**MINISTRY OF EDUCATION AND TRAINING**

**FPT UNIVERSITY**

Capstone Project Document

Equipment’s Classroom Management

|  |  |
| --- | --- |
| Group 10 | |
| **Group member** | Tran Vinh Quang – SE61078  Tang Viet Hung – SE61019  Doan Nguyen Minh Chi – SE60717 |
| **Supervisor** | Kieu Trong Khanh |
| **Ext. Supervisor** | N/A |
| **Capstone Project Code** | ECRM |

-Ho Chi Minh City, May 11, 2015-

Table of Contents

[**Table of Contents** 3](#_Toc419838883)

[**List of Tables** 5](#_Toc419838884)

[**List of Figures** 6](#_Toc419838885)

[**Definitions, Acronyms and Abbreviations** 7](#_Toc419838886)

[**A.** **Introduction** 8](#_Toc419838887)

[**1.** **Project Information** 8](#_Toc419838888)

[**2.** **Introduction** 8](#_Toc419838889)

[**3.** **Current Situation** 8](#_Toc419838890)

[**4.** **Problem Definition** 8](#_Toc419838891)

[**5.** **Proposed Solution** 8](#_Toc419838892)

[**5.1.** **Feature Function** 8](#_Toc419838893)

[**5.2.** **Advantages and disadvantages** 9](#_Toc419838894)

[**6.** **Functional Requirement** 9](#_Toc419838895)

[**6.1.** **Equipment Management** 9](#_Toc419838896)

[**6.2.** **Notification** 10](#_Toc419838897)

[**6.3.** **Classroom Management** 10](#_Toc419838898)

[**6.4.** **Damaged Analysis And Recommendations** 10](#_Toc419838899)

[**7.** **Role and Responsibility** 10](#_Toc419838900)

[**B.** **Software Project Management Plan** 11](#_Toc419838901)

[**1.** **Problem Definition** 11](#_Toc419838902)

[**1.1.** **Name of this Capstone Project** 11](#_Toc419838903)

[**1.2.** **Problem Abstract** 11](#_Toc419838904)

[**1.3.** **Project Overview** 11](#_Toc419838905)

[**1.3.1.** **Current Situation** 11](#_Toc419838906)

[**1.3.2.** **The proposed system** 11](#_Toc419838907)

[**1.3.3.** **Boundaries of the System** 12](#_Toc419838908)

[**1.3.4.** **Development Environment** 12](#_Toc419838909)

[**1.3.4.1.** **Hardware requirements** 13](#_Toc419838910)

[**1.3.4.2.** **Software requirements** 13](#_Toc419838911)

[**2.** **Project organization** 13](#_Toc419838912)

[**2.1.** **Software Process Model** 13](#_Toc419838913)

[**2.2.** **Roles and responsibilities** 14](#_Toc419838914)

[**2.3.** **Tools and Techniques** 14](#_Toc419838915)

[**3.** **Project Management Plan** 15](#_Toc419838916)

[**3.1.** **Software development life cycle** 15](#_Toc419838917)

[**3.2.** **Phase Detail** 16](#_Toc419838918)

[**3.2.1.** **Phase 1: Room Type Management.** 16](#_Toc419838919)

[**3.2.2.** **Phase 2: Classroom Management.** 17](#_Toc419838920)

[**3.2.3.** **Phase 3: Equipment Management.** 17](#_Toc419838921)

[**3.2.4.** **Phase 4: Web Service.** 18](#_Toc419838922)

[**3.2.5.** **Phase 5: Android Application.** 18](#_Toc419838923)

[**3.3.** **All Meeting Minutes** 19](#_Toc419838924)

[**4.** **Coding Convention** 19](#_Toc419838925)

**List of Tables**

[**Table 1: Role and Reponsibility** 10](#_Toc419828660)

[**Table 1: Hardware Requirement for system** 13](#_Toc419828661)

[**Table 3: Roles and Responsibilities Details** 14](#_Toc419828662)

[**Table 4: Software development life cycle** 16](#_Toc419828663)

[**Table 5: Phase 1: Room Type Management** 16](#_Toc419828664)

[**Table 6: Phase 2: Classroom Management** 17](#_Toc419828665)

[**Table 7: Phase 3: Equipment Management** 18](#_Toc419828666)

[**Table 8: Phase 4: Web Service.** 18](#_Toc419828667)

[**Table 9: Phase 5: Android Application** 19](#_Toc419828668)

# List of Figures

[**Figure 1: Iterative Development Model** 13](#_Toc419828743)

