# CHAPTER 3: SYSTEM DEVELOPMENT METHODOLOGY (SDM)

## 3.1. INTRODUCTION

The system Development Methodology (SDM) embodies all facets of bringing business ideas to reality or resolving business problems that require information systems and technology (IS/IT) as a solution enabler.

However, Kellen & Night (2001), vividly define System Development Methodology as the framework that is used to structure, plan, and control the process of developing an information system. A wide variety of frameworks have evolved over the years, each with its own recognized strengths and weaknesses. One system development methodology is not necessarily suitable for use by all projects hence; each of the available methodologies is best suited to specific kinds of projects based on various technical, organizational, and project. Examples of system development methodologies include waterfall, prototyping, incremental, spiral, Rapid Application Development etc.

The Basketball Recruitment Portal project will be achieved through the **waterfall system development methodology**. The waterfall methodology uses a linear framework type in which a project is divided into sequential phases, with some overlap and splash back acceptable between phases and emphasis is on planning, time schedules, target dates and implementation of the entire system at one time. Using this SDM approach, the progress of the system development will be measurable in alignment with the systems objectives and ensure quality, reliability, and maintainability of the developed system/software.

## 3.2. Systems analysis

The overall objective of systems analysis is to understand the proposed project, ensure that it will support business requirements, and build a solid foundation for system development.

Systems analysis is a process of collecting factual data; understand the process involved, identifying problems and recommending feasible suggestions to improve the systems functioning (Kendall & Kendall, 2010). It involves studying the business processes, gathering operational data, understanding the information flow, finding out bottlenecks and evolving solutions for overcoming the weaknesses of the system so as to achieve system/organizational/project goals.

### 3.2.1. Functional requirements

1. ***Output***
2. The portal's database server must search the text database and download the requested information.
3. The portal's media server must allow access of associated video information which downloads the requested encoded video in a streaming format.
4. ***Input***
5. The portal must provide an on-line text input form for any particular player. The on-line text input form should include game statistics; tangible attributes such as height, weight, speed and strength; intangible attributes such as work ethic, off-season training habits and leadership indicia; and academic records such as grades, and entrance exam scores.
6. The video input from must include an upload area for uploading clips of sporting event participation and tested performance for any particular player.
7. Data entry screens must be uniform.
8. ***Control***
9. The portal must provide logon security at the operating and application level.
10. Player record must be added, changed, or deleted only by a registered member.
11. The portal must maintain separate levels of privileges for users and the administrator.

### 3.2.2. Non functional requirements

1. Performance: The portal should be interactive and the delays involved must be less. Ie. In every action-response of the system, there are no immediate delays.
2. Safety: Information transmission should be transmitted to server without any changes in information.
3. Reliability: As the portal provides the right tools for interaction it must be made sure that the system is reliable in its operations for securing the sensitive details.
4. Availability: in case the internet services gets disrupted while sending information to the server, the information can be sent again for verification.
5. Security: main concern is users accounts hence proper login mechanism to avoid hacking.
6. Usability: the system should be easy to handle and navigate in the most expected way with no delays.

### 3.2.3. System analysis techniques

The overall objective of the systems analysis phase is to understand the proposed project, ensure that it will support business requirements, and build a solid foundation for system development.

The following are the techniques used for analysis of the recruitment system:

1. **Observation**

This technique will be used to observe the current recruiting procedures in action which will give an additional perspective and a better understanding of recruiting system procedures. It will also allow verification of statements made in interviews and determine whether procedures really operate as they are described. Using this fact-finding technique, it will enable to provide better recommendations and the knowledge needed to test or install future changes.

1. **Questionnaire**

This fact-finding technique will be used to gather information of how the current recruitment process/ procedure is and determine if the involved participants (players, coaches, scouts and recruiters) of the system would like to see a change in the recruiting procedure.

1. **Interview**

This technique will enable the gathering of information about the existing basketball recruitment procedures from selected persons or participants i.e. the players, coaches, scouts or recruiters.

1. **Use Case**

The use case will be used to describe or depict the basketball recruitment processes for a better understanding of how operations run in the system. As defined by Shelly& Rosenblatt (2009), a **use case** represents the steps in a specific business function or process. An external entity, called an actor, initiates a use case by requesting the system to perform a function or process. The recruitment processes will have the following actors:

1. Prospective players: they register by creating a profile and uploading their clips/ videos of events.
2. Coach/scout/recruiter: they register or log in to search, view, evaluate and select prospective players.
3. Administrator: manages the portal systems’ web server, website database etc.
4. Other users: searches, views and rate players.



##### Figure 3.2.1 use case diagram depicting basketball recruitment process

## 3.3. Systems Design

The purpose of systems design is to create a physical model of the system that satisfies the design requirements that were defined during the systems analysis phase. The following are the design types to be used in the development of the Basketball Recruitment portal.

### 3.3.1. User interface (UI) Design

It is important to design a user interface that is easy to use, attractive, and efficient.

McBride (2002) describes a user interface (UI) as how users interact with a computer system, and consists of all the hardware, software, screens, menus, functions, output, and features that affect two-way communications between the user and the computer.

