

“GSAN Mobile Launcher Application”

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15865

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## **ABSTRACT**

The launcher application for Global Safety Assessment Network (GSAN) is a mobile application which runs on Android operating system. The GSAN mobile application has established to facilitate collaboration on safety assessment capacity building in support of global nuclear safety harmonization, especially in the expanding and developing nuclear programmes around the world.

This mobile application will be implemented with the cooperation and coordination from Safety Assessment Section (SAS) and will hopefully provide a great experience to the target users while using it. This report will be covered all the details of the mobile application development.

## ACKNOWLEDGEMENT

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**TABLE OF CONTENTS**

ABSTRACT ..... I

ACKNOWLEDGEMENT ..... II

LIST OF FIGURES ..... V

LIST OF TABLES ..... VI

CHAPTER 1 ..... 1

    INTRODUCTION ..... 1

        1.1 Background ..... 1

        1.2 Problem Statement ..... 3

        1.3 Objectives and Scope of Study ..... 3

CHAPTER 2 ..... 4

    LITERATURE REVIEW ..... 4

        2.1 Responsive Web Design ..... 4

        2.2 Android ..... 5

CHAPTER 3 ..... 8

    METHODOLOGY ..... 8

        3.1 Research Methodology ..... 8

        3.2 Development Methodology ..... 9

        3.3 Development Tools ..... 10

        3.4 Project Milestones ..... 10

        3.5 Gantt Chart ..... 11

CHAPTER 4 ..... 13

    RESULTS AND DISCUSSION ..... 13

        4.1 Findings ..... 13

CHAPTER 5 ..... 23

CONCLUSION .....	23
5.1 Recommendations.....	23
5.2 Conclusion .....	23
REFERENCES .....	25
APPENDIX.....	26

## LIST OF FIGURES

Figure 1: Resolution sizes from portrait to landscape orientation.....	5
Figure 2: Rapid Application Development (RAD).....	9
Figure 3: Android phone mockup sketches.....	10
Figure 4: Android tablet mockup sketches.....	15
Figure 5: First set of codes for Android.....	17
Figure 6: Second set of codes for Android.....	18
Figure 7: AVD simulator screenshot.....	20
Figure 8: Screenshot of GSAN webpage using SharePoint 2010.....	21
Figure 9: Expected outcome.....	22

## LIST OF TABLES

Table 1: Android features.....	6
Table 2: Final Year Project 1 Gantt Chart.....	11
Table 3 : Final Year Project 2 Gantt Chart.....	12

# CHAPTER 1

## INTRODUCTION

### 1.1 Background

The GSAN mobile application is an online platform where users, which are the Member States are able to:

1. Discover information about the Design and Safety Assessment Review Service provided by the Safety Assessment Section (SAS) in the International Atomic Energy Agency (IAEA).
2. Easily access the IAEA safety standards, along with those related to safety assessment issues.
3. Find other information, documents and links relevant to safety assessment.
4. Exchange information and discuss issues among experts in a managed forum or webinars.
5. Ask questions and comments within their peer group.
6. Work together on specific projects which enhance their safety assessments capabilities.
7. Access information on the Safety Assessment Education and Training Program (SAET).
8. Request SAS services and training.

The project is involving the author in converting the GSAN webpage to a GSAN



mobile application for mobile devices by creating a launcher application. The application will be based in Android operating system.

## **1.2 Problem Statement**

As for now, the GSAN webpage can only be accessed through a computer. It cannot be accessed through mobile devices as only the default of the GSAN webpage will be displayed. The GSAN is dependent to a web content management software called SharePoint 2010, and it needs to be upgraded to SharePoint 2013.

It would be more productive and useful to target users for the GSAN webpage to also be accessible through mobile devices.

## **1.3 Objectives and Scope of Study**

1. To create a launcher application for GSAN mobile application using Android operating system.
2. To use SharePoint 2013 in the development of the application.
3. To provide target users with an easy way to access the GSAN mobile application through their mobile devices.
4. To provide a great experience while using the application.

## **CHAPTER 2**

### **LITERATURE REVIEW**

Nowadays, almost every person wants a mobile version of their website. It is practically essential for one design for the Blackberry, another for the iPhone, the iPad and also Android devices. All screens must be compatible as well. Perhaps in the next five years, there will be a need to design for a number of additional inventions.

In web design and development, we are quickly reaching the point of being unable to keep up with the endless new resolutions and devices as creating a website version for each resolution and new device would be impossible and impractical. Therefore, a new feature called Responsive Web Design (RWD) has been added in the SharePoint 2013.

#### **2.1 Responsive Web Design (RWD)**

RWD is an approach that design and development should respond to the users's behaviour and environment based on screen size, platform and orientation. The practice consists of a mix of flexible grids and layouts, images and an intelligent use of CSS media queries. If the user switches from their laptop to iPad, the website should also automatically switch to accommodate for resolution, image size and scripting abilities.

With RWD, we can make things more flexible. Images can be automatically adjusted and layouts never break, although they may become squished and illegible in the process. It is ideal for devices that switch from portrait orientation to landscape in an instant or for when users switch from a large computer screen to an iPad.

