**Research Project Mini-Dissertation**

**Project Title**

**By**

**Students’ Names**

A Mini-Dissertation Submitted as a Partial Requirement for the Bachelor Science in Information Technology: Mobile Application and Web Services

In the Faculty of Information Technology, Eduvos

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# Acknowledgements

Words of acknowledgement to the contributors and your support structure during the research. People, companies or Institutions are usually mentioned by name and why you acknowledge their support.

# Abstract

A concise overview of your research work that reveals the aim, objectives, justification, methodology and findings of your research.

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# Problem Settings

In this chapter, briefly explain the research topic, and the subsections to be addressed: research background, aim and objectives, problem statement and research questions.

## Background of Research

In this subsection, you should identify the nature of the issue being explored, its suitable context in respect to theory, research, and/or practice, its scope, and the degree to which prior studies have effectively addressed the topic, highlighting any gaps that your study aims to fill.

## Aim of Research

In this subsection, provide a description of what you intend to achieve in the research work.

## Research Objectives

In this subsection, outline the issues that you need to address to achieve the aim above. Your objectives should be more specific than the aim.

## Problem Statement

In this section, you will identify the problem by describing the ideal situation, the current gaps, consequences of the problem and your approach on how to address the problem.

Based on the above, in one sentence, define the proposed approach to solve (improve) the problem identified.

### Sub-Problems

Often, the problem statement may be divided into parts known as sub-problems (see subsections 1.4.1.1 and 1.4.1.2). These sub-problems provide the researcher a clearer view of the complete project goal.

When defining a subproblem, ensure that each is a completely researchable unit and must add up to the totality of the problem statement.

#### Sub-problem 1

#### Sub-problem 2

**Graphical user interface, application

Description automatically generated**

Figure 1.1: Gantt Chart

## Benefits of Study

In this section, you are required to outline the significance (contribution) of the research work.

## Delimitation of Study

In this section, you are required to describe the boundary or scope of your research work.

## Timelines

In this section, with the use of Gantt chart, you are required to illustrate your research project schedule.

## Outline of Mini Dissertation

In this section, the structure of the final mini dissertation will be outlined.

# Literature Review

In this Chapter, you must indicate:

* that you have studied the work of the major authors in your research field
* that you are familiar with the major themes relevant to your chosen subject area
* what further investigations you intend to pursue as part of your mini dissertation.

Your literature review should lead to and justify your research objectives and problem statement.

*Review sources up to 2 or 3 years back. Older resources should be reviewed only when its justifiable to do so.*

## Introduction

In this subsection, you should discuss an overview of how you treated your literature survey:

* How you defined your research parameters given your research area,
* How you searched the review materials (sources) and evaluated them.

## Mobile Apps

In this subsection, provide a general overview and review of mobile apps and their usage in your area.

### Mobile Apps in your area of research

In this subsection, discuss the current mobile apps in your area of research, you can also analyse these apps looking at how yours might differ or be like the existing ones.

This subsection could be broken into other subsections, either each section describes a different mobile app or expounding on the relevant specifications of the app in question or both.

#### Technologies used in the existing mobile apps

In this subsection, you could discuss the technologies that these apps use.

### Mobile Apps 2

#### Technologies used in the existing mobile apps

## Desktop Apps or Websites

In this section, discuss existing Desktop Apps or Websites or research on such, related to your chosen area of research. Review works like your research and critic the works.

## Mobile App Tools and Technologies

In this subsection, review some tools and technologies you plan to use in your app. Look at how these works were implemented and who else has implemented them.

Break this into further subsections depending on the number of tools or techniques you are researching.

## Mobile Apps Research and Design Methodologies

In this section, review and critique research and design methodologies used by mobile app developers. Drive your discussions towards justifying your chosen methodologies and the effectiveness or lack thereof of the discussed methodologies.

## Conclusion

Summarize your reviews and critiques with a view of justifying your research and its anticipated contributions to your research area.

# System Modelling and Architectural Design

In this Chapter, you will design your app following the Mobile App Architecture and the Iterative Incremental Development Agile Methodology (Should have been discussed in Chapter 2). You will have the logical design of your system or a prototype at the end of this chapter.

## Introduction

In this subsection, you should discuss an overview of how you plan to approach the design of your app, including you will consider user experience (ux design) as you design the user interface. You should also clearly state your overlapping iterations between design and implementation as you follow the prescribed methodology. However, in this chapter you will only discuss the issues to do with planning, requirements (Presentation Layer), and analysis and design (Business Layer and Data Layer) only. All implementation and Testing discussions will be done in Chapter 4.

