

Development And Implementation Of A LAN-Based Faculty Performance Appraisal System

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Abstract— Faculty performance appraisal plays a vital role in motivating faculty members to enhance their teaching skills and strengthen their commitment to quality education. Traditionally, colleges and universities administer the evaluation process using printed evaluation forms. Scores are manually summed-up per area of assessment and encoded in spreadsheets, thus evaluation results are not promptly obtained. This research project intends to expedite the process of faculty evaluation by providing a LAN-based faculty performance appraisal system that allows students, peers, and superiors to fill up Qualitative Contribution Evaluation (QCE) forms in network-connected workstations. All records of student and faculty evaluators are imported from the university enrolment master list to ensure that only registered students and active faculty members can log into the system. The deans or superiors needs to configure the evaluation date and assign courses to faculty members to ensure that they will be evaluated by the right set of students. Once the QCE forms are filled – up and submitted, evaluation results are generated. College deans and department heads can view the scores and the comments. Detailed and summary reports in printable or downloadable file formats are also provided. The Agile development method was used to allow the researchers to deliver output incrementally incorporating user requirements and feedbacks in each iteration. The system was created using PHP and MySQL and can be accessed through an internet browser. Several test cases have been undertaken to ensure the reliability and correctness of results. Considering the testing results and feedbacks from IT specialists, iterative debugging and refinement have been performed to improve the quality of the system. The performance of the system was evaluated by 100 respondents using the ISO 25010 Evaluation Criteria and obtained an "Excellent" rating with the overall mean of 4.76. Eighty-two percent (82%) of the evaluators were in favor of utilizing the developed system. This proved that the respondents recognized the need for a faster evaluation method and that the LAN-based Faculty Performance Appraisal System can be a replacement to the manual evaluation system. It is the aim of the researchers to integrate this project into the university's enrolment system and create a web or mobile version of the system.

Index Terms— appraisal system, faculty evaluation, faculty performance, performance appraisal, QCE, LAN-based system, evaluation system

1 INTRODUCTION

Faculty performance evaluation is one of the most practiced tools in quantifying the quality of service of teaching personnel in terms of instruction, research, extension, and other academic and administrative responsibilities. Periodic evaluation intends to assess the competence, commitment, learning management, and teaching skills of faculty members. According to Apaka (2016), performance appraisal is a process that consists of feedback of any appraisal result determining the performance of the employee at work and establishing a development plan ideal for the employee. The information obtained as a result of performance appraisal is materialized at the organizations through the establishment of systems such as strategic planning, wage increases, promotion decisions, job enrichment, determination of education requirements, selecting reliable personnel and similar purposes. Similarly, Islami et al (2018) conversed that the performance appraisal system is used in organizations to measure the effectiveness and efficiency of their employees. Generally, performance appraisal aims to recognize the current skills' status of their workforce. To evaluate employees' performance appraisal various techniques exist including the utilization of information technology.

Kumara and Jainb (2017) developed a Faculty Evaluation System (FES) which is an automated system that analyzes the textual feedbacks of faculty members teaching in any institute. The developed system extracts relevant data from the feedbacks of evaluators and the sentiment score of each evaluation area is calculated using machine learning algorithms. In the implementation of FES, the researchers evaluated the sentiment score of each faculty at a scale of three i.e. 'good', 'satisfactory' and 'unsatisfactory'. To perform more grained sentiment analysis, the researchers used five scale sentiment score i.e. 'excellent', 'good', 'average', 'below average' and 'unsatisfactory' and make use of domain-

dependent linguistic knowledge to enhance the accuracy of FES. According to the NBC 461 Manual of Operations, the Qualitative Contribution Evaluation (QCE) of the National Budget Circular (NBC) No. 461 practices of State Universities and Colleges (SUCs) is an integral component of the total quality assurance in public tertiary education. Faculty evaluation serves as an effective measure for faculty ranking and intends to motivate teaching personnel to develop a culture of excellence in performing their duties as faculty members (NBC461_QCE_Manual, 2018).

