**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 during school hours.
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

**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

**References**

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