International Journal of Engineering Inventions
e-ISSN: 2278-7461, p-ISSN: 2319-6491
Volume 11, Issue 3 [May.-June. 2022] PP: 396-401

Web-based Computer Laboratory Inventory Management System

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Abstract

Inventory management gives your insight into the supply chain (purchasing, production, and fulfillment). A school must balance custodian demand with storage space. Inventory management is critical in the supply chain. With that, the researchers developed a Web-based Computer Laboratory Inventory Management System that can help to the administrator and the custodian of the school to manage its inventory when it comes to the facilities of every computer laboratory rooms. The researchers employed the mean as a statistical tool. A standard questionnaire was used to test the mentioned system's designed features and functions. The Rapid Application Development Model was used as a model in the software development cycle. The conclusion reached was Very Good in terms of functionality, usability, and performance efficiency.

Keywords: Inventory Management, Web-based, Computer Laboratory, RAD, SDLC, Mean

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Date of Submission: 02-06-2022 Date of Acceptance: 15-06-2022

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1. INTRODUCTION

Around the world, education systems face significant challenges that put traditional techniques to the test. To address long-standing issues and offer students with an education that meets the needs of a modern, information-based global economy, new approaches are required. Computer and communication technology are finally ready to give prospects to greatly improve teaching and learning after more than two decades of unmet promises to revolutionize education [1].

We live in an information age, in which news and ideas are transmitted not just between humans, but also between massive computers and data processing equipment. Large communication networks have allowed this to happen. Computers have become a vital tool in the bulk of daily tasks [2].

Computer laboratories are one of the most important school facilities that cannot be overlooked because the theory and practice learning are combined in this type of schooling [3].

Inventory control is another term for inventory management. Inventory management is a method of managing finished goods, work-in-progress, supporting operations, and raw materials to optimize stock levels [4]. Inventory is necessary in every school. With this, the researchers developed a Web-based Computer Laboratory Inventory Management System in order to determine the level of functionality of the said system in terms of suitability, accuracy, and security as perceived by the laboratory custodians. Also, determine the level of usability of the developed system in terms of understandability and operability as perceived by the laboratory custodians. Finally, evaluate the level of performance efficiency of the developed system in terms of time behavior and resource utilization as perceived by the expert evaluators.

With the help of other studies such as a Web-based Computer lab Management System: case study, provide facilities for teachers to make reservations for using lab computers, log student computer usage, and provide

reports regarding computer lab usage for school and education authority management [5]. Another is the Application Design of Web-based Computer Laboratory Inventory and Maintenance System at SMK Bhakti Anindya, this report discusses a problem with computer lab inventory and upkeep. Every company or institution's inventory management process is linked to the company's data management procedure for products and equipment [6]. A Web based Inventory Control System using Cloud Architecture and Barcode Technology for Zambia Air Force, this is done to ensure that the equipment is in good enough shape to perform its primary and secondary functions [7]. Web-based systems development leading up to this period was characterised by systems.
development processes that were unstructured and usually unsupported by methods or techniques that one might ordinarily expect to ensure high quality or effectiveness.
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Prior to this time, web-based system development was characterized by unstructured procedures that were rarely backed by methods or approaches that would normally be expected to ensure high quality or efficacy [8].With the help of the developed system it provides with easy access to all the information of facilities inside the computer laboratories.

1.1 Conceptual Framework

This paper conceptualizes to develop a Web-based Computer Laboratory Inventory Management System.
In this study: input phase; process phase; and output phase are compromised. Input phase refers to the Computer Laboratory Rooms, Facilities Information, and Custodian Information. Process Phase includes the Web-based Computer Laboratory Inventory Management System that will manage all the transaction between the input and the output. The Output phase is the system's evaluation regarding to its functionality, usability, and performance efficiency.

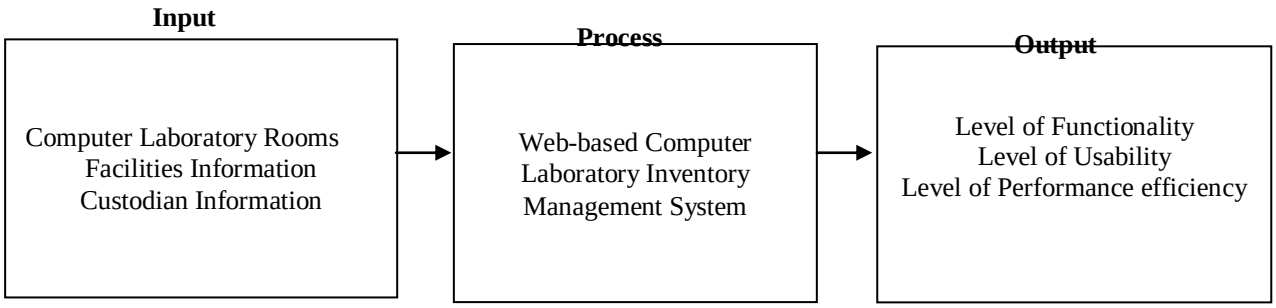

Figure 1. The Conceptual Framework of the Study.

