

Rule-Based Access Control Information Management System for Effective Records Management of Employee Performance

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Abstract: The main objective of this work is to design and develop an employee performance evaluation and management system that will: improve the effectiveness and efficiency of performance evaluation and management, eradicate unnecessary delay during search/retrieval of employee records, minimize the loss of data/information of employees and evaluate and rank the employees based on their performance and set target values for all the output factors for the inefficient employees. The methodology adopted in the design of this work is the universally accepted software engineering model, which is the Structured System Analysis and Design Methodology (SSADM). This research work heralds the achievement of an automated system in carrying out performance evaluation and management which is easier, faster and interactive; interestingly it eliminates the problems associated with the old system. The utility of the new system will be maximized with the support of supervisors in carrying out performance evaluation and management tasks. This research work has revealed that a computer system can be used to perform a successful and easy performance evaluation and management exercise.

Keywords: Job Performance Evaluation, Structured System Analysis and Design Methodology (SSADM), Federal College of Education (Technical) Umunze.

I. INTRODUCTION

Job performance has been described as an accomplishment of assigned duties in accordance with organizational guidelines subject to the normal constraints of reasonable utilization of available resources (5). (2) are of the view that effective job performance has positive effects on production, economic growth and survival. Similarly, effective job performance provides the employees with economic gains, security, social status, family and social prerogatives, medical benefits, recreational and educational opportunities (6). Having a job has always been a crucial factor in Nigerian society as individuals are identified by their occupations. A person's job reveals his/her personality, and it influences the nature of interactions he/she has with people. It largely determines the individual's social status, affiliation, economic status and self-concept.

1.1 The Concept of Performance Evaluation:

(4, 16) defines performance evaluation as a specific evaluation with respect to an individual's progress in completing specified tasks. (3, 13) defined performance evaluation as a process by which an organization measures and evaluates an

individual employee's behavior and accomplishments for a finite period. (2, 15) defines employee performance evaluation system as the formal, systematic assessment of how well employees are performing in their jobs in relation to established standards, including communication of that assessment to the employee and the organization. Edwards notes that the goal of the performance evaluation process is to improve the quality of work and the individual employees involved in the work. Edwards goes on to state that performance appraisal, if done properly, can strengthen the organization as it prepares and develops the personnel in that organization. After all, Edwards' states, the sum total of the individual performance is the performance of the organization. According to (2, 4) appraisal is the systematic evaluation of the individual with respect to his performance on the job and his potential for development.

Performance evaluation reflects an employee's actual job performance levels, but in order to get a true picture, the rating must be accurate. Accuracy is the primary goal of any appraisal system. Employment decisions that are based on inaccurate ratings are not valid and would be difficult to justify if legally challenged. Moreover, employees tend to lose their trust in the system when ratings do not accurately reflect their performance levels, and this cause morale and turnover problems, it also hinders the opportunity for advancement.

In many instances, accurate rating seems to be rare. Inaccuracy is most often attributable to the presence of rater errors such as halo, recency, and leniency errors. Rater errors are errors in judgment that occur in a systematic manner when an individual observes and evaluates another. Rater errors may be defined technically as a difference between the output of a human judgment process and that of an objective, accurate assessment uncolored by bias, prejudice, or other subjective, extraneous influences (14, 17, 19). Another element that can cause inaccuracy in rating is that of raters who lack the necessary training in how to conduct performance evaluations. Training can help to educate a rater not only on the system itself, but how to deal with other issues such as consistency in rating and also the sensitization to appropriate rating strategies and behavior. Even though these issues are some of the causes for inaccuracy, there is a main factor that should be considered at the initial stage of the performance evaluation which is fitting practice to purpose. Setting performance goals that are in sync with organizational goals are essential. It would help employees to be aware of the organization's objectives hence allowing them to be aware of the level of performance expected of them so that the organization's objective can be achieved. Hence linking employees' goals with that of the organization will not only help to improve employees' performance, but also the overall performance of the organization.

1.2 Ongoing Performance Evaluation:

According to Grubb (1, 5, 11), performance appraisals are only effective if it is ongoing. Periodic observations, monitoring, coaching, counseling, feedback and record keeping by rater are crucial. Hence in this way performance problems are caught early and corrected before they have costly consequences.

The results of performance evaluation must be given frequently to an employee if they are to bring about a change in an employee's behaviour or maintain a high standard of excellence. Employees need feedback on how well they are doing. They must accurately perceive the consequences of their efforts and be able to set goals on the basis of this feedback (12, 18, 20).

Performance appraisals are most commonly undertaken to let an employee know how his/her performance compares with the supervisor's expectations, whether they are working toward organizational objectives/goals, and to identify areas that require training or development. Without adequate communication between the employee and supervisor, undesirable work habits may be formed or good work habits may be modified. Therefore lack of communication may be viewed by the employee as approval of their current work habits and performance.