## Presentation Layer

In this subsection, discuss how you plan to approach the presentation layer of the mobile app architectural design.

### User Experience

In this subsection, you could discuss the plans for elicitation and analysis of the user feel and expectations of the app.

#### Fact-Finding Technique(s)

In this subsection, discuss the fact-finding techniques used and the facts gathered from the users. You have to eventually compile a ***User Requirements Document*** that will be one of the appendices of your Mini-Dissertation.

#### Facts Analysis

In this subsection, analyse the facts gathered and the user requirements, using preferred tools and techniques.

### User Interface

In this subsection, discuss the user interface design plans and approach, based on the way you want to approach the Incremental Iterative Development Agile Methodology.

#### User Interface Design

In this subsection, design the various user screens using preferred tools and also discuss and document the design process.

##### Iteration 1

In this section, you may show the designs for the first iteration and you can have the next iteration designs as you follow the iterative incremental development process.

##### Iteration 2

## Business Layer

In this subsection, you will discuss and design the business logic of your mobile app.

### Operations/Process Models Design

In this subsection, you will design the control flow of the apps’ operations in line with the interface screens that have been designed and the business flow of the app’s operations. Use some modelling tools and techniques.

##### Iteration 1

In this subsection, you may show the designs for the first iteration and you can have the next iteration designs as you follow the iterative incremental development process.

##### Iteration 2

### Data Handling Operations

In this subsection you will design the processes of handling user’s and app data, including security protocols, data validation and handling errors and exceptions. Use some modelling tools and techniques.

##### Iteration 1

In this section, you may show the designs for the first iteration and you can have the next iteration designs as you follow the iterative incremental development process.

##### Iteration 2

## Data Layer

In this subsection, you will discuss and develop data for the app. You will decide where the data should be stored, that is, on the app or on a network server.

### User Data

In this subsection, you will discuss and design data structures for the user’s personal data, that may need to be stored on the mobile device.

##### Iteration 1

In this subsection, you may show the designs for the first iteration and you can have the next iteration designs as you follow the iterative incremental development process.

##### Iteration 2

### System Data

In this subsection you will discuss and design data that is stored as the system functions. It may be necessary for your system to store system wide data. Design those data structures.

##### Iteration 1

In this subsection, you may show the designs for the first iteration and you can have the next iteration designs as you follow the iterative incremental development process.

##### Iteration 2

## Conclusion

In this subsection you will give a summary of all the models that were designed and the incremental design interleaved with the iterative designs and implementations. However, you will not include detailed information of implementation in this chapter.

# System Prototype Development and Testing

In this Chapter, you will implement the components of the app that were designed using Iterative Incremental Development Agile Methodology. This means you may have to improve some designs as you iteratively implement the app designed components. This chapter is closely related to Chapter 3 as expected, and you can refer to the sections of Chapter 3 in your discussions. You will be expected to illustrate the implementations using, screenshots of the app running on the emulator and code snippets (layout xml code or java code). You are not required to copy and paste all the code, but just snippets that you would like to discuss.

You will also create a ***User Guide Manual*** document as part of the Appendices of the Final Mini-Dissertation Document.

## Introduction

In this subsection, you should discuss an overview of how you implemented the designs of your app in Android Studio/Xcode. Discuss your approach to the prototype and how you applied the Iterative Incremental Development Agile Methodology. You can also explain how you factored in the incremental implementation given the incremental development at various iterations (if any).

## Testing Plan

In this subsection, discuss testing plans for your app and choose and discuss Testing Types you will/have performed as you develop the app from the designs. Your Test Plan should detail the type of test, when and by who it will be conducted. See Table 4.1 for guidance.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Test Plans** | | | | |
| **Increment** | **Test Type** | **Test Date** | **Team Members** | **…** |
|  |  |  |  |  |

Table 4.1: Test Plan

### Testing Type 1

In this subsection, you could discuss the plans for this particular Test Type and design a testing report. Also indicate how you plan to respond to the test results as you continue to design and implement the app.

### Testing Type 2

### Testing Type 3

## Layouts Development

In this subsection, you will demonstrate the development of the layouts from the User Interface Designs. Consider incremental designs in your demonstrations. You can use pseudocode and/or xml and java code snippets, or even screenshots of the app running on the emulator, for your demonstrations, combined with verbal explanations where necessary. You don’t have to show all the code, but snippets of the important parts that warrant discussions.

### User Interface 1

In this subsection, demonstrate and illustrate the first/main layout of your app.