Institutions such as the Lyceum of the Philippines University – Batangas, Gordon College – Olongapo City and STI College Sta Maria Bulacan were able to successfully develop and implement their own LAN-based Faculty Evaluation System. Similarities in their system include the use of LAN-connected workstations where students need to fill-out electronic evaluation forms. However, their system does not include a maintenance module where evaluation questionnaire can be modified and evaluation settings can be configured. In Bataan Peninsula State University (BPSU), the QCE forms are used to evaluate the teaching competency and effectiveness of faculty members. QCE also serves as a motivator for ranking and promotion under the NBC 461. Hence, periodic evaluation plays a vital role in motivating faculty members to enhance their teaching skills. BPSU is undertaking a performance evaluation for its faculty members once in every semester. Evaluation involves the dean or the immediate supervisor, faculty members and students. Normally, student evaluation is done after the midterm grading period while supervisor, peer, and self-evaluation are usually done at the end of the semester. The evaluation process is administered by the dean or the college coordinator. He/she is also responsible in tallying all the scores, generate evaluation results and prepare summary reports. At present, BPSU is evaluating its faculty members the traditional way. Evaluation forms are printed or reproduced, selected evaluators fill out the forms, individual scores are manually summed-up per area of assessment and later on encoded in spreadsheets, and then summary results are computed. Printing of forms consumes a lot of paper and encoding takes time thus results are not promptly obtained.

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Moreover, comments are sometimes not encoded hence has to be summarized separately. Further, issues regarding faculty members being evaluated by students who are not in their official list, or students not being able to evaluate their teachers sometimes arise. These issues may jeopardize the integrity of the evaluation results. To address the challenges encountered during evaluation, a LAN-based faculty performance appraisal system can be utilized. Evaluation forms can be filled out by verified evaluators using network-connected workstations. Evaluation results can be automatically generated right after the electronic evaluation forms are submitted. Summary reports are readily available and can be printed or stored in portable files. The LAN-based Faculty Performance Appraisal System is designed to expedite the process of faculty evaluation. It is intended for use by BPSU students, faculty and supervisors/deans in evaluating the performance of teaching personnel. It includes the evaluation from students, peers, and supervisors.

1.1 OBJECTIVES OF THE STUDY

The general objective of the study is to develop and implement a LAN-based faculty performance appraisal system for BPSU that will aid deans/supervisors in administering faculty evaluation and speed up the generation of summary reports.

Specifically, the study aims to:

1. Design a Lan-based system that is capable of:
 - a. Allowing students, faculty members, and superiors to evaluate the performance of teaching personnel through the e-valuation module;
 - b. Providing faculty members with a summary of the evaluation results through the result generation module;
 - c. Allowing superiors to generate evaluation reports faster through the report generation module;
 - d. Allowing administrators to manage users and modify the QCE form as needed using the maintenance panel;
 - e. Allowing superiors to easily configure evaluation settings through the configuration panel;
2. Create the system using PHP as the programming language, MySQL for the Database, Adobe Photoshop for the design and a complete computer system;
3. Test and improve the proposed system in terms of functionality and reliability; and
4. Evaluate the system based on functional suitability, reliability, performance efficiency, usability, security, compatibility, maintainability, and portability.

1.2 SCOPE AND LIMITATIONS

The system was installed in LAN-connected workstations. The deans/supervisors are in-charged in the configuration of the system such as setting up the appropriate semester and academic year as well as indicating the valid dates of evaluation. Also, they are responsible for the maintenance of the system such as importing the master list of faculty members and registered students. The imported master lists are used to verify user accounts and ensure that only authorized users are able to use the system. All needed data such as faculty name and courses handled, student name, their sections, and their enrolled courses are managed by the

college dean. The evaluation process is undertaken once in every semester through a LAN-based set-up. The evaluation forms are based on the existing QCE forms of NBC 461. The criteria of evaluation consist of 4 areas namely commitment, knowledge of the subject, teaching for independent learning and management of learning. Students and faculty members needs to fill-out the QCE forms using the on-site workstations. A computer server is provided to facilitate the treatment of evaluation results. Summary reports are generated once the results are collated. Supervisors/deans and faculty members may view the results of the evaluation including the comments. The system was developed using the agile software development methodology. Iterative testing and debugging has been performed to ensure that all the components of the system is functional. Test script forms were used to record test scenarios. The system's quality has been evaluated by 100 respondents using the ISO 25010 evaluation criteria.

