Power.Log Project Plan

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10 June 2022

1 Introduction

Power.Log is a website that allows users to measure and compare the energy they use for transportation and compare it to the data of other users. The site will be developed by the four founding members of GROOP, using an Agile philosophy, a Kanban methodology, and a focus on lean, user-centred design. The first prototype with basic energy logging features will be Lunched on 10 June 2022. The official release will be on 1 May 2023.

2 Company Outline

GROOP is a small software and web development startup company founded in 2022 to begin the development of "Power.Log". GROOP consists of four members, all of whom are third-year Bachelor of Engineering Science (Digital Arts) students. Although the team has limited project planning and business management experience their studies have equipped them with the ability to design, analyze and test systems while considering user interface (UI) and user experience (UX).

GROOP's mission is to make average people cognizant of the amounts of energy they consume while commuting by allowing them to visualize their energy usage in simple, convenient terms.

3 Value Proposition

This section gives an overview of the proposed functionalities of 'Power.Log'; a more detailed disruption is given in the power.log version 1 technical document (included in this document package).

Power.Log allows users to log the energy they are spending on transport and compare it to the energy they would use if they had to travel in a different type of vehicle. The final version will be a web application/site capable of recording the energy consumption of private vehicles based on user log data. The web app will also allow the user to compare their energy usage over a period of time with that of other users.

Allowing users to compare their data with that of others is a core to the Power.Log model and a unique selling point of the product. There are several competing complies that offer vehicle power consumption tracking; however, their comparisons relate the user's consumption to the average vehicle consumption provided by manufacturers. This average consumption relies on specific driving conditions and is seldom equivalent to real consumption.

A web app is favoured over a normal app because it provides a high level of convenience. The user can access it via the website or download and install it onto their mobile phones.

4 Time Frame

GROOP intends to launch the prototype to potential investors on 7 June 2022. The marketable version of "Power.Log" will be released on 1 May 2023. With development starting in late April, this gives the team a month and 2 weeks to create the prototype and just over a year before the launch of the final product. Given the lack of experience within the company; the project plan, scope, and development model will need to be constantly adapted to suit the scope, situation, and current skill level of members.

5 Key Milestone

As a fledgling company, it is difficult to accurately predict the direction of development in the long term, however, GROOP has outlined a list of proposed milestones that the development team imagines accomplishing before the official launch. Major themes throughout these processes are a dedication to the incremental improvement, user-centred design, and agile development.

- Basic pre-launch application with fuel logging capacity - 24 May 2022
- Improved and debugged application with changes based on market feedback - 31 May 2022
- Launch prototype with refined logging and energy usage comparison systems - 7 June 2022
- Added improved UI and in-app feedback logging - July 2022
- Produced relatively accurate power consumption algorithm that does not require fuel logging - July 2022
- Launched five more distinct prototype iterations based on feedback collected - December 2022
- Beta Release - 2 April 2023
- Official web app release - 1 May 2023
- Expanded to cater for public transport systems - July 2023

6 Time and Group Management

6.1 Estimated Hours of Work

The team has just under a year before the scheduled release. However, the prototype will be launched in a month (7 June 2022). As university students, the company acknowledges that they have other commitments and cannot work on the project full time until they graduate at the end of 2022. It is estimated that at least 120 hours (thirty hours[1] for each group member) of work will need to be put into producing the prototype. Given a time frame of about over 4 weeks, this implies that each member will need to dedicate seven and a half hours of their time to the project per week. This covers time spent on testing, research, and documentation as well as programming. Group timesheets will be kept giving insights into the time taken to complete each task. This will facilitate better time estimations and enhance efficiency as the project progresses.

6.2 Lean and Agile Philosophy

The team lacks the necessary experience required to make accurate long-term predictions and time estimates. Furthermore, the market has not yet been identified and the exact customer needs remain unknown. Thus, a deterministic management philosophy, such as waterfall, is a poor fit for the group.

