Mesopotamian journal of Computer Science
Vol. **(2023)**, 2023, **pp**. 72-91
DOI: https://doi.org/10.58496/MJCSC/2023/010; ISSN: 2958-6631
https://mesopotamian.press/journals/index.php/cs

Research Article

Student's Rating System for Teachers: A Tool for Teacher Scheduling Consideration

Naomi A. Bajao [1], Jose Primo S. Bardoquillo [1], Jhay G. Concha [1], Mae Fatima S. Monsanto [1], Ma. Chrisfie Karen L. Mojar [1]

[1]*Cebu Technological University- Tuburan Campus, Barangay 8, Tuburan, Cebu, 6043, Philippines*

ARTICLE INFO

Article History
Received 02 Feb 2023
Accepted 14 Mar 2023
Published 06 Apr 2023

Keywords
Rating system
Teacher effectiveness
Faculty evaluation
Professional development
School improvement

ABSTRACT

The end-of-term ratings are one of the most crucial components of improving educational institutions' ability to assess teachers' performance. The paper-based evaluation system for teachers at Cebu Technological University's Tuburan Campus is time-consuming and laborious. During the flexible learning, the school uses Google Forms to create surveys to rate the teachers which also has shortcomings since Google Forms has limited functions. To solve these issues, the proponents created a web-based evaluation system that makes it simple for students to rate their professors and generates evaluation reports at ease. Additionally, the system gives the system administrator the ability to control colleges, users, and evaluations. It will save time and manpower because the results are created automatically. The system was developed using HTML, CSS, Bootstrap, PHP, and MySQL while adhering to the Agile Model of the Software Development Life Cycle. The proponents allowed the SAST Coordinator and students to test the system and evaluate each module during the usability testing. Throughout unit testing, integration testing, and system/alpha testing, the system was successful and performed as planned. Enhancements to the system's features is highly recommended in order to augment the system's functionality including further study on the system's technology acceptance.

1. INTRODUCTION

The achievement of the program's set learning outcomes is one of the primary processes in university educational programs. Several methods of learning assurance can be used to assess whether or not learning outcomes have been met. Course embedded measurement, in which teaching and assessment methods are evaluated, is an important method for determining whether or not learning outcomes have been met. Student's rating system for teachers, in which students evaluate the quality of teaching and assessments (teaching management and performance) per course, are widely used to assess course and teaching quality. Studies spectate that individual teachers are the most significant school-related factor in student achievement gains that effectiveness varies greatly between teachers and that differences in effectiveness are not well predicted by traditional qualifications. The current system for evaluating teacher's performances inside the campus is manually running. During face-to-face classes, the university used to distribute paper questionnaires and students are required to complete the evaluation form. After the forms have been completed and gathered, statistical analysis begin. This process is lengthy, difficult and prone to errors, making it difficult to be quick and accurate. It is not feasible to use because the amount of data available is limited. When flexible learning began, classes moved online and the university found another way of evaluating the teachers. Google Forms were used to create surveys and rate teachers which also has shortcomings due to the application's limited functions. Student's Rating System for Teachers is a web application that enables the administrator to add colleges, departments, courses, classes, subjects and users. It will also enable the administrator to create evaluation criteria and questionnaires and assign teachers to be evaluated by the students. It also enables the students to rate and give comments about the performances of their teachers. After the students submit the ratings, the system will automatically generate an evaluation report that can be used by the department chairs to consider in the assigning of schedules of the teachers.

1.1 Review of Related Systems

This section presents the different similar systems from both foreign and local researchers. The related studies focus on numerous aspects that will support in the development of the study. The study is generally concentrating on creating a system for the Cebu Technological University- Tuburan Campus. The literatures of this study comes from articles, journals and electronic books such as PDFs, and another existing dissertations which is significant in the advancement of awareness concerning the study.

*Corresponding author. Email: naomi.bajao@ctu.edu.ph

Foreign Systems

A similar system was conducted at the Stamford University Bangladesh by [1] which is a web-based automated tool for Course Teacher Evaluation System (TTE). The system lets the students evaluated the teachers of any particular course based on the predefined questions and the results of the evaluation is automatically generated along with graphical representation. From the generated reports, it will be easy for the teachers to understand and focus on the area where they need to improve their skills and teaching methods. In TTE system the main control is done by the admin. Initially the admin has to sign up for creating an account. This account is created by an email and password. This password should have at least 8 characters, one character must be capital letter, one must be small letter and one must be digit. This process helps to create strong password. The TTE is a fully automated web based system which saves time to evaluate the courses very easily. It is also possible to save the result as pdf file format and print as a report.

Another similar system was conducted by [2] entitled “Online Teaching Evaluation System”. The system enable the students to rate the teaching performance of their instructors at the end of each and every semester in the academic session. The system only allows the registered students in the department to perform the rating. The system is limited only for the use of the Mathematics Department. Administrator of the implemented system will use the rating results to improve course offerings and provide feedback to the instructors to improve their teaching performance. Technologies used to implement the system were: HTML, JavaScript, JQuery, MySQL, Bootstrap, WAMP and PHP.

Another study entitled “CFES or the Computerized Faculty Evaluation System” was conducted to allow for easier data collection and more accurate data analysis of faculty evaluation in less time The Computerized Faculty Evaluation System is a paperless process in which the evaluator (students, co-teachers, and supervisor) will evaluate the teacher using the computer and the system. The Administrator has the ability to revise and update the list of questions. The Administrator can also generate and print faculty evaluation results. Students can rate or evaluate the teacher by logging into their accounts. Students may also leave a comment for their teachers. Teachers and faculty can access their accounts to view their results and comments. The system was developed using Visual Basic, PHP and MySQL.

The "Faculty Evaluation System" study makes use of automated evaluation to aid examine the verbatim feedbacks of the faculty members instructing in any institute. The suggested solution takes all the crucial information from the comments and uses machine learning techniques to determine the emotion score for each faculty for each facet. In their system, students can grade their professors based on the administrator-created questions using a five-scale sentiment score (Excellent, Good, Average, Below Average, Unsatisfactory). Students may also provide feedback and remarks to a particular faculty member. The suggested system has the following features: login, registration, email verification, faculty evaluation, and commenting [3].

A study titled "Decision Support System of Teacher Performance Assessment with Smart Method" was carried out [4]. The application gives the user the option to access the login form, after which the user logs in using the appropriate credentials. The teacher performance evaluation form will open if the application user is logged in as a teacher. The application opens the admin form if the application user is logged in as the administrator, and the principal form if the application user is logged in as the principal. Users of the application open the criteria form. The data will then be processed as necessary, for instance, if the user adds a computation, it will be saved. If a user modifies a calculation, it will be modified; likewise, if a user deletes a calculation, it will be removed. Users of the application can generate decisions using criteria that are stored in the database for those criteria [4]. Users of the application open the Report form. The data is subsequently processed in accordance with the requirements; if the user enters data from a report, the calculation's overall result is then displayed. A report will be printed if the user chooses to print it.

Another study entitled “Web-based Teaching Evaluation Systems” was conducted at the College of IT and Computer Science in Jerash University. The system enables the instructors to create their own questionnaires on the Web. There will be a question bank attached to the questionnaire builder so instructors can compile questionnaires using questions from the bank. They will also be able to choose to write their own questions or modify existing ones. When instructors finish designing their questionnaires, the questionnaire will be put on the Web to collect students’ responses. To do that, all they will have to do is to specify a period during which the students will be given access to the questionnaire. When the data collection period finishes, a report will be generated automatically which the instructor can view on the web. The web application was created using HTML and PHP, with MySQL being used as the server database. With the aid of these software program implementations, users may easily access the website, log in using any common web browser, fill out the necessary questionnaire forms, and submit the forms. Results are automatically saved to a remote database server, creating dynamic web pages that can be shown to users in the right forms and formats. The evaluation questionnaire's components can be saved in the database and dynamically recreated on the web through dynamic web pages [4].

Another study entitled “Web-based Teaching Evaluation Systems” was conducted at the College of IT and Computer Science in Jerash University. The system enables the instructors to create their own questionnaires on the Web. There will be a question bank attached to the questionnaire builder so instructors can compile questionnaires using questions from the bank.