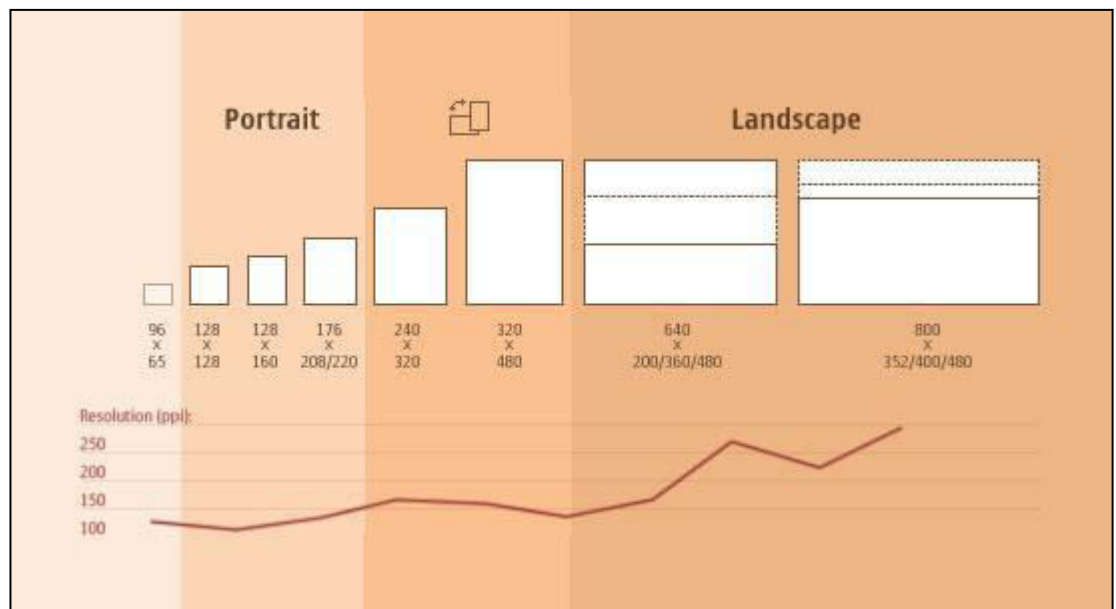


Figure 1: Resolution sizes from portrait to landscape orientation

## 2.2 Android

Android is an open source and Linux-based OSs for mobile devices. Android was developed by the Open Handset Alliance, led by Google and other companies. Android offers a unified approach to application development for mobile devices, such as smart phones and tablets, which means developers need only develop for Android and their applications should be able to run on different devices powered by Android. The source code for Android is available under free and open source software licenses. Additionally, Android is a powerful operating system competing with Apple 4GS and supports great features.

A few of them are listed below:

<b>Feature</b>	<b>Description</b>
User Interface	Android OS basic screen provides a beautiful and intuitive user interface.
Connectivity	GSM/EDGE, IDEN, CDMA, EV-DO, UMTS, Bluetooth, Wi-Fi, LTE, NFC and WiMAX.
Storage	SQLite, a lightweight relational database, is used for data storage purposes.
Media support	H.263, H.264, MPEG-4 SP, AMR, AMR-WB, AAC, HE-AAC, AAC 5.1, MP3, MIDI, Ogg Vorbis, WAV, JPEG, PNG, GIF and BMP.
Messaging	SMS and MMS.
Web browser	Based on the open source WebKit layout engine, coupled with Chrome's VB JavaScript engine supporting HTML and CSS3.
Multi-touch	Android has native support for multi-touch which was initially made available in handsets such as the HTC Hero.
Multi-tasking	User can jump from one task to another and various applications can run simultaneously.
Resizable widgets	Widgets are resizable, so users can expand them to show more content or shrink them to save space.
Multi-language	Supports single direction and bi-directional text.

Table 1: Android features

Android applications are usually developed in the Java language using the Android Software Development Kit. Once developed, Android applications can be packaged easily and distributed either through a store such as Google Play and Amazon App Store.

Android applications development can be started on any of the following operating systems:

- Microsoft Windows XP or a later version;
- Mac OS X 10.5.8 or a later version with Intel chip;
- Linux including GNU C Library 2.7 or later.

All required tools to develop Android applications are freely available and can be downloaded from the web. Below is the list of software that is important to start the android application programming:

- 1) Java JDK5 or JDK6
- 2) Android SDK
- 3) Android Studio IDE for Java Developers (optional)
- 4) Android Development Tools (ADT) Eclipse Plugin (optional)

## **CHAPTER 3**

### **METHODOLOGY**

#### **3.1 Research Methodology**

The project deals with mobile application development in Android operating system. In order to get depth understanding on the topic, access to reading materials such as online articles, research papers, books and others. Besides that, there will be some interviews and observations on target users to inquire about the real working environment and any suggestions in they may have. Communication mediums for doing research are though online tools such as emails.

