Men's Shed Web Application

SOC09109 2022-3 TR2 001 - Group Project

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Project Description

Men's Shed Narrative

The Men's Shed organisation is a national charity, both in Scotland and the wider UK. It is a place where men meet, talk, mend, play, and create. There are group activities that are like garden shed activities. Most significantly, they are pleasant, alleviate loneliness isolation and offer support for peers. Each Shed is made up of diverse groups of people from different social, economic, and educational backgrounds. The common theme is a safe environment for men to meet and be creative and engaged in worthwhile projects and activities.

Each Shed, at their inception, develops independently. The communities they serve donate tools and equipment to the project; consequently, each Shed has an array of tools, equipment, and board games for the members to use which is extremely diverse.

Dunfermline Men's Shed objective.

The committee of the Dunfermline Men's Shed aspires to create a comprehensive and engaging resource for their community. Their Shed environment is limited in space which, presently, compromises their ability to engage more than 4-5 people at a time on site. The Shed has access to some additional facilities and is keen to attract additional members and promote diverse activities. They already have small guitar and computer groups. As part of their aspirations, the intended application should provide a platform upon which they can build as the need arises.

The project

This project will attempt to provide a user-friendly Web-application. To help users identify resources (Tools, Equipment, Games, and literature) that they can reserve for use in their individual projects or activities.

The feature of the application requested includes the following:

- The app should provide borrowing/reserving features. This shows when something is in use and when it will be available again. This requires the following database and app features:
- Data administrator portal
- Add/update/retire resources.
- User registration Resource calendar
- Resource status (e.g., Physical Library items still to be audited with pictures, ISBN digits). Mobile Power Tools tested and audited.
- The software should be adaptable.
- The Shed workshop should be bookable for 15 minutes. The Shed and activity determine the maximum time. Deliverables
- Design and implementation of the system back-end (including the database)

- Design and implementation of the app, which should run at least on Android and desktop devices.
- Source code
- Documentation as appropriate

Initial Consultation

From the meeting on the 2$^{nd of}$ February 2023 between the Men's Shed (MS) primary contacts, a selection of the committee and Napier's Student Project Team (PT) representatives.

The MS representatives highlighted their vision for the Dunfermline association, their long-term objectives, and aspirations. The MS team want to build an exemplar of a modern adaptive association embracing the wider community and diverse interests. i.e., Computer club, guitar club and workshop facilities. But also, a lending library for the many tools, books, games, videos, and publications that have been donated by the people of the community at large.

The proposed application is a tool for both the members to use and the management of the organisation to track the donated equipment and manage that equipment, including the facility at large.

The PT had to highlight to MS the module learning objective of the PT and the available time that is available to produce both a worthwhile cause and an in-depth application proposal. The reality of the project is that the exercise is to be done over a trimester and that the PT members will have other learning and assignments to achieve during the same time allocation.

All this being said, a clear way forward emerged from the conversation. Thinking of the bigger picture and the great ideas the MS have, the PT suggested that as a team, our limited time would be better spent on creating a foundation piece of work that could be developed further by subsequent student project teams. There are many different directions that the whole project wishes to develop. Developing all these is not feasible within the time frame allowed.

Agreement then was confined to the following list.

1. Core application with:
   a. User interface
   b. Database
   c. Administrators access to maintain Data.
   d. Administrators User interface.

The MS will provide the following items to assist with the development of the application:

1. Management personal information for the Administrator's access (The data is similar to that of the members, however for GDPR regulations exist, no permissions have been sought to use members' information)

2. A sample spreadsheet with tools and images to display as being available for use. (Please note that many of the tools have H&S requirements for PAT testing, servicing, and safety instruction. These must be visible in the display of available requirement of use. There should also be a way for the administrator to remove the item if it is not useable for whatever reason. In addition to H&S requirements, there is also a training requirement for more dangerous tools and equipment. The membership is diverse, and some members have been identified as having mental health issues. For safety, the MS management team wish to be able to restrict this type of equipment as discretionary.)
3.

