

Student Mark Entry Portal (SMEP)

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1. Introduction

We all know that Google Classroom is a conventional web service that allows schools to simplify creating, distributing and grading assignments online, facilitating paperless communication between teachers and students. Presumably, the benefits of this web service were much appreciated by the teachers of Hwa Chong Institution, to the extent that it is very widely used. One of the many uses of Google Classroom which our group will be focusing on would be the utilization of this web service for teachers to analyse the grades of the students.

By uploading an Excel file on this virtual platform, the students are expected to open the Excel file and enter their scores for common tests and assignments, then upload the saved file back onto the platform. As convenient as it seems for the teachers, the process is often unclear and disorganized for the students. These complications include, but are not limited to:

- i. Having to log into their respective school Google account, download the file then re-uploading it shows how inaccessible the platform, and inconvenient it is for the students to enter their grades.
- ii. Entering the scores using Microsoft Excel application on mobile is very troublesome due to its small size, and can be a hassle for phones with smaller screens.
- iii. Teachers have to export each and every Excel files of the students for collation and in order to conduct analysis.

2. Objective & rationale

The Student Mark Entry portal (SMEP) intends to create an easily accessible platform for both the students to enter, and teachers create or do basic analysis of subject scores from common tests or written assignments. Our project aims to aid the workflow in class, ensuring that the process is made more convenient for both teachers and the students. Our group managed to devise a mobile application and online portal which simplifies the mark entry and mark analysis process for the students and teachers respectively.

Our group conducted a survey in which there were over 70 respondents, ranging from teachers to Secondary 1 to Secondary 4 students of Hwa Chong Institution. With over 70 percent of the students claiming that they have faced much difficulties entering marks through the means of using Google Classroom, and over 50 percent of the teachers having an inclination for a more effective and efficient way to collate and analyse the scores. After collecting and collating feedbacks from them, we conclusively conclude that there is a high demand and need for a solution that will improve the current problem faced by majority of the Hwa Chong population.

Our project is able to tackle and solve the following issues faced by the teachers and students:

- i. Time-consuming process
- ii. Constant appearances of pop-up error messages when the students attempt to log into their school Google account, or also if they use the wrong account (personal email)
- iii. Inconsistencies in the process of marks analysis due to the need for teachers to acquire the results of each student from separate Excel files, which will in turn lead to inaccuracies of the collation of marks.

3. Target Audience & Intended Outcome

Our project is directed at the Hwa Chong population, mainly the High School section. We created a separate portal alongside with different user interfaces for the teachers and students. Our group intends to implement the project in the High School section as a start, then further proceed to bring our project to the Junior College Section.

We conducted a short beta-testing for our mobile application and web portal prototype on selected individuals consisting of mainly students and teachers to ensure unbiased opinions and feedbacks from our test respondents. Generally, the feedbacks given were positive remarks, in which includes:

- i. Mobile interactions are foolproof and easily navigable, making our portal mobile-friendly
- ii. The use of access codes (will be covered on in Process and stages of development section) were used instead of teachers inviting students to the analysis will speed up the process and prevent complications occurring between both parties.
- iii. Categorizing the questions into sections allow students and teachers to check and view the analysis more efficiently.
- iv. Easily accessible on mobile devices and desktop

4. Methodology

Our group used a wide array of software to create the project. After carefully weighing the options available to us, we decided to use Node.JS for the backend of our program, HTML for the frontend as well as RethinkDB for the database.

Since Node.JS it is an application runtime environment which allowed us to write server-side applications in JavaScript, it is lightweight and thus ensured maximum efficiency due to the fact that the frontend uses JavaScript as well.

On the other hand, we chose to use HTML and JavaScript for the frontend of our project due to its compatibility and the rather simple use of templates and basic coding language, which makes the designing of the web page and user interface easier with less complications.

RethinkDB was the best option to be used for our project's database due to its efficient real-time push architecture. In other words, it is capable of continuously pushing updated

results to the intended receiver in real time. This will allow the teachers to receive the subject scores from the students almost instantaneously as the students submit their scores. Apart from this, RethinkDB is a FOSS(Free and Open Source Software) which means that it has great support from the community, and its NoSQL structure makes it very easy to use with Node JS, as well as having an internal cache to serve requests at amazing speeds, which is beneficial to the overall application.

5. Process

The process for both the students and teachers are rather straightforward and uncomplicated. We designed the mark entry portal in such a way it would be easily navigable and accessible on both mobile and desktop devices.

As for the teachers, first login with their respective username and password, and create a new analysis for the students by selecting the number and type of questions, then customizing the maximum score for each question achievable by the students. After saving, an access code would be generated on the analysis page and it can be distributed to the students, thus allowing them to fill up the analysis. The results will then be received by the teachers as the students submit their completed analysis simultaneously. After the analysis has ended, the teacher can download the results easily and without much hassle.

Regarding the students, they can first login with their respective IDs and password, then enter the access code which will be provided by the teacher. The students will then choose the amount of marks they have achieved for each question, since our portal has the multiple-choice function, the students are not required to enter the marks one-by-one using a keyboard. Upon finishing, simply click the submit button to turn in their respective analysis.

6. Stages of development

Our group started off the project by first identifying the major issues faced by most students, we then brainstormed for solutions and came up with ideas to approach these problems. Subsequently, we improved our project by pinpointing the smaller downsides and drawbacks of the currently-available platforms used by the teachers and students for mark analysis, for instance Google Classroom, which is the main focus of our group.

Since the three of us are quite familiar with the programming language and software we planned to use, which includes Node.JS, HTML and RethinkDB, the role allocation process was rather straightforward. William, the group leader was in-charge of the backend, Shaun programmed the frontend, while Chie Weng was responsible for the design of the user interfaces and logistics which includes slides and the written report.

We started developing our app in early April after the Projects Evaluation Round and completed the prototype by late June. Following the completion of our prototype, we conducted a beta-testing on a selected group of teachers and students, where our project gained much approval from the majority of the population. Regardless, we continued striving for improvement by refining the application based on the feedback we collated.

Promptly after the Project Semi-Finals, we began developing our final application. and we managed to complete in within a short period of time.

7. Resources & Reflections

In the course of the development of this project, there definitely were times when we were unable to find the best way to implement a certain feature or component of the project. We have referred to various sources online such as the Mozilla Developer Network for Javascript documentation, as well as W3Schools for providing examples of usage for HTML and CSS that we can refer to.

Our project would also not be possible without the various open-source libraries that help us to implement features with ease and functionality. We would like to thank the authors of those libraries for providing them to us for our usage.

We have taken much out of this project, from the various experiences interacting with group members from different classes as well as coming down to solve issues as a group, as well as learning and enjoying programming along the way, and hopefully creating something that can be beneficial to the school.

However, there are always areas for improvement as we do not believe that any project is perfect. Our platform can be supplemented with more analysis algorithms to analyse the marks of the students, as well as many improvements on the intuitiveness of the application such as the design. The main reason we were unable to include those functions was due to the lack of time for the project.

8. Citations & References

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