Even though ongoing appraisal has been said to improve performance due to feedback and the issue of identifying training needs, there are other important areas that impacts such as the accuracy of appraisals. In order to properly monitor an employee, reviews should be performed on a frequent and ongoing basis. Frequency of evaluation is associated with perceptions of fairness and accuracy. Frequent appraisals are needed to give an accurate account of an individual's performance and make improvements in the future. However, (4.5) believes that frequency of performance evaluation is a difficult dimension to describe due to the ambiguity of distinction between an appraisal meeting and an everyday discussion about work between a supervisor and a member of staff. (12, 20) agrees that the modal frequency of appraisal interviewing is annual however, six-monthly or quarterly are also possible. The most recent evidence suggest that actual

time period may vary in different organizations and with different aims but a typical frequency would be bi-monthly or quarterly (7). This practice would help to eliminate selective memory by the supervisor or the employee and also surprises on the part of the employee at an annual review. It is natural that a person remembers what happened within the last month or high profile situations (good or bad); therefore it is best to have frequent reviews to eliminate this behavior or tendency of unconscious, selective memory.

Such practice by a supervisor when doing an appraisal would result in recency bias. Recency bias is the tendency to assess people based on most recent behavior and ignoring behavior that is "older". Recent performance of a worker can significantly influence the appraisal. If recent performance takes precedent in the mind of the appraiser over performance during the entire appraisal period it may bias his/her judgment. Therefore, appraisers need to guard against good, average or poor recent performance influencing the appraisal disproportionately. Collecting and evaluating demonstrated behavior over the entire course of the appraisal period may minimize the recency error.

Most supervisors do not have the time or resources to closely monitor an employee's performance over a year or make detailed notes. In this case, the appraiser is forced to consult memory, which is clearer and more dependable in the months leading up to the appraisal as opposed to the earlier part of the rating period. This practice can be positive or negative for an employee because if an employee had a good year except for immediately before the appraisal and was rated on the most recent events alone, it would be unfair and vice versa. Both the supervisor and the employee need to know that there is a performance problem prior to the major annual review in order to eliminate surprises. The longer a problem is allowed to continue, the more difficult it is to take corrective action. Hence frequent performance appraisals should eliminate the surprise element and help to modify performance prior to annual review. Informal performance reviews may be done continually if a good relationship exists between the supervisor and the employee (11, 19).

Poor performance should not remain unchallenged because a performance review is not due, it should be dealt with and at the same time objectives can be clarified and revised. This practice would lead to better informed employees who are better equipped to perform their job satisfactorily. (3, 4, 8) also believes that as a part of ongoing performance evaluation, and to ensure the effective use of performance evaluation scheme, it is necessary to keep and maintain accurate records of employees' performance. Careful reviews of these records at the time of the appraisal would help to eliminate selective memory.

According to (1, 7, 10), frequent reviews give supervisors more opportunity to assure that progress is being made in developmental objectives. Job demands can frequently prevent employees from achieving specified objectives. Supervisors in these instances must re-assign work to allow the completion of this objective or modify the objective to reflect the changing conditions of the job. However these shortcomings can only be identified if supervisors are constantly monitoring employees.

There is evidence in literature that annual appraisal does not meet all the objectives of employees and curtails effectiveness. It does not allow employees to prepare themselves for responsibilities and goals are not completed (12, 15, 18). Alternatively, they are poorly completed and the appraisal results in ineffectiveness, poor communication and feedback (1, 4).

The problems that prompted the researcher to carry out this work included those things that made employee performance evaluation and management exercise difficult. Such problems include: Misplacement of employee files, delay in searching/ retrieval of employee records, Loss of data/information of employees, difficulties in the evaluation and ranking of employees based on their performance and challenges in setting target values for all the output factors for the inefficient employees.

Most public sector organizations failed Nigeria because of ineffective and inefficient performance management system (3, 6, 9). In Federal College of Education Technical Umunze, monitoring performance evaluation of staff is limited to paper based/manual handling and processing. It is against this background that the researcher wishes to design and implement an employee performance evaluation and management system that could have significant impact on employee performance and organizational effectiveness in general.

II. METHODOLOGY

The system analysis adopted in this work tried to study the present system with a view to unfolding all possible problems and suggesting ways of reducing or solving them completely. The objectives were to take a realistic insight into the system and its problem areas so that an improved system can be designed. The methodology on the other hand considered the development of methods, procedure or set of procedures to be applied. Different types of methods were considered to be adopted while doing the analysis and design. These include

- i. The structured system analysis and design methodology (SSADM)
- ii. Prototyping
- iii. Experts systems methodology
- iv. Usability Engineering Methodologies e.t.c.

