**STRATHMORE LECTURE ROOM RESOURCE MANAGEMENT SYSTEM**

**Admission Number:71392**

**IS project proposal submitted to the Faculty of Information Technology in partial fulfillment for the requirement of the degree of Bachelor of Business Information Technology of Strathmore University**

**Date of Submission: August 2015**

# Declaration

I declare that this work has never been submitted for examination in any university

Admission No:………………………. Signature:……………….. Date:………………………..

I certify that this work is being submitted for examination with my approval

Supervisor’s Signature:…………………………………… Date:……………………………….

# Abstract

Lecture room resource management has been a prevalent issue in major leading Kenyan universities. This is due to the complexities involved in striking a balance between assigning of rooms in an economic manner and ensuring room availability at any point in time during the school’s operational hours. This project aims at providing efficiency in lecture room resource management in Strathmore University. This process will involve interviewing of faculty administrators, lecturers as well as students given they will be the key benefactors of the proposed system. A brief review of the current system being used will also be done in order to point out the specific areas that will be improved on and those which will be enhanced to bring out a better product for the intended users. One of the key outcomes of the development process will be a fully functional lecture room resource management system which will essentially be a mobile application integrated with a predesigned database.

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# Chapter One: Introduction

## 1.1 Background

A university is an institution that offers higher learning and grants academic degrees in various fields of study. The typical setting of an average university involves a physical geographical area composed of buildings housing rooms utilized for lectures, financial operations, administration and other related activities. Included in this setting is an important constituent – a community of scholars and teachers, which is the rough translation of the Latin phrase *universitas magistrorum et scholarium,* from which the term “university” is derived. An idea fostered in the concept of a university is academic freedom. This is whereby students are at liberty to choose a field of study of their own preference as offered by the particular university.

Strathmore University started in 1961 as the first multi-racial college (http://www.strathmore.edu/en/about-strathmore/history). Awarded with a letter of interim authority to operate as a university in 2002, there are currently over 4000 students enrolled in Strathmore University (full-time and part-time) studying Accountancy, Administration, Commerce, Finance, Management and Information Technology. Over 70 lecture rooms are at the campus’ disposal mainly for lecturing purposes. In addition to these, students have access to over 10 labs fully equipped with computers.

With the numerous number of students enrolled, lecture rooms comprise one of the scarce resources that need to be managed efficiently to ensure economical operation of the teaching process as well as preventing congestion of rooms. This is done using an academic timetable which is published every academic year for the various courses offered by the university at different intake periods. The successful manner in which the university administration develops the timetables serve 4 vital functions:

1. Notifying students of the venues of lecture sessions for the various units they are undertaking
2. Giving students a visual and mental perspective of how a particular day is planned out as far as lecture sessions are concerned
3. Ensuring that there are no time conflicts in regard to lecture sessions
4. Ensuring the efficient utilization of the campus’ lecture rooms

The last function is a key focus area in the proposed system. Efficient utilization of lecture rooms in the campus prevent the wastage of lecture rooms which is manifested in there being little periods of time where a given lecture room is not in use. Despite this being a show of efficiency on the administration’s part, it creates a problem both for the lecturer and the student that will be discussed below.

## 1.2 Problem Statement

On a daily basis, a full time student in Strathmore University usually has a significant number of free hours accumulated from the distributed mid-lecture intervals. Most of this time is spent at the university library, the student center, in a vacant lecture room or outside the campus. In cases where a student intends on spending this “idle” time in a vacant lecture room – which is usually the case – identifying the room in the first place proves to be a big challenge. This involves physically checking room by room to see if a lecture session is ongoing. This process consumes a lot of time which could otherwise be used in doing something more constructive. The proposed system will be able to mitigate this by giving students on-the-go access of information pertaining vacancy of rooms in the campus at any given time. This will significantly save a lot of time at the same time ensuring a vacant room is put in to good use by efficiently connecting the resource to the user.

During a lecture session, lecturers may occasionally be dissatisfied with the room specifications due to one factor or another including capacity, personal preference, acoustics etc. Should this be the case, the lecturer proceeds to contact the administration who is able to assign the lecturer a different room should it be available. Though effective in most cases, this process is unnecessarily lengthy and wastes time that could otherwise be used in delivering the learning material to the students. The proposed system will enable lecturers and class representatives alike to immediately retrieve information on rooms that are vacant and enable them to reserve them remotely in real time right from their mobile phone. This would result in a notification to any other user concerning the reservation made.

All these will enable the university as a whole increase its productivity and spend more time doing what it is intended to do – advance knowledge.

## 1.3 General Objective

The main aim objective of developing this system is creating a platform for Strathmore University students, lecturers and faculty administrators to better view and manage the lecture rooms as a resource which mainly includes capability to easily reserve rooms as well have an instant view of vacant rooms in the campus at any given time for the users’ convenience. All these functions will be conveniently available on the user’s mobile phone.

