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Science and Engineering

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Final Report

Project Design and Management 300

# Abstract

This report has been generated to cover all aspects of the development of an online web platform for Curtin associates to collaborate on ideas and innovations. The report has been developed for the project client to address the key aspects of the project implementation, design and other project management issues. Outlined in this report is the project background, design and implementation decisions, full documentation for each Sprint iteration and a post-mortem discussion on the challenges faced.

The online platform was developed utilizing the Django framework, a high-level python web framework. Issue tracking was performed via the Pivotal Tracker platform, with version control also being applied as required. The back-end database of the platform was implemented via the SQLite database management system.

The project utilized Agile techniques and the SCRUM framework to ensure its success. SCRUM uses an iterative and incremental delivery solution to help deliver projects on track with all functionality implemented. The use of SCRUM ensured that the project was a success and that the team functioned efficiently and productively. The resulting solution delivered provides all the functionality requested by the project client in the requirements document. In addition to the functionality, the produced platform is fully polished with an easy to use and aesthetic user interface.

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# Introduction and Objectives

The main purpose of this report is to illustrate the process employed in developing our project solution for the Curtin Ideas platform. The report provides a detailed overview of the projects design and exists to summarize the teams progress over the previous four months. The primary audience of this report is the project client, in addition to anybody interested in understanding the SCRUM framework and its implementation on an academic group project.

Project objectives,

constrains, scope, delimitations

Approach used to complete work

Structure of report

# Background

Max 5 pages. Describe initial project management approach and plan. Discuss solution approaches considered. Describe other similar systems and possible solutions you have looked at. Describe tools considered for development and for SCRUM. Provide reason for choice of tools (Salami made us).The requirements volatility was quite low throughout the project, with minimal changes to the requirements by the product owner after the initial specification.

Talk about pivotal tracker.

The tools considered for use throughout the project were centered around the following various categories:

* Communication
* Task management
* Development
* Documentation.

Tools considered for communication were Facebook Messenger and Slack, for group messaging and Hangouts and Skype for video conferencing. Due to group member’s unfamiliarity with Slack we decided to go with the more familiar messaging platform and chose Facebook messenger for group messaging. As for the video conferencing solution, we discovered that Skype required premium access for group video calls . As a result of this we found that Skype did not fit our use case. On the other hand, Google Hangouts is a free service provided by Google and is easily accessible. Both of the choices we made, Facebook messenger and Hangouts were cross-platform tools which worked well with our group as members used a variety of devices from Android to iOS.

Using Facebook Messenger allowed us to stay in contact with each other throughout the project duration. The push-notifications allowed members to quickly respond to questions which increased our productivity and helped reduce stress as we were able to stay up to date during the development process. The usage of Google Hangouts also increased productivity greatly. Our primary use for Google Hangouts was as an informal conferencing tool. We found that, due to the tools we have chosen and the way we allocated tasks, some members did not know how to do some things that others knew how to. When such a situation occurred we found that using Hangouts as a way to explain step-by-step worked well. The ability to share-screen in Hangouts made it an excellent learning tool and allowed more knowledgeable group members to guide and teach others.

Tools considered for task management were chosen to be suited for the SCRUM methodology. Software considered included Atlassian’s JIRA, Pivotal Lab’s Pivotal Tracker and Trello. The group began to use JIRA but discovered that the trial was not sufficient for the project. As the project owner had given us access to Pivotal Lab’s Pivotal Tracker we decided to use that instead of JIRA. However, the group found Pivotal Tracker a little cumbersome to use and we decided to also use Trello to track the tasks.

Pivotal Tracker allowed us to keep track of and manage the user stories that we complete for each sprint as well as our product backlog and icebox. Pivotal Tracker also allowed us to keep track of the tasks we needed to complete for a user story. Using Trello gave us a mobile and cross platform way to keep track of the tasks needed for each user story. Having all the group members in the same Trello group allowed us to allocate and complete tasks quickly.