Below summarizes the research methodology:

1. Project planning
  - a) Topic selection
  - b) Brainstorming
  - c) Project approval
2. Literature review
  - a) Conducting research
3. Data gathering and analysis
  - a) Collecting data
  - b) Interviews
  - c) Observation
4. Develop system architecture
  - a) Determine the system functionality
5. Design
  - a) Graphical User Interface (GUI) illustrations

### 3.2 Development Methodology

The development methodology that will be used this project is Rapid Application Development (RAD) method. The RAD methodology will be used due to the time constrain of the project, which is less than 8 months.

The benefits of using the RAD methodology is that it allows any modifications to be made during the development phase, especially if there is a need to review at any phases throughout the project development. Having flexibility throughout completing the project is important.

The whole project will be divided into four main phases as below:

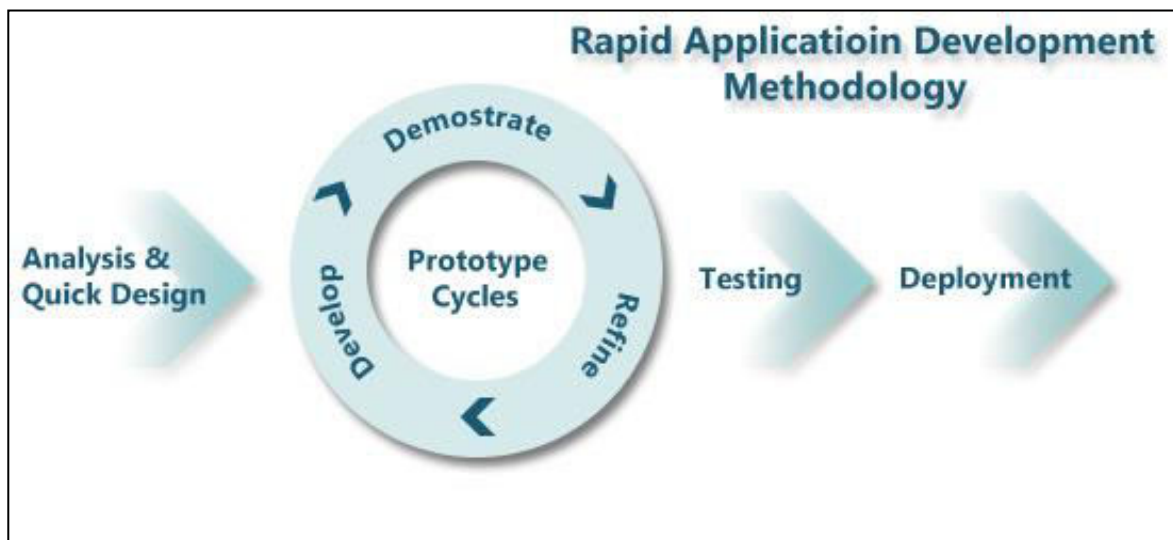


Figure 2: Rapid Application Development (RAD)

1. Analysis and Quick Design Phase
2. Prototype Cycles ( Develop, Demonstrate and Refine processes)
3. Testing Phase
4. Deployment Phase



### 3.3 Development Tools

Basic development tools will be used in this project are:

- Hardware
  1. A Laptop for development purposes
  2. Any Android mobile device
  
- Software
  1. Android Studio
    - For main coding and system development
    - For debugging, compiling and building solutions

### 3.4 Project Milestones

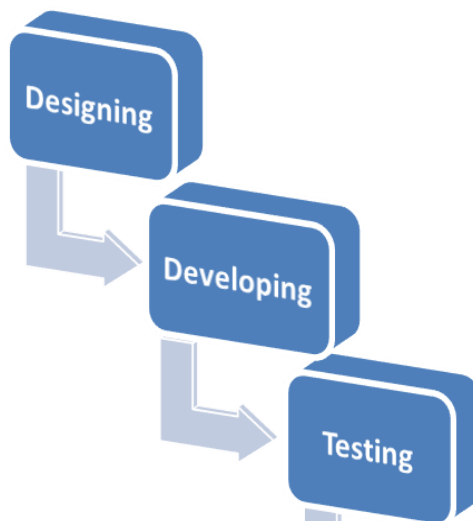


Figure 3: Project milestone chart

### 3.5 Gantt Chart

No.	Details / Week	1 / 2	3 / 4	5 / 6	7 / 8	9 / 10	11 / 12	13 / 14
1	Project Planning	✓	✓					
2	Literature Review		✓	✓				
3	Data Gathering		✓	✓	✓	✓		
4	Designing Interface						✓	
5	Proposal Defense							✓
6	Submission of Interim Report							✓

Table 2: Final Year Project 1 Gantt Chart

<b>No.</b>	<b>Details / Week</b>	<b>1 / 2</b>	<b>3 / 4</b>	<b>5 / 6</b>	<b>7 / 8</b>	<b>9 / 10</b>	<b>11 / 12</b>	<b>13 / 14</b>
<b>1</b>	<b>Designing</b>	✓	✓					
<b>2</b>	<b>Developing &amp; Prototyping</b>		✓	✓	✓			
<b>3</b>	<b>System Testing</b>					✓		
<b>4</b>	<b>Implementation</b>						✓	
<b>5</b>	<b>Documentation</b>						✓	
<b>6</b>	<b>Pre-SEDEX &amp; Viva</b>						✓	✓
<b>7</b>	<b>Final Dissertation</b>							✓

Table 3 : Final Year Project 2 Gantt Chart

## **CHAPTER 4**

### **RESULTS AND DISCUSSION**

#### **4.1 Findings**

##### DESIGNING PHASE

Having a great idea is the starting point for every new project. Before the author went straight into the detailing task, she discussed her idea with her supervisor to clearly define the purpose of the application.