Structure & Possible Risks of developing the backend.

The Men's shed application will be structured by having a packaged file structure which uses a run.py file that is located inside the main directory to launch the web app. Within the men's shed directory that will be inside the main directory, there will be multiple python files that can all be imported within one another to allow them to work together. Some of the files that will be included in the men's shed directory will be the __init__.py file that will contain code that the package modules and sub-packages need to share, such as app, security and database packages. Another file that will be held within the men's shed directory will be the routes.py file which will hold all the code for each page of the web app. The following file that will be held within the men's shed directory of the web app will be the forms.py file. This is where the code for the flask-forms package will be held. Finally, the last main file in the men's shed directory that will be used for the web app will be the modules.py file. This will hold the main python code for the database that will be used to hold all the given Men's Shed data.

Another directory that will be used in the packaged file structure will be the templates directory. The templates directory precisely correlates to the flask framework as this is the name that must be given to the directory that will hold all the html files for the front end of the website.

Finally, the last directory that will be included in the initial design of the Men's Shed web app will be the static directory. Once again, this correlates with the flask framework as this is the name that must be given to the directory that will hold all images used within the web app.

Following the MoSCoW requirements of prioritisation, the priority of each file and directory, along with the corresponding functions, are detailed in the MoSCoW Table below.

Some of the possible risks when developing the backend of the Men's Shed Application is the risk of having incomplete admin features due to time constraints; this may lead to crucial functions not working correctly. This could lead to the Men's Shed company failing to reach goals such as having the ability to share and manage resources among multiple Men's Shed locations.
Another risk that may occur when developing the backend of the Men's Shed web application could be the decided file structure that I plan to implement. Errors may occur when importing each file within the directory to communicate with one another, which would lead to slower production and more bugs when implementing new functions.

Finally, one last possible risk that may occur during the development of the Men's Shed web app could be the possibility of modifications or an introduction of a bug into the SQL database that will be used for the web app. This could lead to one or more functions not working correctly if they are unprepared for such changes to occur.

User interface development considerations

When considering the design for our database, there are several precautions which must be taken in regards to the real-world side of the system.

For example, it must be considered that some tools require special equipment to operate. While some tools are straightforward in their use, others may require additional equipment to allow for safe operation. This could be as simple as a pair of gloves or protective eyewear. In the implementation of our database, we aim to ensure that these items will include the required items for safe use. Additionally, some tools may require not only additional equipment for operation but instructions on how to operate. In the creation of our system, we should endeavour to

Regarding the loaning and borrowing of tools, caution must be taken regarding mental health. One of the groups which the MS organisation cares for are those with mental health issues. While our system will seek to include users of all backgrounds and abilities, some restrictions may need to be imposed for safety reasons. While we want to create an inclusive system, some concerns did arise from members of the group in reference to loaning specific equipment to vulnerable users. It was mentioned that the area in which the MS operates aims to be a space for many groups to socialise.

We hope to implement a system which will add necessary precautions and an extra level of security for users who could be deemed high-risk and are seeking to borrow dangerous tools. This would involve one of the following.

- Users who would be deemed as "at risk" would have their user account labelled as so, and therefore their accounts would have restrictions on viewing and borrowing tools.
- Dangerous tools would be labelled as so and would not be visible to high-risk users

Regardless of the implementation, it is essential that this feature would be done respectfully so as not to demonise certain users. Seeing as the men's shed is an inclusive environment, we must ensure that these precautions are solely designed for the purpose of safety and not as a method of deliberately excluding members. For our project, we will aim to have users be able to access as wide a range of features as possible.