The methodology adopted in the design of this work is the universal accepted software engineering model, which is the structured system analysis and design methodology (SSADM). SSADM is a methodology used in the analysis and design stage of system development. SSADM in common with other structured methodology adopt a prescriptive approach to information systems development in that it specifies in advance the modules, stages and tasks which have to be carried out, the deliverables to be produced and furthermore, the techniques used to produce the deliverables. It uses standard structures which makes it wonderful approach to programming.

2.1 Steps Involved In Structured Systems Analysis and Design Methodology (SSADM):

- a. Problem Definition:** The new system is to evaluate and manage the performance of staff of Federal College of Education (Technical) Umunze.
- b. Feasibility Study:** This has to do with how possible it is to design new system that will enable Federal College of Education (Technical) Umunze carryout performance evaluation of her staff. This is done by considering the system's services, constraints and goals. Also consultations with the system users which may involve interviews, market surveys e.t.c until an agreement is reached.
- c. Analysis:** The user's requirements are translated into a more formal form which will be useful to the software engineer.
- d. Designs:** Using the requirements definition and specification, the requirements are partitioned into software or hardware systems. This is the systems design software is the process of representing the functions of each software systems in a manner which may be readily transformed to one or more computer programs.
- e. Implementation:** The software design is now realized as a set of programs which are written in some executable programming language.
- f. Maintenance:** The activities of maintenance involves correcting errors which were not discussed in earlier stages, improving the implementation of systems units and enhancing the system's services as new requirements are perceived.

2.2 The Organization and its Environment:

The Federal College of Education (Technical), Umunze was established in 1989 following the Federal Government demand for the production of qualified vocational technical teachers for Nigeria's 6-3-3-4 system of education. One other Federal College of Education (Technical) was also established at Gusau, Zamfara state at the time to bring to eight the number these specialized Colleges of Education in the country. The college admitted her first batch of students on 10th May, 1990 with a pioneer provost in the person of Prof. T.I. Eze.

Federal College of Education (Technical) Umunze is presently located in Lomu Village, Umunze, and Headquarters of Orumba South Local Government Area of Anambra State, Nigeria. The school presently has two campuses. The temporary site is about two kilometers from the centre of the town. Umunze is perhaps unique in that it is so centrally located, i.e. within easy reach of most cities in the Eastern part of the country such as Onitsha, Awka, Aba, Owerri, Nnewi, Umuahia, and Asaba, most of the cities being approximately one hour away by road.

