Final Deliverable

StudySync Web Extension

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CM2020: Agile Software Projects

Team 68 (Tutor Group 6)

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# 1 Background

## 1.1 Introduction

Two months ago, our group proposed a project, StudySync, that would meet the vision statement below. The proposal laid out a quality plan to ensure our team could bring this vision to life. Our team has worked diligently during the past months to bring this project to life through iterative development and a user-centred design philosophy. Section 2.1.3 of the project proposal clearly states the problems and objectives we aim to solve and meet.

“For computer science students enrolled in the program offered via Coursera and the University of London who need help to limit distractions to their studies, StudySync is a web extension that will provide a single point of access to study productivity tools. The web extension will use a whitelist to block all web traffic except for the URLs specified. The system will combine this with time-tracking analytics to provide actionable feedback on the quality of the user’s study sessions. The time tracker will track students' time spent studying

during semesters in each class and each specific task within classes. This extension will increase students’

productivity and provide actionable statistics to help guide their study sessions. This enables students to

create better study habits and become better students. Unlike the current productivity web extensions on the

market, our product will integrate directly with the Coursera website, contain no paywall, and come with out-

of-the-box functionality to combine into a low barrier to entry Coursera productivity extension.”

This final report details the successful implementation of the project and highlights the intricacies our team navigated in completing the project. The reader will understand why our group made certain decisions and how the implementation came to be. Finally, the report will reflect on the overall process from a group and individual perspective. Developing new skills and overcoming setbacks has been challenging and rewarding. Our team is proud of what we built and looks forward to navigating more complex projects throughout the rest of our degree.

Throughout this report, we will heavily refer to the work presented in our project proposal and thus classify it as a dependency. Specific references to relevant sections will be made by referring to the section title instead of repeating ourselves for brevity.

## 1.2 Literature

Our project proposal went through an in-depth analysis of the current products on the market that could solve our project's problems and objectives described in the above vision statement. The market analysis found that none of the current products could match the needs of our target demographic and what they wanted from a tool of this nature. This validated StudySync had a place within the market. We recommend reviewing section 2.1.2 of our project proposal to understand the market picture before StudySync’s development.

This market analysis significantly aided in developing the functionality and design of StudySync. The minimalist nature of these web extensions and the simplistic functionality were critical design heuristics our team saw as valuable within this market. The images below show how this market analysis influenced the overall outcome of StudySync. The simple colour scheme, the visual distinction of call to actions, and the input/output forms were some of the many items influenced by our research.

// TODO IMAGES

Reviewing this section of our project proposal proved to be critical for the development of StudySync. The market analysis was completed effectively, which helped guide our designs that our users widely accepted throughout the development process. In the evaluation section of the report, the SUS survey’s actively verified how our proposed design led to high usability satisfaction when functionality was added—a direct consequence of our market analysis.

Further literature review involved direct research regarding specific design patterns or functionality. This is better reserved for the planning and research section of the report, where sources and their influence will be discussed within their domain to show their effect on StudySync better.

## 1.3 Scope

Section 2.2 of the project proposal defined the project's scope. We defined significant features and limitations, scoped the development process via a Gantt chart, and explicitly defined the context in which the project was being built. Throughout the latter half of this class, this section was heavily referenced to ensure our team stayed within the scope and ultimately ensured the MVP met our stakeholder's expectations.

Within section 2.2.1 of the project proposal, we defined the significant features of our initial release. Through a robust testing system, we confirmed that the MVP produced by our team met the major features defined for release. The testing also demonstrated that the final MVP met our defined scope requirements.

We also defined a Gantt chart within this section of the report which will be touched on in section three of this report.

## 1.4 Group Work

We split the working tasks for the latter half of the course. While there was much overlap within the project, we did assign major roles to individuals that served as a guideline. Still, all four of us were crucial to implementing the MVP and the deliverable.

* Technical
  + Hashem was the technical lead. He oversaw the implementation of the web extension. He completed this role with his strong technical background and efficiently divided up roles related to the process. He was pivotal to the success of the project.
* Testing
  + Sunidhi and Mason were the lead quality assurance and user liaisons. They ensured the project stayed within scope and completed much of the research and user testing required to guide and validate it. They kept the stakeholders within the loop and efficiently guided the project toward a sound completion.
* Report
  + Gage managed the implementation of the report. He effectively divided roles and managed the report process throughout the latter half of the course.

# 2 Planning and Research

## 2.1 Research

Throughout the development process, many resources were used. Ranging from Google extension documentation to other BSc courses to discussion prompts. A high-level overview of these three resources follows.

### 2.1.1 Google Extension Documentation

Our project proposal identified Google Chrome as the sole supported web browser for StudySync in section 4.2.2. This was done in response to a survey which indicated around 70% of our target demographic use Google Chrome as their web browser. To ensure StudySync met the standards set by Google, we heavily referred to the Chrome extension developer documentation: <https://developer.chrome.com/docs/extensions/develop>. No one in the group has built a web extension before, and this resource proved invaluable to guide our project implementation.