MoSCoW prioritisation

Label	Interpretation
M	• Constructing the backend of the database for Men's shed has a wide range of items that are available, from power tools to magazines. • Way method to restrict users from accessing dangerous tools that have or could have a severe impact on health and safety (Mental Health, Ability) • The date of the last time an admin check that an item is still safe to use, e.g., a power drill or the item was still in usable condition, e.g., a book whose pages aren't falling out of the binding. • That the booker has: read the health and safety requirements of the item, has the proper training required to use the item requested or the PPE is needed for the item. • Required files will be run.py; this will be held in the main directory. __init__.py, routes.py, forms.py, modules.py. These files will be held in the men's shed directory. The Templates directory will be required to hold all HTML files created for the web app. • Admin functions must be included in the web app as this is one of the primary features that was asked to be implemented. Admin functions that are required for this project are as follows: ◦ The ability to add/update/retire resources, User registration, and the ability to track and share resources among different men's shed locations with the ability to set limited time frames with the minimum being 15 minutes and a calendar visualisation to go with it.
S	• Hiding an item from view if currently booked out. • High amount of good documentation for people in the future to build on. • The static directory should be required to hold all images that will be used for the web app. The only time this would not be required is if the web app did not have any images involved.
C	• Could have a feature to possibly set up a delivery option for larger equipment for sharing amongst Men's shed's locations
W	• The blog page application Men's Shed expressed interest in will not be involved in our project.

Table 1 MoSCoW prioritisation of objectives

Purpose and Expected Benefits

The development of this application will allow the MS to develop their services to the community while the organisation grows. It is a way of introducing the activities and a range of capabilities. It will allow access to both equipment and resources in terms of tools and facilities where to use those tools for repairs, hobbies, DIY and purely out of companionship with like-minded people. The application will also be a tool for the management of the organisation, for instance, the database of registered members, committee and all the resources that are available for use, the management of the tools and their whereabouts.

This project is a valuable resource for the MS organisation, with the prospect of it becoming the backbone of management processes and user functionality for resources and facilities.

Security considerations

The Dunfermline MS is an organisation that exists to provide a safe and healthy space for its members to gather, socialise, work together, and take part in several different activities and interests. The organisation does not engage in political activity nor holds any beliefs that are commonly interpreted as inflammatory/extreme and, as such, is extremely unlikely to have a heightened risk of being targeted above and beyond the traditional threats of existing on the modern internet.

The main assets to be considered in the context of security for this application development project are the member's personal information and the application itself.

As member's personal data will be stored on the application/database, this brings GDPR into play; all reasonable steps must be taken during the development of the application to ensure the security, integrity, and availability of the member's personal details always.

Member information should be encrypted with a suitable encryption algorithm in all data states at rest, in transit and, where possible, in use as well. An appropriate cypher suite should be used for the client application to server communications.

Passwords should be stored using a secure hashing algorithm (not md5 or sha-1) and not stored in plain text.

During the development of the application, there are particular areas to focus on with regard to keeping the application secure.

Due to a SQL database/web front-end setup, strict input validation will be critical; enforcing strict input validation at both the client side of the application and the server side will reduce many risks from command injection, buffer-overflow attacks and the old but still possible SQL injection attacks.

Development of the application should include functionality to redirect incoming HTTP traffic to an HTTPS secure connection, and this should be done automatically behind the scenes to provide security benefits without confusing or placing the responsibility onto the user.

Appropriate secure headers should be used in order to mitigate the risks from cross-site scripting attacks and clickjacking.

A password policy should be enforced for the users on the app so that they are using relatively secure passwords for their accounts, for example, a minimum of 8-chars with a mix of upper and lower-case and/or special characters. Rate-limiting the amount of unsuccessful login attempts to 3-5 is recommended as well; this is to reduce the risks from brute-force/dictionary attacks against user accounts.

Risks

Some of the possible risks when developing the backend of the Men's Shed Application is the risk of having incomplete admin features due to time constraints; this may lead to crucial functions not working correctly. This could lead to the Men's Shed company failing to reach goals such as having the ability to share and manage resources among multiple Men's Shed locations.