2.3 Demographic Variables:

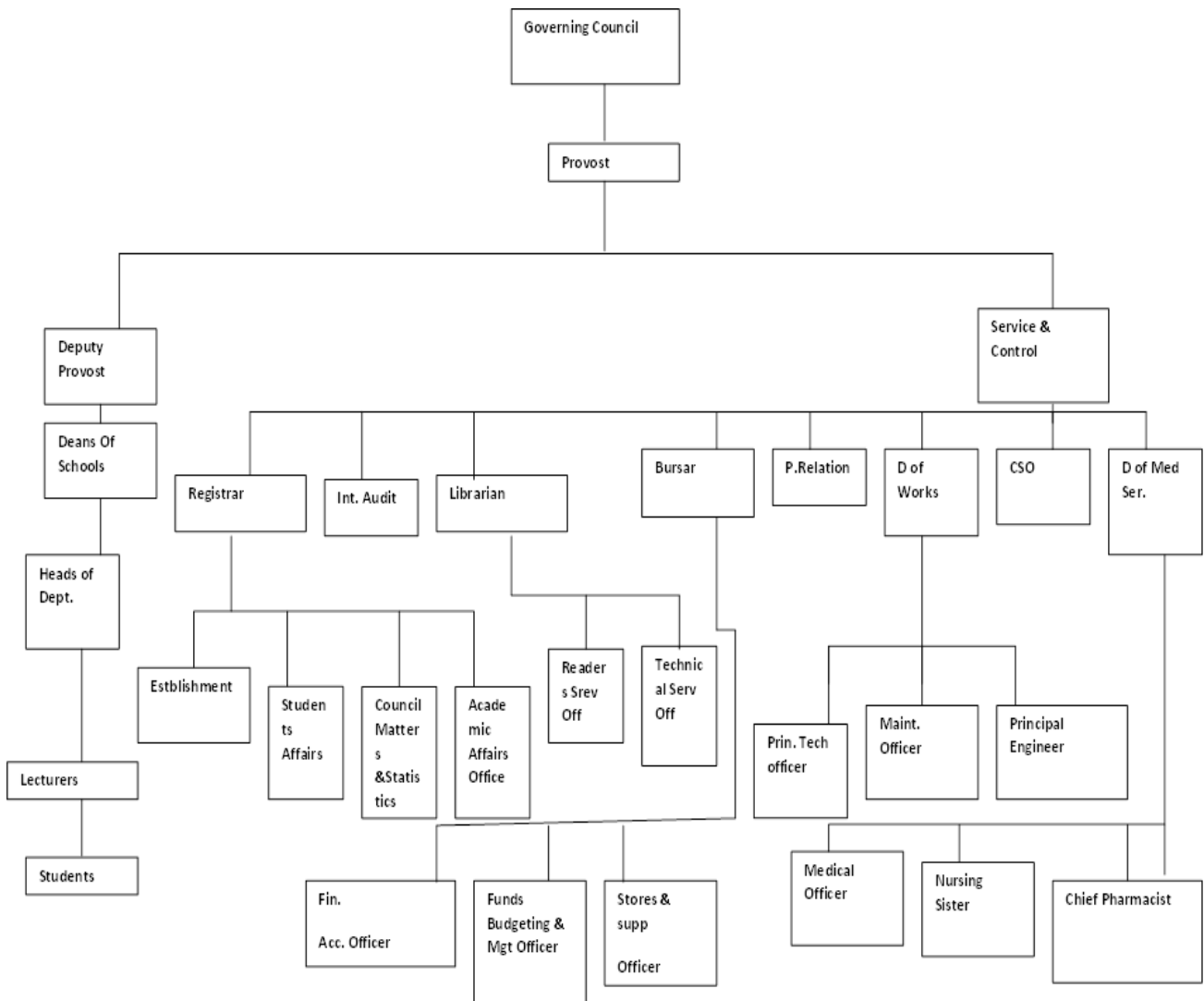


Fig. 1: The Organogram of F.C.E. (T) Umunze

From the organogram, the College comprises of the Governing Council, the Provost. Coming down the organogram it is divided into the deputy Provost, then Service and Control, from the deputy Provost down to the Deans, H.O.Ds, lecturers then the students. The Registrar down the lane has its subordinates. Federal College of Education (Technical) Umunze was established in April 1990 with a pioneer provost of prof. T.I. Eze. It was established with respect to the requirement of National Commission for Colleges of Education (NCCE). From the inception, the staff strength is about one hundred (100) which comprises of both academic and non academic. As time went on, new innovations started cropping up and more staff strength has to be put in place in order to meet with the new development. The present staff strength is over one thousand which comprises of both senior and junior staff.

2.4 Analysis of the Existing System/ Present Procedure:

1. Analysis of present system: The present system which is the manual system where employer records are stored in cabinet file. Different employer records are stored in different files, indexed by schools, departments, sessions and year.

The various files are listed as follows:-

- (i) Employee record file: This file stores the employee employment record which includes:- year of employment, position, ranks, date of birth/birth certificate, academic qualification, state of origin, nationality, school, department/unit, employee identification number, acceptance form, medical fitness, passport and assumption of duty form.

(ii) Promotion file: It stores record on promotion of employers. The information stored in this file includes: - employee id, previous rank/step, new rank/step and date of last promotion.

(iii) Retirement file: this stores information on employee retirement. The retirement file has the following information: - date of employment, date of last promotion, the last rank promoted to, date of retirement and emolument.

(iv) Transfer file: This file stores information on transfer of the employees. It stores the following information: - employee id, previous department/unit/institution, new department/unit /institution and date of transfer. There is need to study the present system, since it will serve as a spring board for the design and implementation of a better system. However, a careful critical analysis of forms and procedures and documentation are useful in preparing the performance evaluation and management system for the staff of F.C.E. (T).Umunze.

2.5 Weakness of the Existing System:

The weakness identified includes:

- Employees are denied of their promotion as at when due.
- Employees' records are not easily accessible.
- Employees' records are not readily available.
- Employees' records are not protected against unauthorized use.
- Employees' files are easily misplaced.