# Definitions, Acronyms and Abbreviations

|  |  |
| --- | --- |
| Name | Definitions |
| ECRM | Equipment’s Classroom Management |
|  |  |
|  |  |

1. **Introduction**
   1. **Project Information**

* Project Name**: Equipment Classroom Management.**
* Project Code**: ECRM.**
* Product Type**: Web Application, Mobile Application.**
* Start Date**: May 11, 2015.**
* End Date**:** 
  1. **Introduction**

Nowadays, numbers of equipment in school are increasing with the rising of students and makes equipment management becoming more important. Therefore, our project looks to meet the demand of managing equipment. We provide website and mobile application for user to send and receive notification about damaged equipment, analyze damaged level to make recommendations, find available classroom and send SMS for related persons, view equipment statistics.

* 1. **Current Situation**

At the moment, all the equipment in the school is not managed by any software. Staff has to gather much information such as number of classroom, status of classroom, status of equipment in each room…., each 6 or 12 months they must check all the equipment about the damaged. When there is any problem occurred, teacher has to report directly to staff and it causes wasting time to report. After that, staff will track status, notice to fixer to fix this. In the other hand, staff must check which room is available if changing is needed.

* 1. **Problem Definition**

Advantages:

* Requires less human resources.

Disadvantages:

* Wasting time to report problem.
* Hard to manage equipment by document, book…
* Hard to find available room when needed.
  1. **Proposed Solution**

Building the application supports the staff manage the equipment’s classroom. The classroom type is present with position of each equipment. The user can report their damage by checking, then that report is notified to staff. The staff also notify to the reported about fixing.

* + 1. **Feature Function**

Staff can:

* Create account and manage account.
* Create room type and mapping to each class in school.
* Manage equipment in school.
* Create schedule by import schedule excel file.
* View equipment current status and statistic.
* Receive notification about damaged equipment.
* Resolve notification and notice to reporter.

Teacher can:

* Send notification about damaged equipment.
* Receive notify about fixed or changing room

System can:

* Analyze damaged level and give recommendations.
* Find available classroom.
* Send SMS.
  + 1. **Advantages and disadvantages**
* Advantages
* The report is created easier and faster. Saving time for equipment staff.
* Easy to find the available room if changing room is needed.
* The notifications are received real-time, so the equipment will fix faster.
* Easy to make decision thanks to recommendations from system.
* Staff easily finds the position of failure equipment which shows in classroom map.
* Equipment histories are researched exactly and quickly.
* Show statistics about equipment’s status, using time…
* Disadvantages
* The system would not check the behavior of user, so if the report is not correct, the notification will be wrong.
* System can’t apply to complicated classroom likes discuss room…
* The system could not check validate data imported from excel file.
* User must have internet connection to use this.
  1. **Functional Requirement**

Function requirements of the system are listed as below:

* + 1. **Equipment Management**
* Support to manage all equipment in school.
* Track status equipment.
  + 1. **Notification**
* Report the damage about equipment by checking. This also send notify to staff.
* Check the notification and fixing the equipment.
* Notify to reporter about that fix.
* Send SMS.
  + 1. **Classroom Management**
* Support to manage all classrooms in school.
* Track status of classroom.
  + 1. **Damaged Analysis And Recommendations**
* Analyze about damaged level of classroom and give recommendations.
  + 1. **Suggest Available Classroom**
* Find a similar available classroom with the current classroom.
  1. **Role and Responsibility**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Full Name | Role | Position | Contact |
| 1 | Kiều Trọng Khánh | Project Managers | Instructor | khanhkt@fpt.edu.vn |
| 2 | Trần Vĩnh Quang | Developer | Leader | quangtvse61078@fpt.edu.vn |
| 3 | Tăng Việt Hưng | Developer | Member | hungtvse61019@fpt.edu.vn |
| 4 | Đoàn Nguyễn Minh Chí | Developer | Member | chidnmse60717@fpt.edu.vn |
| 5 |  |  |  |  |

Table 1: Role and Reponsibility

1. **Software Project Management Plan**
   1. **Problem Definition**
      1. **Name of this Capstone Project**

* **Official Name:** Equipment’s Classroom Management.
* **Vietnamese Name:** Ứng dụng hỗ trợ quản lí trang thiết bị cho các phòng học
* **Abbreviation:** ECRM
  + 1. **Problem Abstract**

Reporting damaged equipment in classroom is very important. It affect the quality of teaching badly since it caused wasting time. If we can optimize it, the quality of teaching will improve. So the ECRM system will provide the platform where people can reduce reporting damaged equipment time, manage equipment and receive suggestions via web site and mobile application.