### 1.3.1 Specific Objectives

1. To identify key components of a Lecture Room Resource Management System
2. To review the integrated software development platform to be used in development of the application program i.e. Eclipse ide
3. To review MySQL database management system which will be used in the partial development of the system
4. To develop a Lecture Room Management System
5. To test the system’s functionality

## 1.4 Justification

The Lecture room management system used currently by the university (<http://timetable.strathmore.edu/>) does not implement the functionality of allowing students to have an instant view of the campus’ vacant lecture rooms at a given point in time. An implementation of a system that has this capability would be of high value to empower the average Strathmore University student.

Despite, having room reservation functionality, this can only be done with intervention from the different faculty administrators i.e. a given lecturer cannot conveniently reserve a vacant room without consulting the administrator. The proposed system will enable this function to be done directly by the lecturer or by the elected class representative associated with the respective course unit to be taught.

The third advantage that the propose system will have over the current one in on the accessibility of functionality. Being mainly a mobile based application, users can access the system ideally wherever they are given there is internet access. This is a major aspect of the system as it will significantly increase effectiveness of students and lecturers alike in utilizing the campus’ resources economically and productively.

The final crucial characteristic of the proposed system focuses on simplicity. The current system in use in very complex and difficult to interpret the information displayed pertaining the campus’ lecture rooms. The proposed system will focus on user-friendliness to enable any student or lecturer to utilize the functionality of the system and to enable them to easily interpret data displayed.

## 1.5 Scope

The proposed system will be limited to offer the services to fulltime students i.e. it will display daily information on the campus’ lecture rooms between 8.15 a.m. and 5.15 p.m. The reason for this is the continuous nature of evening classes done by part time students in relation to the main aim of the proposed system. Since a part time student has only one class at any given day in school, they do not experience “slack time” in between classes for that given day i.e. there are no mid-lecture intervals. The system would thus be ideally irrelevant in their case and implementation of a similar functionality for evening classes would not be economical.

Administration privileges which include vacant room reservation and engaged room clearance (e.g. in cases of cancelled classes) will be limited to university lecturers, class representatives, module leaders and faculty administrators. Other users which include students will only be allowed a “read-only” mode of access.

# Chapter Two: Literature Review

## 2.0 Introduction

This chapter will give a summary of the current state of lecture room resource management systems. Its main aim is to identify and explain concepts specific to components used in the development of the system. A literature review is a summary of a subject field that supports the identification of specific research questions – it distills the existing literature in a subject field; its objective is to summarize the state of the art in that subject field (J Rowley, 2004).

## 2.1 Components of Lecture Room Resource Management System

To enable security of a Lecture Room Resource Management System, access control is implemented by use of a log in module that prompts users for a pre-defined username and password. These parameters, should they be authorized, allow a user to access the system as well as identify the type of privileges they have. In the proposed system, access control will be in the criteria of faculty administrator, lecturer, class representative, module leader and student, each having a set of unique privileges.

Other components of a Lecture Room Resource Management System are as follows:

1. Database
2. Remote Server Connection
3. Mobile application
4. Access List Controllers

## 2.2 Eclipse IDE

Eclipse is one of many integrated development environments (IDE). IDEs are software applications that provide comprehensive tools for software development. Though not necessary for use in software development, they are highly useful for this specific purpose and result in greater efficiency and convenience for programmers.

Eclipse is an open-source cross platform IDE. Though supporting several programming languages, it is mainly used for development of software applications using Java. Other IDEs that support development of Java applications include NetBeans, BlueJ, JCreator and several others. The main advantages of Eclipse over other IDEs include the following:

1. It has a more efficient syntax checker which help in auto completion of code as well as detecting errors promptly
2. The development environment is can be better standardized to suite the programmer’s needs
3. Eclipse needs significantly less storage requirements as compared to an IDE such as NetBeans
4. It is simpler to use as compared to other IDEs

## 2.3 MySQL Database Management System

A database management system (DBMS) is a collection of programs that enables you to store, modify, and extract information from a database (Vangie, 2010). MySQL is an open source database management system that uses Structured Query Language (SQL) for extracting database information and is one of the leading relational database management systems commonly used by businesses (Giacomo, 2005).

Other common Relational Database Management Systems (RDBMS) used include PostgreSQL, Oracle, MS SQL Server and Informix. Illustrated below is a general comparison of these RDBMs’ advantages and drawbacks.