They will also be able to choose to write their own questions or modify existing ones. When instructors finish designing their questionnaires, the questionnaire will be put on the Web to collect students' responses. To do that, all they will have to do is to specify a period during which the students will be given access to the questionnaire. When the data collection period finishes, a report will be generated automatically which the instructor can view on the web. The web application was created using HTML and PHP, with MySQL being used as the server database. With the aid of these software program implementations, users may easily access the website, log in using any common web browser, fill out the necessary questionnaire forms, and submit the forms. Results are automatically saved to a remote database server, creating dynamic web pages that can be shown to users in the right forms and formats. The evaluation questionnaire's components can be saved in the database and dynamically recreated on the web through dynamic web pages [5].

In a 2016 project titled "Online Teachers Evaluation System" at the State University of Bangladesh, a web-based system was created and deployed to enable grad students to rate their professors. With this approach, students can engage in assessments from any location using their own devices, and authorities will receive automated results. Laravel is a framework that was used in the system's development. The proponents also used PHP for the back-end, MySQL for the database, and HTML, CSS, and Bootstrap for the front-end. There are four main users of the system. The Super Admin can keep track of and enable or disable the evaluation's current year, semester, and time frame. The Departmental Admin can be added, edited, deleted, and have their password changed by the Super Admin. The Departmental Administrator or the Administrator can add, update, and delete teachers, students, and courses. They can also keep track of students' course registrations and enable or disable courses that are currently in session. The Teachers, where they can only see their evaluated result for their instructed courses. Last is the Student, students can see their registered courses, can evaluate those courses which are enabled and not evaluated [6-11].

Local Systems

A local system was conducted in Laguna College of Business and Arts (LCBA) named "Online Faculty Evaluation System for Laguna College of Business and Arts". In this project, it will have four different user types: the Human Resource Department, the faculty members, the students, and the administrator. With the help of this system, the Human Resource Department would find ease in determining the efficacy of the instructors based on the evaluations made by the students themselves. The system created was designed to have an administrator that would handle the entire system. The Human Resource Department will be the one to implement the system to the students. The system is programmed to generate evaluation reports that contain the total number of students who made the evaluation and will produce hard copies of evaluation reports for each faculty member [12-15].

Another similar system, titled "Web and Mobile-Based Performance Evaluation System," specifically targeted the criteria and policies of the traditional evaluation method of some higher education institutions based on the ISO 9126 standards, which ensure the quality of all software-intensive products. In order to develop the project, PHP was used along with JavaScript and CSS programming languages. The WAMP package was used to utilize the Apache Server as the web server, with MySQL as the administrator and phpMyAdmin as the database [16].

Another similar system, titled "The Development of Automated Faculty Performance Evaluation System (AFPE)," was conducted at the Pamantasan ng Lungsod ng Marikina. The system is web-based, allowing the evaluator (students, co-teachers, and supervisor) to use the computer to evaluate the teacher instead of using a manual process. The system was made using a PHP framework that includes security features and form validation. The system can automatically compute the performance ratings from the students, generate a summary of results and reports, and can only be accessed by the assigned faculty and the school administrator [17].

Another study, titled "Web-based Faculty Evaluation System of Apayao State College, Philippines," was conducted to enhance the current evaluation system for efficient conduct and to supplement the traditional paper-based system. The Multi-Methodical Approach in Information Systems Development was used in the development of the project, which included data modeling and theory building. The PHP and MySQL platforms were used to create the project. In this study, the researcher determines the input and output data to the system, then studies the process that must be done with these data and looks at the constraints on the software's behavior [18].

A further local investigation was carried out at the MIT College of Computer Studies in Biñan, Laguna. Rapid Application Development (RAD) is used as the approach model in the study titled "Web-based Thesis/Capstone Project Defense Evaluation System of the CCS Biñan" to construct the system. To test and evaluate the program for potential improvements and better project use, planning, data collection, and coding are done concurrently [19-23].

A study used the Rapid Application Development technique to create "Online Teacher Evaluation System using PHP," another system that was built. The created system automatically generates reports and evaluates teachers. Students, professors, and administrators will all be distinct types of users for the system. The technology enables students to register for an account and grade their instructors online. To access their ratings, teachers will register and create accounts. The system's administrator will be a member of the HR division [24].

A capstone project, titled "The Student Academic Evaluation and Advising System," employed a prototyping model. The demands of first- through fourth-year students are the main focus of the study. The department chair can automate the manual process of evaluating the students with the help of the study. To enable the software development team to produce mock-ups and prototypes of screens, reports, and processes, clarify demands or design elements in the researchers' model. For the department chair to evaluate the students, the system can provide reports and information on topic requirements. The system was developed using HTML, CSS, and JavaScript for the front end and PHP and MySQL for the back end [25,26].

An online teaching performance evaluation system was implemented at the Far Eastern University in a local study titled "Online Teaching Performance Evaluation System: A Tool for Quality Education" to address the predictable complex issues the university encountered when using a manual teaching performance evaluation. A web-based program called FEU-TPES was created to enable online faculty evaluation through the University's intranet. The Active Server Pages (ASP) programming language, the MySQL 5.1 database, the Microsoft Internet Information Services (IIS) 6.0 web server, and Internet Explorer 6.0 or later versions were all used in the development of this system [27-29].

Another similar system, titled "Online Faculty Evaluation System for Laguna College of Business and Arts," was created with three user categories: the Human Resource Department, faculty members, and students of Laguna College of Business and Arts (LCBA). The approach allowed the Human Resource Department to quickly assess the faculty members' ability to teach by looking at the evaluations submitted by the students. The technology is able to provide reports that include the total number of students who completed evaluations and print printed copies of the evaluation reports for each faculty member [30].

A study titled "Web-Based Faculty Evaluation with Recommendation Support Module utilizing Analytic Hierarchy Process Algorithm" was completed at Eastern Samar State University. The proposed system seeks to offer a Web-based client and admin panel that gives students the chance to participate in the evaluation of faculty members so that both the students and the supervisor can offer their views and ideas. One of the features in the created system that supports and strengthens the capability of the Human Resource Officer and the Human Resource Department (HRD) to decide what steps should be taken to improve the performance of faculty members in the classroom is the Recommendation Support Module using the Analytic Hierarchy Process Algorithm (AHP) [31].

Another study titled "Web-based Instructor Evaluation System: A Fuzzy Rule-Based Approach" uses the Agile model in developing the project. Different software and technologies are used by the system's supporters to construct it. CodeIgniter was used as a primary framework and the PHP (Hypertext Preprocessor) as the scripting language. It also includes a ton of default aids for things like handling forms files, arrays, strings, directories, and more. The layout, colors, and fonts of the system are designed using CSS, or cascading style sheets. The system's database management is handled by MySQL, Notepad++ was used as the text editor. The system that would allow the VPAA, Deans, Program Heads, Instructors, and students to assess the MCC Instructors online at the CISCO Laboratory under the Dean's or its representative. To start the procedure, the HRMO created each user account in the system. The VPAA may assess the deans and professors of MCC whenever there is an internet connection, if necessary. The Program Director and the Instructors can be evaluated by the Dean, the Dean and the VPAA cannot be evaluated by the Program Head, but the instructors can. The peer assessment tool allows instructors to rate their fellow instructors, while the self-evaluation feature allows instructors to rate themselves. Only the teacher is subject to student evaluation. The student's student number can be used as the username to log into the system [32].

1.2 Theoretical Background

This capstone project was based on the Technology Acceptance Model (TAM) theory by Fred Davis which seeks to model how users come to accept and use a technology. The end point where people use technology is the actual system use. Behavioral intention is an aspect that hints the people upon using the technology. The behavioral intention (BI) is influenced by the attitude (A) which is the overall impression of the technology. According to the model, when users are presented with new technology, a variety of aspects can influence the choice on how and when to use it, most notably:

Perceived Usefulness (PU) - Fred Davis described this as “the degree to which a person believes that using a particular system would enhance their job performance”. This simply means that whether someone identifies the technology to be useful or not based on what they want to do.

Perceived Ease-of-Use (PEOU) – this was defined by Davis as “the degree to which a person believes that using particular system would be free from effort”. Barriers conquered if the users find the technology easy to use. On the other hand, if the technology is difficult to use has a complex user interface, users won’t have a positive attitude towards it.

External variables such as social influence are considered as a crucial aspect to define the attitude. People will have the attitude and intention to use the technology when these things (TAM) are evident. However, as quantified by Davis, perception may to alter depending on the age and gender because everyone is different [33,34]. Refer to figure 1.