Tools considered for development of the project included PHP, C# ASP.NET, Django, and Node.js. Database solutions that we considered included MongoDB, MySQL, phpMyAdmin and sqlite3. Most of the group had no prior knowledge for web development so no matter the choice we had a large learning curve to overcome. After researching online, we opted for a simple database system for sqlite3. This allowed group members with limited database knowledge to create databases. In order to connect to our database, perform business login and serve the frontend we decided to go with Django for the web framework as some of our members had prior experience with Python. This allowed for good integration with sqlite3 as the Django web framework handles a lot of the database management for us. Both of our choices, Django and sqlite3 are open source which ensures that no additional cost is passed onto the client.

The Django web framework allowed for quick and easy organisation with a Model/View/Control layout which allowed a clean way for us to develop the website. Django also offered ORM (object relational mapping) where much of the databases were setup and handled automatically. Django also had the advantage that it is based on Python. Which was a familiar programming language for some members of the group.

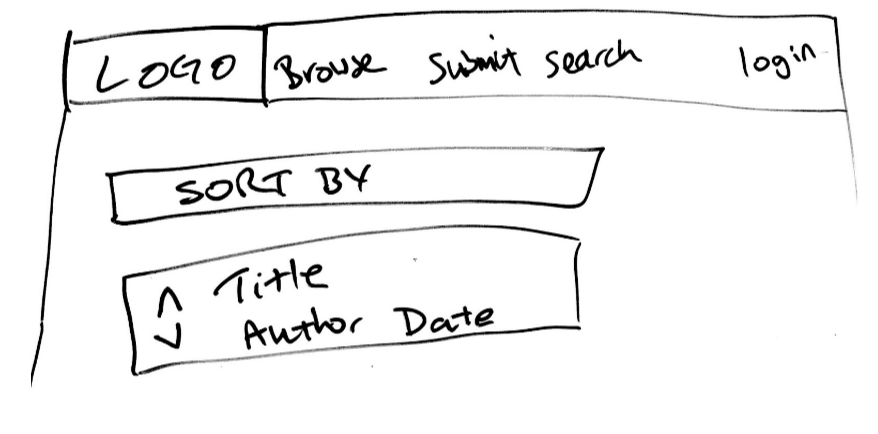


Figure 1: Project Mockup

# Product Backlog

Upon receiving the project requirements from the client, the requirements were converted into a collection of 45 user stories. These stories were further broken down into groupings for simplicity and to improve modulation when the stories were implemented. The following major groupings were applied to the user stories:

* Account
* Administration
* Commenting
* Posting Submissions
* Viewing Submissions
* Voting
* Rewards

Each user story was allocated into a specific grouping, with each Sprint generally focusing on completing one or two groups of stories. The group allocations for all user stories are displayed below. For a more detailed overview of the product backlog and a breakdown of stories completed per sprint, see the attached file exported from *Pivotal Tracker* in Appendix B.

## 3.1 Account

* As a User, I want to login to the platform so that I can post a submission.
* As a User, I want to logout of my account so that nobody else can access my account.
* As a User, I want to create an account so that I can use the platform.
* As a User, I want to be able to change my password so that I can keep my account secure.
* As a User, I want to access user profile so that I can view specific user’s details.

## 3.2 Administration

* As an Admin, I want access to a Admin platform so that I can perform administrative actions.
* As an Admin, I want to create user profiles so that users can use my site effectively.
* As an Admin, I want to edit submissions so that I can remove offensive language.
* As an Admin, I want to remove submissions so that I can remove inappropriate submissions
* As an Admin, I want an Admin tag so that other Users see my account as an Admin.

## 3.3 Commenting

* As a User, I want to delete my improvements so that I can remove my improvement.
* As a User, I want to edit my improvements so that I can fix spelling errors.
* As a User, I want to delete my comments so that I can remove my comment.
* As a User, I want to edit my comments so that I can fix spelling errors.
* As a User, I want to suggest improvements to a submission so that I can improve upon an idea.
* As a User, I want to comment on a submission so that I can voice my support of the idea.
* As an Admin, I want to be able to delete comments because they may contain inappropriate material.
* As an Admin, I want to edit comments so that I can remove offensive language.
* As an Admin, I want to delete improvements so that I can remove inappropriate improvements.