2.6 High Level Model of the Proposed System:

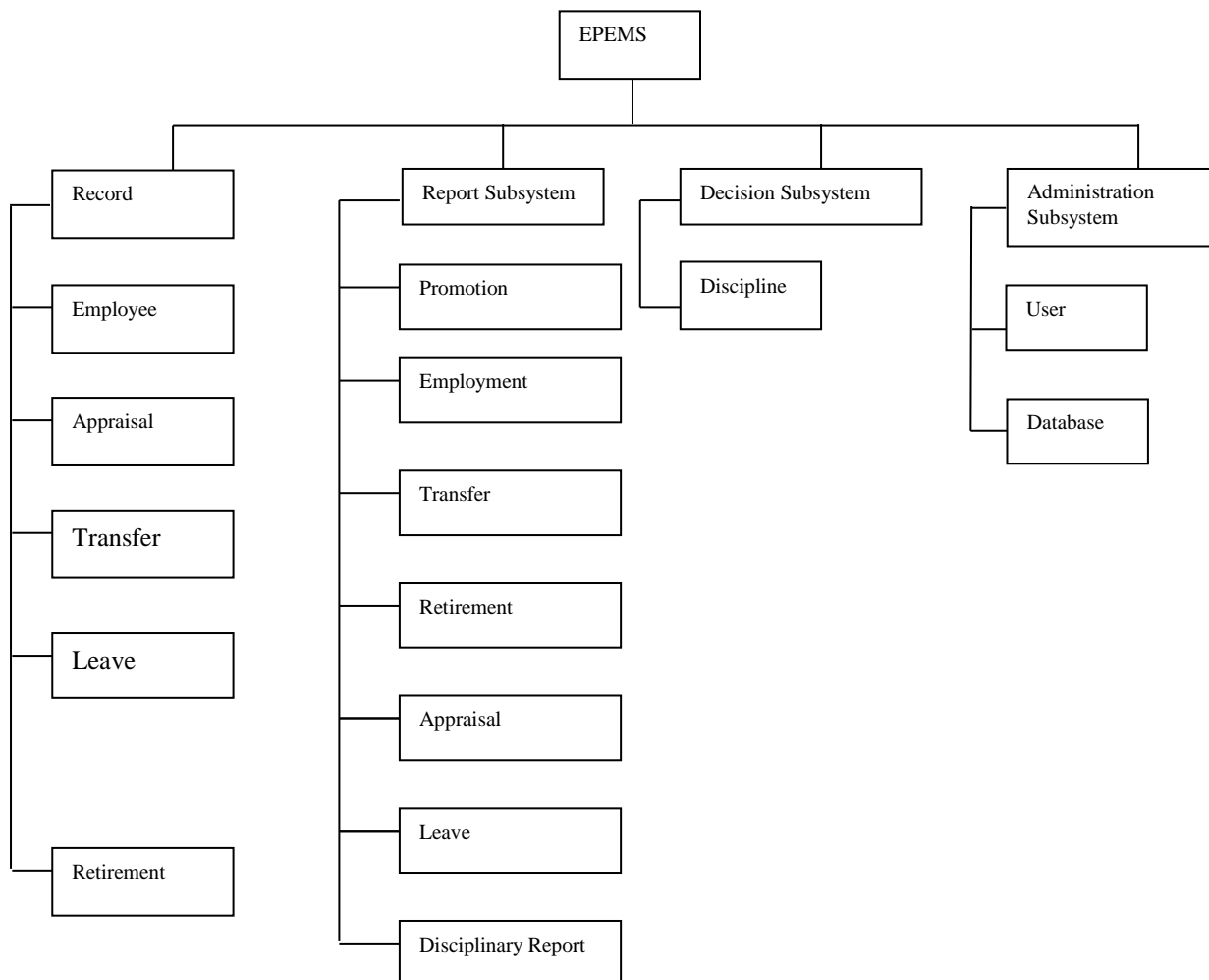


Figure 3: High Level Model of the Proposed System

2.7 Data Flow Diagram of The Existing System:

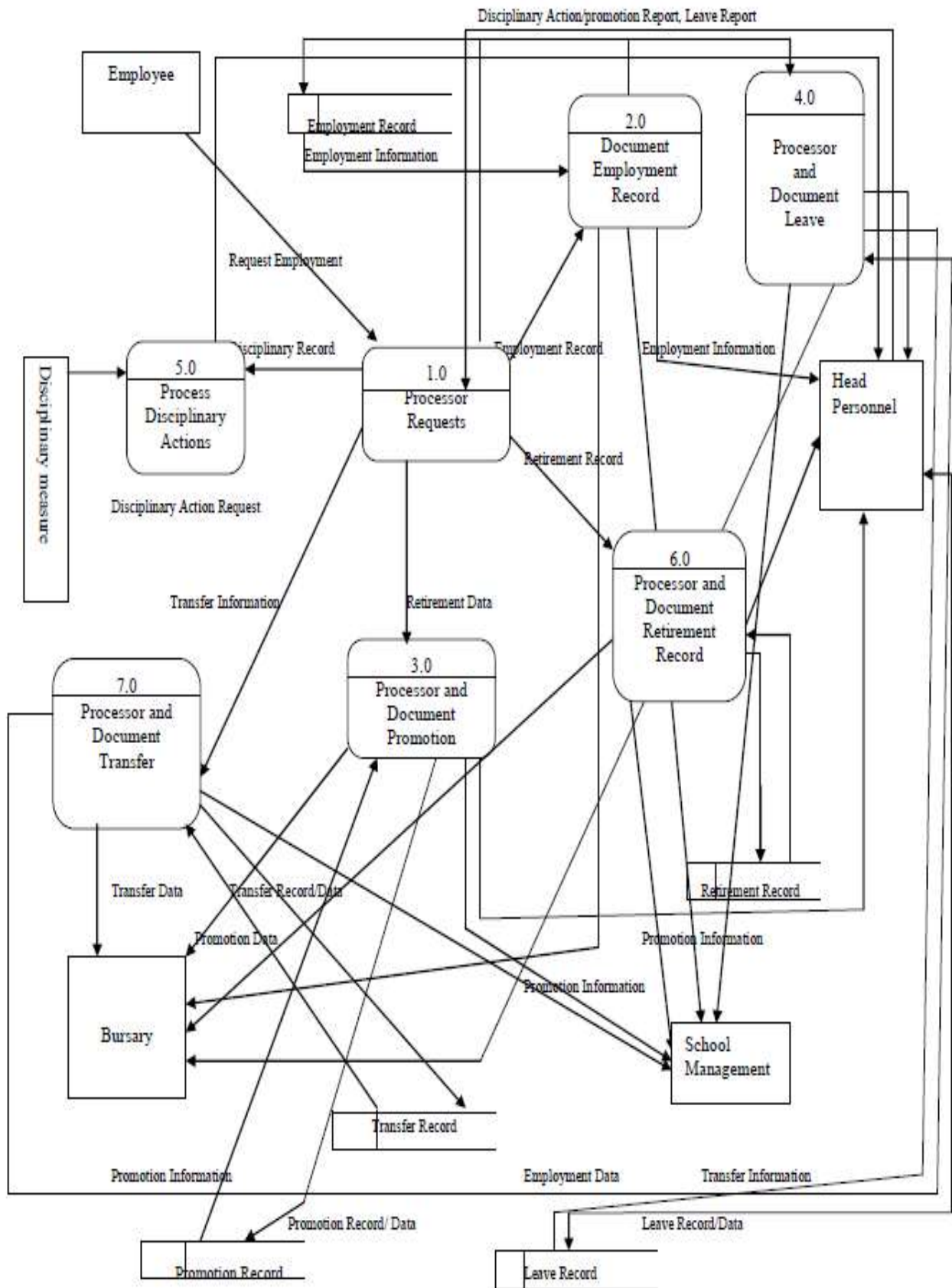


Figure 2: Data Flow Diagram of the Existing System

III. SYSTEM IMPLEMENTATION

3.1 Program Modules Specification:

Table 1: Modules Specification

Module Name	Function
Application	This is the application object that serve as a control centre for all the activities carried out by the application
Database	This module as the name implies is responsible for all database transactions
Query	The query module checks the input entered by user for its correctness before passing it to the database

3.2 Choice of Programming Language:

VB.Net was opted to be used considering the following reasons:-

- VB.Net standard edition is a full fledged software development with a (free) open source license;
- VB.Net is platform independent and can run in any operating system without need for compilation;
- VB.Net has a native support for SQL and used for most, if not all, relational database management system;
- VB.Net has a runtime exception of handling mechanism that allows applications written in VB.Net to end gracefully in the space on an exception.

3.3 System Documentation and Implementation:

System implementation and documentation are introduced after the codes are being translated, since it is designed through a set of programs which are written in some executable programming language.