The designing phase started with the sketching of the application layouts. The author made sketches which laid the foundation for the application's future interface. The author visually conceptualized the main features and the application approximate layout and structure of the application. The benefits of first having a rough sketch of the application are that it helps everyone to understand its purpose and could be used as a reference for the next phase of the project.

The author used a wire framing process to create a mockup or prototype of the application. There are many prototyping tools available on the internet, one of which is Balsamiq. Balsamiq allowed the author to drag and drop all placeholders and representative graphics into place, and add button functionality so that the author could click through the application in review mode.

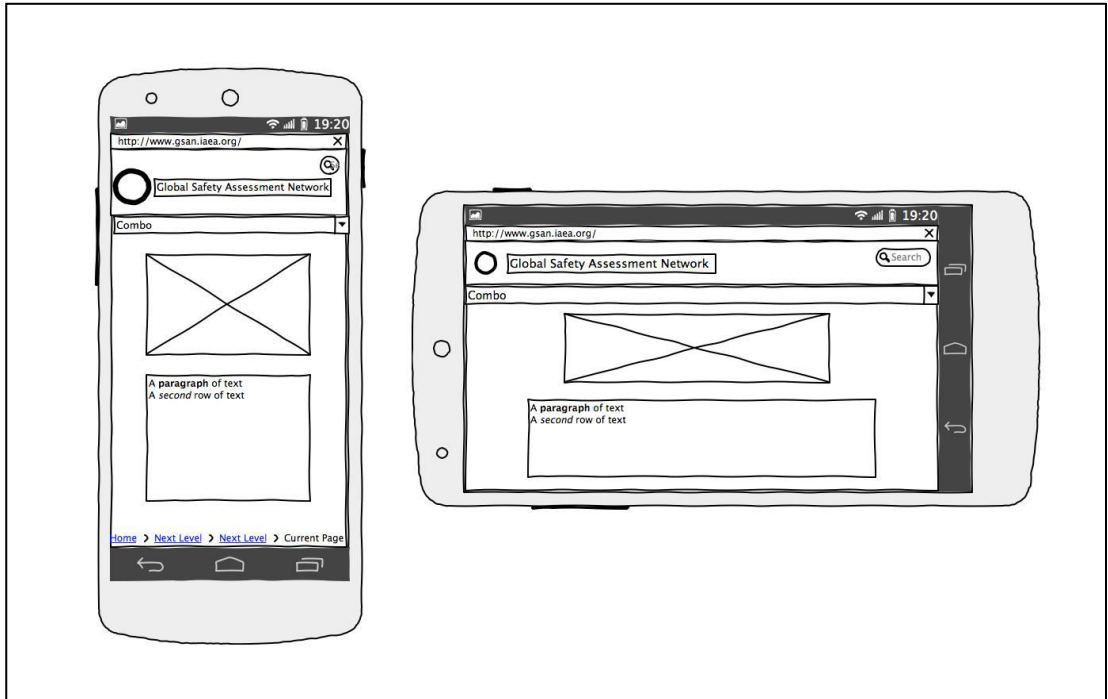
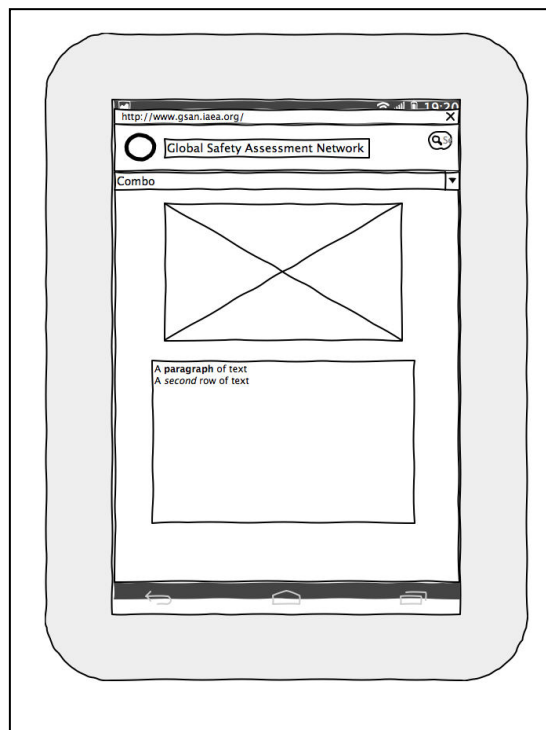


