

**Unity university**

**SCHOOL OF ENGINEERING, TECHNOLOGY AND COMPUTATIONAL SCIENCES**

**GROUP PROJECT ON FUNCTIONAL AND NON-FUNCTIONAL REQUIREMETS**

GROUP MEMBERS ID NO

Abigail wondessen UUR02193/17

Addisalem Demis UUR00506/17

Hebron Samuel UUR00672/17

Misgana Getachew UUR00801/17

Natnael Bizuayehu UUR00785/17

Yeabbereket takele UUR01632/16

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**1. Introduction About the Project**

The Teacher Rating System is a comprehensive program designed to gather, analyze, and present feedback from students regarding their teachers. It focuses on improving the quality of education by enabling students to rate the teachers they have interacted with and provide comments on their performance. This system ensures that the feedback collected is structured, consistent, and reliable, helping both educators and administrators gain insights into areas of strength and improvement. By allowing students to provide feedback in a more formalized and secure manner, the system improves the overall evaluation process and offers a more objective way to assess teacher performance.

With the rise of data-driven approaches in education, there is an increasing need for reliable systems that can measure and improve the effectiveness of teaching. Traditional methods of teacher evaluation often rely on informal, unstructured feedback, which lacks consistency and is prone to inaccuracies. In contrast, the Teacher Rating System aims to overcome these challenges by providing a structured and secure platform for students to rate teachers. It helps educational institutions by offering insights that are not only quantitative (through numerical ratings) but also qualitative, through written comments that are analyzed for sentiment. This allows administrators to better understand the context of the feedback, making it easier to identify trends, strengths, and areas for improvement.

The system is built with a user-friendly console interface implemented in C++, which allows students to securely log in and rate their teachers based on their experiences. The feedback is limited to the teachers assigned to the students, ensuring that only relevant data is collected. Additionally, the system performs basic sentiment analysis on the comments provided, categorizing them as positive or negative. This analysis helps in providing a clearer picture of a teacher’s performance beyond just the numerical ratings.

One of the primary objectives of the Teacher Rating System is to maintain fairness and accuracy in the data collection process. By restricting students to rating only their assigned teachers, the system eliminates any bias that may arise from students rating teachers they have not interacted with. This also prevents duplicate ratings, ensuring that each student can only submit one rating per teacher, which further improves the reliability of the data. With these safeguards in place, the system delivers accurate, actionable feedback to both teachers and administrators.

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Furthermore, this system not only addresses the need for structured feedback but also strives to bridge the gap between subjective student opinions and objective performance metrics. Written comments are analyzed to determine the sentiment of the feedback, offering a deeper understanding of the context and tone of the students' assessments. This feature adds an important layer of nuance to the evaluation process, as administrators can better interpret the feedback and make informed decisions about teacher performance and professional development.

The growing importance of measuring and improving teacher effectiveness is reflected in the development of systems like this one. Educational institutions are increasingly relying on feedback from students to drive improvements in teaching methods. The Teacher Rating System plays a vital role in providing structured, consistent, and accurate feedback, which ultimately leads to better teaching practices and a more enriching learning experience for students.

Though the system is currently implemented with a basic console interface and array-based data storage, the potential for future development is vast. Key improvements could include adding persistent data storage to retain feedback across sessions, scaling the system to handle larger datasets, and incorporating a more user-friendly graphical interface (GUI). These enhancements would make the system even more effective, allowing it to be used in a variety of educational settings, ranging from small classrooms to large universities. By continuing to develop and refine the Teacher Rating System, it could become a powerful tool for improving education at all levels.

**2. Statement of Problems**

The existing systems for teacher evaluation often struggle with various issues that undermine their effectiveness. These problems can lead to unreliable feedback, inaccurate assessments of teacher performance, and ultimately hinder the potential for improvement in teaching methods. Below are some of the key issues faced by the current systems:

**1. Unstructured Feedback**: Many teacher evaluation systems lack a formal structure for students to provide consistent feedback. Students often submit feedback without clear guidelines, leading to feedback that is subjective, inconsistent, and difficult to analyze. Without a standardized method for students to rate their teachers, the data collected can vary significantly from one student to another, making it challenging to assess teacher performance accurately.

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**2. Unauthorized Access:** In many existing systems, there are no proper authentication measures in place to ensure that only authorized users—such as enrolled students—can provide feedback. As a result, anyone with access to the system could manipulate the feedback, leading to inaccurate or biased evaluations. This opens the door for misuse, such as teachers rating themselves or others submitting false feedback, which undermines the credibility and reliability of the evaluation system.

**3. Unrestricted Ratings**: In some teacher evaluation systems, students are able to rate any teacher they wish, regardless of whether they have been taught by that teacher. This leads to skewed results, as students may rate teachers they have not interacted with, and the feedback becomes irrelevant. Allowing unrestricted ratings reduces the validity of the data and can create unfair ratings based on limited or no experience with the teacher’s performance.

**4. Duplicate Ratings:** Without sufficient safeguards, many systems allow students to rate the same teacher multiple times. This results in duplicate ratings that can distort the evaluation process. The same student submitting multiple ratings for a single teacher can inflate or deflate a teacher's overall rating, which ultimately compromises the accuracy and integrity of the feedback system. Preventing duplicate ratings is essential for maintaining fair and reliable evaluations.

**5. No Sentiment Analysis:** Written comments submitted by students are often left unexamined in many teacher evaluation systems. As a result, the qualitative feedback is not analyzed to determine whether it is positive or negative. This omission leads to missed insights, as sentiment analysis of comments can provide a deeper understanding of a teacher’s strengths and areas for improvement. Analyzing the tone and context of student comments can reveal important details that numerical ratings alone may fail to convey.