For modification and understanding of the software by the user and to make the software run efficiently and error free, the designer makes sure using the software maintenance details hardware and software requirement and modification details are well specified.

3.3.1 Hardware and Software Requirement:

3.3.1.1 Hardware Requirement:

These components are physical part of the computer system needed for efficient functioning of the software.

- Power surge protector
- Stabilizer
- Uninterrupted Power Supply(UPS)
- Monitor
- Mouse
- Keyboard
- System Unit
- 512MB RAM
- CD-ROM drive
- 60 GB hard drive

- Pentium 1V 2.4GHz
- Floppy disk drive
- Compatible Printer

3.3.1.2 Software Requirement:

For running of the software efficiently and effectively, the following must be installed in the computer system.

- Microsoft windows or Sun Solaris or Linux among others can be installed
- VB.Net (programming Language) Development kit.

3.3.2 How to Install the Software:

The class file for the project should be copied to the “Employee Performance Evaluation and Management” folder in “C:\” or root directory of the production system or the work station to be used in running of the software.

3.3.3 Training of Operations and Application Detail:

3.3.3.1 User’s Guide:

How to Run the Program

Power on the system; wait for the system to boot up and complete loading. When that is done;

1. Insert the CD containing the software (Employee Performance Evaluation and Management System) on a CD drive.
2. Right click on my computer icon on the desktop.
3. Select Open.
4. Double click on the CD drive containing the software
5. Click on the setup file and then follow the instruction.

