**CHAPTER THREE**

**SYSTEM ANALYSIS AND METHODOLOGY**

**3.0 Introduction**

System analysis is a process of collecting and interpreting facts, identifying the problems, and decomposition of a system into its components. It is a problem solving technique that improves the system and ensures that all the components of the system work efficiently to accomplish their purpose.

Analysis specifies what the system should do. Systems analysis is the process of observing systems for troubleshooting or development purposes. This chapter takes overviews on the system analysis and various research methodologies and the entire research work.

**3.1 Analysis of the Existing System**

The existing system that is really understudied in this research work is the work designed by Jimoh R. G (Nigerian).  *et al* (2014) presented in the paper “*A Scalable Online Crime Reporting System*”.

The research work developed a prototype crime reporting system was designed that relies on four reporting forms: a complaint or dispatch reporting form, a crime event report form, follow-up investigation report form, and an arrest report form. The system consists of three functional modules: a data capture module, a report management and control module, and a data utilization module. The system maintains an event or case file and a police activity file. The conceptual crime reporting system design and data elements thus developed must now be tested and evaluated in an operational environment.

**3.1.1 Existing System Architecture**

The system was aimed at providing a flexible platform that enhances user friendliness. In the diagram below, the information provided to and received from the ‘Online Crime Reporting System’ is identified. The arrows represent the information received or generated by the application. The closed boxes represent the set of sources and sinks of information. In the system, we can observe that the user interacts with the application through a graphical user interface (GUI). The inputs to the system are the FIRs (First Investigation Report), profile, police detail etc. criteria provided by the user and a new review written by the user to some certain entries unlike FIRs. Also, the output is in the form of repeater and grid views which present the users (Police) with the list of FIR available. The users (police) can view complete FIRs or complaints; view Images and reviews by other users (public).

User Interface

Online crime reporting system

Add to FIR, profile, edit profile abd provide different platform etc.

**Figure 3.1: Architecture of the existing system**

(Source: Jimoh R. G.  *et al*, 2014)

**3.2 Problems of the Existing System**

After scrutinizing the existing methods of certificate verification, the following loopholes were identified;

1. The system was not tailored towards accessibility (mobile version), awareness and improvement on the usage.
2. Multilingual support was not included in the design of this system so that it cannot be understood perfectly by the person of any language.
3. The system didn’t add email verification and auto-reply SMS in an off-line reporting for validation, which is texting using mobiles phones or tablets.

**3.3 Research Methodology**

This is a procedure for resolving the problems of the current system by building a new system that addresses the flaws of the existing system. A system development methodology is the framework that is used to structure, plan, and control the process of developing the web-based academic certificate verification system.

The research methodology adopted for this research work is the secondary data source collection. The secondary data collection is the collection of an already made data, information obtained from sources like journals, textbook, magazines, internet. In order to achieve the research objectives the below procedures will ne follow;

1. Conducting a preliminary study on the existing systems.
2. Designing the system using UML diagrams.
3. Developing the system using agile software development model.
4. Implementing a prototype system using PHP, Javascript, Java as programming languages, MySQL for database, and Visual Studio Code IDE.

The system development methodology employed in this research work is the Agile Methodology approach. Agile methodology is a software development process framework that adopts the iterative approach, open collaboration, and process adaptability throughout the life-cycle of the project. This iterative agile approach is more flexible and its short time-span iterations seek improvement for the project in small release, with minimal planning, rather than plan at length. This helps to minimize the overall risk, and allows the project to adapt to changes more quickly.

Agile software development life circle (SDLC) model is a combination of iterative and incremental process models with focus on process adaptability and customer satisfaction by rapid delivery of working software product. Agile Methods break the product into small incremental builds. These builds are provided in iterations. Every iteration process involves cross functional teams working simultaneously on various stages of the Agile SDLC.

The steps involved in agile software development process are presented in Figure 3.2.

Planning

Requirement Analysis

Design

Coding

Testing

Iteration(s)

**Figure 3.2: Agile software methodology**

* 1. **Principles of Agile software methodology**

The Following are the Agile Manifesto principles;

1. **Individuals and interactions**: In Agile development, self-organization and motivation are important, as are interactions like co-location and pair programming.
2. **Working software**: Demo working software is considered the best means of communication with the customers to understand their requirements, instead of just depending on documentation.
3. **Customer collaboration**: As the requirements cannot be gathered completely in the beginning of the project due to various factors, continuous customer interaction is very important to get proper product requirements.
4. **Responding to change**: Agile Development is focused on quick responses to change and continuous development.
   * 1. **Advantages of Agile development software methodology**
5. It is a very realistic approach to software development.
6. Promotes team-work and cross training.
7. Functionality can be developed rapidly and demonstrated.
8. Responding to change over following a plan.
9. Delivers early partial working solutions.
10. Good model for environments that change steadily.
11. Early release, better stakeholders' feedback.
12. Improves stakeholders' confidence and reduce uncertainties.

**3.4 Justification of the Research Methodology**

In other to permit a code-and-fix approach to program implementation, the agile software development methodology is employed. This method is very good for medium projects whose requirements may change at any time. This method allows the programmer to effectively manage change in requirement by either modifying an existing design or adding to (updating) an existing design with a reduced cost.

**3.5 The Proposed Architecture**

The Architecture of the Web-based Academic Certificate System for Verifying Counterfeit Certificate is a formal description and representation of the system, organized in a way that supports reasoning about the structures and behaviors of the system. It shows the various components of the system and how they interact with each other. The conceptual architecture of this system is composed of the certificate institutions, Internet network, Certificate fetching, local database, certificate verifier, and the user interface. The architecture of this system is presented in Figure 3.3.

Database Server

Application

Language Translator

User Interface

Crime Reporting System

Retrieve information

**3.6 Justification of Proposed System**

After carefully analyzing of the existing system, the proposed system will greatly fill in the loopholes of the existing crime reporting system. The system will reduce the rate of unreported crime cases to the law enforcement thus reducing the level of crime in the society. Some of the importance of the proposed system is highlighted below:

1. The system will eliminate the problem of time wasting in the law enforcement office during crime reporting. This is being tackled through making this system web base, which a user can stay in his or her house and make a report to the station.
2. The system will equally tackled the problem of intimidation during crime reporting as the user does not really need to physically visit the law enforcement office.
3. Making the system Multilanguage will aid users in reporting crime with their fluent language.
4. With the aid of the android app the user can report any crime incident anywhere and anytime.
5. The system will also make information saving and retrieving fast and easy.

Considering the lapses of the existing system, the result of the system can be seen efficient than that of the existing system.