## 3.4 Posting Submissions

* As a User, I want to post a submission so that I can put my idea onto the platform.
* As a User, I want to delete my submission so that I can remove my submission.
* As a User, I want to edit my submission so that I can fix spelling errors.
* As a User, I want to add images to my submission so that I can add relevant images to my submission.
* As a User, I want to add videos to my submission so that I can add relevant videos to my submission.

## 3.5 Viewing Submissions

* As a User, I want to view existing submissions so that I can see all submissions posted.
* As a User, I want to search all submissions so that I can find one relevant to my field of study.
* As a User, I want to sort submissions based on popularity so that I can see the most popular submissions.
* As a User, I want to sort submissions based on date so that I can see the newest submissions.
* As a User, I want to sort submissions based on views so that I can see the most popular submissions.
* As a User, I want to categorize my submissions so that other users can find it easily.
* As a User, I want to view submissions based on category so that I can view relevant submissions.

## 3.6 Voting

* As a User, I want to down-vote on submissions so that I can acknowledge submissions I dislike.
* As a User, I want to up-vote on submissions so that I can support submissions I like.
* As a User, I want to see the total votes for a submission so that I can see how popular it is.
* As a User, I want to up-vote on improvements so that I can support improvements I like.
* As a User, I want to down-vote on improvements so that I can acknowledge improvements I dislike.
* As a User, I want to only vote once for a submission so that voting is fair and equal for all users.
* As a User, I want to un-vote on submissions so that I can change my mind on voting.

## 3.7 Rewards

* As a User, I want other users to see my level when I post so that I can show off my level.
* As a User, I want to gain levels based on my points so that I am rewarded for utilizing the platform.
* As a User, I want to gain points when my submission receives votes so that I am rewarded for good work.
* As a User, I want to gain points for posting improvements so that I am encouraged to post again.
* As a User, I want to gain points for posting submissions so that I am encouraged to post again.
* As a User, I want to gain points for voting on submissions so that I am encourages to vote again.

## 3.8 Pivotal Tracker Analytics

The following figures illustrate the progress through the product backlog over the period of the project. Figure 2 shows the cumulative flow of points, while Figure 3 and Figure 4 display the project burnup and burndown respectively.