### Table 2-1: Merits and Demerits of Common Relational Database Management Systems

|  |  |  |
| --- | --- | --- |
| **RDBMS** | **Advantages** | **Drawbacks** |
| Oracle | Versatile, stable, and secure | Potentially high Total Cost of Ownership(TCO) |
| MS SQL Server | Stable and secure; Microsoft offers excellent support | Relatively high TCO; proprietary. |
| PostgreSQL | Up-and-coming database with low TCO | Has yet to be widely implemented in large-scale business use. |
| Informix | Stable; has good support available. | Generally higher TCO |
| MySQL | Offers a best-case-scenario database in many ways; low TCO; high stability; high security and excellent support. | Not all available versions can offer the full range of MySQL capabilities. |

MySQL is the Relational Database Management System that will be used in the proposed system.

# Chapter Three: Methodology

## 3.1 Introduction

Methodology is the systematic and theoretical analysis of different methods applied in a particular area of study (Hice, 1978). Thus system development methodology in software engineering is a framework that is used to structure, plan, and control the process of developing an information system. There are several methodologies used in system development. The common ones include Waterfall Model, Agile Software Development and Rational Unified Process (RUP). System developers implement different model based on a number of pertinent factors that may make one methodology more suitable compare to another given the parameters.

For the development of the proposed system, the Waterfall Model will be applied. The Waterfall Model, also referred to as the Traditional Model, is a system development methodology that uses a number of defined phases that are implemented sequentially (Petersen, 2009). This approach will be applied in the development of the proposed system as it is convenient in determining progress as well as being able to accurately estimate the time required to complete the development. This model will thus allow prudent time budgeting to be done pertaining to the development phases.

## 3.2 System Analysis

System analysis is the process of decomposing a system into its component pieces for the purpose of the studying how well those component parts work and interact to accomplish their purpose (Blanchard, 1990). For this to be done effectively, an analysis of functional and nonfunctional requirements have to be clearly defined.

### 3.2.1 Functional Requirements

1. Access control
   1. The proposed system will be able to ensure access level privileges are strictly compartmentalized with regards to the end user’s position. This will be implemented by a login module that will determine privileges bases on “hierarchy” level. This will ensure no unauthorized personnel operates a level-specific restricted operation hence security.
2. Output
   1. The proposed system will enable to display information requested by a user which will be retrieved from the database.
3. Input
   1. The proposed system will allow authorized users to issue controls that create user generated data to be stored in the database accordingly.
4. Remote access
   1. The proposed system will allow remote access to the server where the database resides.

### 3.2.2 Non Functional Requirements

1. Security
   1. The system will ensure only authorized users can access the system’s services.
2. Accessibility
   1. Access to the service will always be available given one has internet access.
3. Simplicity
   1. The graphics user interface will ensure ease of use of the proposed system. Simple “hints” at the early stages of use by each specific user will help hasten the learning process.
4. Reliability
   1. The information stored in the database will provide real time data thus the information will be highly reliable and of value to the user

### 3.2.3 System Analysis Techniques

1. Observation
   1. Observation will be done to be able to review the shortcomings of the current system and to enable determination of the best way to mitigate them in the proposed system.
2. Questionnaires
   1. This will be issued to the proposed system’s benefactors to be able to get more input on how to best suit the system for the users’ utility.
3. Use- Case
   1. This is a list of actions that define what each actor that will participate in the system will be able to do while depicting the various interactions with other users and different processes. The proposed system will comprise of the following actors:
      1. Administrator
      2. Lecturer
      3. Class Representative
      4. Course Module Leader
      5. Student

## 3.3 System Design

Systems design is the process of defining the [architecture](https://en.wikipedia.org/wiki/Systems_architecture), components, modules, interfaces, and [data](https://en.wikipedia.org/wiki/Data) for a [system](https://en.wikipedia.org/wiki/System) to satisfy specified [requirements](https://en.wikipedia.org/wiki/Requirement).

The following are system design types that will be used in the development of the proposed system:

1. Data Flow Diagram (DFD)
2. Entity Relationship Diagram
3. Database Schema
4. Class Diagram
5. UML Use Case Diagram
6. Sequence Diagrams

## 3.4 System Development Tools and Techniques

### 3.4.1 System Development Tools

The following system development tools will be used:

1. Eclipse
   1. This tool will be used by implementing Java. This will be the main programming language that will be used in the development of the system.
2. Xampp
   1. Consisting mainly of the Apache HTTP Server and MySQL database, this tool will mainly be used for the construction of the database.

### 3.4.2 System Development Techniques

Modelling will be implemented in the development of the proposed system. Modellingproduces a graphical representation of a concept or process that systems developers can analyse, test and modify.

## 3.5 Deliverables

The following are deliverables expected at the end of the system development:

1. System
   1. This is the functional system itself – a Lecture Room Resource Management System.
2. User manual
   1. This will provide user oriented assistance on details concerning the functionality of the system and how to use it.
3. Documentation of the system
   1. A detailed document pertaining various aspects of the proposed system will be delivered

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# Appendix

## Appendix A: Time Schedule