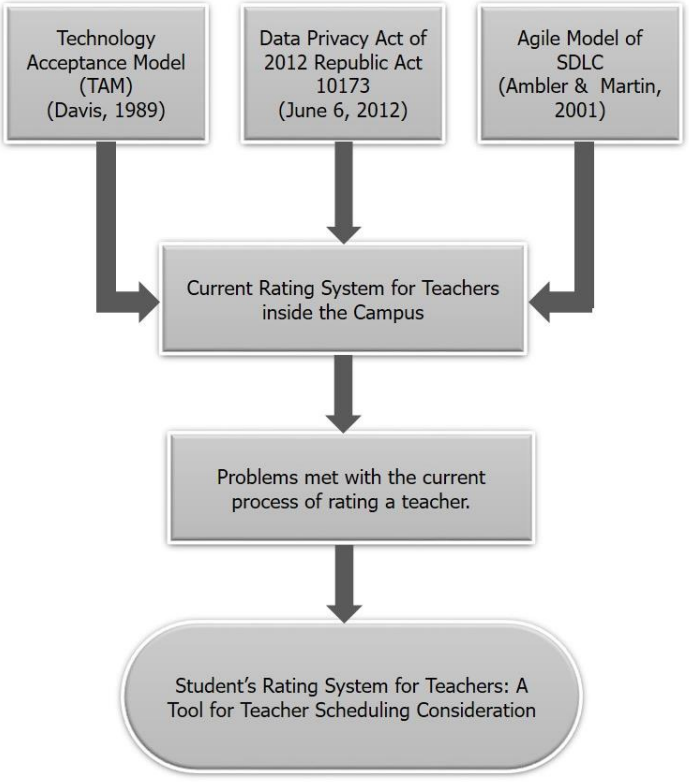


Fig.1. Theoretical Framework of the Study

1.3 Technical Background

Overview of the Present System

The present rating system employed by university administrators to review teaching performance is of the manual kind, in which students utilize paper questionnaires to assess their teachers through ratings. Following the students' evaluations, the evaluation forms will be manually gathered, tallied, and totaled, which is time intensive and prone to error. During the epidemic, schools were obliged to adopt a new method of instruction: flexible learning, in which students attend courses online. A different way of assessing instructors was used in that situation. Google Forms, a component of Google's online app suite of tools, is used by school administrators to assess surveys through mobile or web browser, which students may use to rate their professors. Though the process is electronic, however, there are still limited functions about the web application and since it is part of Google's suite, the university has no access to the database and has no complete control of the application.

Overview of the Proposed System.

The proposed system is a complete web-based application named Student's Rating System for Teachers, which allows administrators to add colleges, departments, courses, classes, subjects, and users. It will also allow the administrator to design evaluation criteria and questionnaires, as well as assign teachers to be evaluated by students. It also allows students to rate and comment on the performance of their teachers. After the students submit their ratings, the system will automatically generate an evaluation report for the department chairs to consider when assigning teacher schedules.

To develop the system, these following technologies were used by the proponents:

- PHP- Hypertext Preprocessor is a widely-used open source and is known as a general-purpose scripting language that can be used to develop a dynamic and interactive websites.
- HTML- Since the project is a complete web-based application, Hypertext Markup Language is used to create visuals and describe the structure of the webpages.

- CSS- In developing the system, Cascading Style Sheet is used to describe the presentation of the Webpages, including the system's layout, the combination of colors and the fonts.
- MySQL- a relational database management system that uses SQL (Structured Query Language). The application is used for a variety of tasks, including data warehousing, e-commerce, and logging. However, the most common application for MySQL is as a web database.
- XAMPP- This was used as a local host to make a local web server that can be used by the proponents in testing and deployment functions. Since most actual web server deployments use the same components as XAMPP, it makes transitioning from a local test server to a live server possible.
- VISUAL STUDIO CODE IDE- As the system's development involves a series of text-editing, debugging, compiling and testing. The proponents are using Visual Studio Code IDE , a streamlined code editor that consolidates and provides a quick code-build-debug cycle.

1.4 Statement of the Problem

Cebu Technological University- Tuburan Campus used the manual process of evaluating the teachers during the physical classes from which the students use paper questionnaires to evaluate the performance of their teachers. After the students evaluated, the papers were gathered, tallied and counted manually which takes a lot of time and is prone to errors. During the flexible learning which the students and teachers used the online classes, the school later used Google Forms, a part Google's online app suite of tools which helps the administrators analyze surveys using mobile or web browser where students can use to evaluate their teachers. However, Google Form is not that efficient because the application has limited tools and functions that are essential in managing the evaluation and keeping track of the data stored. Aside from that, it would take a lot of time in generating reports and finalizing the results of the evaluation.

Specifically, this study answered the following questions:

1. What are the problems met by the existing rating system in terms of:
    1.1. Creating evaluation questionnaires;
    1.2. Rating a teacher;
    1.3. Generating individual reports;
    1.4. Storing of reports;
2. What improvements can be added to the existing rating system in terms of:
    2.1. Usability
    2.2. User-friendliness
3. Based on the findings, what kind of system could be considered and proposed?

1.5 Objectives of the Project

The objective of this study is to achieve the quality education by means of implementing a student's rating system for teachers as a tool for teachers scheduling consideration to be used in Cebu Technological University- Tuburan, Campus.

Specifically, the proposed system will:

1. Develop a web-based system for the students to rate the classroom management and the teaching performance of their instructors.
2. Generate a summary of reports based on the ratings given by the students per instructor.
3. Reduce the amount of time in gathering and analyzing the answers for the survey questionnaires given by the students.
4.

1.6 Scope and Limitation

The system will be able to create an assessment system for the students to rate the performance of their teachers with the following:

1-Needs Improvement

2-Satisfactory

3-Good

4-Competent

5-Outstanding

The system has six different users: the administrator, the students, the teachers, the department chairs, the college deans and the dean of instruction. The administrator user is responsible for managing the data in the system the users, the colleges, the departments, the courses, the classes, the subjects, the evaluation and the reports. Student users are only allowed to rate the faculties and give comments. The teachers can only view their individual reports. Department chair users can only view the individual reports of all the teachers that belong to their department. College Deans can only view the individual reports of the teachers under their colleges. The Dean of Instruction can view all the individual reports of the teachers inside the campus. This study will only focus on student's rating on their instructors inside the Cebu Technological University-Tuburan Campus. Only the students can rate their teachers. Based on the gathered ratings given by the student evaluators, the proposed system will rank the teachers. Thus, this system will be limited in the use of the CTU-Tuburan students, teachers and administrators only. Any other forms of algorithms aside from the evaluation are not included in the study. The restriction of this study is, users who are not registered in the system are not allowed to evaluate and also users cannot access the system without Internet Connection.

1.7 Significance of the Study

This study will be beneficial to the following:

- The University Administrators. The university administrators are the ones who will be assisted in this study as this will lessen the burden of them in creating a manual Student's Evaluation on Teachers.
- Department Chairpersons and College Deans. The proposed system will benefit the department chairs in and college deans in considering the scheduling of teachers.
- Students. Students will be given a chance to rate based on their instructor's performances. They will also be given the opportunity to include comments based on the teaching efficiency of their instructors and give recommendations for a more effective and efficient learning.
- Teachers. Based on the reports from the ratings given by the students, teachers will be able to improve their performances and work on the areas or subject where they need improvement.
- Future Researchers. The time disbursed for the enhancement of the system is limited, that is why it will be a chance for the subsequent batch of researchers to consider the project and comply with the critical changes and updates.

1.8 Project Highlights

Aside from having an effortless gathering and a more accurate analysis of the evaluation data, it will also help in an efficient way of monitoring the performance and determining the strengths and weaknesses of the teachers making the department chair choose for a perfect subject and schedule that will suit for their skills and strengths at ease. The system will also help the students get their educational need and providing a quality education that helps in developing their individual ideas and improving their learning habits.

These are the highlights of the project:

- Managing of Evaluation - the Administrator user can create and manage the criteria and the questionnaires of the evaluation at the same time, be able to restrict an evaluation. This means that a student can only rate a teacher that he is assigned to. The administrator can also make a default evaluation, which means that you can only evaluate the teacher at the certain school year and semester as well as create criteria and the evaluation questionnaire inside a specific semester and academic year.
- Rating of Teacher – This feature can only be used by the students. Students can rate their teachers from 5 being the highest and 1 being the lowest. Students can also include comments about the performance of their teachers. The ratings and comments made by the students are strictly confidential. To promote confidentiality, only the Administrator can be allowed by the system to view the ratings and the comments being given by the students..
- Generating of Evaluation Reports - Since the teachers, department chairs, college deans and the dean of instruction cannot view the ratings, the administrator will generate a report and send it to them. Teachers can only view their

individual reports. Department chairs can view the reports of the teachers that is under their departments. College deans can view the reports of the teachers that is under their colleges and the dean of instruction can view the reports of all the teachers inside the campus. Reports are automatically generated and updated every time a student submits his ratings and comments.