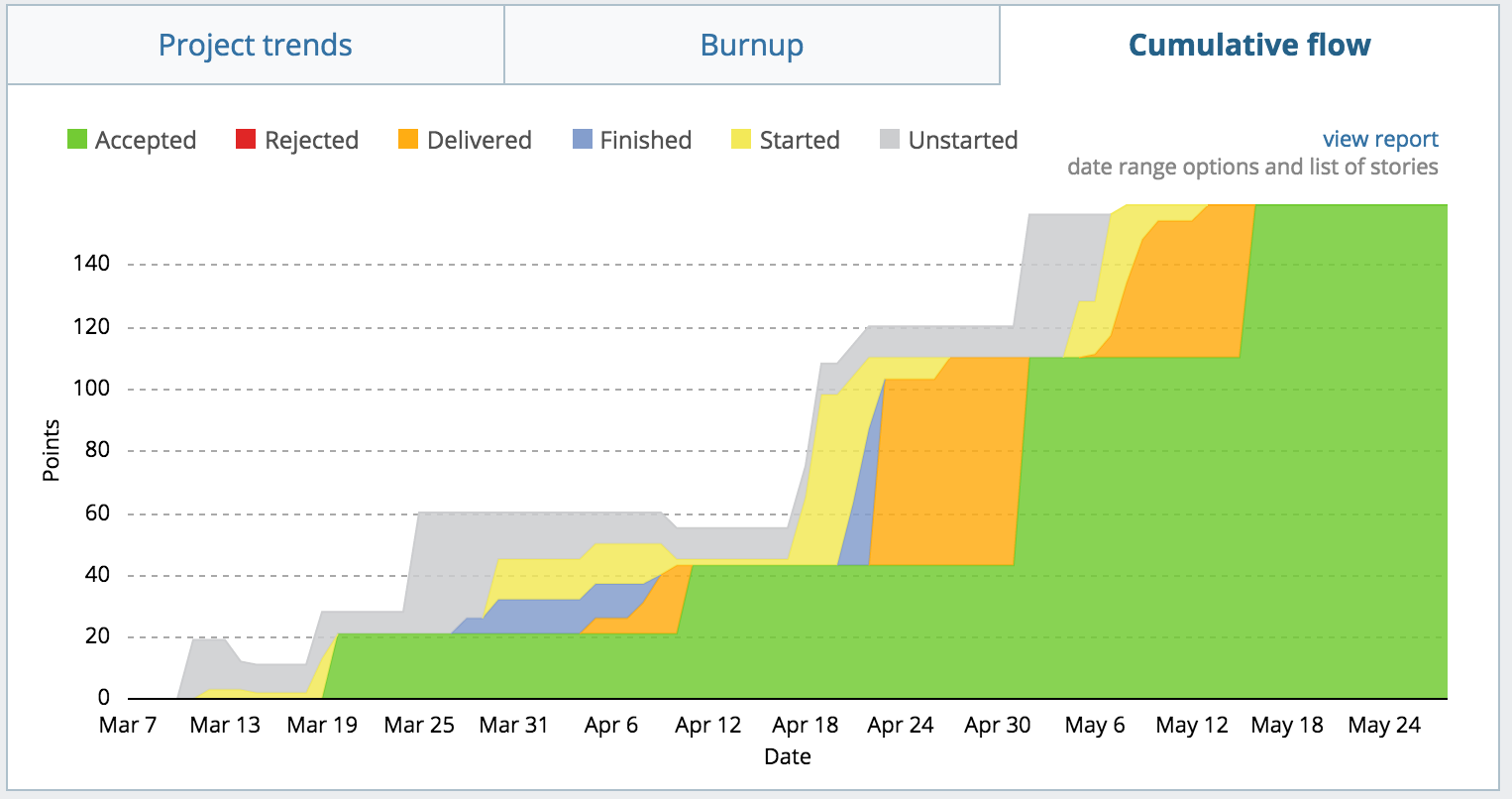


Figure 2: Cumulative Flow

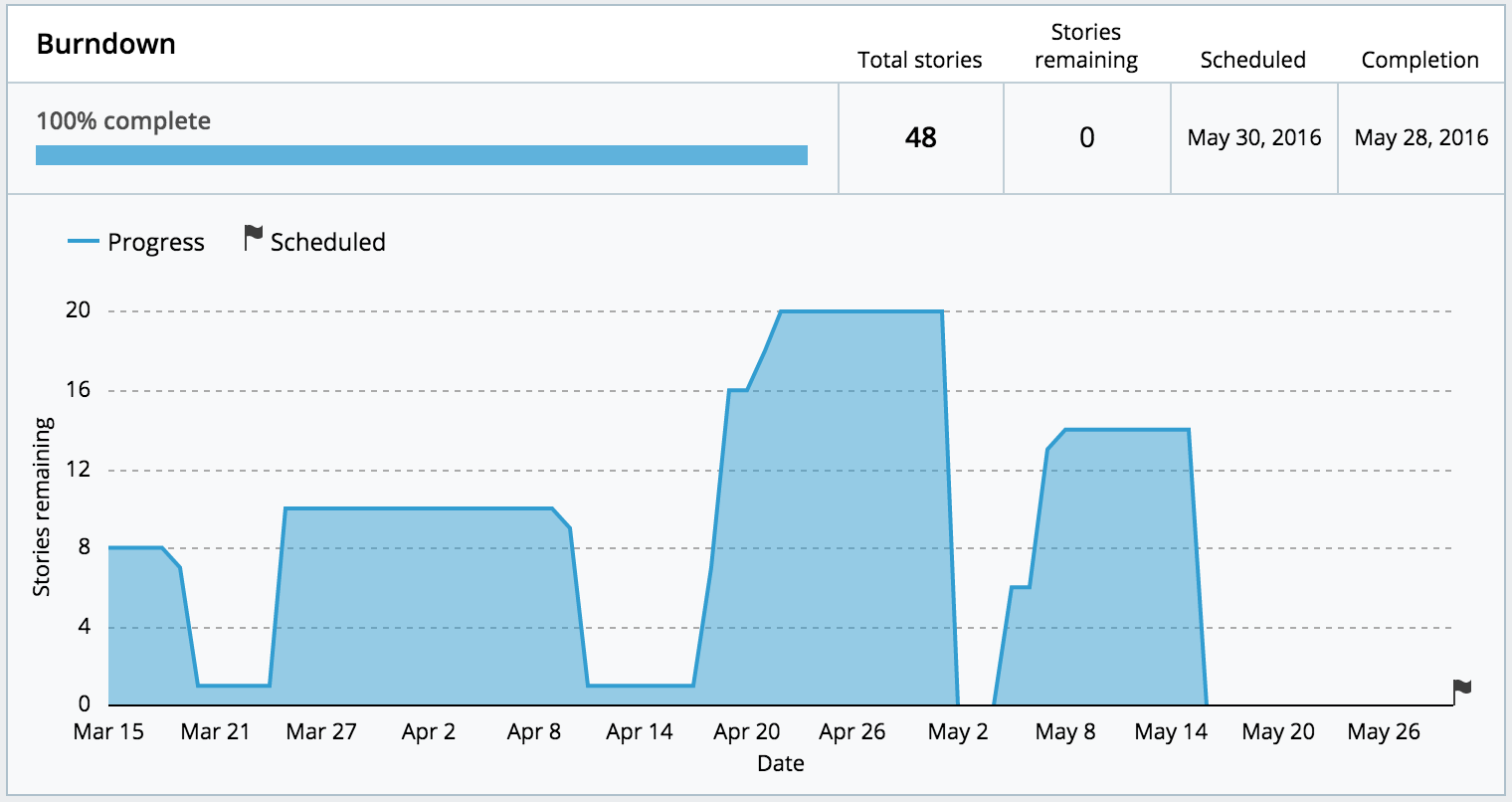


Figure 4: Project Burndown

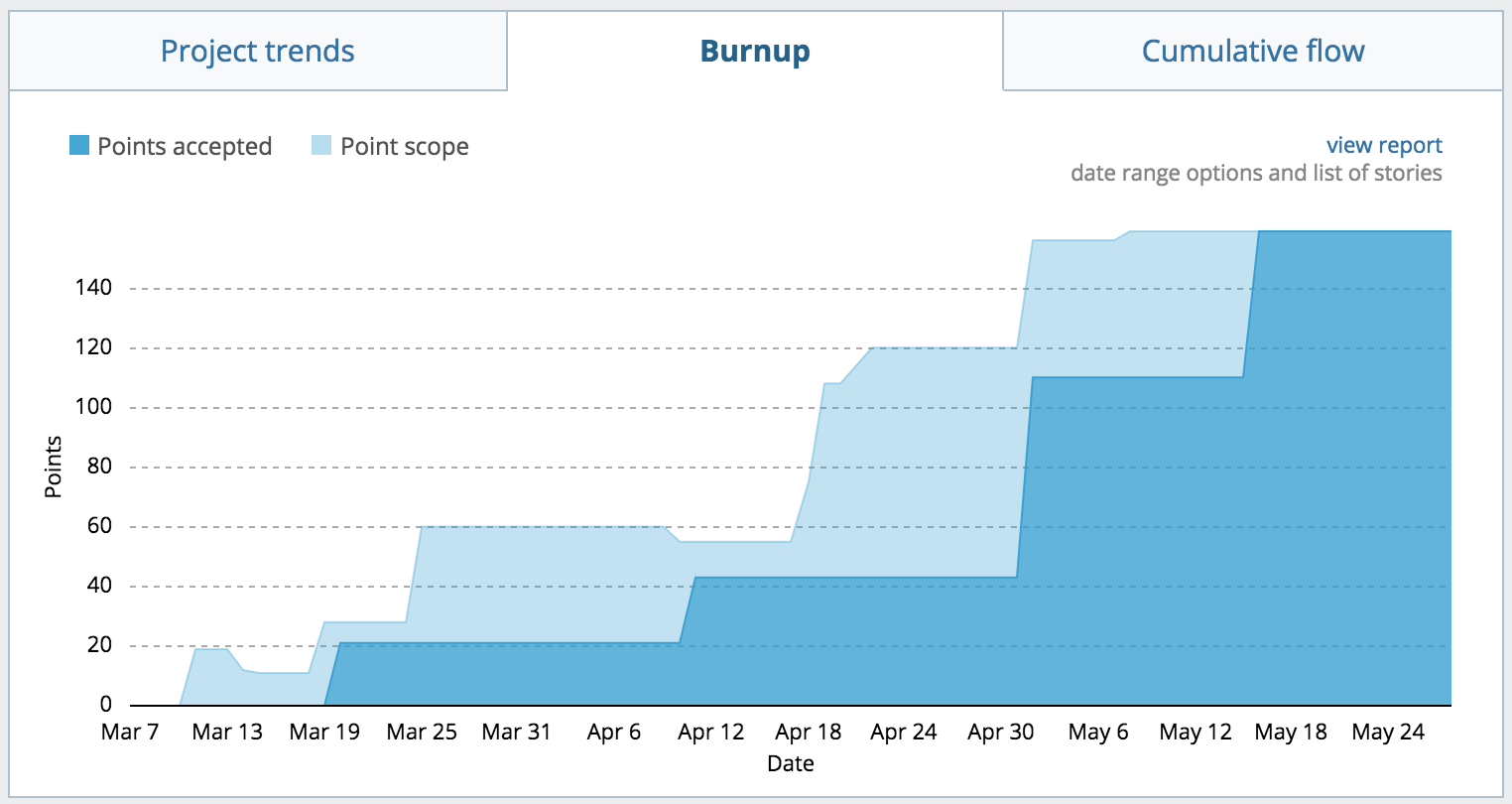


Figure 3: Project Burnup

# Overall Design

## 4.1 Design Details

*Relevant design details. Uml, er diagram etc. provide reasons for choices. Report changes to user stores due to the design process. So many ER diagrams + relations*

*UI design, CSS and template design*



Figure 4: Curtin Ideas Logo

After initially reading through and understanding the requirements for the project, each user story was created and placed in a sub-group: admin, user accounts, submissions, voting, commenting or rewards.

It was decided quite early on in the project to implement the website using the Python web-framework, Django. This would allow for easy to use and powerful admin features, along with well-defined ways to implement all the functionality deemed necessary for the project to work (ADD MORE REASONS WHY USED DJANGO). Django’s model system seemed very applicable for creating objects such as users, submissions and comments which were central to the overall design.

Figure x shows the UML diagram for the design of the project.

### 4.1.1 Back-End

One of the major design issues that was central to the project as a whole was the submission. The submission model needed to store information about a user-generated idea including the title, author, category, the idea itself and links to external webpages. The majority of the project features in some way interact with the submission, be that viewing, commenting on, suggesting improvements or voting. As well, submissions had to be both editable and removable by the correctly privileged users/admin.

We wanted a user to be able to create an account storing basic personal and contact information that could be used to identify the user and for them to participate in submitting, commenting and voting on submissions. A user would have to be currently logged onto the system to be able to submit, comment and vote on submissions. However, submissions could be viewed by anyone of the general public without requiring an account.