Figure 3: Android phone mockup sketches



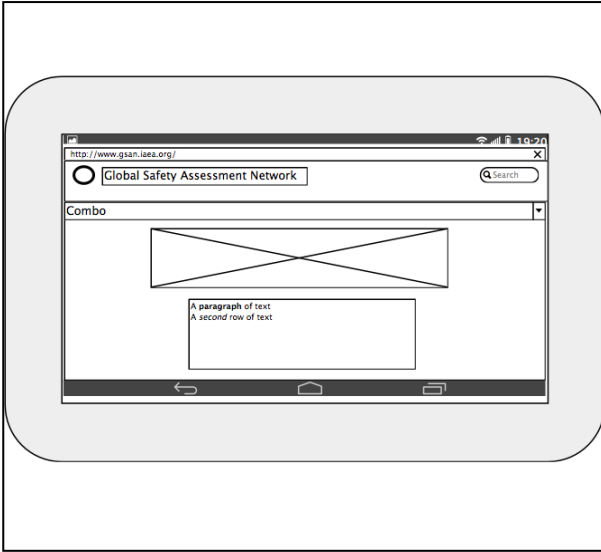


Figure 4: Android tablet mockup sketches

## DEVELOPING PHASE

The author conducted research on the development of a mobile app for Android. The research purposes were to find out whether there were other apps available on the market offering similar features, find design inspiration for the application, find information on the technical requirements for the application and find out how to put the application on the market.

The author also looked into the technical aspects of the application. The author investigated the requirements and gained better understanding of whether her idea was truly feasible from a technical standpoint. This research and information gathering also extended into legal restrictions, such as copyright and privacy questions.

The author collected all materials and information related to the coding for Android from tutorials available on the Android Developer and webpages. The author also watched YouTube tutorials.

Writing codes for Android is quite challenging because the Android app uses Java programming language. The Android version of the application is written in the Android Studio.

While writing the codes, the author only had preview links of SharePoint 2013 which only showed the new look and feel; GSAN is currently using SharePoint 2010 which does not provide support for mobile apps. SharePoint 2013 will be officially launched in September 2014; only at that time can the actual results be seen. However, the preview links of SharePoint 2013 do gave an expectation on how the application would be in the future.

Below are the some parts of the codes . The rest of the codes are attached in the appendix.

```

// MainActivity.java
// GSAN
//
// Created by Najihah
// Copyright (c) 2014 SAS-NSNI. All rights reserved.

package gsan.launcher.app;

import android.app.Activity;
import android.os.Bundle;
import android.view.KeyEvent;
import android.webkit.WebView;
import android.webkit.WebViewClient;

public class MainActivity extends Activity {

    private WebView mWebView;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        mWebView = (WebView) findViewById(R.id.webview);
        mWebView.getSettings().setJavaScriptEnabled(true);
        mWebView.loadUrl("http://sinnint.com/temp/bss-rwd/examples/index.html");
        mWebView.setWebViewClient(new HelloWebViewClient());
    }

    private class HelloWebViewClient extends WebViewClient{
        @Override
        public boolean shouldOverrideUrlLoading (WebView webView, String url)
        {
            webView.loadUrl(url);
            return true;
        }
    }

    @Override
    public boolean onKeyDown (int keyCode, KeyEvent event)
    {
        if ((keyCode == KeyEvent.KEYCODE_BACK)&& mWebView.canGoBack())
        {
            mWebView.goBack();
            return true;
        }
        return super.onKeyDown(keyCode, event);
    }
}

```

Figure 5: First set of codes for Android



```
<?xml version = "1.0" encoding = "utf-8"?>
<WebView xmlns:android = "http://schemas.android.com/apk/res/andr
    android:id = "@+id/webview"
    android:icon = "@drawable/ic_launcher"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent" />
```

Figure 6: Second set of codes for Android

## TESTING PHASE

The testing can be performed once the designing and developing phases are complete. Before the testing phase began, the author had the app concept completely in place and inserted all of the graphics and text in the mockup sketches, which meant that the application could be tested to observe its expected look and feel.

The author ran the application on the Android Virtual Device (AVD), which she created in the Android Studio. An AVD is a device configuration for the Android that allowed the author to model different devices. The AVD allowed the author to prototype, develop and test the Android app without using a physical device as it mimicked all of the hardware and software features of a typical mobile device, with the exception that it could not place actual phone calls. It provided a variety of navigation and control keys, which the author pressed using the mouse keyboard to generate events for the application. It also provided a screen, on which the application is displayed together with any other active Android apps.

It is important to see how the application appearance of the GSAN webpage has evolved on mobile device screens. SharePoint 2013 has a new feature called Responsive Web Design (RWD), which enables the GSAN webpage to adjust to the various mobile device screen resolutions. SharePoint 2010 does not offer this feature; therefore, only the default GSAN webpage appears on mobile device screens.

Below are screen shots taken during a testing session for iOS and Android using the preview link of SharePoint 2013.