The objectives of the portal project user interface are;

1. Create a design that is easy to learn and remember.
2. Design the interface to improve user efficiency and productivity.
3. Write commands, actions, and system responses that are consistent and predictable.
4. Minimize data entry problems.
5. Allow users to correct errors easily.
6. Create a logical and attractive layout.

### 3.3.2. Output design

Millions of firms use the internet-based information delivery to reach new customers and markets around the world. To support the explosive growth in e-commerce, Web designers must provide user-friendly screen interfaces that display output and accept input from customers. The basketball recruitment portal will mainly use this approach to provide output to its users. That is, by use of digital audio, images, and video sounds, images, and video clips that will be captured, stored in digital format, and transmitted as output to users who can reproduce the content. Also, screen displays will be used to display requested information by users in order to communicate effectively.

### 3.3.3. Input design

The purpose of this stage is to determine how data will be captured and entered into the system/portal. Since Input methods should be cost-efficient, timely, and as simple as possible, the input method that will be used in the Basketball Recruitment Portal will be an online input because of its major advantages, including the immediate data validation and availability of data.

The input design objectives are to:

1. Restrict user access to screen locations where data is entered.
2. Display a sample format if a user must enter values in a field in a specific format. For example, provide an on-screen instruction to let users know that the date format is MMDDYY.
3. Display a list of acceptable values for fields, and provide meaningful error messages if the user enters an unacceptable value.
4. Provide a way to leave the data entry screen at any time without entering the current record.
5. Provide users with an opportunity to confirm the accuracy of input data before entering it by displaying a message.

### 3.3.4. Control Design

The control design indicates necessary procedures which will ensure correctness of processing, accuracy of data, timely output etc.

The following are the control design measures that will be put in place.

1. Output Security and Control: Output must be accurate, complete, current, and secure.
2. Input Security and Control: Input control will include the necessary measures to ensure that input data is correct, complete, and secure.

### 3.3.5. Data Design

**Entity-relationship diagram (ERD)**

This entity-relationship diagram (ERD) is a model that will depict the logical relationships and interaction among the system entities. The ERD will provide an overall view of the portal system and a blueprint for creating the physical data structures.

**Data dictionary**

Data dictionary is a central storehouse of information about a system’s data. Hence, the data dictionary will be used to collect, document, and organize specific facts about the system, including the contents of data flows, data stores, entities, and processes.

**Database schema**

This is more like a database description including descriptions of all fields, tables, and relationships. The database schema will enable to come up with the final database for the basketball recruitment portal system.

## 3.4. System development Tools and techniques

The project development will be aided with the following system development tools and techniques.

### 3.4.1. System development tools

1. Computer-aided systems engineering (CASE): a technique that uses powerful software, called CASE tools, to help develop and maintain information systems.
2. Cascading Style Sheet (Css): CSS defines how HTML elements are to be displayed. It enhances the attractiveness of a website or web application in terms of input and output designs.
3. The Yii framework: Yii is a free, open-source Web application development framework written in PHP5 that promotes clean, dry design and encourages rapid development. It works to streamline your application development and helps to ensure an extremely efficient, extensible, and maintainable end product.
4. Php: Server-side HTML embedded scripting language designed for web development.
5. HyperText Markup Language (HTML): the standard markup language building block of web pages and used for creating and visually representing a webpage. It dictates every website look and presentation.
6. Net beans IDE/ Sublime text: these are code editors that will provide the platform for the project development.
7. Xampp: a free and open source cross-platform web server solution stack package consisting mainly of the Apache HTTP Server, MySQL database, and interpreters for scripts written in the PHP and Perl programming languages. It will be used as a development tool, to allow testing of the project.

### 3.4.2. System development techniques

**Structured Analysis**

Structured analysis is a traditional systems development technique that is time-tested and easy to understand. Structured analysis uses a series of phases, called the systems development life cycle (SDLC), to plan, analyze, design, implement, and support an information system. It uses the SDLC to plan and manage the systems development process.

The SDLC model usually includes six steps, which are:

1. **Systems planning:** the purpose of this phase is to perform a preliminary investigation to evaluate an IT-related business opportunity or problem i.e. it describes problems or desired changes in an information system or a business process.
2. **Systems analysis:** the purpose of this phaseis to build a logical model of the new system.
3. **Systems design: t**he purpose of this phaseis to create a physical model that will satisfy all documented requirements for the system.
4. **Systems implementation** During thisphase**,** the new system is constructed.
5. **System testing and debugging:** in this phase, the system is tested using various methods to test its functionalities and debugged to remove any errors encountered.
6. **Systems support and security** thisphase the system is maintained, enhanced, and protected. Maintenance changes correct errors and adapt to changes in the environment.

## 3.5. Deliverables

The following are the deliverables that will be delivered at the end of the portal system development.

1. System Documentation: the final document containing the information about the system and its development.
2. User manual: a Document that will entail the guidelines on how to use the system.
3. Profile module: that which will enable prospective players to register by creating their profile.
4. Video module: that which will enable prospective players to upload video clips of their games and performances in different events.
5. Search module: that which will enable scouts, coaches and recruiting teams to search for prospective players for evaluation and selection.

## REFERENCES

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