Implementation of a Database System to Evaluate Staff Work Performance

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ABSTRACT: *Performance evaluation gives a manager advance way of determining employee salary increase, promotion, training needs, transfers, job termination, reassignment e.t.c. In performance evaluation process, an employee is judged based on pre-defined objectives and criteria that were agreed on by employer and employee in order to ascertain the workflow of the employee. The primary objective of this study is to implement a database system for staff performance evaluation for Geecoms Integrated Services Ltd. The methodology adopted in the design of this work is rapid application development (RAD) model, which is an incremental software process model that emphasis a short development cycle of 60-90 days. Its approach to software development put less emphasis on planning and more emphasis on process. ASP.Net technology was used in combination with VB.Net programming language for the frontend design. Moreover, every robust system requires a backend for proper storage and maintenance of records. In this system, Microsoft Access database was used for the backend design. MS Access was chosen in order to avoid compatibility issues of systems not being able to meet system requirements. In the database design, tables where created to hold related records as well as implementation of table normalization. Primary key was used to create table relation in the database to make data manipulation as easy as possible. Judging from the efficiency and effectiveness of the system accomplished in this work; is therefore recommended organization managers should adopt this technology as it will ensure successful performance evaluation and bring great change in the system*

KEY WORDS: evaluation, assessment, employee appraisal

INTRODUCTION

Effective employee performance is vital for the growth and stability of any organization. Dedicated employees are essential for achieving the company's mission, and recognizing their efforts through

performance evaluation is crucial. In our research, we've made significant contributions by developing a comprehensive framework tailored for performance evaluation databases. This framework streamlines the collection, storage, and analysis of performance data, enabling data-driven decision-making. We've also focused on standardizing performance metrics across diverse sectors like business, healthcare, education, and government, allowing organizations to measure performance using relevant data-driven indicators. Additionally, our work includes the development of advanced data mining algorithms and methodologies, such as statistical models and data visualization approaches, to uncover meaningful patterns within complex datasets, ultimately enhancing the decision-making process.

Evaluating and ranking employees' work performances can be challenging, especially when setting target values for less efficient staff. Performance evaluation is essentially a formal communication process between supervisors and subordinates, often taking the form of periodic interviews to assess work performance. These systems serve as valuable tools for management to assess workers' effectiveness, competence, and inefficiencies within the organization. Systematically, performance evaluation assesses a worker's performance over time, capturing important information like dedication, punctuality, and attitude while storing this data for future reference, making staff assessment and retrieval more efficient. It also facilitates the exchange of technical information among professionals and researchers and serves as a means of publication for various special interest groups in the performance community. Importantly, through performance evaluation, workers' strengths, weaknesses, mental well-being, and focus are examined to identify opportunities for improvement, dedication, and skill development.

Furthermore, assessing employee performance is a fundamental tool to determine whether assigned tasks are carried out effectively. Job performance, as described by John P. Campbell, pertains to individual-level variables or what a single person accomplishes, distinguishing it from higher-level variables like national or organizational performance.

In addition, performance evaluation usually consists of frequent assessment of staff performance such as accomplishments, weakness, strength, conduct; within the organization he is employed (Armstrong, 1997; Baiman, 2000). Appraisal system can help any subordinate respond to two basic questions as follows: what exactly are your expectations of me? And, how am I doing to meet your expectations? After evaluating the performance of an employee, is also important to employ the use of performance management. Performance management will help the staff to know the progress of his performance as well as giving them guideline on how to do better.

Actually, improving performance evaluation for every worker of the organization should be one of the highest priorities of every organization that wants to grow. Though performance evaluation is not easy, the results worth the effort. Utilization of performance evaluation in an organization will improve the employees' performance. Other primary reasons of utilizing evaluation system include: employment decisions, as a criterion in research, pave way for employees to know how they are doing and organizational expectations, establishment of personal goals for educating programs for transmission of objective feedback, as a way of recording to aid in keeping track of decisions and legal requirements.