- Managing the Colleges, Departments, Courses, Classes and Subjects – The system lets the administrator manage the colleges, inside the colleges are the list of departments, inside the department are the list of courses, inside the courses are the list of classes, and then inside are the list of subjects. The system allows the administrator to manage all the data being stored in this module, the administrator can delete, edit and add data to the system.

1.9 Methodology

This phase described the methodology and processes for carrying out the research endeavor. It discusses research methods and methodologies, systems development methodology, requirements analysis, requirement documentation, software design, development and testing, implementation strategy, and implementation outcomes.

Research Methods

The proponents used descriptive qualitative approaches to collect as much data as possible in order to record all of the processes in the event. In this strategy, the interview is a dialogue in which questions are asked to obtain the necessary information. It assists proponents in understanding the procedures of the present rating system inside the institution and identifying the challenges encountered with the current system. This assists proponents in developing a new system that addresses the concerns encountered.

Data Gathering Instruments

The following strategies were employed by the proponents to collect data:

Interview- During the requirements collecting stage, the proponents conduct an online interview with possible system users who provide resources regarding the present system's flow.

Observation- The proponents conduct an investigation of the existing system in order to get additional ideas on how to create the proposed system. Based on this observation, the proponents identified several issues that needed to be addressed, and these issues were used to improve the process of the present system.

System Development Process

The Agile Model is a part of the Software Development Life Cycle (SDLC) Model that was used in the development of the system in creating targets, monitoring performance, and validating points at various stages of the development life cycle to improve the ultimate product's quality. Refer to figure 2.

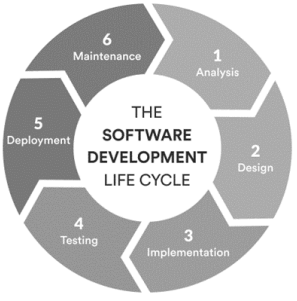


Fig.2. The Agile Model of SDLC

The proponents follows the Agile Model, one of the major models of the Software Development Life Cycle in the development of the system. Agile modeling is a best-practices-based technique for modeling and documenting software systems. It is a set of ideals and concepts that may be used to guide a software development project.

1.10 Requirements Specifications

This phase provides a detailed overview the parameters and goals of the software and defines the nature of a project, software, or application. The proponents of the system utilizes three different types of feasibility studies. Operational Feasibility, Technical Feasibility and Schedule Feasibility are measured to ensure the efficiency of the resources in terms of the technology used and the procedural plan in developing the system.

Operational Feasibility
The current system will address difficulties experienced by the current rating systems and make use of opportunities uncovered in the scope definition, and how well it meets the requirements in the system analysis phase. The proponents examine the willingness of the organization to support the proposed system before implementing it.

1.11 Requirements Modelling

Requirements modeling was used in the project to identify and establish the best practices required to create an effective model. It outlines the way you intend to put the practices into action.

Input-Process-Output
The Input-Process-Output model is a popular method used by the proponents to describe the structure of the information processing program in system analysis.

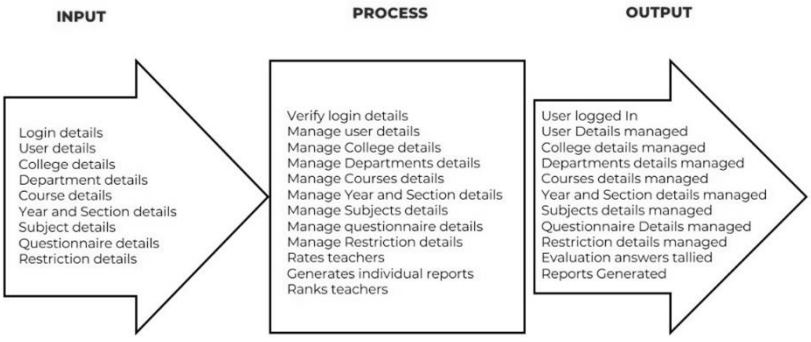


Fig.3. Input-Process-Output Diagram

Figure 3 is the Input-Process-Output Diagram that shows the processes of turning all the inputs including the login details, the user details, the college details, courses and subject details, the evaluation details, the questionnaire details and the restriction details which are all necessary for the internal system to transform and process the inputs and generate it into outputs and reports.

Process
The system needs the participation of the students, the teachers, the department chairs, the college deans, and the dean of instruction to improve the quality of teaching and learning for all students. The system requires strong internet connection for uninterrupted activity.

Control
To execute the processes of the system, it will require several inputs from the users.

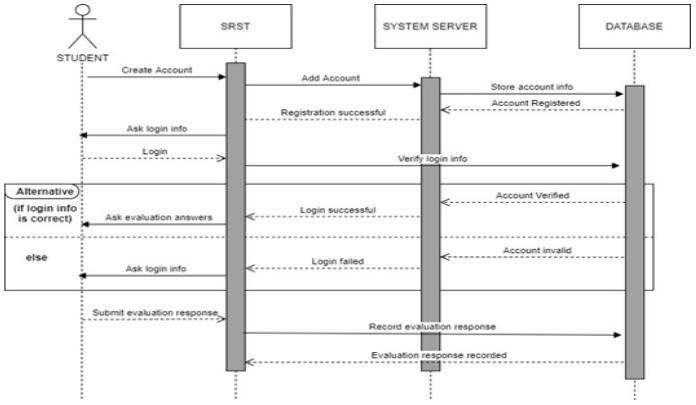


Fig.4. Sequence Diagram for the Student

Figure 4 is the sequence diagram of the system showing all the sequences of activities, requests and responses which are involved in the processes inside the student's account. "STUDENT" represents the actor of the system and the objects are enclosed with a rectangle. The sequence starts with the student creating an account (if a student does not have an account yet) followed by the logging in of the system after the student successfully log in the system. Students can now choose and evaluate a teacher. Student user submits evaluation response and the system will process the student's response and the web server will record it.

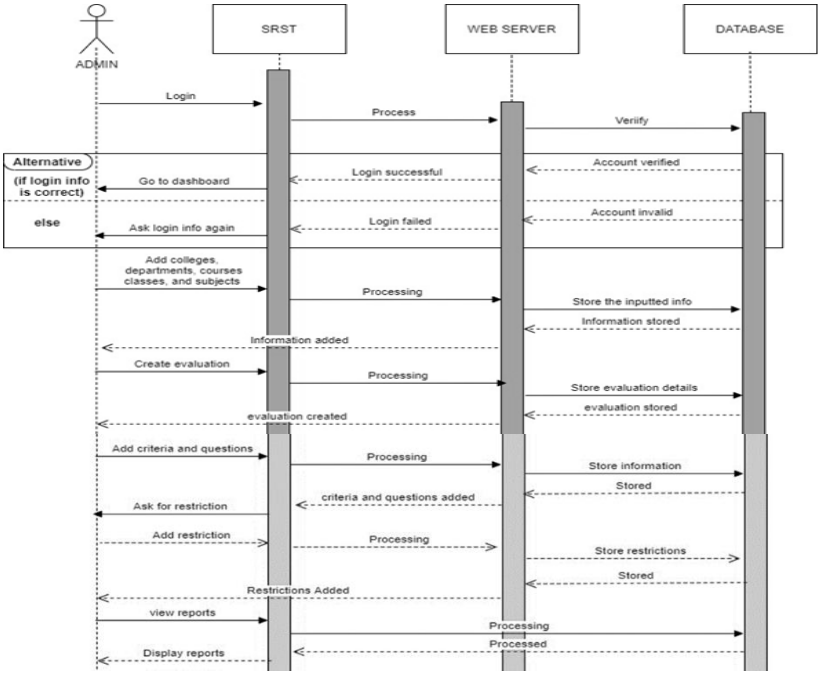


Fig.5. Sequence Diagram for the Administrator

Figure 5 shows the sequence of the activities inside the admin's account in the system. The sequence starts with the admin logging in the system, if the login information is verified, the admin can proceed to the next step which is to create a college, department, course, class, and subject. After that, the admin can now create an evaluation, add criteria and questions an add restrictions to the evaluation. The admin can also view the reports and the rankings of the teachers based on the scores given by the students.