Agile development provides more scope for experiential learning and adaptability. This gives a larger margin for poor estimation during the initial planning. Iteration will ensure that the product meets the needs of the consumer allowing the group to continually gain and apply new knowledge to the product. A lean philosophy will be adopted, prioritizing only the most essential features for each iteration to improve the rate of rapid prototyping. This will accelerate knowledge gain and product improvement. Furthermore, there will always be a working iteration of the web app following the launch of the website prototype so that major issues or failures do not jeopardize the project as a whole.

[1] As per the notional hours in the CBO

6.3 Kan-ban Methodology

Kan-ban is a project management methodology that aims to increase productivity by minimizing works in progress and allowing a team to visualize their workflow. Tasks are written on sticky notes and placed on a Kan-ban board. Tasks on the board are organized into three columns "to-do" "work in progress" (WIP) and "complete". New tasks are constantly added to the board as they are defined. This allows the team to understand project workflow at a glance and easily identify which tasks need to be fulfilled.

If Kan-ban is to be implemented effectively, each group member should never have more than two WIPs at a time [2].

The Kan-ban methodology was chosen because it prioritized consent output, a key requirement for rapid Agile prototyping. Unlike similar systems, such as Scrum, Kan-ban encourages individual leadership, self-management, and self-actualization. All employees can add a task and elect to begin tasks at any stage. Tasks do not need to be assigned in a meeting and do not have predetermined frames - although they should be completed as soon as possible. This reduces down-time while accommodating the busy schedules of the group members - allowing them to provide input when able to do so effectively.

6.4 User Centered Design

Products which meet the needs and desires of the consumer are undoubtedly more successful than those which do not. Testing each iteration with potential customers will allow the group to better cater to their needs. Testing provides enhanced usability while market research ensures that no time is wasted on developing features that the customer does not want. Much of the development process will be informed and adapted continually based on user feedback.

6.5 Roles and Responsibilities

All four of the founding members have joint management responsibilities. Each is responsible for ensuring that tasks on the board are flowing at a constant and steady rate. Members are also expected to evaluate the progress of the project concerning the milestones and judiciously select which task to prioritize accordingly. Some additional responsibilities have been assigned to certain individuals to ensure that the group does not lose sight of key tasks [3]. R. Costa-Tré and K. Ngwenya are the lead developers to ensure that programming design is followed. A. Kapp will ensure that all necessary group documentation is compiled and filed. J. Jandrell will act as a team leader and project manager.

6.6 Meeting and Communication

There will be a minimum of two Kan-ban sessions (meetings) per week (on Tuesdays and Thursdays) wherein the group evaluates their progress and define any new key tasks. These meetings are intended to be brief so as not to waste production time. All other communication will be communicated asynchronously via Slack. Members are expected to check and respond on slack at least once every two hours between 08:00 and 18:00 on weekdays.

6.7 Managing the Risk of Delays

Given the limited experience within the company, there is a high probability that the time required for tasks has been underestimated in some cases and overstated in others. Thus, there is a risk of delays or a lack of direction. To avoid this, the team will hold bi-monthly meetings in which the long-term planning is evaluated and revised based on new understanding gained and current progress. The aim of these meetings will not be to merely push back dealings but rather to adjust the scope and development strategy to ensure that the 1 May release date is met. Following 7 June 2022, there will always be a working version of Power.Log which could theoretically be released.

[2] If progress on a task cannot continue it will be returned to the 'to-do' section until all issues probating progress have been resolved. The allowance for the second WIP is because some tasks might be handled in pairs, in this case, an employee should not have idle time when their partner is unavailable

[3] Note: all members will still contribute to the project in all areas.

6.8 Additional Labour

GROOP does not intend to hire additional staff before the 2023 release. At this point, the nature of the business model and scale of the target market will be better understood, and thus more informed hiring decisions can be made. Most tasks will be handled in-house with out-sourcing as a last resort. The founding members understand the company's vision and should learn to understand the company running through hands-on experience.