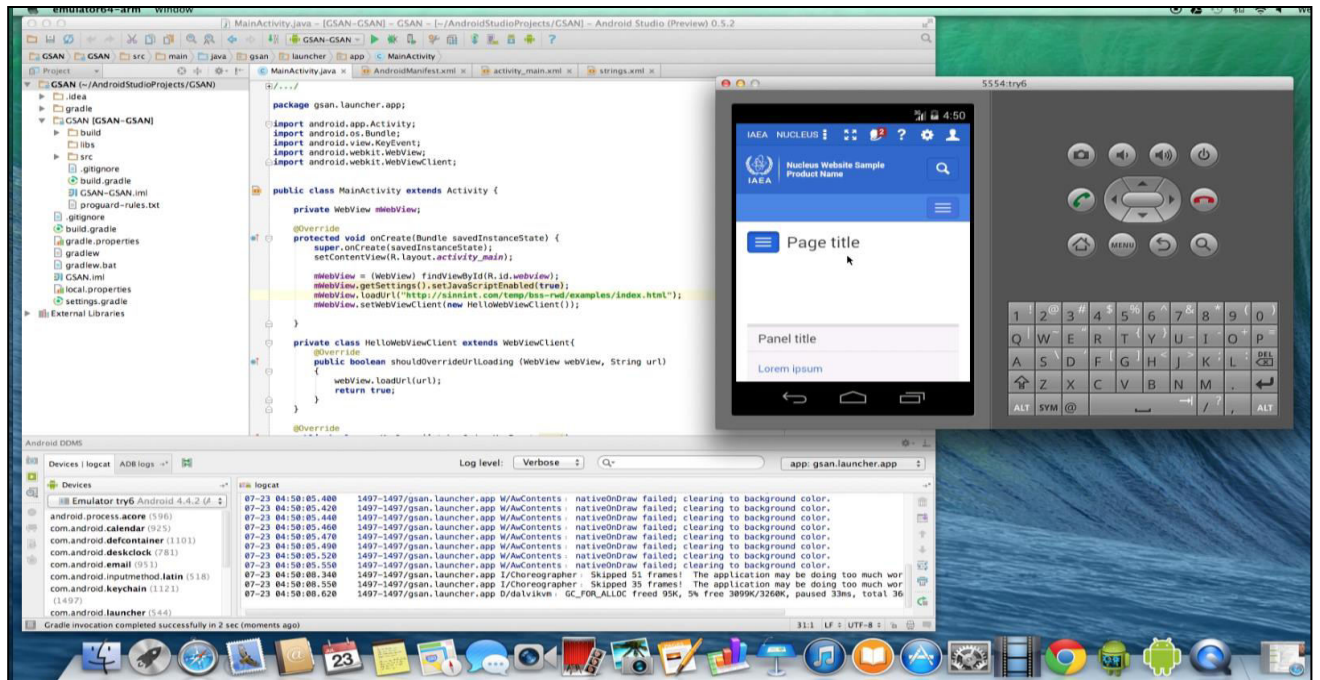


Figure 7: AVD simulator screenshot

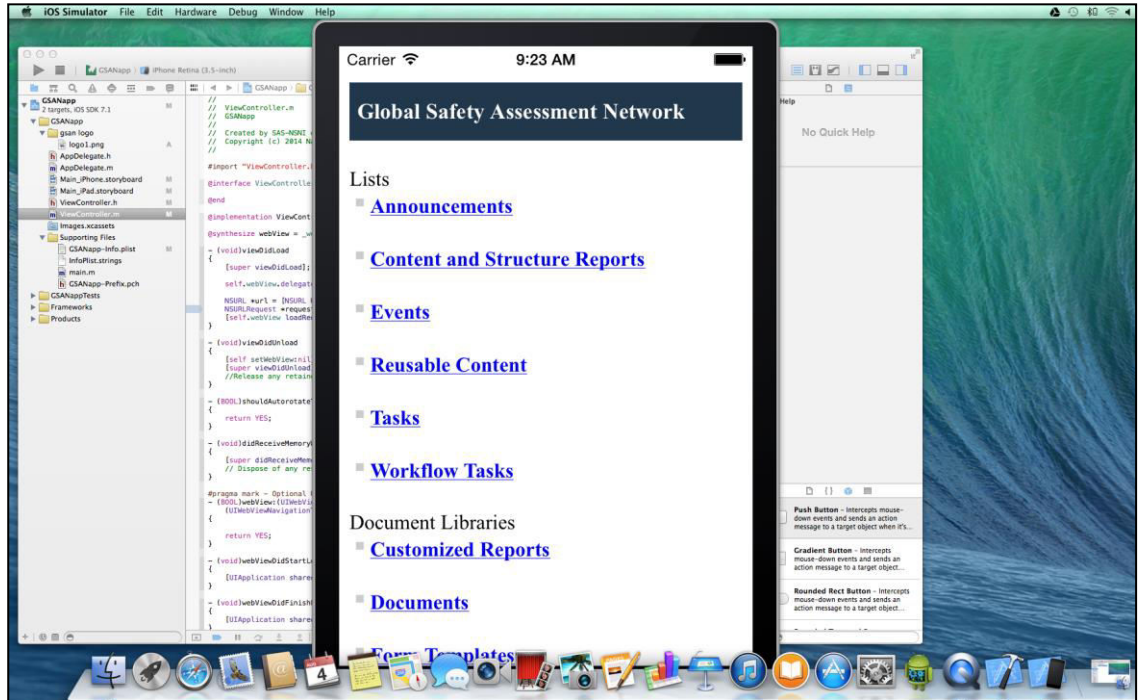


Figure 8: Screenshot of GSA Network webpage using SharePoint 2010

## EXPECTED OUTCOME AND IMPROVEMENT

### Expected Outcome

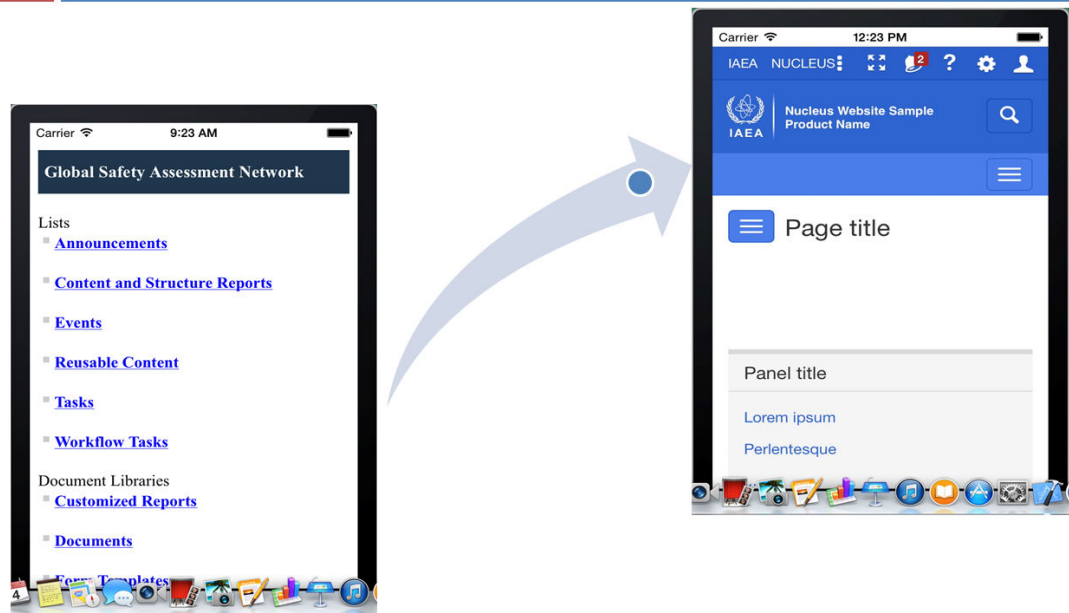


Figure 9: Expected outcome

Improvement expected in the future are:

1. Keeping users signed in to the GSAN account even though they close the application.
2. Providing another access point for logging on to the GSAN webpage, such as via Facebook, Twitter or private email.

## **CHAPTER 5**

### **CONCLUSION AND RECOMMENDATION**

#### **5.1 Recommendation**

The scope of this project only covers Android operating system users. It is possible to create a similar application for other common operating system such as iOS and Windows in the future.

More research and study are needed such as coding efficiency to enhance the interactivity of user interfaces. Besides that, a study on Responsive Web Design (RWD) should be conducted as RWD allows application users to view a site like a fluid grid. The fluid, dynamic grid adapts itself to fit the information on various mobile device screen resolutions.

Below are the display resolution:

- 1200 x 1900 (desktop, portrait orientation)
- 768 x 1366 (tablet, portrait orientation)
- 480 x 800 (smart phone, portrait orientation)

## **5.2 Conclusion**

To conclude, all the details of the early phases of the project and its significant are well explained. Based on the gant chart and project milestones, the development of the application is well designed starting from the designing phase until the completion phase.

My hope for this project is it will achieve its main objective and help the target users in doing their work by using this application.