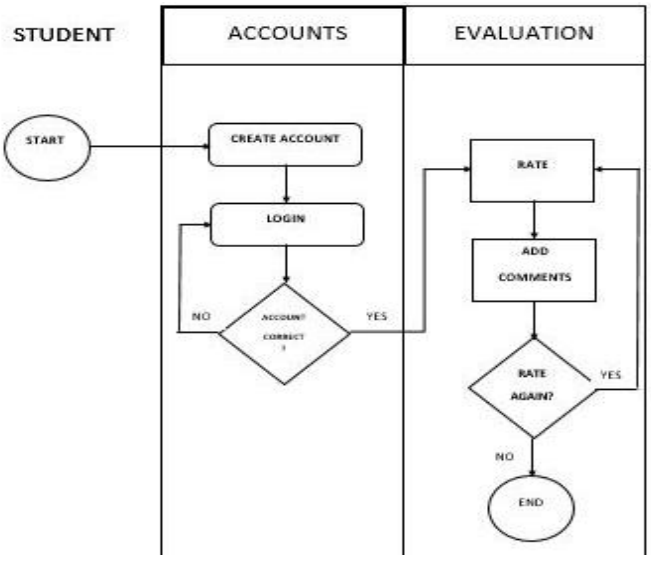


Fig.6. Activity Diagram for the Students

Figure 6 shows the activity diagram for the students. It represents the workflow of stepwise activities and actions that happens in the student's account in the system with support of choices, iterations and concurrencies. For a more accurate representation of workflows, the proponents categorized the diagram by the modules of the system.

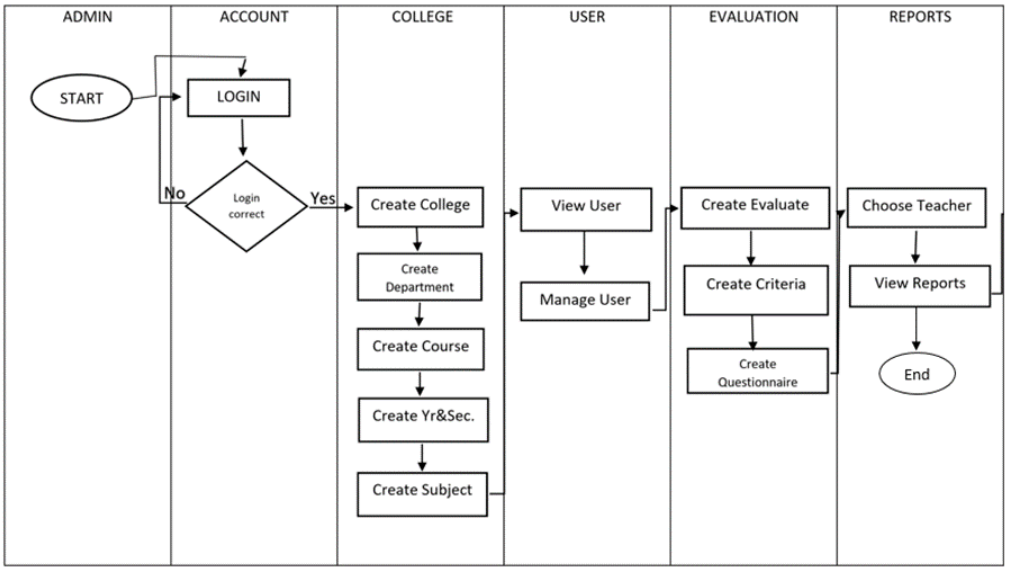


Fig.7. Activity Diagram for the Administrator

Figure 7 shows the activity diagram for the administrator. It represents the workflow of stepwise activities and actions that happens in the administrator's account in the system with support of choices, iterations and concurrencies. For a more accurate representation of workflows, the proponents categorized the activities based on the modules included in the administrator's account.

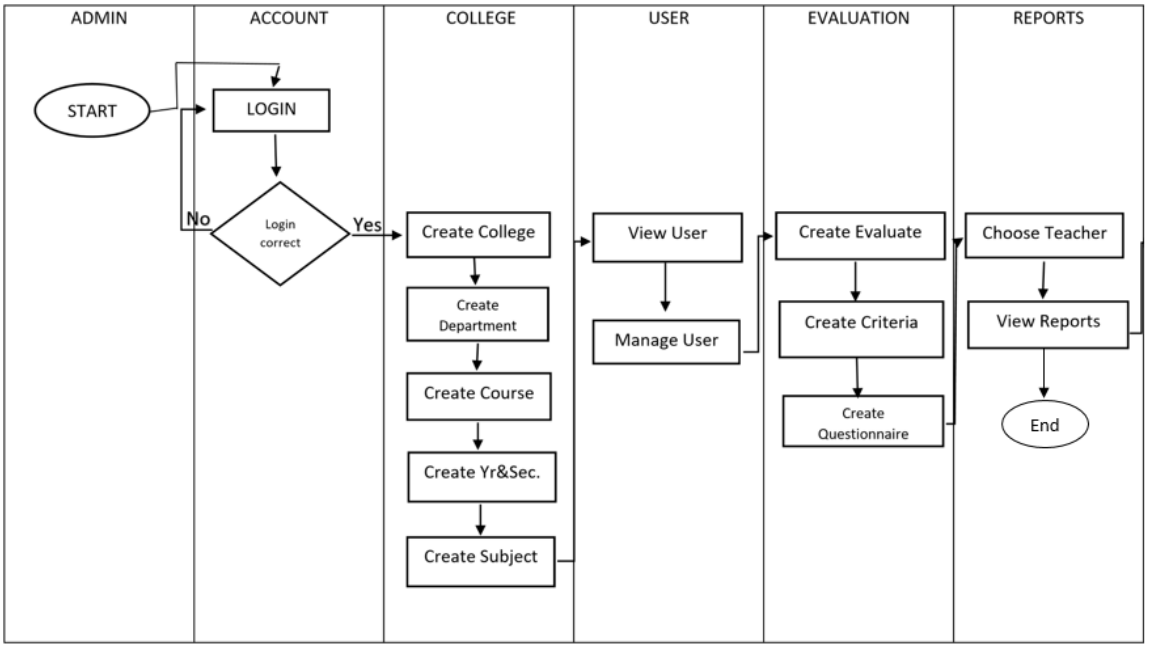


Fig.8. SRST Use Case Diagram

Shown in Figure 8 is the Use Case Diagram of the proposed system containing six different kind of users: the student; the teacher; the department chair the college dean, the dean of instruction and the system administrator. The use case diagram shows what these users can do in the system. Students can login, signup, rate teachers and add comments. Teachers can login and view individual reports. Department chairs can login and view individual reports of all teachers within the department. College deans can login and view individual reports of all teachers within the college. Dean of instruction can login and view individual reports of all teachers within the campus. System administrator can login, manage the ratings, manage the users, manage the rankings and at the same time, can generate reports to be submitted to the department chairs and dean.

1.12 Analysis

This part of the study will include all the cost and benefits of the resources that are being used to develop this system along with the risk assessment and analysis that can be used to reduce the chances of having risks in the implementation of the system.

Risk Assessment/ Analysis

The proponents examines all the risks found during the development phase of the system. Along with it are the preventive measures on how to reduce the probability of occurrence and the person responsible for maintaining the wellness of the system.

TABLE I. RISK ASSESSMENT ANALYSIS

Risk Factors	Risk Impact	How to limit?	Person Responsible
Failure of the System Server	**High-** This will lead to failure of the whole system	System should have a backup server to secure the data.	System Developer
Unsecured Accounts	**High**- This will lead to stealing of information.	System should provide proper user authentication	System Developer
Unsecured Evaluator's Identity	**Low-** This will lead to loss of trust in the system.	System should promote evaluator's anonymity	System Developer
Poor Internet Connection	**High**- This will lead to improper working of some functions	Secure a strong internet connection	Users

Table 1 shows the Risk Assessment/Analysis. All the risk factors that might be possible to happen during the development process and the implementation of the proposed system are assessed and analyzed and the actions that are needed to do in order to prevent or mitigate the occurrence as well as the actions needed to perform in order to address the errors and system failures. This will help the system developers and the system administrator in keeping and maintaining the system.