### 4.1.2 User Interface

The interface design went through numerous iterations before eventually settling on the current design.

The main aims of the interface design were to create a sleek, modern interface which was easy to navigate and to use.

## 4.2 Implementation Details

Document the implementation including tasks, effort, features and task distribution (planned and actually completed). Screenshots of functionality. Changes to initial design. What testing was done? \*lol none.

# Project Review

## 5.1 What Went Right

Numerous aspects of the project worked well for the group and contributed to the overall success of the project. Throughout all Sprints, the moral of the team was high and the work ethic of each team member was decent. Being able to choose our team members was a likely factor producing this, with everyone in the team already knowing each other relatively well before the start of the project.

The aspect that helped the most in the product development was the high level of communication between all team members. Every member attended the weekly SCRUM meetings that were held and these worked to guide the team in completing their designated stories for each sprint. In addition to these formal meetings, communication was also performed via a *Facebook* group message. This allowed us to be in constant communication and ask for help or clarification instantly when it was required.

Another team-based part of the project that went well was the utilization of pair programming. Every story was allocated not to an individual, but to a pair of team members. This greatly enhanced performance as members could bounce ideas off one another and troubleshoot bugs and issues in tandem. As a result, this contributed to the high morale of the group and resulted in high all-round performance. This also resulted in no major issues arising in the weekly SCRUM meetings.

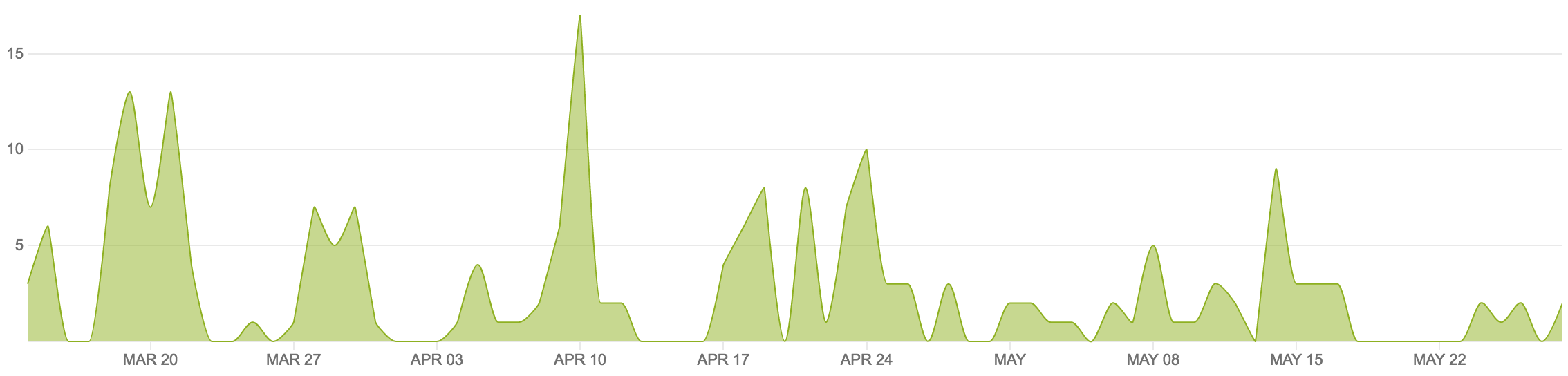


Figure 5: Version Control Commits

Numerous tools utilized throughout the project worked in our favor during product development. The use of version control via the *BitBucket* platform enabled team members to concurrently work on the project without their work interfering with one another. The commits pushed to this platform are shown in Figure 5 and analysis of this helps us to analyze our group and individual contributions over time. It also enabled us to rollback and help solve any regression errors inserted into the source code. The issue tracking tool *Pivotal Tracker* worked to keep the team on track and provide a metric on how our performance was progressing and whether we were on track or not. Without this, we expect we would not have fully implemented the solution by the final release date.