##### Iteration 1

In this subsection, you may show the implementation at iteration 1 of this main layout for your app.

##### Iteration 2

In this subsection, you may show the improved implementations of this main layout as you incrementally develop your app with user feedback on your prototype.

### User Interface 2

In this subsection, you can discuss the implementation of the second layout screen of your app.

##### Iteration 1

In this subsection, you may show the implementation at iteration 1 of this layout for your app.

##### Iteration 2

In this subsection, you may show the improved implementations of this layout as you incrementally develop your app with user feedback on your prototype.

### User Interface 3

#### Iteration 1

## Business Logic Development

In this subsection, you will demonstrate how you implemented the Busine Logic of the app, clearly detailing the response to user interactions and operational flow from layout to layout. You will demonstrate the algorithms that have been used to implement the Business Logic and the algorithms that solve the operational challenges. You can use code snippets to demonstrate the implementation, but do not copy and paste all the lines of code, but the snippets that need discussion. You can also discuss special technologies (like Location Services, Google Maps, Cameras, Sensors, etc) used and justify their use.

### Algorithm 1

In this subsection, you will illustrate the line-by-line code used to solve particular operational challenges in your app.

*You can change the subheading to an appropriate one, given the illustration you are making and the names given to the classes or methods.*

##### Iteration 1

In this subsection, you may show the step by step incremental improvements on the code, into the iterations of your development process.

##### Iteration 2

### Algorithm 2

##### Iteration 1

##### Iteration 2

## Data Access Development

### Database Implementation

In this subsection, you can discuss the plans and choices of platform for implementing the database for your app. You can discuss the justification of the chosen platform and the anticipated benefits of that platform for your app.

#### Database Creation Class

In this subsection, you will illustrate snippets of code from the class that implements the database and the tables in the database

##### Iteration 1

In this subsection, you may illustrate the incremental improvements on this code and drill down to the iterations of the incremental development and implementation

##### Iteration 2

### Data Access Adapters

In this subsection, discuss and illustrate the class used to access the data from the database. Snippets of code can be shown together with screenshots of layouts showing the extracted data.

#### Accessor Methods

In this subsection, illustrate the algorithms used to retrieve data from the database. You can show the incremental developed of these algorithms and methods.

##### Iteration 1

In this subsection, you may illustrate the incremental improvements on this code and drill down to the iterations of the incremental development and implementation

##### Iteration 2

## Conclusion

In this subsection you will give a summary of all the design implementations and an overall summary of the technologies used. You also may give an insight into how you integrated design and implementation in the incremental and iterative development processes.

# Results, Conclusion, and Recommendations

In this Chapter, you will discuss your findings throughout your research. You will elaborate on the progress and outcome of your research, clearly stating your successes and failures. You will explain if the research objectives were met and if the aim of the research was achieved. You will outline the solutions implemented for the problem and it’s subproblems.

## Results

In this subsection, discuss all your findings given the research problem you had presented in the Problem Settings (Chapter 1). Evaluate your own successes and failures in line with the objectives and aim you set out for the research. Discuss what the researchers have learnt and what the customer has gained.

You can breakdown your results into subheadings if you feel it is necessary.

### Research Findings

In this subsection, you could discuss the discoveries you made through your research. You could expand on the benefits of the research findings you made.

### Successes

In this subsection, you will evaluate the successes you made in your research journey. Discuss how you achieved the aim and objectives of the research, also discuss how solved the problems and the subproblems.

### Challenges

In this subsection, you will discuss the challenges you faced during your research. You will reveal the challenges you could not solve. You can also discuss the group dynamics challenges you faced during the research project. You can also discuss any technical challenges faced.

### Benefits

In this subsection, you will discuss the benefits of the research to you the researchers, to the academic community knowledge base and to the customer.

## Conclusion

In this subsection, you will give a concise conclusion of the project. You will close down the research project and round up all your work.

## Recommendations

In this subsection you will give recommendations to the customers concerning the product you have released. You can discuss immediate extra needs if any, and future developments and expansions of the app.

# Appendices

## Appendix A

## Appendix B

# List of Figures

The list of figures identifies the titles and locations of visuals (figures, drawings, photos, maps) in your research proposal or mini dissertation.

# List of Tables

A list of tables is a reference tool that allows your readers to navigate to data quickly and easily in your thesis or dissertation.

# References

All references used in writing the dissertation (whether direct quotations or paraphrasing) should be included in a reference list/bibliography, compiled in alphabetical order by author. The Harvard system for listing references should be used.