**3. Objective of the Project**

**General Objective**

To develop a secure and efficient Teacher Rating System that allows students to evaluate teachers assigned to them, while administrators can view structured teacher rankings.

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**Specific Objectives**

**1. Authentication and Authorization:**

- Students and administrators can log in securely with a username and password.

- Teachers cannot access the system.

- Only administrators can access the ranking page.

**2. Rating and Comment Submission:**

- Students can rate teachers on a scale of 1–5.

- Students can submit an optional written comment (10–200 characters).

**3. Restrict Rating Access:**

- Students can only rate teachers who are assigned to them.

**4. Duplicate Rating Prevention:**

- Ensure each student can only submit one rating per teacher.

**5. Ranking Page (Admin Only):**

- Display teacher rankings based on:

- Average ratings (1–5).

- Percentage of good comments.

- Percentage of bad comments.

**6. Comment Analysis:**

- Analyze student comments to classify them as "good" or "bad."

- Use the ratio of good to bad comments to refine the teacher rankings.

**4. Limitations of the Project**

The system has a few limitations that should be noted. First, it uses array-based storage, which means all data is lost when the system is closed, as there is no persistent storage in place. The

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system also has limited scalability, only being able to manage a small number of teachers, students, and ratings at once. Another limitation is the static teacher assignments, where teachers are manually assigned to students in the program, making it less flexible. The system also uses a console-based interface, which limits its usability compared to a graphical user interface (GUI). Finally, the sentiment analysis of comments is quite basic, with comments being classified simply as “good” or “bad” based on basic filtering, which doesn’t capture the full complexity of feedback.

**5. Scope of the Project**

**5.1 Geographical**

The project is ideal for small-scale educational institutions or classrooms where teachers' performances are evaluated locally.

**5.2 Functional**

The Teacher Rating System has the following features:

**1. Authentication and Authorization:**

- Students log in to rate teachers.

- Administrators log in to access the ranking page.

- Teachers do not have access to the system.

**2. Rating and Comment Submission:**

- Students rate teachers on a scale of 1–5.

- Optional comments (10–200 characters) can be submitted with ratings.

**3. Restricted Rating Access:**

- Students can only view and rate teachers assigned to them.

**4. Duplicate Rating Prevention:**

- Students cannot rate the same teacher more than once.

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**5. Ranking Page for Administrators:**

- Teachers are ranked based on:

- Average ratings.

- Ratio of good to bad comments.

**6. Comment Analysis:**

- Comments are filtered into good or bad categories.

**6. Significance**

The Teacher Rating System plays an important role in helping educational institutions evaluate and improve teaching quality in a fair and organized manner.

For Students, it offers a chance to provide valuable feedback on teachers they have been assigned to. This feedback can help identify strengths in teaching methods as well as areas that need improvement, allowing students to contribute to the overall quality of education.

For Administrators, the system provides a clear view of teacher performance, making it easier to track and analyze feedback. By looking at both ratings and the ratio of positive to negative comments, administrators can make more informed decisions about teacher development and identify where improvements are needed across the board.

For Teachers, the system offers constructive insights based on the feedback they receive from students. Understanding both the positive and negative aspects of their performance helps teachers refine their teaching methods and enhance their effectiveness in the classroom.

The system ensures fairness by restricting students to rating only the teachers they are assigned to, avoiding any potential bias. It also prevents duplicate ratings, making sure the data remains accurate and reliable.

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**7. Organization of the Project**

The project is organized into the following modules:

**1. Authentication Module:**

- Allows login for two user types: Students and Administrators.

- Ensures teachers cannot access the system.

**2. Teacher Assignment Module:**

- Displays only the teachers assigned to a specific student.

**3. Rating and Comment Module:**

- Students can submit a rating (1–5) and an optional comment (10–200 characters).

**4. Duplicate Rating Prevention Module:**

- Prevents students from rating the same teacher multiple times.

**5. Comment Analysis Module:**

- Classifies comments into good or bad based on keywords or basic filtering.

**6. Ranking Module:**

- Calculates teacher rankings based on:

- Average rating.

- Ratio of good to bad comments.

**7. Administrator Module:**

- Allows administrators to view teacher rankings and performance summaries.

**8. Conclusion**

The Teacher Rating System offers an effective and straightforward way for students to provide feedback on their assigned teachers. By preventing duplicate ratings and restricting access to only the relevant teachers, the system ensures that the feedback remains accurate and fair.

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Administrators can use the system’s structured approach to analyze teacher performance based on both numerical ratings and the sentiment of comments, providing a comprehensive view of teacher effectiveness.

While the system currently relies on array-based storage and a console-based interface, it successfully meets its core objectives of usability, accuracy, and fairness. The system not only streamlines the feedback process but also allows educational institutions to gather meaningful data for improving teaching quality. Teachers can benefit from constructive feedback, and administrators have a clear way of assessing overall teaching performance.

Despite its limitations, the system is a valuable tool that helps bridge the gap between students and teachers, fostering a more transparent and data-driven approach to improving education. Future improvements, such as implementing persistent data storage and a more user-friendly interface, would further enhance its potential.

**9. Recommendations**

The following enhancements are recommended to improve the system:

**1. Persistent Storage:**

- Implement file storage or a database to preserve data across sessions.

**2. Dynamic Teacher Assignment:**

- Allow administrators to dynamically assign teachers to students.

**3. Graphical User Interface (GUI):**

- Replace the console interface with a user-friendly graphical interface.

**4. Advanced Sentiment Analysis:**

- Use machine learning or advanced tools to analyze comments for better accuracy.

**5. Scalability:**

- Optimize the system to handle larger datasets of teachers, students, and comments.

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