1.13 Design

This part of the study is composed of the user interface design, including the reports and forms available in the system, the data design and the network design that was used by the proponents for the better understanding and guide in the implementation of the project.

Outputs and User Interface Design

This phase includes the screenshots of the output and the user interface design which is composed of all the reports, forms and the webpages that is present in the system.

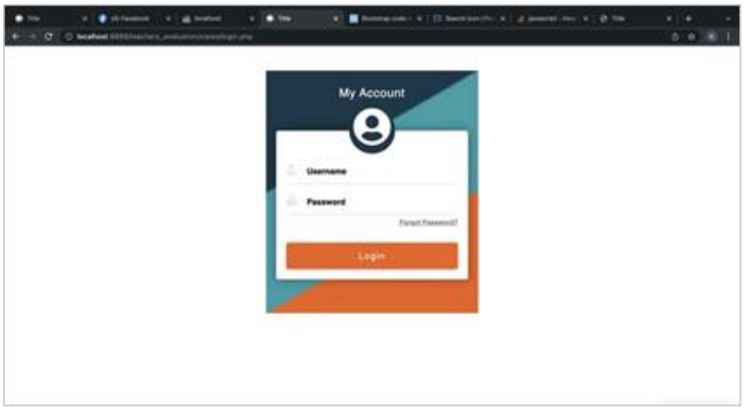


Fig.9. SRST Login Page

Figure 9 shows the login page of the system where the users can login using their login credentials, username and a password. It also provides the link in the register page for those users who do not have an account.

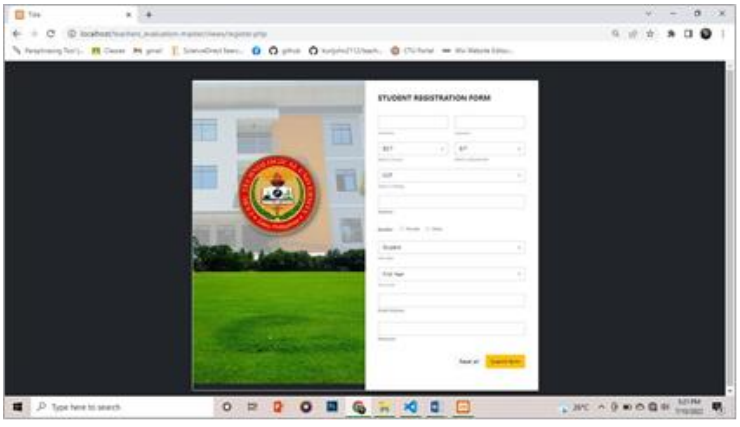
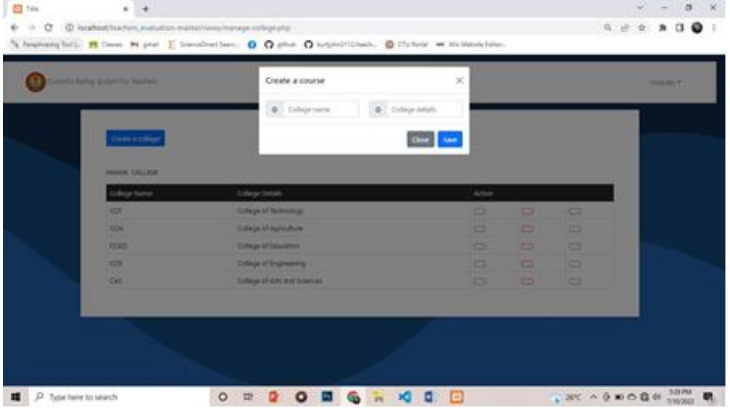


Fig.10. SRST Register Page

Figure 10 is the register page of the system. This is where the student users create their accounts if they do not have any account yet in the system by filling out the forms with the necessary information needed.



.Fig.11. Create College Page

Figure 11 shows the page where the system administrator can add a college. The system administrator can add a college and a college description. This page also enables the system administrator to edit or delete the department. The system also allows the system administrator to view the courses under a specific department by clicking the view button on the actions column.

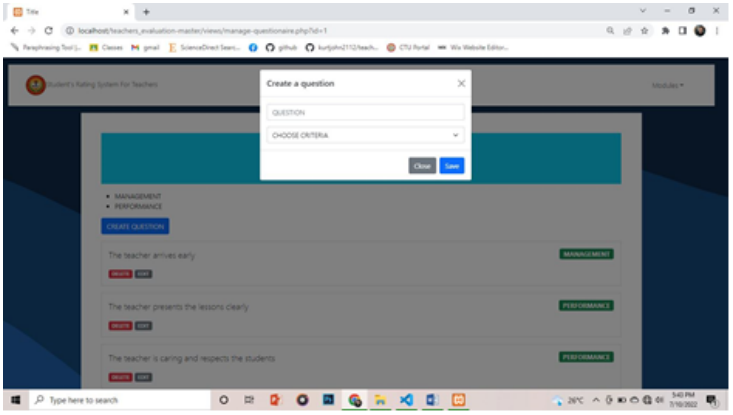


Fig.12. Create Questionnaire Page

Figure 12 shows the page where the administrator creates questionnaire and choose a specific criteria that best suits the question. The system also allow the administrator to edit and/or delete a specific question. After the questions being created, the admin can set a restriction by clicking the “Set up restriction” button below.

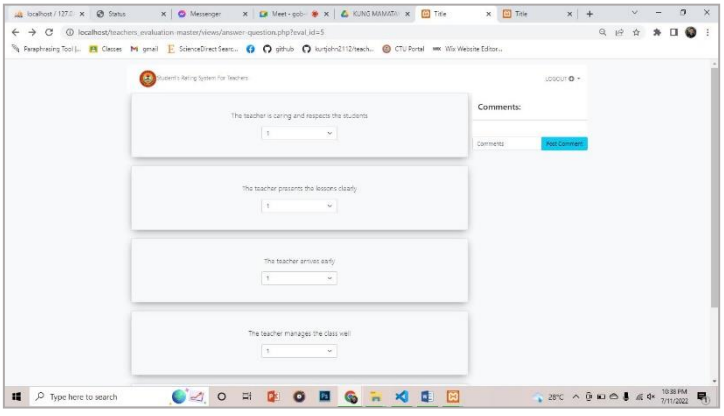


Fig.13. Ratings Page

Figure 13 shows the page where the Student can rate a teacher based on a scale of 1 to 5 where 5 being the highest and 1 being the lowest. Students can also add comments which will be reflected on the generated reports.

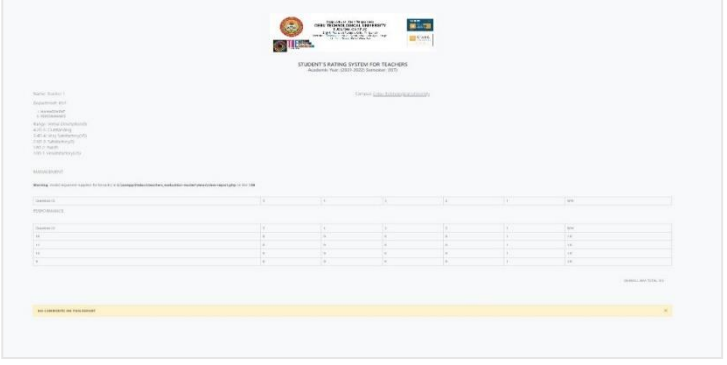


Fig.14. View Reports Page

This page is where the user can view the individual reports of the teachers based on the ratings given by the students. All comments that are submitted by the students will also be reflected on the reports page. Refer to figure 14.

1.14 Data Design

This phase depicts the various types of data stored in the system, as well as how the proponents use the relationship between each data and the various ways the data are grouped and organized. A data design is a blueprint or roadmap that allows for a more in-depth understanding of the data stored in the system.