2 METHODOLOGY

The research project was conducted at Bataan Peninsula State University and was intended to benefit the university in terms of faculty performance appraisal. Faculty evaluation is administered once every semester and the developed system aimed to expedite the process. The research project was completed after six months of development. The researchers used the agile software development method to reduce the overall risk associated with software development. In agile method, the software is developed incrementally. Activities under this model include requirements analysis, design, implementation, testing and evolution. In this method, the researchers can work iteratively, thus helping them manage work more efficiently and do the work more effectively within the time and budget constraints. In the first phase of development, all the requirements were taken into account, analyzed and validated. Various activities like research, interviews, and observation were conducted to gather the necessary information in the study. Data gathered was analyzed to identify problems to propose solutions. The scope and boundaries of the system were also identified as well as the software and hardware requirements. Further, the proponents conducted a consultation meeting with students, faculty members, deans, university officials, and other stakeholders. In the design phase, the proponents created a design to transform the gathered requirements into a product. These include the creation of use case diagram, database design, and user interface design. It is also in this phase that the project was subdivided into several program modules to ensure that each project objective was implemented. In the implementation stage, the design was converted into reality. This is the phase where the actual coding starts while keeping in mind the defined requirements. In the testing phase, unit testing, integration testing, system testing and acceptance testing were performed. Unit, integration and system testing was done to verify and check code flaws while acceptance testing was done to determine if the end-users wanted to use the system. The testing phase was repeated until all the critical issues are removed and all user-requirements are met. The last phase is the evolution. This includes the evaluation and deployment stage. Based on the user's feedback, the system was improved and fine-tuned. Once the software was finalized and has no critical issues, it was

released to the end-users. It is also in this phase that the users were trained and the user's guides were distributed. During the training, the researchers had a system demonstration. There was also a hands-on training experience for the users which was guided by the researchers. To visualize the behavior of the system, the proponents created a use case diagram. A use case diagram models the functionality of the system using actors and use cases.

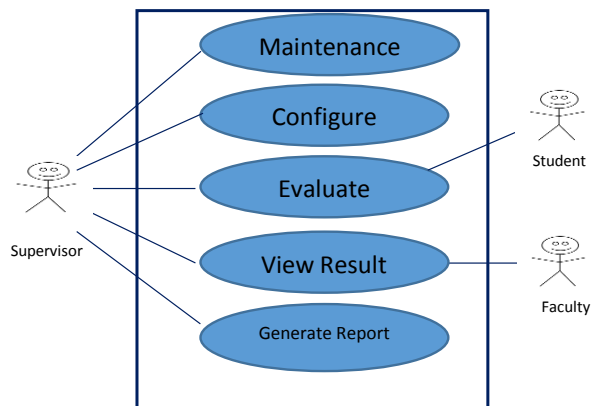


Fig. 1. Use-case Diagram

Fig. 1 depicts the use-case diagram of the LAN-based Faculty Performance Appraisal System for Bataan Peninsula State University. As shown the system has three actors namely the supervisor, faculty and students.

The supervisor is the one responsible for maintaining records, configuring faculty evaluation date and generating report. The supervisor can import the list of students and faculty members in excel file format and even add student and faculty records. In addition, the supervisor can also deactivate all students and activate/deactivate a faculty member whenever needed. The supervisor can also add a new curriculum, edit and delete an existing curriculum. Also, the supervisor can add a new course, edit and delete existing courses in the curriculum and assign subject to faculty members including sections to handle. Likewise, the supervisor can also maintain questionnaires in the QCE evaluation form. Furthermore, the supervisor can set the faculty evaluation date by providing the start and end date of evaluation. Additionally, the supervisor can generate a summary of evaluation results and comments per faculty and can able to print the report. On the other hand, the faculty can evaluate his/her peer and view his/her summary of evaluation. The faculty member can also view and edit some of the information in his/her profile, and view the subjects and sections assigned to his/her in the current semester and academic year. Likewise, the students can evaluate faculty members and can view and modify some information in his/her profile.