* + 1. **Project Overview**
       1. **Current Situation**

The ECRM is the system that helps manages equipment in classroom more convenient way. With teacher, they just click (with web app version) or touch (with mobile app version) on the equipment which is damaged and system will notify to the staff immediately. With staff, they can see specific equipment was damaged in which classroom and who reported it. They can also check which classroom is available due to the schedule excel file imported to the system. Staff can read the statistic about equipment in school if they want to.

The system also has restrictions and it comes from the data in schedule excel file. If staff imports incorrect data but match the template, the result will be wrong. One more thing is the system couldn’t check user’s behaviors. So if teacher report wrong position of the damaged equipment, there are no way the system can deal with it.

* + - 1. **The proposed system**

Our system includes three main subsystems: an online website application for teacher and staff, a mobile application for teacher and a mobile application for staff.

* + - * 1. **Website application**
* Classroom management:
* Staff can create a new classroom.
* Staff can edit classroom.
* Room type management:
* Staff can create a new room type.
* Staff can edit room type.
* Notify about damaged equipment:
* Staff can receive notification about the damaged equipment.
* Teacher can send notification.
* Equipment management:
* Staff can manage equipment.
* Staff can manage equipment information.
* Create or mapping schedule by import excel file:
* Staff can import the schedule excel file into the system and system will create a schedule.
* Statistic:
* Staff can read statistic about the equipment likes life time, current status…
* Analysis:
  + System analyzes the damaged level and gives suggestions.
* Send SMS:
  + System sends SMS to related peoples.
* Suggest available classroom:
  + System find similar available classroom with current classroom and give suggestion.
    - * 1. **Mobile application for teacher**
* Teacher sends notification about damaged equipment.
* Teacher sees the map of room with interactive graphic in their account.
* Teacher receives notification about fixed equipment or changing room if needed.
  + - * 1. **Mobile application for staff**
* Staff can get notification from damaged equipment which reported by teacher.
* Staff can send notification to teacher about fixing equipment of changing room if needed
* Staff can send SMS to relative people such as: teacher, security…
* Staff can check status of all room in school.
  + - 1. **Boundaries of the System**
* The ECRM is used by teacher and staff, run in laptop, PC and android smart phone.
* Language: English.
* The lasted product contain:
* The website application for staff and teacher.
* The android application for staff.
* The android application for teacher.
  + - 1. **Development Environment**
         1. **Hardware requirements**

**For system**

|  |  |  |
| --- | --- | --- |
| Windows | Minimum Requirements | Recommended |
| Operating System | Window Sever 2008 | Window Server 2012 |
| Computer Processor | 512MB RAM | 2GB RAM or more |
| Computer Memory | Intel**®** Core 2 duo | Intel**®** Core™ i5 CPU, M460 @2.53 GHz |
| Internet Connection | Cable, WIFI (2 Mbps) | Cable, WIFI (4Mbps) |

Table 1: Hardware Requirement for system

* + - * 1. **Software requirements**
* Window Server 2008: Operating system for deploy web service.
* SQL Server 2008 Enterprise R2: used to create and manage the database for system.
* StarUML v5.0: used to created models and diagrams.
* Skype 7.0: used for communication and meeting.
* IntelliJ IDEA 14.0.3, JDK 7, Apache Tomcat 7, Android SDK 14: used to implement web application, web service, and mobile application.
* Github & TortoiseSVN 1.8: used for source control.
  1. **Project organization**
     1. **Software Process Model**

The model for project is: Iterative Development Model



Figure 1: Iterative Development Model

Source: <http://en.wikipedia.org/wiki/Iterative_and_incremental_development>

The reasons for choose iterative development are:

* Members are active but lack of experience so we need to receive feedback during project evolving.
* We have 14 weeks for this project. So we can defined this is small project. Iterative model is suitable for this project to approaching the user thinking.
* This project does not exist, so we must take the survey to customer to know the equipment management in each school.
* In each phase, members only focus for their function. This will make the result better.
* Customer is more actively involved, get higher priority.
* Requirement changed frequently.
  + 1. **Roles and responsibilities**

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Full name** | **Role in Group** | **Responsibilities** |
| **1** | Kieu Trong Khanh | Project manager | * Specify user requirement * Control the development process * Give out technique and business analysis support |
| **2** | Tran Vinh Quang | Team Leader, BA, Developer, Tester | * Managing process * Designing database * Clarifying requirements * Prepare documents * GUI design * Create test plan * Coding * Testing |
| **3** | Tang Viet Hung | Team Member, Developer, Tester | * Designing database * Clarifying requirements * Prepare documents * GUI design * Create test plan * Coding * Testing |
| **4** | Doan Nguyen Minh Chi | Team Member, Developer, Tester | * Designing database * Clarifying requirements * Prepare documents * GUI design * Create test plan * Coding * Testing |