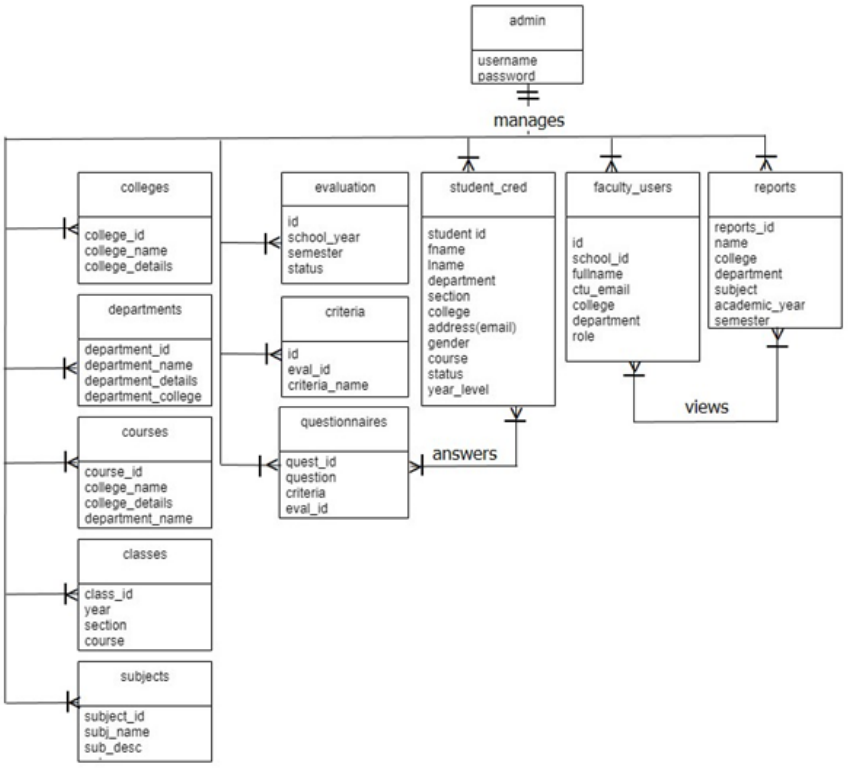


Fig.15. SRST Entity Relationship Diagram

Shown in Figure 15 is the Entity Relationship Diagram of the proposed system. This depicts the relationships among the entities within the system. Enclosed in rectangular shapes are the entities involved in the system together with their attributes. Connecting the entities together are the connections.

1.15 Development

This phase covers the development plan for the project. It also includes the hardware, the software and the program requirements for the system to operate. This phase also includes the deployment and the test plan for the project.

Software Specifications

The table below lists all the software requirement specifications needed for the system to operate.

TABLE II. SOFTWARE SPECIFICATION

Component	Specification
XAMPP	Build Version V3.2.4
Google Chrome	Version 98.0.4758.102 (Official Build)(64 bit)
Visual Studio Code IDE	Product Version 1.56.2 (64 bit)

Table 2 shows all of the software requirements needed in the development of the system. Components include XAMPP for the localhost, Google Chrome for the browser and Visual Studio Code 2019 for the IDE together with their specifications and minimum requirements.

Hardware Specifications

The proponents listed all the hardware requirements needed for the development of the system and the components needed for the system to operate which includes the processor, the RAM, the display or the monitor solution, the hard drive, the internet connection as well as the operating system.

TABOLE III. HARDWARE SPECIFICATION

Component	Specification
Processor	Intel(R) Pentium(R) Silver N5000 CPU @ 1.10GHz 1.10 GHz
RAM	4.00 GB (3.83 GB usable)
Display/ Monitor Resolution	1366 x 768
Hard drive	64 bit
Internet Connection	Wireless (Wi-Fi)
Operating System	Windows 10

Table 3 shows the hardware requirements for the development of the system. Components include processor, RAM, display resolution, hard drive, internet connection and the operating system together with their components.

1.16 Testing

Software testing enables the developers to measure the quality of the system before deploying it. Every single unit were examined in order to determine what the system can do and how well it does it.

Unit Testing

TABLE IV. UNIT TESTING SUMMARY

Test Case No.	Test Name	Test Reference	Test Priority	Test Input	Test Expected Output	Test Verdict
UT01	Login	Account Module	1	Email and Password	Login successfully	Passed
UT02	Register	Accounts Module	2	First Name, Middle Name, Last Name, College, Department, Course, Year and Section, User type Email and Password	Registered Successfully	Passed
UT03	Create College	Colleges Module	3	College Name and College Details	College created successfully	Passed
UT04	Create Departments	Colleges Module	4	Department Name and Department Details	Submission Folder Added successfully	Passed
UT05	Create Courses	Colleges Module	5	Course Name and Course Details	Assigned Document successfully	Passed
UT06	Create Year and Section	Colleges Module	6	Year and Section	Shared successfully	Passed
UT07	Create Subjects	Colleges Module	7	Subject Name and Subject Details	Subject created successfully	Passed
UT08	Create Evaluation	Evaluation Module	8	School Year and Semester	Evaluation created successfully	Passed
UT09	Create Criteria	Evaluation Module	9	Criteria	Criteria created successfully	Passed
UT10	Create Questionnaires	Evaluation Module	10	Question and Criteria	Questions created successfully.	Passed
UT11	Rate Teachers	Evaluation Module	11	Answers and Comments	Answers Submitted	Passed
UT12	Upload Header	Upload Header Module	13	Image	Image uploaded	Passed
UT13	View reports	Reports Module	12	Name, Subject, Department and College	Reports Displayed	Passed

Table 4 shows the summary of the conducted unit testing on the system. In this phase every individual units or components of software are tested. The primary goal of the unit testing is to ensure that each unit of software code works as intended.

Integration Testing

TABLE V. INTEGRATION TESTING SUMMARY

Test Case No.	Test Name	Test Reference	Test Priority	Test Input	Test Expected Output	Test Verdict
ITO1	Accounts Module	UT02	1	First Name, Middle Name, Last Name, College, Avatar, User type/ Email and Password	System will store the user's inputted account information	Passed
ITO2	Colleges Module	UTO3-UTO7	2	College Name, Department Name, Course Name, Year and Section, Subject Name	System will store the created College information	Passed
ITO3	Evaluation Module	UTO8-UT10	3	Evaluation Name, Criteria Name, Questions, Answers, Comments	System will store all the information inputted by the users.	Passed
IT54	Ratings	UT011	4	Teacher Name and Subject Name	System will display the individual reports of a teacher	Passed
IT05	Upload Header	UT012	5	Image	System will display the uploaded image in the reports page	Passed
IT06	Reports	UT013	6	Teacher Name and Subject Name	System will display the individual reports of a teacher	Passed

Table 5 shows the integration testing summary of the project. This software testing stage is where the different units, modules and components of the system are tested and combined as a group. The table shows the Test name, the reference, the inputs, the expected outputs and the test verdict. This stage of testing is conducted to evaluate the compliance of a system or a component with specified functional requirements.

System/ Alpha Testing

TABLE VI. SYSTEM / ALPHA TESTING SUMMARY

Test Case ID	Test Suite Name	Description	Steps	Test Data	Expected Result	Actual Result	Pass/Fail	Remarks
ST1	Create Account	This will allow the users to create an account before logging into the system	Go to the "register here" link in the login page and fill out the information needed	Click submit	User is added successfully	User information are displayed	Pass	Good
ST2	Create College	The system lets the admin add a college, department, course, class and subject	Go to the college page and click add college.	Click Save	College added successfully	College details are displayed on the list	Pass	Good
ST3	Create an Evaluation	Administrator can create an evaluation, add criteria and questionnaires	Go to the Evaluation page and add evaluation, click the view button to add a criteria and questions	Click save	Evaluation Added successfully	Evaluation Details, Criteria and Questions are added	Pass	Good
ST4	Rate Teachers	Students can rate the teachers and add comments	Login as student and click on the name of the teacher you want to evaluate, fill out the questionnaire forms and click submit	Click submit	Answers Added	Answers Added	Pass	Good
ST5	Upload Header	Admin can browse the computer and add a header	Go to the navigation bar and click "upload header", choose a file to upload and click the upload icon.	Click the upload icon	Header Uploaded	**Header Uploaded Successfully, Check reports here**	Pass	Good
ST6	View reports	Admin can view the individual reports. Other users of the system can only view individual reports.	Admin must go to the reports page to view and share the reports. Teachers, Chairs and Deans will see the reports already after logging in.	Click view, click share	Reports shared successfully	Individual reports are displayed	Pass	Good

Table 6 shows the system level testing of the project. The proponents of evaluates how the various components of the system interact together and meets all of its requirements, which includes technical and functional requirements by utilizing various test types including the performance and usability of the system. This testing phase usually verifies that the system performs the task as expected.

Funding

We would like to declare that no external funding was received for this research. All resources and materials used in this study were provided by the researchers and their respective institutions.