7 Necessary Software and Resources

7.1 Software Present in Final Release

The majority of the back end will be written in Python due to the large volume of open-source libraries and resources which exist for the language. The team are avid practitioners of object-oriented programming and are pleased with the modality that Python offers. The front end will be created using HTML, CSS, and JavaScript. This is advantageous as every member of the team has reasonable amounts of experience with these languages and is capable of developing a functional front-end with these languages.

7.2 Development Platforms

. The following platforms will be used by the teams for the development of the project:

- **GitHub** for version management and control - familiar system.
- **Slack** for group commutation via messaging - an industry standard with stability and security.
- **Microsoft Teams** for online meetings - allows for recording and scheduled meetings
- **Overleaf** for compiling Latex documentation - simultaneous online editing without conflicts. (Latex makes consent but adaptable formatting travail)
- **Shortcut** as an online Kan-ban board and planing tool - free version, slack and git integration.
- **Chart.js** for drawing charts.
- **Flask** will be used to integrate JavaScript with Python.
- **Flask-Cors** will be used in conjunction with Flask to integrate JavaScript with Python

8 Testing and Quality Assurance

8.1 Imitate Module Bug Testing

When a module of code (this could be a single script of the full website) is competed[4] or updated [5] it will be subjected to black-box testing with general test cases and trivial cases. The results of the tests will be documented. If the developers feel necessary, the program will also undergo glass box testing. The coverage of the script will be measured to confirm that the program is executing as expected. Testing modules for bugs immediately after completion ensures that issues are addressed at the source. This approach avoids future complications and reduces the number of repeated tests on code that is known to work.

8.2 Internal Stress Testing

The development team intends to make use of an early-release version of each iteration. Developers will use the website as intended: gaining a better understanding of UX, and UI and noting any major issues. The application will then be intentionally misused to identify bugs and glitches. Any issues will (functional, non-functional, or technical) will be documented.

[4] Module runs without errors and is believed to be bug-free
[5] major changes that are likely to have an impact on the outputs

8.3 Face to Face Tests

Founding members will conduct a face-to-face test with potential customers to gain first-hand knowledge of user experience. These will be informal conversations so that the tester feels comfortable sharing their thoughts and is not inconvenienced by tedious forms and surveys. These tests will provide insights into product usability and marketability. major findings from these tests will be documented.

8.4 Crowd Testing

Feedback and test results from users are invaluable and they provide clear insights into the concerns of the target market allowing developers to focus on what matters most to the customer. Each iteration will be circulated to a growing group of early adopters. These users will be encouraged to share any feedback or experiences they have while using the product. A more developed iteration of the website will include a designated screen for feedback and bug reporting.

8.5 Calculation Testing and Data Collection

The initial log style system will give accurate measurements of fuel usage. The log data from users will be compared with the energy consumption predictions and used to make distance-based estimates sufficiently accurate[6]. This process will remain ongoing throughout the development and improvement of the website and possibly beyond the official release to ensure accuracy and quality.

8.5.1 Ethical Considerations

Some individuals may consider the energy they use to be personal information. The development team does not wish to violate the privacy of their users in any way. Any information the user provides will be encrypted and not be shared with any third party. The user has no obligation to disclose their legal identity to use the application. All data used for analysis and improvement will be anonymous. Users will be notified of this information upon installing the application. If any changes are made to this agreement the user will be notified and allowed to revoke consent.

8.6 Ensuring Constant Quality Code

GROOP has produced standards and procedures guidelines that encourage consistent testing and good object-oriented programming (OOP) practice. Embracing these guidelines should lead to a quality, saleable, and maintainable code base.

9 Marketing

9.1 Market Research

Market research is critical at all stages of development, allowing for the production of an application with features, functionality, and UX that please customers.

Initial market research will be conducted by the founding members[7]. Although a list of set questions will be prepared, the research will be conversational and informal so that the researcher can enthuse the potential customer. Conversations avoid the tedium of forms and surveys. Furthermore, this allows the potential customer to provide direct feedback and suggestions or describe specific issues. The researcher is capable of changing their line of questioning based on comments to gain further insights. Although results and trends will be documented; a personal understanding of customers will likely provide the team with more valuable design insights. Information used during market research will aid in user-centred design.