Table 3: Roles and Responsibilities Details

* + 1. **Tools and Techniques**
* Front-end: HTML 5, Bootstrap, CSS3, Javascript, jQuery.
* Back-end: RESTful Web service, Spring MVC, Hibernate,
* Web-server: Apache Tomcat 7.0.
* Database Management System: MS SQL Server 2008 Enterprise R2
  1. **Project Management Plan**
     1. **Software development life cycle**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Phase** | **Description** | **Deliverables** | **Resource needed** | **Dependencies and Constrains** | **Risk** |
| **Room Type Management** | * Support to create, edit room type. | * Website application allowed creating, editing room type of school. * Related document (SRS, SDD, User Guide…) |  | N/A | * Lack of experience. * Technology is difficult. * Not have a clear understanding about business process. |
| **Classroom Management** | * Support to create, edit classroom with room type. * Support to check status, change status of room. * Support to import, mapping schedule. * Support to remove, update classroom. | * Website application allowed creating, editing, removing classroom. * Related document (SRS, SDD, User Guide…) |  | Dependence on “Room Type Management” | * Lack of experience. * Technology is difficult. * Not have a clear understanding about business process. |
| **Equipment**  **Management** | * Support to manage equipment on school. * Support to check life time,… of equipment. | * Website application allowed managing equipment. * Related document (SRS, SDD, User Guide…) |  | N/A | * Lack of experience. * Technology is difficult. * Not have a clear understanding about business process. |
| **Notify damage and fixing** | * Support user to notify about damaged equipment. * Support staff to notify about fixing. | * Website application allowed user receive notify. * Related document (SRS, SDD, User Guide…) |  | Dependence on “Manage Classroom”, “Manage Equipment” | * Lack of experience. * Technology is difficult. * Not have a clear understanding about business process. |
| **Web Service** | * Build web service to develop android application. | * Web service provides API. * Related document (SRS, SDD, User Guide…) |  | Dependence on “Notify damage and fixing” | * Lack of experience. * Technology is difficult. * Not have a clear understanding about business process. |
| **Android Application** | * Support user to notify about damaged equipment and receive notification in their smartphone using Android OS with internet connection. | * Android application allow user send notify about damage. * Related document (SRS, SDD, User Guide…) |  | Dependence on “Web Service” | * Lack of experience. * Technology is difficult. * Not have a clear understanding about business process. |

Table 4: Software development life cycle

* + 1. **Phase Detail**
       1. **Phase 1: Room Type Management.**

|  |  |  |
| --- | --- | --- |
| **Task** | **Description** | **Author** |
| **Planning** | * Identify start date, end date of iteration. * Identify what team should implement in this iteration. | QuangTV |
| **Requirements** | * Collect requirements from customer * Identify and clarify requirements | QuangTV, HungTV, ChiDNM |
| **Analysis & Design** | * Research and identify technology to implement function * Identify how to implements function * Create ER diagram, database * Create detail design for this function | QuangTV, HungTV, ChiDNM |
| **Implementation** | * Implement function base on detail design, technology had research. | QuangTV, HungTV, ChiDNM |
| **Deployment** | * Create deployment documents, user guide. * Deploy this function to server | QuangTV, HungTV, ChiDNM |
| **Testing** | * Write and run test case for this function * Do unit test and integration test. * Create testing document | QuangTV, HungTV, ChiDNM |
| **Evaluation** | * Receive feedback | QuangTV |

Table 5: Phase 1: Room Type Management

* + - 1. **Phase 2: Classroom Management.**

|  |  |  |
| --- | --- | --- |
| **Task** | **Description** | **Author** |
| **Planning** | * Identify start date, end date of iteration. * Identify what team should implement in this iteration. * Notice about feed of customer about previous iteration to team member. | QuangTV |
| **Requirements** | * Collect requirements from customer * Identify and clarify requirements | QuangTV, HungTV, ChiDNM |
| **Analysis & Design** | * Research and identify technology to implement function * Identify how to implements function * Create, update ER diagram, database * Create detail design for this function | QuangTV, HungTV, ChiDNM |
| **Implementation** | * Implement function base on detail design, technology had research. | QuangTV, HungTV, ChiDNM |
| **Deployment** | * Create deployment documents, user guide. * Deploy this function to server | QuangTV, HungTV, ChiDNM |
| **Testing** | * Write and run test case for this function * Do unit test and integration test. * Update testing document | QuangTV, HungTV, ChiDNM |
| **Evaluation** | * Receive feedback | QuangTV |