To highlight this, one can see how the whitelist storage was implemented. We knew storage would need to be used when researching the project, and Hashem found the Google Chrome Storage API referenced in section 4.6.2 in the project proposal. However, we did not anticipate it being difficult to get the API to store the extension's data effectively and consistently. These web docs enabled us to navigate this trouble with efficiency.

A screenshot of a computer program

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Figure 1: The documentation used to help guide storage implementation.

### 2.1.2 Software Design and Development

The software design and development course offered by the University of London was another great resource which helped the testing team navigate that process. The testing Excel sheet provided in week 14 of that course served as the basis for our complex testing set. It also directed us to the SUS testing procedure to speed up and efficiently test the usability metrics of the extension. A detailed breakdown of SUS and how it affected the design can be found in the design portion of this report.

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Figure 2: test procedure provided in CM2010.

### 2.1.3 Discussion Prompts

Lastly, our group completed the discussion prompts throughout the course during our weekly meetings. These discussion prompts were primarily discussed ad hoc at the start of our meetings to help get us into a proper mindset for that week’s work. For example, the discussion prompt 7.202, the importance of integration testing, was discussed before we decided on a manner for testing StudySync. It helped guide us to relevant industry practices. It ultimately led us to choose the testing method provided in CM2010, focusing on ensuring the program met our functional requirements and verifying the validity of the MVP.

## 2.2 Planning and Iteration

In section 2.2.2 of the project proposal, we created a Gantt chart to guide us through the completion of this assignment. This Gantt chart made it extremely easy to compare our progress against the expectations we laid out for ourselves in the project proposal. We had to adjust it slightly after submitting the project proposal as we found that making weekly sprints dedicated to the features defined in section 4.3 of the project proposal was clearer and easier to manage rather than basing sprints on user stories. Every week, the three teams knew when they were expected to jump into the project and what they were expected to do. The technical team was given four days to implement a given system feature. The testing team was given one to two days to build a test set for that system feature and its completed functional requirements. Finally, a day was given for the team to meet live to reflect on the prior week and confirm the following plan.

This methodology worked exceptionally well for this project due to the work ethic of our team members. Hashem has industry experience and could produce efficient production-level code very quickly. While Sunidhi and Mason could promptly test and confirm the implementation, Hashem led to completion. Finally, Gage’s writing skills and project management oversight allowed the team to document and produce a quality final deliverable. In another setting, our plan would be too casual to lead to success. However, we feel the weekly meetings and effort put in by every teammate allowed us to follow a plan built for us that worked in our given circumstances. There were problems regarding prompt responses and confusion surrounding what was required at certain times. However, the simple nature of the user stories allowed us to clear up his confusion without limiting our end deliverable.

# 3 Prototyping and Iteration

## 3.1 Prototyping

Prototyping and evaluating user feedback was a critical aspect of our development process. Section 5 of our project proposal shows the prototype and user feedback loop followed to produce the design and user interface. In brief, the team used market analysis to create low-fidelity prototypes that met our project objectives. The prototypes were then tested against direct user feedback to see the direction the users wanted us to follow. We then quickly iterated through prototypes to come to a final design, which largely stuck throughout the project's development.

During the iterative development cycle, we used SUS surveys to test our usability choices every other week. The SUS survey allowed us to test our design choices held up when functionality was implemented. We found that the users responded positively to the product as functionality was implemented. Therefore, little was needed on our end to change the product's design as our development process proceeded. The market analysis and initial user involvement paid dividends as the project progressed. This allowed our technical team to focus on implementing our project solutions rather than adjust the design on the fly.

## 3.2 Iteration

Most of this half of the semester was spent in iterative development cycles loosely related to an agile development process. Our technical team was given a system feature to implement at the start of every week. The system features are in section 4.3 of the project proposal.

The technical team was then given four days to implement this functionality in our codebase. Hashem was the technical team lead, effectively divvied up roles, and managed the GIT repository in which the code base was stored. After the technical team implemented the functionality of the given week’s system feature, the testing team wrote a testing suite which directly mapped to the functional requirements covered by that particular system feature. The testing suite was then run to confirm all functionality was successfully implemented. The group then met every Saturday to discuss the past week and the overall success or failure of the sprint.

While this iterative process was ongoing, the report team was documenting all processes used by the team into a coherent final report which touched on the successes of the individual weeks and the project as a whole. For a picture of our work, our GIT logs and code base can be found in response 2 of this submission.

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Figure 3: Defining roles after project proposal submission.

Our team worked in a tight iterative loop based on a weekly approach. Due to the simplicity of the system features and in-depth research completed in the project proposal, we could quickly iterate through functional development and deliver what we set out to build.

# 4 Design

As mentioned in our introduction

# 5 System Development

## 5.1 Development Process

This section will cover the development process on a week-by-week basis. We followed an ad hoc agile development process based on user stories mapped to functional requirements. The development process followed an 8-week plan. Each week will be broken down below.

### 5.1.1 Week One

The technical team received US-1 from the project proposal to start the week. This is primarily mapped to system feature 4.3.1. the technical team

# 6 Analysis

# 7 Evaluation

# 8 Conclusion

# 9 Individual Reflection (Name)

# 10 Appendix

# 11 References