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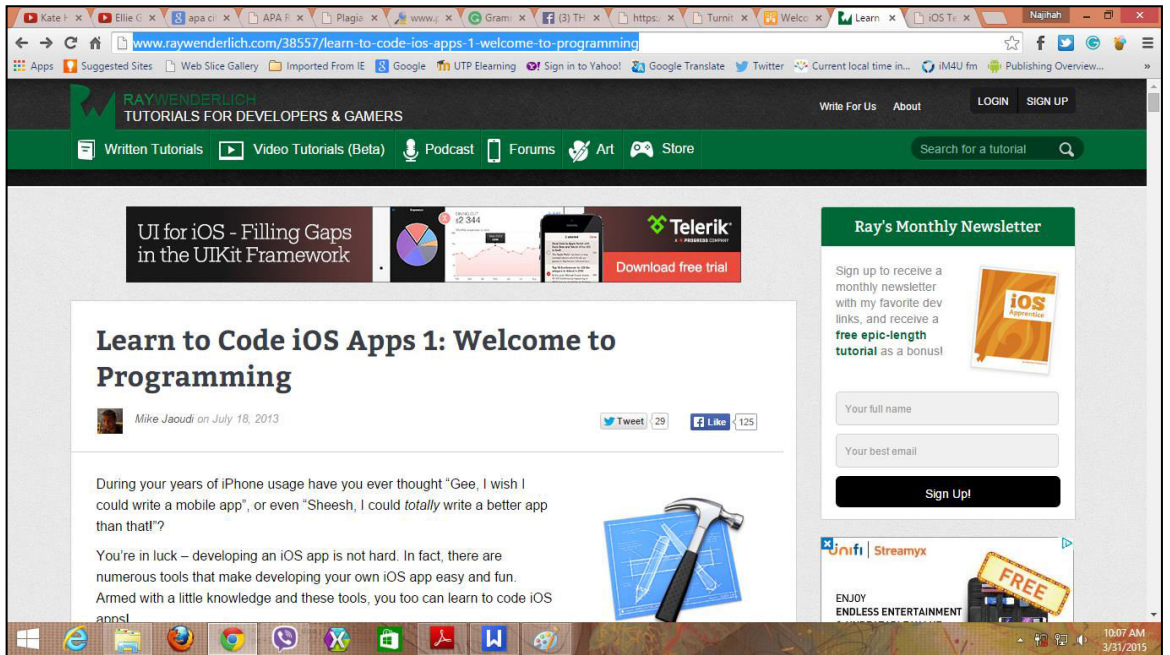
About iOS Development. [ONLINE] Available at: <http://nathanmock.com/files/com.apple.adc.documentation.AppleiOS6.0.iOSLibrary.docset/Contents/Resources/Documents/#documentation/Miscellaneous/Conceptual/iPhoneOSTechOverview/IPhoneOSOverview/IPhoneOSOverview.html> . [Last Accessed 25.2.2015].



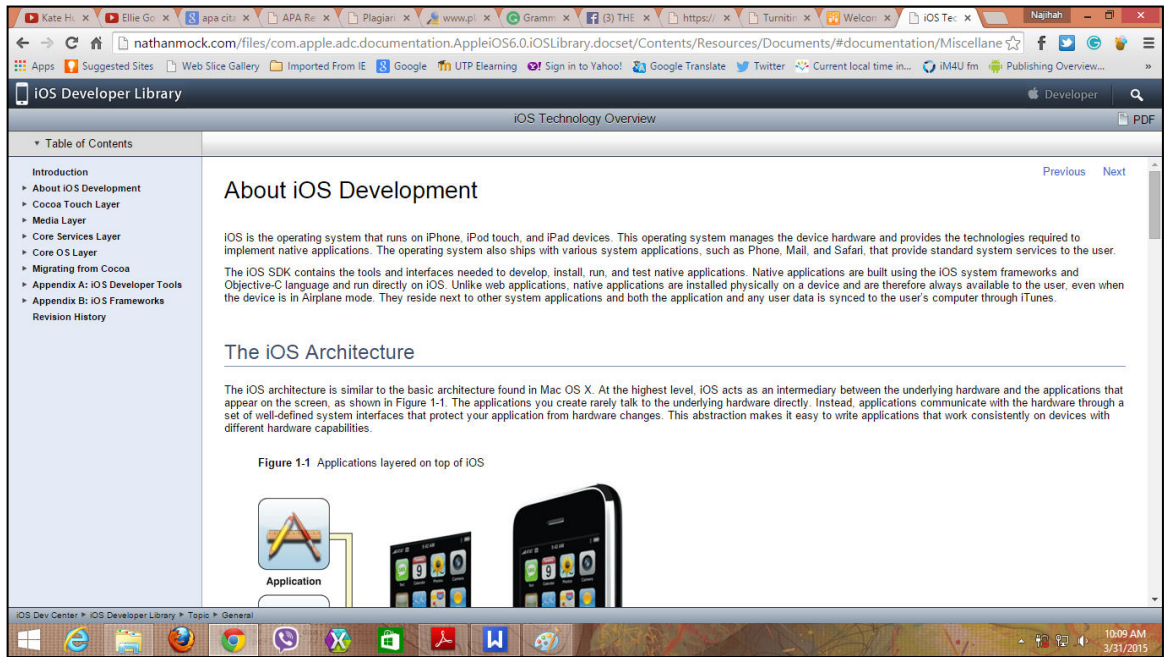
# APPENDICES



Appendix 1: GSAN webpage screenshot



Appendix 2: Raywenderlich.com



### Appendix 3: nathanmock.com

Coding for Android using the Android Studio

```

</xml version="1.0" encoding="utf-8" />
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="gsan.launcher.app" >

    <application
        android:allowBackup="true"
        android:icon="@drawable/ic_launcher"
        android:label="GSAN "
        android:theme="@style/AppTheme" >
        <activity
            android:name="gsan.launcher.app.MainActivity"
            android:label="GSAN "
            android:theme = "@android:style/Theme.NoTitleBar">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>

    <uses-permission android:name="android.permission.INTERNET" />

</manifest>

```

```

</xml version="1.0" encoding="utf-8" />
<resources>

    <string name="app_name">"GSAN " />
    <string name="hello_world">Hello world! />
    <string name="action_settings">Settings />

</resources>

```