To EXIT

Go to file menu on the Main menu, then select “Exit”.

3.3.3.2 Application Details:

On the Main menu, to access any of the Submenu select the Menu from the Main menu, then select the Submenu of choice, For example;

REPORT

Employment;

Appraisal;

Promotion;

Leave Assessment;

Transfer;

Retirement.

3.3.4 Implementation Detail:

3.3.4.1 Sample Implementation Snapshots:

The sample implementation snapshots are shown below:

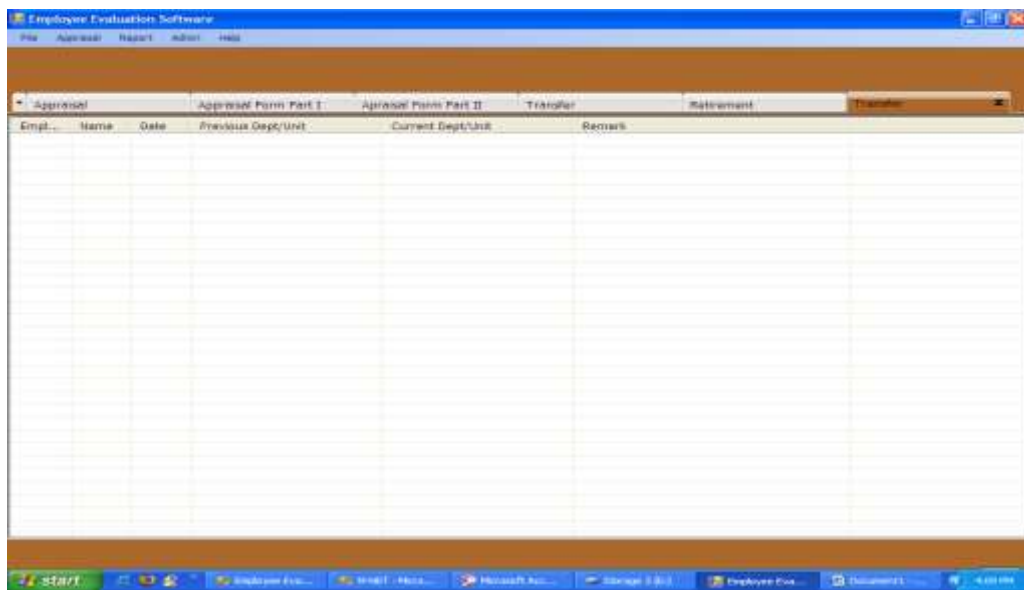


Fig. 4: Employee evaluation and management system summary

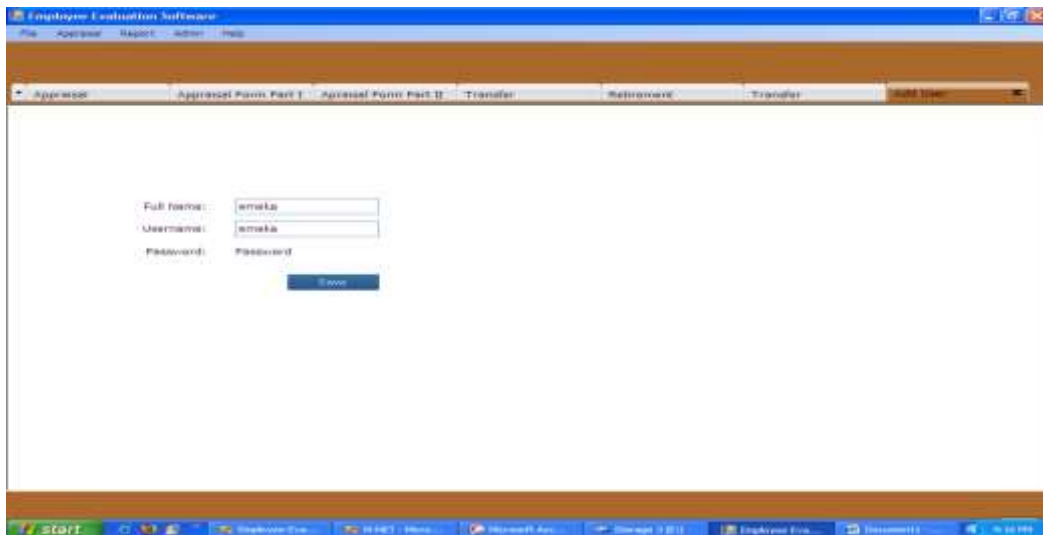


Fig. 5: Administrative submenu for adding user. It contains user and password

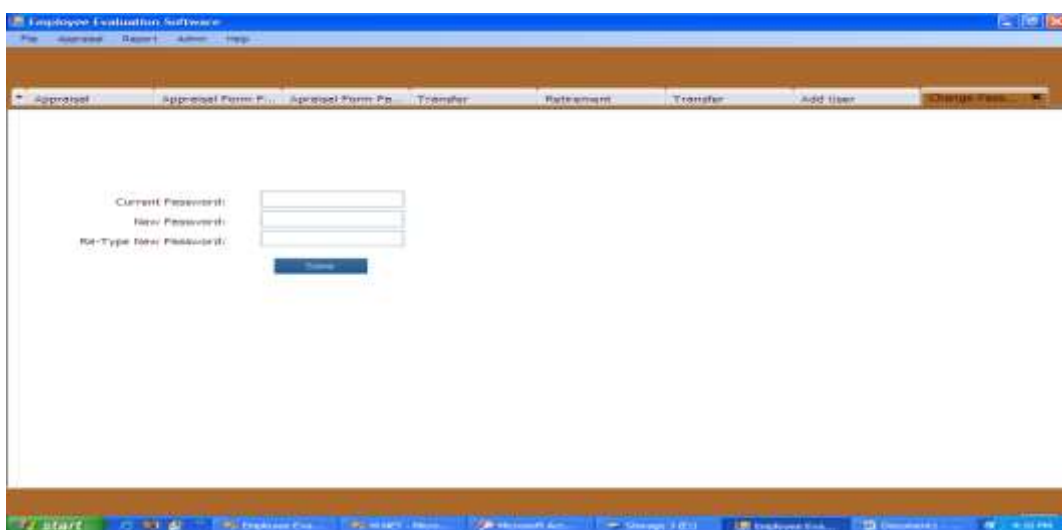


Fig. 6: Administrative submenu for changing password

3.4 Program Testing:

Program testing is a process of running a program on a selected input to ensure proper reliability and accuracy of the output. In some cases, incorrect data may be used as input to check how the system will respond.

3.4.1 Debugging:

This is the process of eliminating the errors or malfunctioning part that occurred during testing. The error might be a syntax or logical.

3.4.2 The Testing Procedure:

The test procedure refers to the procedure meant for testing. There are two methods for testing namely:

- Bottom up testing (which is used for the Implementation) and
- Top down testing (which is used for the design of the program).

a) Bottom up testing- this testing starts from the unit, it proceeds with the modules, then the subsystem and then finally the system.

b) Top down testing- this testing starts from the system, proceeds with the subsystem, the modules and then the unit.

3.5 File Conversion:

In the system development, file conversion is a major part, also it involves fact finding, data capturing, clerical procedure, design and even program specification. It means the conversion of existing manual records, into a medium used by the computer. This may involve the appropriate computer medium. Once file has been created, extensive checking for accuracy becomes essential otherwise problem may occur when the system becomes operational.

3.6 Changeover Procedures:

This process changes from manual system to computerized system. These are method of changing over. They include:-

a) Direct change over: This is a method that involves the system being completely replaced by the new system in such that; there is an immediate changeover. Program corrections are difficult while the new system has to remain operational.

