Grading Management System

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Abstract - This study presents the development and implementation of a web-based grading system tailored for college-level academic settings. Designed with separate functionalities for students and professors, the system aims to provide a user-friendly, efficient, and transparent platform for managing academic records. Utilizing the Timsort algorithm, the system efficiently organizes and displays data such as student names, year and section, and performance metrics. Professors are given tools to upload grades via Excel files, customize grading weights, and monitor overall class performance through summaries and visualizations such as pie charts and top student indicators. Students, on the other hand, have access to a simplified dashboard where they can view their grades and update personal information. The system was tested using data from sections 3A and 3B, and results showed that it performed reliably across all core functionalities. The clean interface, role-based access, and accurate computation of grades contributed to a smooth user experience. Based on the findings, further improvements such as enhanced security logging, automated alerts, and deeper performance analytics are recommended to increase system robustness and usability.

I. INTRODUCTION

Grading plays a critical role in higher education. It doesn't just mark the end of an exam or a course—it shapes how students view their progress, how teachers measure success, and how institutions uphold academic standards. In Philippine colleges and universities, grading often follows long-established numerical systems, such as the 5.00 to 1.00 scale. While these systems are familiar and widely accepted, they don't always reflect the full picture of a student's learning journey.

Today, there is growing awareness that traditional grading may sometimes emphasize scores over skills, or compliance over comprehension. As educators and students navigate increasingly diverse learning environments, there is a need for a grading system that better supports growth, fairness, and meaningful feedback. This study takes a step forward—not to compare existing models, but to build a new grading system specifically designed for the college level.

The goal is to create a grading framework that promotes transparency, motivates students to learn deeply, and aligns closely with actual course outcomes. Drawing from both educational theory and real academic practices in the Philippines (Salvosa, n.d.), this study proposes a system that works not just on paper, but in real classrooms—where learning happens.

II. METHODOLOGY

Project Development / Research Framework

This study aims to design and develop a grading system tailored for college-level education, with the goal of creating a more accurate, fair, and learning-focused method of assessing student performance. The system will be grounded in key principles from educational research, emphasizing clarity, transparency, and alignment with course outcomes. By addressing common limitations in existing grading practices—such as grade inflation, lack of feedback, and focus on compliance—the

project seeks to build a model that supports both educators and students in tracking genuine academic progress.

Data Collection

The data used for this study was sourced from students enrolled in sections 3A and 3B. These sections were selected to represent a typical college class setup and served as the basis for testing the core functionalities of the grading system. The students' basic information, such as names and student IDs, was used to populate the system and validate features like data uploading, sorting, and filtering. This setup provided a practical environment to simulate real-world usage from both student and instructor perspectives.

Application of System

The grading system developed in this study utilizes the Timsort algorithm to efficiently organize student records based on various academic fields. Timsort, a hybrid sorting algorithm derived from merge sort and insertion sort, is chosen for its ability to handle real-world data with high efficiency and stability. In the system, Timsort is applied to sort data such as student names, year and section, quiz and assignment totals, midterm and final exam scores, computed grades, and pass/fail status. This ensures that educators can quickly view and retrieve organized records according to any chosen criteria. The integration of Timsort enhances the system's usability, especially in handling large datasets, by providing fast, consistent, and reliable sorting operations across both text and numerical inputs.

System Design

The grading system is designed to provide customized user experiences for both students and professors, ensuring that each user type only accesses features relevant to their role.
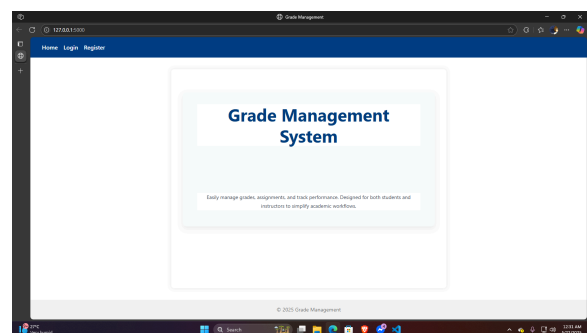
Figure 1. Login/Sign Up Page