The purpose of which performance evaluation system was developed is to engage employees' efforts either as a group or as individuals in order to achieve the organization's overall mission. It set out a basis that can be handy in giving corrections to any disparities observed in staff performance. As a result, the scope of this study is focused on the implementation of a database system to evaluate staff performance and is limited to Geecoms Integrated Services Ltd. This research offers a solution to the challenges of automating and accurately recording employee performance, facilitating easy retrieval of related information, and providing a valuable reference for researchers with similar inquiries.

Problem Statement
Starting from the planning process to the execution of the performance evaluation system, the primary problems inherent in most manual processes are manifest. The problems with the manual evaluation system are listed as follows:

i.   Evaluating the staff performance in the manual system rely heavily on subjective opinions when attempting to measure objective data such as productivity or risk management ability, which can lead to misjudgment
ii.   Data reporting is also a big issue because managing reports in multiple spreadsheets can be a tedious task to achieve in short time.

Objectives of The Research
The objectives of this research is as follows

i.   Designing the architecture for the proposed system.

ii.   Designing a graphical user interface (GUI) to serve as input and output channels.

iii. Developing the database structure for the proposed system.

iv.   Creating the system's flowchart and dataflow diagrams for clarity and functionality

LITERATURE REVIEW

In a study conducted by Lacho, Stearns, and Villere (2000), the appraisal practices of the sixty largest cities in the United States were investigated. The research revealed that 72 percent of these cities had implemented a performance appraisal system. The primary objectives of these appraisals were to determine rewards, raises, and promotions, rather than focusing on development and training needs. The most commonly used method was a combination of graphic rating scales and essays, accounting for 68 percent of cases. However, the typical employee appraisal systems and forms were found to be poorly designed. They lacked relevance to the specific job requirements and utilized inadequately defined job factors and performance levels The definition of performance appraisal as "the process of identifying, observing, measuring, and developing human performance in an organization" is crucial as it encompasses all essential components necessary for a well-executed appraisal process. The identification of criteria guides the appraisal process towards making informed decisions. It is widely acknowledged that successful organizations owe their achievements to the efforts and accomplishments of their employees.

Recognizing these contributions and providing appropriate feedback or guidance is vital for organizational success, which constitutes the fundamental purpose of performance appraisals (Carroll and Schneider, 2001).

According to the findings by Ammons, David, and Rodriguez (2003), Management by Objectives (MBO) was employed in the council-manager and mayor-council forms of government. The study revealed that MBO was used citywide in 35 percent of cases and in selected areas in 30 percent of cases. However, in 5 percent of cities, MBO had been attempted but subsequently discontinued. Notably, MBO, which is a centralized planning and control approach, saw more extensive use in citywide applications.

Another study conducted by Allan and Rosenberg (1986) examined the distribution of performance ratings and pay increases over three rating cycles. The results showed a noticeable trend towards an increase in above-average performance ratings. Moreover, the relationship between performance ratings and salary increases weakened over the three-cycle rating period. The higher ratings were attributed to three factors.

In 2017, Chukwuedozie et al. developed an "Employee Performance Appraisal Database Management System" with the aim of creating a model suitable for implementation. Their work aimed to achieve a result-oriented administration during performance evaluation while ensuring efficiency and fairness in the process. The system's features allowed for timely enhancement and filing of appraisal forms, easy review for completeness and identification of discrepancies, and adequate evaluation and monitoring of employee performance.

Afolalu et al. (2017) proposed an "Online Employee Assessment and Performance Evaluation System for Private Universities in Nigeria." Their study focused on creating an effective means of assessing and evaluating employees in the Nigerian private university system, with Afe Babalola University as the case study. They used observation and record review to gather relevant information about the institution's current system. Their findings highlighted challenges such as time-consuming form filling and queuing for evaluation, as well as difficulties in storing and maintaining records.