b) Parallel change over: This method involves both the manual and the computerized system. They are operated concurrently for sufficiently long period and their output compared periodically. The old system is discontinued if the new system performs according to expectation. It has the new system to fall back on in case the new system fails and the disadvantage is the cost which will achieve similar results.

c) Phase change over: In phase change over, the change start with a branch, the effect of the new system in the sampled branch is observed before some other section which may be more sensitive can adopt the new system.

d) Pilot change over: In this method, some transactions that are very complex are operated using parallel change over and in the remaining section of the existing system, direct change over is used. The researcher recommends the parallel changeover to avoid drastic problems that may arise due to failure of a newly developed system.

Therefore, parallel change over is recommended for this work.

3.7 Commissioning:

In order to make the system operational, the following steps have to be considered;

- Obtain and install the hardware requirement.
- Obtain and install the software requirement
- Obtain and install anti-virus/utility software (which should be frequently updated in order to remain active).
- The new system is installed and ready for use.

It can now run on the required window 98 and above platform by following the user's guide.

IV.CONCLUSION

This work has achieved an automated system in carrying out performance evaluation and management which is easier, faster, interactive and interesting; thereby eliminating the problems associated with the old system. This will be achieved with the support of the supervisors in carrying out performance evaluation as effective and successful exercise will be achieved.

Looking at the benefits and achievement accomplished so far in this work, the researcher therefore, recommends this work for unique and excellent results in the task of carrying out performance evaluation. It eliminates undue stress caused by the old system. Supervisors should adopt this technology that will bring great change in the system. This will ensure successful performance appraisal.

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