2. METHODOLOGY

The research design, respondent selection, research instrument, data collection procedure, and statistical treatment are all covered in this chapter.

2.1 Research Design

The clearly specified frameworks within which the investigation is carried out are referred to as research design [9]. The types of analyses that must be performed in order to achieve the desired results are always determined by the research design. It specifies what data is necessary, what data collection and analysis methods will be employed, and how the data will be used to answer the research questions [10]. Developmental and descriptive research designs were used in this study.

In its broadest definition, development entails steady growth, evolution, and change [11]. An interactive, cyclic creation and research process in which the designer's theoretical ideas feed the production of goods that are tasted in classrooms, finally resulting to theoretically and empirically founded products, the developer's learning process, and (local) instruction theory [12].

This research employed a descriptive strategy for describing or describing a thing [13]. Descriptive research entails gathering information to test hypotheses or answer questions about the existing state of the study's subject [14]. Descriptive research is defined as a method of gathering, analyzing, classifying, and tabulating data about current conditions, practices, processes, trends, and cause-and-effect relationships, and then making adequate and accurate interpretations of the data with or without the use of statistical methods, which is sometimes minimal. This method also determines the current state of facts in a group under investigation, yielding either qualitative or quantitative, or both, descriptions of the group's general features as a result [15].

2.2 Software Development Life Cycle

The SDLC (System Creation Life Cycle) is a critical procedure in the development of any system. From the planning phase to the implementation phase, a procedure is used to develop software systems. Also used to comprehend how an information system may serve business requirements, as well as to design, create, and deploy the system to users [16]. RAD model were used as the SDLC design in the development of the system.

Quick application development (RAD) is a software development process that prioritizes rapid prototyping over extensive planning. A prototype is a working model that functions in the same way as a product component. The functional modules are produced in parallel as prototypes in the RAD approach, and then combined to create the whole product for faster delivery. It is easier to accommodate modifications into the development process because there is no detailed preplanning. Small teams of developers, domain experts, customer representatives, and other IT resources work progressively on their component or prototype in RAD projects, which follow an iterative and incremental methodology [17].

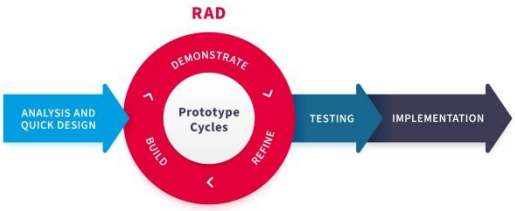

Figure 2. The Rapid Application Development Model

2.3 Entity-Relationship Diagram

The relationship between entity sets is depicted using an ER diagram. An entity set is a collection of comparable entities that can share attributes. An entity in a database management system is a table or an attribute of a table; hence an ER diagram depicts the entire logical structure of a database by illustrating relationships between tables and their properties. To better comprehend this concept, consider a simple ER diagram [18].

There were three entities in the diagram which were the Laboratory, Report, and Update. There is one and only one laboratory can send one- to- many reports. One-to-many reports can process a one and only update.

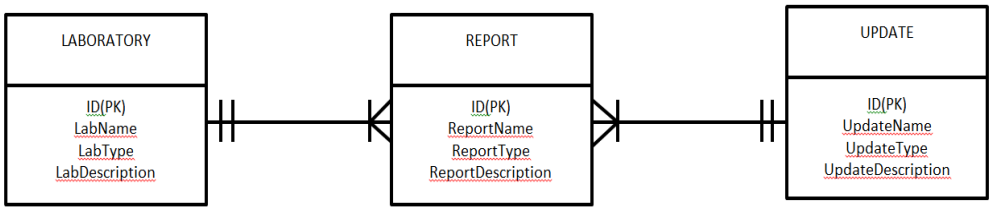

Figure 3. The Entity Relationship Diagram of the Developed System.

2.4 Process Model

In this study, a data flow diagram in context was used. A data flow diagram depicts the movement of data in an information system graphically. It can show incoming data flow, outgoing data flow, and data that have been saved. The DFD makes no indication of how data is routed through the system [19].

