* choice of project and how it fits in with the modules you have studied \*\*\*\*
* background research and the way it has influenced your project \*\*\*
* your methodology and planning (Include your original project plan, together with any later versions or a discussion of any necessary changes to the plan) \*\*\*\*
* an assessment of the progress you made, problems encountered, their solutions and the lessons learned
* aspects of your work you are particularly proud of
* further areas for possible investigations or enhancements.
* Technical grasp
* Understanding of problem area
* Project management
* Report quality
* Evidence of learning
* Research effort.

## Abstract

Very brief summary of the project, goals, products and outcomes (One paragraph)

Contents

[Introduction 2](#_Toc32224535)

[Methodology 3](#_Toc32224536)

[Product Description 8](#_Toc32224537)

[Critical Review 8](#_Toc32224538)

[References 10](#_Toc32224539)

[Appendices 10](#_Toc32224540)

## Introduction

1. Summary of project goals, and achievements (One page)

## Methodology

1. Explanation of choice of relevant methodologies such as project management, surveys, development tools/environments, testing

Project management

I knew from the beginning that this project will have significant amounts of functional dependency, for example, the user will need to be able to log-on in order to uniquely identify them and the documents they have the privilege to access. For this reason, I considered using a Waterfall approach to development as this would have the advantage of being able to strictly plan each of the individual dependencies. Due to my choice in following OOD waterfall became a much less attractive methodology. Being more compatible with OOD and having better mobility to deal with uncertainty, Agile has become my choice of development methodology.

Agile has much tighter feedback loops, this allows the testing of elements in the project as I develop, enabling change of design and reallocation of time, based on results of tests. This also allows for restructuring of the project if specific functionality takes longer to make than initially planned. Further research revealed Agile is considered to increase efficiency and the successfulness of a project (SERRADOR; PINTO, 2015)\*\*\*\*.

My plans in the initial stages of the project consisted of simply releases and functionality that I wanted to be in each release. This provided a good outline for proper sprint-based development. I further developed the plan into (\*\*fig\*\*) with more tasks still grouped into releases. It was only at the planning stage for each sprint that I decided which tasks I want to complete over the two-week period. Each sprint has unallocated contingency to allow me to adapt to development changes or to recover for tasks taking longer than estimated.

\*\*\*\* go through plans

I knew from \*\*\* that it is a good idea to complete tasks that are more likely to overrun or that have more impact of risks involved. For this reason, all high impact tasks where added to the first few sprints, this gave me capacity to correct any errors made and extended development time of features.

Initially I struggled to time tasks accurately and after the second sprint I had a substantial over run of time taken beyond my estimates. I had to adapt my planning process by splitting up tasks into smaller, more atomic tasks this proved to be very effective and the more planning I did the more accurate my estimates became.

Working document spreadsheets

Burndown charts

Risk tool add burnout talkabout downtime

Collection restoration

ES6

Custom-elements

Firebase CLI cloud hosting

UML \*\*\*\* user roles task doer() task creator() both team types link to survey result seperateing group 1 task does group 2 task creator

This upgrade was from a conversation with my project supervisor

\*\*UI issues identified before the survey\*\*

### Surveys

Link affordance with descernability\*\*

Surveys where conducted in order to evaluate the User Experience(UE) of using Workaholic and to evaluate the success of base usability of initial development. The study was conducted on a very small sample of 5 people. Each of the users was given the same amount information on the things they needed to do, and the application version was maintained throughout.

The survey consisted of atomic tasks that are designed to be understandable from the moment of opening the application. Actions where explained in terms of what the participant needed to do but not how they go about doing it. This was an important in order to give a way to assess the affordance of the UI.

Tasks where timed from the point of giving the instruction to being observed to completing it. Times taken where rounded to the nearest whole second with tasks under a second being rounded to 1. This creates an empirical basis to assess a participant’s understanding of how the application works based on affordance.

|  |  |
| --- | --- |
| questions |  |
|  |  |
|  |  |
|  |  |

The following graph shows (fig\*\*) the time taken for each survey participant on each question.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | S1 | S2 | S3 | S4 | S5 |
| mean | 59.75 | 47.25 | 45.75 | 56.25 | 144.75 |

A surprising observation made Is that every user was able to transition from the team’s page to the tasks page without being told how to do so. I was expecting to see a significant difference in the time taken between completing task 1a and 2a for all participants. This was demonstrated by S5 which I know personally and is particularly unfamiliar with mobile based applications.

This demonstrates that a user can identify how to do each task from by what is being displayed on the screen. Which is a sign that basic functional requirements have been met and that the application affordance is correct.

The next set of results are grouped until similar assessment. In all the following results the users where asked to attempt to complete a task. \*\*\* consider un re-rounding these

This set of results demonstrates that a user can complete tasks completely. This is a very important concern with the uptake of the application. From the prospective of a task doer at this point of using the application any labour required is already understood and completed. This means any time spent completing the task on Workaholic is a potential productivity loss.

The following results are the participants where asked to measure their level of understanding on the effect their actions had. The purpose of these survey questions where to evaluate how discernible actions where. There is a fundamental requirement for actions to be discernible both in terms of using an application and for gamification elements to be effective\*\*\*.