Conflicts Of Interest

The authors declare no conflicts of interest in this study.

Acknowledgment

The researchers are grateful to Cebu Technological University Tuburan Campus specially the BS Information Technology Department for the opportunity to conduct this study.

References

[1] A. Akiri, "Effects of Teachers' Effectiveness on Students' Academic Performance in Public Secondary Schools; Delta State – Nigeria", Journal of Educational and Social Research, pp. 102-110, 2013

[2] A. Al-Khatib, "Web-based Teaching Evaluation Systems", International Journal of Information Technology & Management Information System (IJITMIS), pp. 15-27, 2014.

[3] M. Amjad, and N. Linda, "A Web Based Automated Tool for Course Teacher Evaluation System (TTE)", Bangladesh: I.J. Education and Management Engineering, pp. 11-19, 2020

[4] C. Bolyard , "Test-based Teacher Evaluations: Accountability VS. Responsibility", Ohio: Ohio Valley Philosophy of Education Society, pp. 73-81, 2015

[5] S. Benton, "Student Ratings of Teaching: A Summary of Research and Literature", Manhattan: The IDEA Center, pp. 1-11, 2018

[6] T. Beran and C. Violato, "Student Ratings of Teaching Effectiveness: Student Engagement and Course Characteristics", Canadian Journal of Higher Education, pp. 1-13, 2009

[7] H. Alkattan , Trans., "Employing Data Mining Techniques and Machine Learning Models in Classification of Students' Academic Performance", Babylonian Journal of Artificial Intelligence, vol. 2023, pp. 43–54, Aug. 2023, doi: 10.58496/BJAI/2023/008.

[8] H. Chen, M. Li, X. Ni, Q. Zheng, and L. Li, "Teacher effectiveness and teacher growth from student ratings: An Action Research of School-based Teacher Evaluation", Studies in Educational Evaluation, pp. 1-13, 2013

[9] J. Cohen and D. Goldhaber, "Observations on Evaluating Teacher Performance. In Improving Teacher Evaluation Systems: Making the Most of Multiple Measures", New York: Teachers College Press, pp.8–21, 2016

[10] K. Connally and M. Tooley, "BEYOND RATINGS: Re-envisioning State Teacher Evaluation Systems as Tools for Professional Growth", EDUCATION POLICY, pp. 6-8, 2016

[11] S. Culver, "Course Grades, Quality of Student Engagement, and Students' Evaluation of Instructor", International Journal of Teaching and Learning in Higher Education, pp. 3-10, 2010

[12] G. Daley and L. Kim, "A Teacher Evaluation System that Works. Santa Monica", National Institute for Excellence in Teaching, https://files.eric.ed.gov/fulltext/EJ938568.pdf, 1-2, 2010

[13] S. Doan, J. Schweig & K. Mihaly, "The Consistency of Composite Ratings of Teacher Effectiveness: Evidence from New Mexico", American Educational Research Journal, https://journals.sagepub.com/doi/10.3102/0002831219841369, pp. 2117-2119, 2019

[14] P. Downing, "Effects of Teacher Evaluation on Teacher Job Satisfaction in Ohio", pp. 127-134, 2016

[15] A. Eguid, C. Kho and S. Tatang, "Student Academic Evaluation and Advising System", https://capstoneguide.com/student-academic-evaluation-and-advising-system-capstone-project-document/

[16] V. O. Nyangaresi , Tran., "Role of Artificial Intelligence (AI) in Improving Educational Quality for Students and Faculty", Babylonian Journal of Artificial Intelligence, vol. 2023, pp. 83–90, Dec. 2023, doi: 10.58496/BJAI/2023/012.

[17] J. Grissom and S. Loeb, "Assessing principals' assessments: Subjective Evaluations of Teacher Effectiveness in Low and High-stakes Environments", Education Finance and Policy, https://direct.mit.edu/edfp/articleabstract/12/3/369/10273/Assessing-Principals-Assessments-Subjective?redirectedFrom=fulltext, pp. 369–395, 2017

[18] L. Goe, L. Holdheide and T. Miller, "A Practical Guide to Designing Comprehensive Teacher Evaluation Systems", Washington, DC: National Comprehensive Center for Teacher Quality, https://www.ets.org/research/policy_research_reports/publications/report/2011/ivtg, pp. 1-50, 2011

[19] E. Hanushek, "The economic value of higher teacher quality", Economics of Education Review,https://hanushek.stanford.edu/sites/default/files/publications/Hanushek%202011%20EER%2030%283%29.pdf, pp. 466 479, 2010

[20] L. Hammond, "Creating a Comprehensive System for Evaluating and Supporting Effective Teaching", Stanford: Stanford Center for Opportunity Policy in Education, https://edpolicy.stanford.edu/sites/default/files/publications/creating-comprehensive-system-evaluating-and-supporting-effective teaching.pdf, pp. 1-39, 2012

[21] W. S. H. Alalwany and J. F. Yonan , Trans., "Role of Artificial Intelligence (AI) in Improving Educational Quality and Networking for Students and Faculty ", BJN, vol. 2023, pp. 66–76, Aug. 2023, doi: 10.58496/BJN/2023/008.

[22] S. Jimaa, "Students' Rating: Is it a Measure of an Effective Teaching or Best Gauge of Learning", Procedia - Social and Behavioral Sciences, pp. 30 – 34, 2013

[23] J. Jimerson,V. Cho and J. Wayman, "Student-involved data use: Teacher practices and considerations for professional learning", Teaching and Teacher Education 60, https://www.sciencedirect.com/science/article/abs/pii/S0742051X16301366 , pp. 413-424, 2016

[24] S. Kimball and A. Milanowski, "Examining Teacher Evaluation Validity and Leadership Decision Making Within a Standards-Based Evaluation System", Educational Administration Quarterly, pp.1-2, 2009

[25] M. Kraft, and A. Gilmour, "Can Principals Promote Teacher Development as Evaluators? A Case Study of Principals Views and Experiences", Educational Administration Quarterly,

https://journals.sagepub.com/doi/10.1177/0013161X211052501?icid=int.sjabstra ct .similar-articles, pp. 711–753, 2016

[26] C. Koedel, J. Li, M. Springer and L. Tan, "The Impact of Performance Ratings on Job Satisfaction for Public School Teachers, American Educational Research Journal, https://journals.sagepub.com/doi/10.3102/0002831216687531 pp. 244-245, 2017

[27] L. Lopez, J. Franco and J. Galan, "Constructing an Instrument with Behavioral Scales to Assess Teaching Quality in Blended Learning Modalities", Journal of New Approaches in Educational Research, pp. 142-165, 2019

[28] Comprehensive Review of Noise Pollution Sources, Health Impacts, and Acoustic Environments Affecting College and University Students (H. H. M. Ali, A. H. Farhan, & A. S. Jawad , Trans.). (2023). Mesopotamian Journal of Civil Engineering, 2023, 86-97. https://doi.org/10.58496/MJCE/2023/011

[29] L. Sartain and A. Zon, "Teacher Evaluation in CPS: REACH Ratings and Teacher Mobility", Chicago: Chicago Consortium Research Brief, https://consortium.uchicago.edu/sites/default/files/202003/Teacher%20Evaluation%20in%20CPS%20Mobility-Mar2020-Consortium.pdf, pp. 5-8, 2020

[30] A. Scheepers, "SET Project: Student Evaluations of Teaching, Measuring and Enhancing Course Quality and Teaching Quality", Rotterdam School of Management, https://equal.network/wp-content/uploads/2019/03/SET_Ad-Scheepers-.pdf, pp. 12-13, 2019

[31] S. Singh, S. Phade and S. Yeole, "Faculty Evaluation System. Journal of Emerging Technologies and Innovative Research (JETIR), https://www.jetir.org/papers/JETIR2004562.pdf, pp. 499-501, 2020

[32] J. H. Stronge, "Teacher evaluation and school improvement: Improving the educational landscape", Thousand Oaks, CA: Corwin, pp. 1–23, 2nd ed., 2006.

[33] M. F. Flayyih and H. Hassan TOUT, "Predictive analytics model for students' grade prediction using machine learning. A review", EDRAAK, vol. 2023, pp. 1–4, Jan. 2023, doi: 10.70470/EDRAAK/2023/001.

[34] M. Turnip, S. Aisyah and A. Sembiring, "Decision Support System of Teacher Performance Assessment with SMART Method", Journal of Physics and Conference Series. 2019