The final feature of the project that went well was the choice of web development tools employed. The use of the easy-to-learn Django web framework for the development platform meant that team members could learn the relevant skills to perform their required work with ease. It also enabled us to use the PythonAnywhere tool for hosting the site, providing users and the project client with easy access, comparatively to some other hosting solutions. All in all, the majority of aspects of the project went extremely well and the project smoothness as a result of this contributed strongly to our overall performance.

## 5.2 What Went Wrong

Despite the majority of aspects being productive during the project, some aspects of the project could have been performed better. The major issue was the team’s unfamiliarity with both the SCRUM process and web development projects in general. This project was the first undertaken for many of the team members and thus the learning curve was relatively steep. This was shown by our weak performance in Sprints one and two. Our team also had no experience with web development frameworks and thus learning these technologies slowed our progress significantly in the early weeks. This was unavoidable however and we believe we dealt well with this minor setback.

Not having undertaken any previous projects however also led to aspects of poor project management at times. The most significant of these would have been the poor time management shown occasionally. This become a concern at times when members had external time constraints and thus productivity was greatly reduced. The experience learned from these mistakes will be vital in future projects as we further enhance and hone our time management skills.

## 5.3 What Was Learned

The team has learned a lot from the project and grown significantly as a result. Coming into the project, the team had no experience with project management, web development or the Agile and SCRUM frameworks. Coming out of the project however, each team member now has a firm understanding of these concepts and experience in applying them to an actual concrete project.

The project management skills and time management skills learnt will be extremely useful in future projects. Learning how to balance productivity with external time constraints is a valuable skill that any member of a project requires and hence learning this skill has been very immensely valuable. The experience gained in general group skills cannot be quantified in a metric, but is also a good skill for each team member to have acquired.

Team members gained experience in several tools and frameworks during the semester. The use of version control was crucial to the success of this sprint and now each member understands how to apply it in future roles. Similarly, the team learnt how to use issue tracking software as a project management tool to ensure the project was kept on track and was an overall success.

The major point of learning throughout the project came in terms of web development. The team developed a full-stack web platform without any prior web development knowledge and thus, everything was learned during the project itself. The Django framework is now considerably understood by the team and can be applied in the future if ever required again. The python language has also been learnt to an extent and this tool will no doubt be of use in the future to all the software engineers involved.

## 5.4 Future Improvements

The group has several recommendations for future participations of the Project Design and Management unit. These are issues we discovered throughout our participation of the unit and may not be relevant to certain groups and their personal group-dynamic.

Firstly, the weighting of the project was weighted heavily towards the SCRUM process and the Sprint and Final reports. We propose placing some of this weighting into the platform and its actual functionality. Thus, teams that produce a fully working and functional solution can receive marks for this. As a team that completed all functionality, this would have benefitted us significantly.

During the project, the one-on-one time with the project client was extremely limited. Through Sprint 3, only a small 10-minute window was held with the client. We feel that more time with the project client to discuss specifics on aspects such as styling and functionality implementation would benefit both our team and the final solution. However, this may be difficult considering the time constraints of both parties and the constraints of a university unit in general.

# Conclusions and Summary

Brief summary

What was achieved in product development

What as gained in project experience

The following list produced indicates expansions and new features that can be implemented in future release of the product. The project client may wish to implement these recommendations into the platform over time to enhance the solution:

**Expansions:**

* Enhanced reward system with added rewards upon reaching certain levels
* Embedded images and videos for links in submissions
* Enhanced user profiles, enabling user to upload profile pictures and modify their details

**New Features:**

* Implementation of a scoreboard, listing the top 10 contributors for each category
* Department added to user profiles and on posting, to link users from departments
* Dynamic page background that change over time

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# 8.0 Appendices

## 8.1 Appendix A: Sprint Reports

The full Sprint reports for sprints 1 through 4 have been included as an attachment to this final report.

## 8.2 Appendix B: Pivotal Tracker Backlog

All data tracked within the issue-tracking tool *Pivotal Tracker* has also been included as a *csv* attachment to this final report.