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A more detailed review of the potential risks is contained in Appendix 1 Follow-Up Register, excerpt of a live excel document to record and mitigate Risks Changes and Issues.
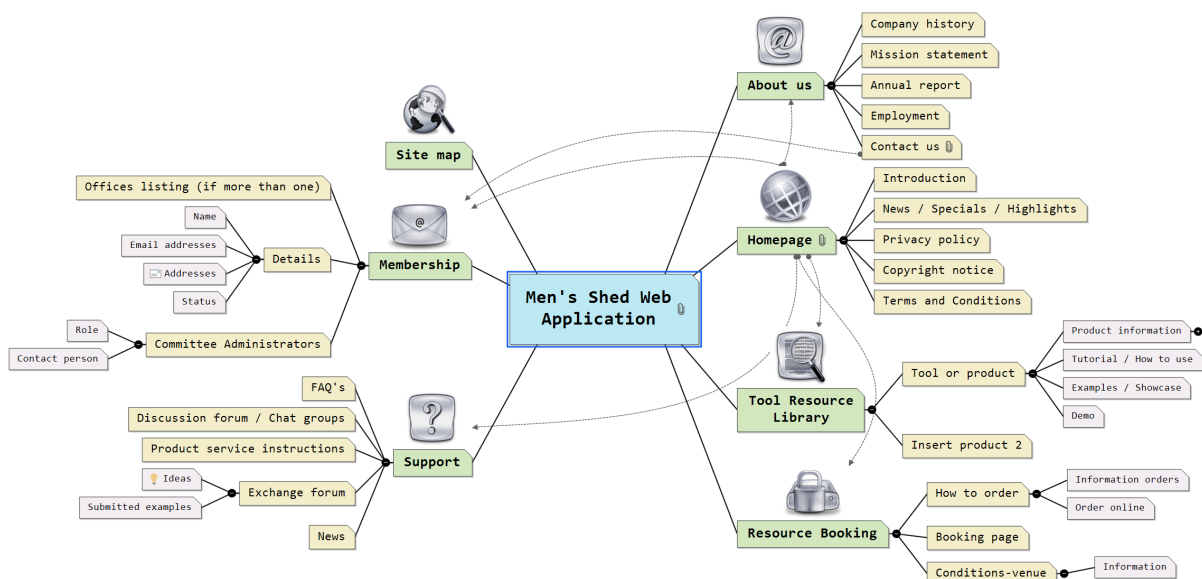
Deliverables Map

Figure 1 Deliverables Map

Deliverable's timeline

Application progress aims; along with the development of the server side administration (Backend team) structures and database implementation, the User Interface (UI) team have structure the UI development along the timeline detailed in the table below.

Week	Objectives
Week 3	Project initiation report, completion, and submission
Week 4	Begin work on wireframe designs for application
Week 5	Begin refining wireframe designs in line with client preferences and recommendations
Week 6	Begin implementation of front-end UI with Python Flask
Week 7	Continued initial implementation
Week 8	Adjust features implemented by client request
Week 9-10	Testing of front-end UI, identify any potential errors and correct code
Week 11	Final testing, prepare interface for final submission
Week 12	Submit code

Table 2 Deliverable's timeline

Expected Cost and Duration

Given this project is an academic exercise that has real world benefits for a selection of the community the costs are negligible. There is some time by the stakeholders coordinating the relationships between the PT and MS. There will be some out of pocket expenses in terms of milage for the consultations and presentations to the MS by PT.

The PT is guided by Napier University regarding the timeline for the project. The University runs a trimester system of three equal terms over any given year. Trimesters one and two are where the bulk of the learning and undergraduate curriculum is delivered; trimester three is used to support students that require additional learning or support alongside examinations of failed modules.

This project is to be completed over trimester two from January to May 2023, with the half term from the 3rd – 17th April 2023.