People I knew so they where potentially nice about what

A major shortcoming of this survey is the number of participants. This means any conclusions made are tentative. A bigger sample size would allow for any potential statistical anomalies to be picked out. Although several S5 results are well above the average of the survey the lack of results means the results cannot justifiably identified as anomalous.

Further surveys should include more participants but also include alternate process for comparison. This could be either an application that has similar functional capabilities or a more traditional form of personnel management.

Although there is evidence of discernibility measuring the effectiveness of gamification elements was difficult for a number of reasons: gamification and progress within the application would require long term use, gamification is dependent on using the systemic context \*\* explain else where \*

Could have compared to a similar application

Run survey in a team

### Test Driven Development

Test Driven Development (TDD) is the process of writing program changes in order meet the conditions of tests. These tests are written before development occurs and have pass and fail conditions that are known results. This is an effective way of mitigating risk from making changes to complex systems.

Research \*\*where\*\* and initial testing showed that firebase rules had poor default error handling client-side. Actions can be prevented but the nature of the permission error is hard to identify. When querying a collection if the query *could* return a record that a user doesn’t have permission to access, it will fail regardless of the actual results of the query. This added a requirement to be able to identify the effects rules had on a user’s ability to access documents and collections.\*\*

The following test where written and performed from a separate page built for purpose. A test account was used and no database changes where made during the process.

|  |  |
| --- | --- |
| Test Query | Expected Result |
| document in the accounts collection that does **not** have the same ID as the authentication token UUID. | Reject |
| document in the accounts collection that has the same ID as the authentication token UUID. | Accept |
| Entire Collection of teams | Reject |
| Collection of teams where UUID is in the members collection | Accept |
| Task of a team where UUID is **not** in the members collection | Reject |
| Task of a team where UUID is in the members-collection | Accept |

After writing these test rules where created using the firebase console. This proved to be a very effective way to develop these. Although writing the initial tests was time consuming this time was saved by speeding up development when writing the rules. Having tests to run at hand rather then having to use the application to test rule changes had large productivity benefits. These tests also gave confidence that the rules I have written had restricted access to any personal data.

It was important to not add rules until I had the capacity to test as any changes to the database structure or document values could affect access. This would not only waste time disabling and rewriting rules but have development issues where error messages are misinterpreted hindering debugging coding errors.

This carried a small amount of risk where access to my database was relatively unrestricted during development, due to the restorative nature of the application this was somewhat mitigated.

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## Product Description

What has been created, where relevant, explanation of requirements, design, implementation and evaluation of choices and outcomes

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I have created a work a management application called Workaholic. The purpose of this application is to add intrinsic value to doing tasks in the form of gaining experience points. The intension of experience gained in the application is to correspond to gains made in real life. This allows teams of people to create an ecosystem which motivates people to not only do tasks but to actively engage in their own professional development.

The mobile context requires for actions to be quick and require minimal attention \*\*\*. This something that is a potential weakness of Workaholic when creating tasks users took between 34 and 263 seconds to add a task. This maybe problematic when a user needs to add a large volume of tasks. This speed concern maybe slightly alleviated by signs that the speeds improve with use.

When a user is for fulling the role of adding tasks, they are either only adding a single task or their duty has shifted to a more organisational role. I see this adding importance to the capacity to use the application in a different context. PC users are known \*\* to be able to input text much faster this increase in productivity suggests that someone for fulling an organisational role is better suited to a pc context.

### Requirements

One of the major requirements of the application is a persistent data source that all users have access to either a SQL or noSQL(document) database. This data needed to be secure, only being accessible to members of a specific team. Appropriate measures needed to be taken to conform to 2016 GDPR regulations.

### Design

### Firebase

I have a good understanding of what It takes to give users access to persistent data source through a web-based application. During my placement and whilst at university I have had exposure both databases technology that meet the storage requirements and had the opportunity to developed multiple APIs in a variety of languages to access this data. A significantly capable data-engine would take a lot of time to write and as a result would make up either the whole or at least a significant part of development.

Infrastructure and hosting requirements

My initial investigations turned up several alternatives to writing a data engine. \*\*\*\*

Some of the features that attracted me to firebase client notification of data changes, the ability to secure documents based on the values contained there, cloud hosting features, f

OAuth OKTa

Significant operational cost to function based process – opted to create clientside processes to interact with data

In order to keep data accessible only to team members some form of authentication process is required. This will uniquely identify the user and thus the tasks and team data they have the security privileges to view.

### ES6 web based over using android studio

### Custom Elements

## Critical Review

: Review success and areas for improvement, emphasise what has been learnt and how this would affect future projects

No rule based validation

No rule based task edit restriction

Very good discipline following development reflection and

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## References

1. A full accurate list of references to all sources of information that you have used including the source of any non-original material such as code and media assets. You must also reference any tutorials or other sources of information that informed your project.

## Appendices

The promised based nature of the query system created appropriate capacity to handle database errors:

var docRef = db.collection("collectionid").doc("SF");  
  
docRef.get().then(function(doc) {

// no query error do something  
}).catch(function(error) {

//error thrown within promise – potentially permission related  
});

\*\*ref

This pattern of writing queries gives the ability to prevent client-side actions when any errors in accessing a collection or document ocurr