ECM2434

Group Software Engineering Project

Project Specification

Persuasive Gamification of Sustainability on Campus

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This document outlines the specification, assessment structure and submission requirements for the ECM2434 Group Software Engineering Project module.

This specification is released to students on 7th February 2024.

1 Requirements

The requirement for this coursework is to create a web application that uses gamification to promote sustainability on campus for people at the University of Exeter.

1.1 Overview

The University has an ambitious sustainability goal to have a carbon net zero impact by 2030 [1]. To achieve this goal the University will need to increase awareness of the positive and negative contributors to sustainability and environmental impact of activities around campus and promote positive change to the behaviour of people and policy.

This project's aim is to create a system that will help people engage with sustainability on campus. This should be achieved by raising awareness of the changes required to meet the goals set out by the University. In an attempt to grow and retain the engagement of users, teams will use a persuasive gamification application built on the Django web platform that uses locations around campus and user profiles. The game should be persuasive, fun, dynamic and encourage users to engage with University students, staff, facilities and resources along the way.

1.2 Campus Sustainability gamification

Gamification can be as simple as a list of challenges that are validated by the user when they are completed, as seen in green rewards already offered by the University [3]. It can also be complex, for example by using an augmented reality themed adventure with duels, communities, leaderboard, and timed checkpoints to progress through levels. The only limitation in this project is that the gamification must be a web application built on the Django platform and have a user login, the group must follow the Kanban methodology as described in lectures and the code must be hosted on GitHub [4]. As there is a user login you will also be likely to store personal details, therefore a privacy policy and GDPR compliance are expected to be part of any apps that are released to the public.

This specification treats the University of Exeter as the client so there is a strong requirement for the game to professionally represent the University and their sustainability goals. This means all locations and interactions through the app must be safe and make responsible use of the University campus. You might also integrate useful locations, people and resources in the app that promote positive engagement with the University. The module leaders will act as the client contacts for the duration of the project.

1.3 Persuasive gamification and sustainability

Persuasive approaches are one of the most ancient ways to influence and alter human's behaviours. It is defined as an attempt to change attitudes or behaviour or both not necessarily using coercion or deception. Gamification, the integration of game design elements into non-game contexts, serves as a contemporary strategy within persuasive approaches. In this method, challenges are embedded in well-designed, interactive games, and rewards are granted to participants upon successful completion. Through these persuasive elements, participants may be more inclined to alter their behaviour, driven by intrinsic motivation derived from the enjoyment of rewards rather than external coercion.

Persuasive gamification had emerged as a powerful tool to enhance sustainability by engaging individuals in environmentally conscious behaviours. By integrating game elements like rewards and challenges, it transforms sustainable practices into interactive and rewarding experiences. This approach makes eco-friendly choices more appealing and encourages long-term commitment to sustainable living. Through persuasive gamification, sustainability becomes not just a responsibility but a dynamic and enjoyable journey, fostering widespread adoption of green habits for a more environmentally resilient future.

1.4 User profiles

When designing your campus exploration app there are three main types of users you need to consider:

1. Player users - These are the primary target audience for the app. The player users will primarily be students and staff and expect to use the app through a browser on a mobile device.
2. Game keepers - These users are responsible for creating and administrating the app and could be students or members of staff. The game keepers should be able to configure and update their instance and its resources. The game keeper users will be expected to access the app through a desktop or laptop browser.
3. Developers - Developers should be able to build, extend and redeploy the app for future and alternative uses. Developers will expect to be able to access the source code from an online repository and expect clear and concise documentation and deployment instructions. Consider, for example, how easily this app could be redeployed by another University.

For the purposes of this module, the module leaders will be the clients and act as a University representative and consider all three user perspectives when evaluating the app; expect them to attempt to play the game, create or modify a game for others to play on the app, and attempt to download the code. When the project is being delivered to the client, any authentic user feedback will be considered favorably - the best way to show your game is successful is evidence of authentic users having fun engaging with sustainability on campus while using your app.

1.5 Features

1.5.1 Location

Location should be a feature of the app to facilitate the campus aspect of the spec and location can be verified in multiple ways. I have made some implementation suggestions below although none of these are perfect and design decisions will need to be made whether each technique is suitable for your app and achievable within your group:

1. Users may be required to take a picture of themselves at locations. These pictures can be verified by the game masters when the user reaches a final location to complete the game. This approach will be incredibly involved for the game keeper and difficult to scale, however, on the plus side this may provide an opportunity for natural integration with social media as the images document the game interactions.
2. Users may scan a QR code using a phone camera to verify their presence and trigger a location verification. This may be a useful way to make the game a little more interactive.
3. GPS locations can be submitted from a phone to trace locations. GPS locations can be easily accessed from browser applications but deciding how regularly to trace users could be problematic.

1.5.2 Sustainability

Inclusion of sustainability will be evaluated based on the alignment with the sustainability goals and definitions given on the University webpages [2].

1.6 Example ideas

The scope for persuasive gamification is very broad so I've provided some suggestions for games that could be implemented to encourage sustainability on campus. These ideas aren't perfect but are examples. These ideas shouldn't be taken verbatim as your own ideas.

1. Tag - users could play sustainability tag where players 'tag' each other when they complete

sustainability challenges.