Table 6: Phase 2: Classroom Management

* + - 1. **Phase 3: Equipment Management.**

|  |  |  |
| --- | --- | --- |
| **Task** | **Description** | **Author** |
| **Planning** | * Identify start date, end date of iteration. * Identify what team should implement in this iteration. * Notice about feed of customer about previous iteration to team member. | QuangTV |
| **Requirements** | * Collect requirements from customer * Identify and clarify requirements | QuangTV, HungTV, ChiDNM |
| **Analysis & Design** | * Research and identify technology to implement function * Identify how to implements function * Create, update ER diagram, database * Create detail design for this function | QuangTV, HungTV, ChiDNM |
| **Implementation** | * Implement function base on detail design, technology had research. | QuangTV, HungTV, ChiDNM |
| **Deployment** | * Create deployment documents, user guide. * Deploy this function to server | QuangTV, HungTV, ChiDNM |
| **Testing** | * Write and run test case for this function * Do unit test and integration test. * Update testing document | QuangTV, HungTV, ChiDNM |
| **Evaluation** | * Receive feedback | QuangTV |

Table 7: Phase 3: Equipment Management

* + - 1. **Phase 4: Web Service.**

|  |  |  |
| --- | --- | --- |
| **Task** | **Description** | **Author** |
| **Planning** | * Identify start date, end date of iteration. * Identify what team should implement in this iteration. * Notice about feed of customer about previous iteration to team member. | QuangTV |
| **Requirements** | * Collect requirements from customer * Identify and clarify requirements | QuangTV, HungTV, ChiDNM |
| **Analysis & Design** | * Research and identify technology to implement function * Identify how to implements function * Create, update ER diagram, database * Create detail design for this function | QuangTV, HungTV, ChiDNM |
| **Implementation** | * Implement function base on detail design, technology had research. | QuangTV, HungTV, ChiDNM |
| **Deployment** | * Create deployment documents, user guide. * Deploy this function to server | QuangTV, HungTV, ChiDNM |
| **Testing** | * Write and run test case for this function * Do unit test and integration test. * Update testing document | QuangTV, HungTV, ChiDNM |
| **Evaluation** | * Receive feedback | QuangTV |

Table 8: Phase 4: Web Service.

* + - 1. **Phase 5: Android Application.**

|  |  |  |
| --- | --- | --- |
| **Task** | **Description** | **Author** |
| **Planning** | * Identify start date, end date of iteration. * Identify what team should implement in this iteration. * Notice about feed of customer about previous iteration to team member. | QuangTV |
| **Requirements** | * Collect requirements from customer * Identify and clarify requirements | QuangTV, HungTV, ChiDNM |
| **Analysis & Design** | * Research and identify technology to implement function * Identify how to implements function * Create, update ER diagram, database * Create detail design for this function | QuangTV, HungTV, ChiDNM |
| **Implementation** | * Implement function base on detail design, technology had research. | QuangTV, HungTV, ChiDNM |
| **Deployment** | * Create deployment documents, user guide. * Deploy this function to server | QuangTV, HungTV, ChiDNM |
| **Testing** | * Write and run test case for this function * Do unit test and integration test. * Update testing document | QuangTV, HungTV, ChiDNM |
| **Evaluation** | * Receive feedback | QuangTV |

Table 9: Phase 5: Android Application

* + 1. **All Meeting Minutes**

Refer to Meeting Minutes folder

<https://github.com/tranquang9a1/ECRM>

* 1. **Coding Convention**

Java: Using to develop desktop application.

Summary:

* Naming Convention.
  + Use camel case for both variable and function name.
  + Use Pascal case for class, interface name.
  + The names of variables declared constants should be all uppercase with words separated by under-scores (“\_”).
* Four spaces should be used as the unit of indentation. The exact construction of the indentation (spaces vs. tabs) is unspecified. Tabs must be set exactly every 8 spaces (not 4).
* When an expression will not fit on a single line, break it according to these general principles:
  + Break after a comma.
  + Break before an operator.
  + Align the new line with the beginning of the expression at the same level on the previous line.
* Declaration.
  + One declaration per line is recommended slice it encourages commenting.
  + In absolutely no case should variables and functions be declared on the same line
  + Do not put different types on the same line.
* Code Examples

Follow “Code Conventions for the Java TM Programming Language, by Sun Microsystems, rev April 20, 1999”.

<http://www.oracle.com/technetwork/java/codeconventions-150003.pdf>