Requirements and Quality Expectations

The ultimate test of the quality of the work produced is whether the MS is happy with their respective application. To ensure PT deliver a robust application, our undergraduate security expert with test the application robustly, ensuring both functionality and security of the finished application long before delivery, allowing for the fixing of bugs or issues.

Stakeholder List

The stakeholders for this project include the following personnel.

Role	Name	Organization
Project manager	John Johnston	Napier University PT
Main Client Contact	Ron Skirving	Men's Shed Committee
Sponsor	Iain Donald	Napier University Tutor
Project Team	Jonathan Cloke	Napier University PT
Project Team	Rory Mackintosh	Napier University PT
Project Team	Joe Black	Napier University PT
Project Team	Daniel Beardmore	Napier University PT
Project Team	Duncan Hastie	Napier University PT
Men's Shed	Committee members	Men's Shed Committee

Table 3 Stakeholder List

Appendix 1 Follow-Up Register

Type	Cause	Effect	Impact	Likelihood	Importance	Response	Response	Custodian
R	Coding	Inefficient application and failures. Incorrect programming, being under pressure	70	50	2	Avoid	Testing and Adjust	JJ, RM, JB, JC, DB, DH
R	Joining coding elements between team members	Inefficient application and failures. Incorrect programming, being under pressure	70	50	2	Avoid	Testing and Adjust	JJ, RM, JB, JC, DB, DH
R	SQL Scripting errors	Inefficient application and failures. Incorrect programming, being under pressure	70	50	2	Avoid	Testing and Adjust	JJ, RM, JB, JC, DB, DH
R	Broken Object Level Authorization	Integrity of the site being compromised	60	30	1	Avoid	Testing and Adjust	JJ, RM, JB, JC, DB, DH
R	Broken User Authentication	Unauthorised access to the site	50	30	1	Avoid	Testing and Adjust	JJ, RM, JB, JC, DB, DH
R	Broken Function Level Authorization	Application failure	40	30	1	Avoid	Testing and Adjust	JJ, RM, JB, JC, DB, DH
R	Security Misconfiguration	Application security compromise	40	30	1	Avoid	Testing and Adjust	JJ, RM, JB, JC, DB, DH

Appendix 2 Peer Project Initiation Report Feedback

From: Taft, Luke <40498618@live.napier.ac.uk>
Sent: Thursday, February 9, 2023 2:50:41 PM
To: Johnston, John <40582969@live.napier.ac.uk>
Subject: Re: Men's Shed PIR and review document

You guys made that really easy. Great report. If I can get half of the composure and detail into mine I'd be happy. Attached are my very few remarks. Lemme know if you got any questions or need any clarification. Best of luck.

-Luke

Project Initiation peer review

Reviewer: Luke Taft   **Team: 49**

Reviewee: John Johnston   **Team: 13**

Date of review: 9/2/2023

Project description

Reviewer's comments and recommendations

Well described with plenty of detail about the project and the client. Maybe a bit too much client back story but it certainly won't lose any marks for that. One thing that is missing currently is the captions for tables and figures. Other than that, I have no comments.

Response and actions taken

Captions have been added for the table and diagrams. JJ

Deliverables map

Reviewer's comments and recommendations

Excellent deliverables map. Very professional and clearly shows the objectives and different facets of the project.

Response and actions taken

None. JJ

Follow-up register

Reviewer's comments and recommendations

"Cause" and "Effect" categories are a little unclear. Could benefit from clearly designated cells like you used in the stakeholders list. It's a little hard to read currently.

Response and actions taken

Reformatted the table, increased the font size and cleaned up the shading.

Quality of document (clarity, presentation, etc.)

Reviewer's comments and recommendations

10/10. Great document. The styling is very appealing, and the information is detailed and more than covers the required information. If you folks don't get a good mark I'll eat my hat.

Response and actions taken

Thank you for both your time and kind response.

Appendix 3 Client Project Initiation Report Feedback