In the early stages of the project, developers will test the idea with the general public. (Students on the university campus, for example, may be a good starting point.) As customers become more defined, market research methodologies will be defined to target specific categories of individuals.

[6] Accuracy to be defined based in market research and user preferences

[7] Who are also the current development team

9.2 Hypothetical Customer

It is proposed that the average user of Power.Log is a motorist with a daily commute. Their main mode of transport runs on fossil fuel. They wish to reduce their energy usage for environmental and financial reasons. They are in a medium to high-income bracket and can change their mode of transport and possibly purchase an electric vehicle. Their general understanding of energy comes from experience with household electrical appliances. They are not necessarily familiar with SI units used for energy measurement.

9.3 Proposed Marketing Campaigns

There are no proposed advertising or marketing campaigns at this point. The target abundance, their needs, and wants to have not yet been fully understood, it is challenging to plan a campaign that will reach them. Furthermore, many advertising campaigns required large capital investment which comes with significant risk to the start-ups. Such risks should only be taken once the company has clearly defined its business model, adequate capital, a marketable product, and an understanding of clientele.

There is, however, a plan to create a recognizable logo that will represent our company. This will help to differentiate our product and brand from those created by other companies which operate in the same market

10 Budget

10.1 Costs

10.1.1 Labour

It is proposed that, while studying, each of the four group members will be able to provide 30 hours of work a month. This will continue for seven months at which point the developers will have graduated and be able to work on Power.Log full time. 195 hours of work per month (as is standard for a full-time job) is proposed for 2023 (and a half month in December 2022). This gives a total of 1088 billable hours per group member.

If the hourly rate charged is R200.00 per hour (just below entry level for a software developer in the industry) then the total cost value for labour on the project is R652 800.00. GROOP has no capital and thus paying these wages outright is impossible. The founding members do not require a steady income stream during the development process and have accepted to accept payment as a 25% share in the company. The equivalent value of this share will be considered if the startup or its IP is ever sold.

10.1.2 Servers and Web Hosting

A server will be required to store user data. Furthermore, since Power.Log is a website (to be turned into a web app in future), website hosting services must be considered. Companies such as Niva City, Domains.co.za or Web4Africa provide these services at monthly rates ranging from R30 to R300. These rates scale with web traffic and storage used, thus packages can be upgraded as the business grows. The package used will be chosen once the website/server requirements are better understood.

A 'fermium' package where users pay for additional server coverage may be a good manner in which to mitigate costs.

10.2 Funding and Income

10.2.1 Investors

At this stage of development, costs are low[8] and can be paid out of the founding members' pockets. However, increased funding would greatly improve the development rate. GROOP will engage potential investors and bid for external funding once feedback for the second prototype has been gathered, giving

[8] Only the server will need to be paid for

the team more information to present to investors. Investors would be offered a share in the start-ups (up to 49%) based on their financial contribution relative to the estimated value of the company[9].

10.2.2 Income from the Product

It is purposed that, Power.Log will be free to use with most of the income generated from popup advertisements. Users will be able to pay to remove the adverts or to upgrade their stage (so that they can save energy usage over a longer period). This model should allow income to scale with the running costs (both of which are user-dependent).

10.3 Total Estimated Cost

This estimation was made with the following assumptions:

- All members of the team are Junior Developers.
- Each member is to put in 30 hours of work per month.
- Testing shall be conducted by GROOP members at no extra charge.
- Any costs relating to the use of equipment (PCs) or facilities shall be taken on by each member personally.

Item	Cost	Notes
Labour cost/member	R30 189,6	At an hourly rate of R83,86/month
Website Hosting	R979	R89p/m for 11 months from Web4Africa.
Total Cost	R121 737	

Table 1: Development Cost Estimation

This model will be re-evaluated based on market research and user feedback.

[9] Calculated based on billable hours from timesheets and capital invested. Open to negotiation