Prathammesh and Abhay (2018) conducted research on "Performance Evaluation System for Employee Appraisal," emphasizing that appraisals serve not only to recognize and reward good job performance but also to identify areas needing improvement in organizational performance. They developed an automated system using the K-means clustering data mining algorithm, enabling managers to group employees based on various parameters for future comparison and decision-making.

In 2013, Patrick worked on the "Design and Implementation of an Information System for Employee Performance and Evaluation System" to facilitate staff performance analysis and reduce the workload of top managers in gathering information about employee dedication.

K. Karunakaran N. Shanmugasundaram, E.N. Ganesh, S. Pradeep Kumar (2019) conducted research on an online performance evaluation system suitable for large organizations with complex structures. The system was designed to be user-friendly, flexible, and easily modifiable to accommodate different assessments, thereby contributing to organizational development and personnel management.

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Nazaraf et al. (2009) implemented an "Intelligent Agent Based Workforce Empowerment" system aiming to promote the participation of individuals, organizations, and communities in achieving goals related to increased control, political efficacy, improved community life quality, and social justice.

Angelo DeNisi & Caitlin E. Smith (2014) focused on designing and implementing performance assessment and management systems to improve organizational efficiency. Their model emphasized the importance of strong HR practices, fair assessment systems, effective performance management, and a clear understanding of the organization's strategic goals, supported by the pillars of motivation, evaluation, and results management.

In 2013, Yoganandan, Saravanan, and Priya conducted a pilot study involving 56 employees, focusing on the performance evaluation system and its impact on the organization's growth. The study examined how the present Performance Appraisal System (PAS) contributes to employee career development and their participation in the performance evaluation process. The current evaluation method, utilizing the IBHAR software, received positive feedback from employees, especially regarding their involvement in setting performance assessment goals and priorities.

METHODOLOGY

In this study, we adopted a quantitative research methodology. We distributed questionnaires to both employees and employers. The purpose was to gain a deeper understanding of people's perspectives on staff performance evaluation and to identify the most effective criteria for reliable results.

To ensure the accuracy and thoughtfulness of responses, we allowed respondents sufficient time to comprehend each questionnaire item thoroughly before providing their answers. This approach aimed to instill confidence in the data quality and the respondents' knowledge.

Analyzing the responses, we conducted comparisons with our own insights, focusing on areas that required improvement. Through this process, we identified specific evaluation criteria such as task completion, interpersonal relationships with customers and colleagues, cleanliness, punctuality, and dedication. These criteria were then quantified on a scale of 1 to 10.

To mitigate the possibility of result falsification after submission, a barrier prevalent in manual staff performance evaluation, we designed the evaluation system.

Feasibility Study: We conducted a comprehensive examination to assess the practicality and benefits of implementing an employee performance evaluation system. Factors such as technical feasibility, operational viability, economic considerations, and scheduling constraints were thoroughly evaluated to determine the project's feasibility.

During the software backend development phase, we adhered to the System Development Life Cycle (SDLC) methodology. Each stage within this methodology involved distinct steps:

Database Design: We devised a structured approach for efficiently storing and managing the collected data to ensure its effective utilization.

Establishing Criteria: Building on insights gathered from data collection and the feasibility study, we established precise performance evaluation criteria.

Thorough Analysis: Rigorous analysis was performed on the system-generated reports to ensure alignment with our criteria and the insights obtained during data collection.

Generating Reports: The system was responsible for generating comprehensive performance reports for individual employees, offering a holistic assessment of their performance.

Timely Feedback: We emphasized the importance of delivering timely and constructive feedback to employees, enabling them to enhance their performance in areas requiring improvement.