3 RESULTS AND DISCUSSION

The developed LAN-based Faculty Performance Appraisal System included two major modules namely evaluation module and maintenance module. The evaluation module comprised student, peer to peer and supervisor evaluation while the maintenance module involved the system configuration such as setting up evaluation dates,

managing student and faculty records, the printing of evaluation results and maintaining QCE forms.

3.1 Software Quality Assurance Testing

To assess the quality of the developed system and ensure that the standardized software quality specifications are achieved, the team was able to employ Software Tester. Different test cases were tried for each of the modules to verify if expected results were attained. Several test scenarios were undertaken and all the target outputs were achieved. All the modules are working fine though the tester included some suggestions for the improvement of the system.

3.2 Project Evaluation

The developed system was evaluated based on the ISO 25010 software evaluation criteria which include functional suitability, performance efficiency, usability, reliability, compatibility, security, maintainability, and portability. A system demonstration and short user-training were conducted before allowing the respondents to try the system out. Survey instruments were then distributed, filled out, collated and interpreted using the five (5) point Likert Scale.

The Likert Scale was used as the basis for the numerical rating and descriptive interpretation of the respondents' evaluation. The system has been evaluated by 100 respondents consisting of students, faculty members, IT experts, and the CICT dean. Table 1 presents a summary of project evaluation using the ISO 25010 evaluation criteria on software quality. The developed system obtained an overall mean of 4.76 with the descriptive interpretation of Excellent. With regards to implementation, 82 out of 100 respondents were in favor of using the system as a replacement for the traditional way of faculty evaluation.

TABLE I. SUMMARY OF EVALUATION

Criteria	Average Mean	Descriptive Interpretation
Functionality Suitability	4.8	Excellent
Performance Efficiency	4.74	Excellent
Compatibility	4.77	Excellent
Usability	4.71	Excellent
Reliability	4.75	Excellent
Security	4.73	Excellent
Maintainability	4.75	Excellent
Portability	4.79	Excellent
OVERALL MEAN	4.76	Excellent

4 CONCLUSION

The LAN-based Faculty Performance Appraisal System was designed for BPSU to expedite the process of faculty evaluation. The system was developed using PHP, JavaScript, and MySQL. Unit and integration testing as well as debugging was undertaken iteratively to refine each of the system's functionality. A software quality assurance tester has performed different test cases to ensure that the system complied with industry standards. One hundred (100) respondents consisting of students, faculty members, and supervisor/dean were invited to evaluate the quality of the

system.

Based on the findings of the study, the following conclusions were obtained:

1. The LAN-based Faculty Performance Appraisal System was successfully designed to :
 - a. Allow students, faculty members and superiors to evaluate the performance of teaching personnel;
 - b. Provide faculty members with a summary of the evaluation results;
 - c. Allow superiors to generate evaluation reports faster;
 - d. Allow administrators to manage users and modify the QCE form as needed;
 - e. Allow superiors to easily configure evaluation settings.
2. The system was successfully created using PHP as the programming language, MySQL for the Database and a complete computer system;
3. The system was iteratively tested and improved in terms of functionality and reliability; and
4. The system's quality was evaluated based on functional suitability, reliability, performance efficiency, usability, security, compatibility, maintainability, and portability and obtained an overall mean of 4.76 with a descriptive interpretation of Excellent.

However, the proponents recognized the following recommendations for future research and development works:

1. Create a web or mobile version of the faculty performance appraisal system.
2. Integrate the system with the university's enrolment system.
3. Conduct a more extensive consultation with administrators and supervisors to ensure that all requirements are considered.
4. Include evaluation for non-teaching personnel.

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