2. A treasure hunt - users may find clues on their way around campus and discover facts about the university on route.
3. Redlight greenlight - users will make their way through checkpoints on campus. There are greenlight periods where activities are not monitored and red-light periods when if you engage with non-sustainability activities the user is eliminated (via a non-violent notification on the app - this is not squid game) from the game.
4. Carbon capture creatures - each time a user engages with a carbon capture initiative on campus a virtual creature grows at that site.

References:

[1] ”ENVIRONMENT CLIMATE EMERGENCY POLICY STATEMENT” University of Exeter. Technical report. Link accessed Jan 2024: https://www.exeter.ac.uk/media/universityofexeter/campusservices/sustainability/docs/Environment_and_Climate_Emergency_Policy_Statement. pdf

[2] Sustainability - University of Exeter [Webpage]. Link accessed Jan 2024: https://www.exeter.ac.uk/about/sustainability/

[3] Green Rewards [Webpage]. Link accessed Jan 2024 https://exeter.greenrewards.co.uk/

[4] Github [Webpage]. Link accessed Jan 2024: https://github.com/

2 Assessment structure

2.1 Groups

This assessment will be done by groups of students completing tasks to produce a shared software product. Student groups were finalised on **2nd February** and have been published on the ELE page linked below. Groups will remain together throughout the module and share all submissions except the peer assessment submitted individually. Times and locations for client-led group meetings will be listed on a shared spreadsheet linked from the ELE page. All students are expected to attend group meetings which will run weekly beginning in week 5.

Link to team allocation and student groups:
https://ele.exeter.ac.uk/course/view.php?id=10898&section=6

Link to group meeting page: https://ele.exeter.ac.uk/course/view.php?id=10898&section=11

Marks will be awarded to individual students based on the performance of their team and the contribution of the individual student to the team. To be precise individual marks for both submissions will be calculated as below:

Group mark = Mark awarded for the group submission

Individual peer review mark = Total marks awarded to you in the peer reviews from your team
Normalised peer review mark = Individual peer review mark / Total of peer review marks for full team * Size of group

Final mark = (Group mark * 0.5) + (Normalised peer review mark * group mark * 0.5)

Note, this means the average final marks for individuals in the group will equal the group mark. Students with relatively higher peer review marks will get higher marks than the group mark. Students with relatively lower peer review marks will receive a lower mark than the group mark. If all team members receive the same mark (even if that mark is 100%) in the peer review, all team members will receive the group mark as their final mark. Individuals do not award themselves a peer review mark so please do not try to game the system.

If there is evidence of individuals not engaging or not contributing towards team submissions at all the formula above will be overridden and the individual mark will be zero for the disengaged student and the group will be considered to have one less team member. Any issues like this must be communicated to the module leader as soon as they arise so there is a chance for intervention.

2.2 Submissions

There are two submission deadlines for all groups:

- Sprint 1 (40%): Thursday 29th February 2024 (Week 7);
- Sprint 2 (60%): Thursday 21st March 2024 (Week 10).

Both submissions will be assessed on three main criteria:

- Process - to capture the process of group work and the Kanban agile methodology;
- Technical contributions - to capture the technical contributions, particularly source code, of the team;
- Product - to capture the quality and creativity of the end product and client deliverables.

2.2.1 Process documents

The Kanban board should be a chart divided into at least seven columns: Backlog, Specification

(doing and done), Implementation (doing and done) and Validation (doing and done). The board must clearly identify group members and the tasks they are undertaking (and have under- taken). Regular snapshots of the agile board should be taken to show the progression of tickets over the project. A time lapse of the Kanban board changes would be a useful way to capture the revision history.

Records of meetings should be kept with a clear note of attendance and tasks. It should be clear which members have worked on which tickets and tasks and how those tickets link to technical contributions in the source code and technologies that are being used.

2.2.2 Technical documents

The source code snapshot is a link or file containing all the source code needed to build the product and instructions on deploying the artefact that clearly identifies which group members wrote which code. Professional and consistent coding conventions suitable for the chosen language should be followed. A testing strategy and the developer documentation should be included to demonstrate maturity, reliability and professionalism of the technical contributions.

2.2.3 Product documents

The product documents are designed and published for the client to receive. These should include a public handle for the project where the product can be tested with branding and documentation that is suitable for the users.

Product documentation will culminate in a presentation/demonstration after each submission which will be recorded.

2.3 Group submission

One team member must submit the group documents on **ELE**. The electronic submission consists of a single ".zip" file for the group, the name of the file must take the form "GroupXSubmissionY.zip'.

The group documents zip file can contain the peer assessment of the individual submitting the group documents.

2.4 Peer Assessment

All students must submit the peer review template provided on ELE for each submission. Each group member will anonymously rate the contribution of every other group member to the project (but not themselves) using the categories in the template. These ratings will be submitted individually on **ELE**, and will be used as specified above.

3 Summary

In summary, this project is about creating a web app that uses gamification to promote engagement with sustainability on campus at the University of Exeter. The assessment will be judged as a balance of process, evidence of effective teamwork using the Kanban agile methodology, technical contributions, evidence of the team producing effective and quality software, and the final product, evidence of execution of a creative and fun idea.

Each team must be creative and distinguish their app in a unique way.

If you have any questions at any point throughout the project please do not hesitate to get in touch, s.oyelere@exeter.ac.uk.