This approach and methodology were adopted to address the challenges in manual staff performance evaluation and contribute to more effective and reliable evaluation processes.
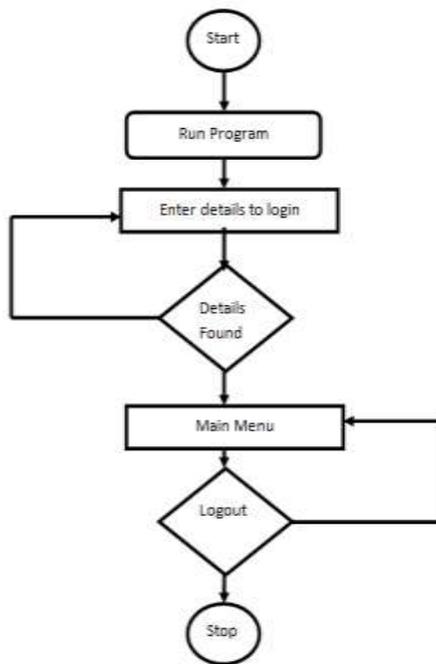
Generating Reports: The system then generates detailed performance reports for each employee, giving us a complete picture of their performance.

Timely Feedback: We provide prompt and helpful feedback to employees so they can improve in areas where they may be falling short.

System Design and Evaluation

In the design stage, we strictly designed the system's architecture, modules, algorithms, flowcharts, interfaces, and dataflow in order to ensure that our proposed system satisfied the specified requirements. The system was broken down into different modules in order to make it easy for coding, error debugging and maintenance when necessary. These modules are:

i.   Role Based Access Control Module: This module was considered important was given a very high priority as it is what makes the system to be able to identify the category of its users and the kind of data and call to action buttons to display.

ii. Authentication Module: In this module, rules were specified that only users that have been registered with the system and same time supplied correct "User ID" and "Password" should be granted permission to access the system dashboard. The following is the diagram of authentication flowchart.

entication Flowchart

Application flow chat

iii. Registration Module: In this module, the system administrator is given the performance to create account for a prospective or already employed staff in order to acquire specific login details for subsequent access.

iv. Report Module: In report module, the system admin has the privilege to give a daily report of all staff registered with the system. Some of the reports are but not limited to punctuality, job completion, customer's relationship e.t.c.

v. Evaluation Module: This is another module of the system that is of high priority because this is where the main focus of the software lies. In this module, an employee performance can be evaluated by the system. It was developed and written with high restrictions. No information can be uttered or deleted once submitted so that the confidentiality of the result can be guaranteed.