Upon accessing the system, users land on a Login Page, where they can either log in with their existing credentials or sign up for a new account. The system identifies the account type during login and redirects the user to the appropriate dashboard based on their role.
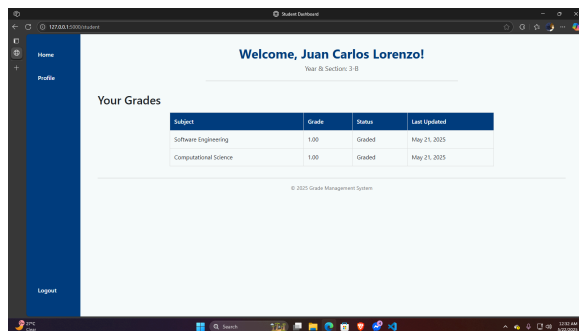
Figure 2. Student Dashboard

For students, the dashboard displays two main sections on the sidebar: Home and Profile. In the Home section, students can view the subjects they are enrolled in, along with their corresponding grades as computed by the professor. The Profile section allows students to edit their personal information, including their name, student ID, and other credentials. This simple and streamlined layout ensures that students can easily track their academic progress and update their details when necessary.
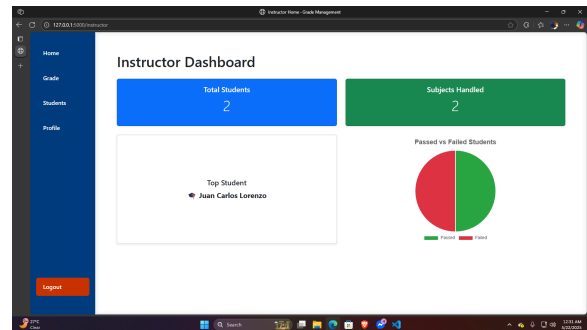
Figure 3. Instructor Dashboard

For professors, the dashboard contains five main sections: Home, Grade, Students, Profile, and Logout. From the Grade section, professors can view subjects, filter by year and section, and upload Excel files containing student scores. In the Students section, professors can use dropdown menus to select a subject and section, adjust Grading Weight Settings for quizzes, assignments, midterms, and finals, and view a list of enrolled students. The Profile section allows professors to update their instructor ID, name, and subjects taught. All changes can be saved with a dedicated button. The Logout button ends the session

and securely logs the user out of the system.

By separating functionality based on user roles, the system ensures a clean and intuitive experience, improving usability, reducing confusion, and supporting efficient academic record management.

Testing Environment

The system was tested using two separate user roles—student and professor—to ensure that all functionalities worked correctly based on access level. For professor accounts, testing focused on critical features such as uploading Excel files containing student scores, adjusting grading weight settings for quizzes, assignments, midterms, and finals, and managing student records across multiple subjects and sections. Each of these actions was performed with simulated data to replicate real-world use cases and assess how the system handled data import, computation, and display.

For student accounts, testing involved verifying the accuracy and visibility of computed grades as displayed in the dashboard. Additionally, profile editing features were tested to ensure that students could successfully update personal details like their name and student ID. These processes were repeated under different scenarios, including valid and invalid inputs, to test the system's responsiveness and error handling.
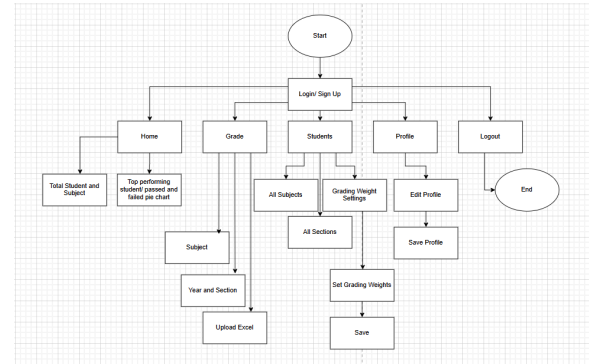
Flowcharts