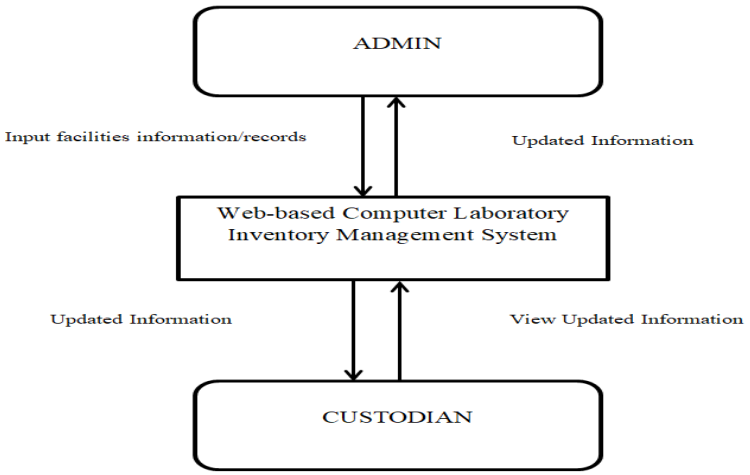

Figure 4. The Context Data Flow Diagram depicting the Process Model of the Developed System.

2.5 Testing and Evaluation

Due to the finalization of the developed system, the researchers requested the testers to evaluate the system in terms of it level of functionality, level of usability, and level of performance efficiency. A survey questionnaire was given to the interface design as well as to test the system's functionality, usability, and performance efficiency. A 5-point Likert scale comprising of 1 as Poor and 5 as Very Good was used on the developed system prototype. To statistically compute whether the developed system passed the evaluation criteria, the Mean statistics was applied. The Mean is computed as:

$$\overline{X} = \frac{\Sigma X}{n}$$

Where $\overline{X}$ is the mean

ΣX is the summation of individual raw scores

n is the number of populations

The obtained mean score was interpreted using the following verbal description:

Mean Score	Description
4.21 – 5.00	Very Good
3.41 – 4.20	Good
2.61 – 3.40	Average
1.81 – 2.60	Fair
1.0 – 1.80	Poor

3. PRESENTATION OF DATA AND INTERPRETATION OF RESULTS

The presentation, analysis, and interpretation required to satisfy the previously specified objectives are covered in this chapter.

3.1 Level of functionality of the developed system in terms of its security, accurateness and suitability

The result shown below indicates that the functionality of Web-based Computer Laboratory Inventory Management System composed with the following mean: in terms of security (M=4.50) was verbally interpreted as "Very Good", accurateness (M=4.75) was interpreted as "Very good" and its suitability (M=4.70) was interpreted as "Very Good".

Table 1: Level of functionality of the developed system in terms of its security, accurateness and suitability

	Implementation Indicators	Mean	Verbal Interpretation
a.	Security	4.50	Very Good
b.	Accurateness	4.75	Very Good
c.	Suitability	4.70	Very Good

Legend: 1.00-1.80 (Poor); 1.81-2.60 (Fair); 2.61-3.40 (Average); 3.41-4.20 (Good); 4.21-5.00 (Very Good).

3.2 Level of usability of the Web-based Computer Laboratory Inventory Management System in terms of learnability and operability.

The result showed that the usability of Web-based Computer Laboratory Inventory Management System composed with the following mean: in terms of learnability (M=4.64) was interpreted as "Very Good", operability (M=4.73) which was verbally interpreted as "Very Good".

Table 2: The level of Usability of the Developed System in term of Learnability, and Operability

	Implementation Indicators	Mean	Verbal Interpretation
a.	Learnability	4.64	Very Good
b.	Operability	4.73	Very Good

Legend: 1.00-1.80 (Poor); 1.81-2.60 (Fair); 2.61-3.40 (Average); 3.41-4.20 (Good); 4.21-5.00 (Very Good).

3.3 The Level of Performance Efficiency of the Developed System in terms of time Behavior and Resource Utilization

The result showed that in terms of time behavior (M=4.53) the system was interpreted as "Very Good" and for resource utilization (M=4.75) was interpreted as "Very Good".

Table 4 : The Level of Performance Efficiency of the Developed System in terms of time Behavior and Resource Utilization

	Implementation Indicators	Mean	Verbal Interpretation
a.	Time Behavior	4.53	Very Good
b.	Resource Utilization	4.75	Very Good

Legend: 1.00-1.80 (Poor); 1.81-2.60 (Fair); 2.61-3.40 (Average); 3.41-4.20 (Good); 4.21-5.00 (Very Good).

4. CONCLUSION

The following conclusions were drawn after considering the study's findings:

It has a high level of security, accuracy, and suitability, all of which were rated as "Very Good". Only authorized users have access to the system, and log records of system activity are retained. Furthermore, the system retains comprehensive records of data management.

Respondents rated the Web-based Computer Laboratory Inventory Management System as "Very Good" in terms of learnability and operability, indicating that the developed system had a high level of usability, with users finding the system's operations to be user-friendly and the information provided to be generic enough for easy comprehension. It was simple for new users to navigate the system because it was designed to be user-friendly.

The constructed system was judged to have "Very Good" performance efficiency in terms of time behavior and resource use, with the system completing tasks in realistic time intervals and gathering all relevant data. As a result, even when a huge number of message requests are received, the system stays stable.

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