Furthermore, another aspect that was taken into consideration was the way data flow throughout the operation of the system. To paint a better picture of how the data are interacting based on user's action, we used a dataflow diagram for better and clearer explanation.
Every successful and powerful system has a way through which information is passed or circulated from module to module, page to page etc.
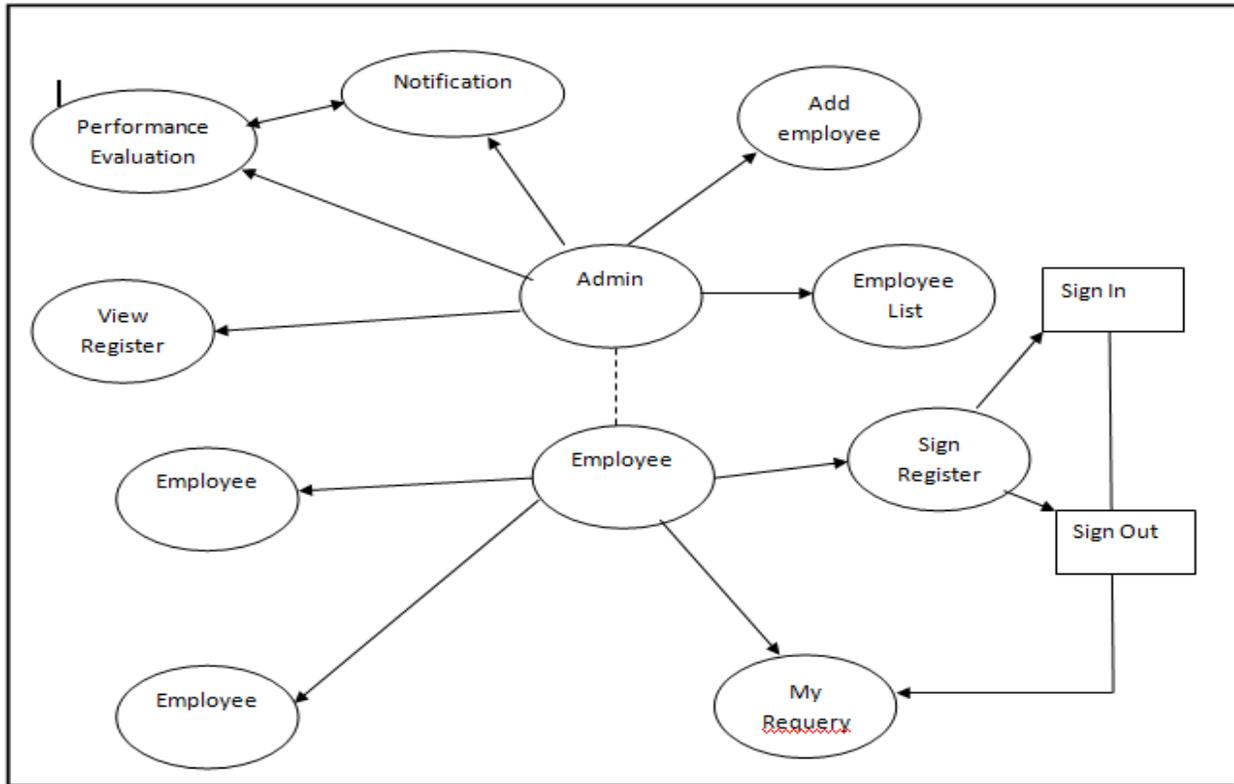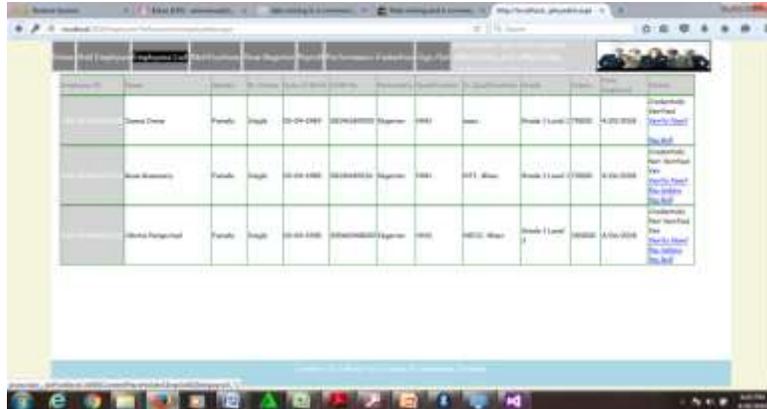
This data flow pattern was represented with a simplified dataflow diagram as follows.

a. Output Design

Our output design was used to represent registered employees on a list and this was achieved through the use of repeater control.

Some of the Reports are as follow:

Employees List Report: This report presents all active employees registered with the system.

Figure 3.5: Employees List Report

Register Report: This report is used to track all signed in employees

Figure 3.6: Register Report

Performance Evaluation Report: This report shows the over performance of a staff and represents it in a scale of 0.01 to 0.99

b. Backend Design

One of the basic requirements of the proposed system is the ability to hold information for future reference, thus, the need for a backend. In order to ensure the good performance of the system database, we used a single database with different tables used for information management while at the same time considering table normalization.