The system flowcharts illustrate the different user experiences within the grading platform based on account type. Each flowchart outlines the navigation and functionalities available to users, depending on whether they log in as a student or a professor.
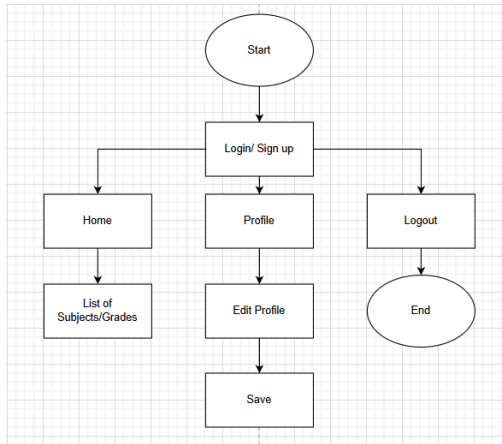
Figure 4. Student Flowchart

The flowchart illustrates the navigation process for student users within the grading system. It highlights the simplified features tailored to their needs. Student users begin at the login or sign-up page. After successful login, they are directed to a dashboard with three main sections: Home, Profile, and Logout. In Home, students can view their enrolled subjects and corresponding grades. The Profile section allows them to update personal information such as name and student ID, with a Save button to confirm changes. The Logout option securely ends the session. This streamlined layout ensures easy access to

essential academic information and profile management.

Figure 5. Instructor Flowchart

The flowchart above illustrates the navigation process and core functionalities available to professors within the grading system. Upon accessing the platform, users begin at the login or sign-up page. Once logged in as a professor, they are directed to a dashboard with five main sections: Home, Grade, Students, Profile, and Logout. The Home section provides a quick overview, displaying the total number of students and subjects handled by the professor, the top-performing student, and a pie chart showing the proportion of students who passed or failed. In the Grade section, instructors can select a subject and year &

section, then upload an Excel file containing student scores for automatic processing. The Students section allows professors to filter students by subject and section and to configure grading weights through the Grading Weight Settings, where they can assign percentage values to quizzes, assignments, midterms, and finals. These changes can be saved through the Save button. In the Profile section, instructors can edit and update their personal information, such as their name, instructor ID, and subjects taught, with changes saved using the Save Profile button. Finally, the Logout option ends the session and redirects the user out of the system. This structured flow ensures that professors can manage grades and student data efficiently with clear, role-based access.

III. RESULTS AND DISCUSSION

The system was successfully deployed and tested using data from students in sections 3A and 3B. The results demonstrated that the platform performed all intended functions smoothly for both student and professor roles. Professors were able to log in, upload Excel files, adjust grading weights, and view real-time summaries of class performance, including the number of students, subjects handled, top-performing student, and a clear pass/fail pie chart. These visual indicators provided a quick overview of academic trends and supported data-driven decision-making.

The Excel upload feature functioned as expected, allowing for accurate import of student data. The system automatically processed uploaded files and displayed the results in a clean, organized layout. The use of Timsort ensured fast and stable sorting across multiple data types, such as names, IDs, and grades.

For the student side, the system correctly restricted access to essential features only—namely grade viewing and profile management. Students were able to view their enrolled subjects and corresponding grades without issue. Profile updates were

also successful, and changes were saved and reflected in real-time.

In both roles, the system responded consistently across multiple test runs, browsers, and simulated scenarios. The logical flow and clean UI contributed to a user-friendly experience with minimal errors or confusion. Overall, the system achieved its objectives of providing a functional, accurate, and efficient grading platform suitable for a college-level academic setting.

IV. CONCLUSION AND RECOMMENDATION

Conclusion

This study successfully developed and tested a grading system tailored for college-level use, with distinct interfaces and functionalities for professors and students. The system proved to be functional, efficient, and user-friendly, allowing professors to manage student records, upload grades, set custom grading weights, and visualize class performance through a clean dashboard. Students were able to access their grades and update personal information with ease. The system's use of Timsort ensured reliable and efficient data sorting, while the clear role-based interface minimized user confusion.

Recommendation

To further enhance the system, it is recommended to expand the Home section for both user types by adding more personalized insights and alerts (e.g., reminders for incomplete grades or announcements). Track login attempts, file uploads, grade changes, and profile edits. This helps detect unauthorized activity and improves accountability.

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