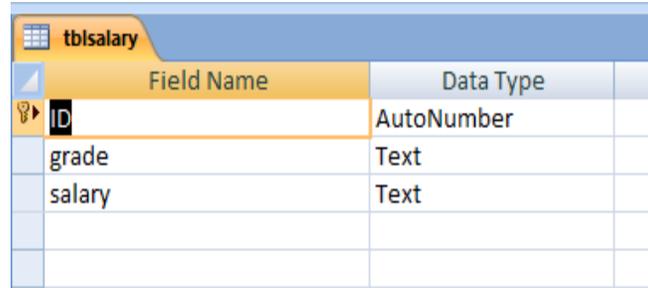The tables of the database of the proposed system are normalizes as follows:

Employee Table: This table store all registered employee information.

Table 1: Employee Information Table

Salary Table: This table is used to store all available positions and accepted qualification alongside with the salary structure.
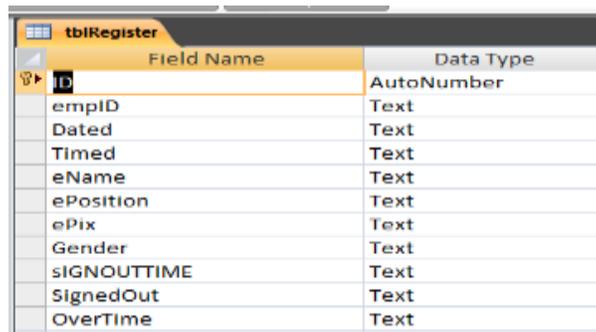
Table 2: Salary Table

tblsalary	
Field Name	**Data Type**
ID	AutoNumber
grade	Text
salary	Text

Register Table: This table is used to keep track of day to day sign in and sign out of staffs.

Table 3: Register Table

tblRegister	
Field Name	**Data Type**
ID	AutoNumber
empID	Text
Dated	Text
Timed	Text
eName	Text
ePosition	Text
ePix	Text
Gender	Text
SIGNOUTTIME	Text
SignedOut	Text
OverTime	Text

DISCUSSION

In this section of the work, we discuss the results obtained based on the criteria specified during the system design phase. All criteria were rated on a scale of 1 to 10.

To ensure the validity and reliability of the evaluation process in the developed system, we calculated the overall score for each selected employee by summing up their scores for each criterion and dividing the result by 100. This calculation can be expressed using the following simple formula:

$$P_E = \frac{\sum(C_x)}{100} * k$$

Where P_E = Performance evaluation overall score, C_x = Criteria scores

$\sum(C_x)$ = Summation of total criteria scores

k = Constant = 1.32

When we tested the system with various live employee data from Geecoms Integrated Services Ltd, it generated different results. We retrieved and rated the past records of each employee based on the scale factors specified during the initial development of the software.

The results of the evaluation for the seven (7) employees assessed are presented in tabular form as follows:

[Please provide the tabular data for the results.]

We aimed to eliminate grammatical errors in the text while preserving the intended meaning.

Employee	Performance Scale	Remark
Francis Eres	0.25	Low
Okoromadu Evans	0.46	Average
Anthony Terry	0.78	High
Udo Elo	0.21	Low
Ebi gGbaminido	0.49	Average
Gbaminido Rebecca	0.89	Superb
Adam Hansel	0.69	Higher

As seen above, some of the staff fall into a scale of 0.21 and 0.25 and it was interpreted by the system as Low performance. Another fall in the range of 0.46 and 0.49 and was interpreted as Average performance, 0.69 and 0.78 whose performance was rated High and finally, there was also a performance scale of 0.78 and 0.89 which was rated Superb.

CONCLUSION

In conclusion, the Employee Performance Evaluation Database System represents a significant advancement in the field of performance management. It offers an efficient and objective way to assess employee performance, facilitating the development and growth of staff, and ultimately leading to improved productivity. At Geecoms Integrated Services Ltd, this system has already proven its worth by bridging the gap between the organization and its employees. As organizations seek to optimize their workforce and promote a culture of continuous improvement, implementing such systems becomes imperative in achieving these goals. Our research and application demonstrate that technology-driven solutions can indeed transform the way we evaluate and manage employee performance, ensuring a brighter and more productive future for organizations and their employees alike.

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