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LEARNING RESOURCES MANAGEMENT SYSTEM

VINCENT B. CORTEZ
JOSEFINA R. SARMIENTO
MILAN E. BAUSA

AEMILIANUM COLLEGE INC.
Rizal St., Piot, West District, Sorsogon City, Sorsogon, Philippines

Abstract. The Learning Resources Management System (LRMS) for Aemilianum College Inc. is designed to support improved access to quality basic education by managing and distributing learning and teaching resources. The system aimed to strengthen education management and learning support systems and provide a technical basis for assessing, acquiring, adapting, developing, producing, and distributing quality materials for students and teachers. The specific objectives of this study were to: strengthen the Learning Resources Development System, improve instructional and learning materials, provide access to quality resources, modify and enhance instructional materials, and design and develop a user-friendly and cross-platform LRMS with features such as accepting and storing resources, generating reports and summaries, browsing resources, user log in and logs.

In addition, the LRMS aimed to provide an electronic process for the existing system of Aemilianum College Inc. This included support for the assessment, acquisition, adaptation, development, production, and distribution of teaching/learning materials to schools. Furthermore, the system aimed to digitize available student learning materials and make them accessible to students and teachers. The system also included standards, specifications, and guidelines for assessing and evaluating, acquiring, modifying, developing, and production of resources. These features were intended to improve the quality and access to basic education in the college system and contribute to the improvement of overall education management and learning support systems.

In summary, the Learning Resources Management System for Aemilianum College Inc. was a comprehensive system that aimed to manage and distribute learning and teaching resources to improve access to quality education. It includes various features that supported education management and learning support systems, such as an electronic process for the existing system, support for the assessment, acquisition, adaptation, development, production, and distribution of materials, digitization of available student learning materials, and standards and guidelines for evaluating and modifying resources. It also includes a user-friendly interface with features such as accepting and storing resources, generating reports and summaries, browsing resources, user login, and logs. The system is recommended to have a bigger database for storing the digitalized learning materials, have an automatic backup of the data, and create an activity log.

INTRODUCTION

The transformation of the education system could create an entirely new demand for producing the kind of talent its economy will need to sustain growth and development. Instructors and deans must be able to utilize technology inside the classroom through their competence in the use of such by attending workshops and seminars and being able to manage the learning resource materials which is the ultimate goal of a Learning Resource Management System (LRMS). As the country seeks to develop and expand its economy to better serve all socio-economic groups, efforts to boost the country's educational system are gaining traction. Upgrading teachers' competence through proper utilization of technology and proper management of learning resources will play a key role in overall development.

As described by the former Secretary of Education, Jesli Lapus (2015,) the current condition of Philippine Basic quality education had sunk to its lowest level. Accordingly, this was very alarming. Therefore, educational leaders must do something in order to address these aspects of the system that needs special attention.

On the other hand, Leonor Magtolis Briones (2017) DepEd, Secretary believed that a challenge among the school heads, master teachers, and teachers exists in raising the quality of education all throughout the country. This is in regard to the management of learning resources in school, utilization of technology in class, and most significantly the articulation of teachers' competence in carrying out the objective of the Department of Education in its vision of creating a globally competitive learner. [2] The challenges and expectations are great and the task is daunting in the management of Learning Resource Materials (LRM) as cited by Domingo (2018) but the master teachers and school heads are confident that through the wise utilization of such resources, the Department of Education will be able to achieve such reform in the education system.

However, the adequacy and sufficiency of learning resource materials were always the main consideration in the attainment of the aforementioned DepEd goals and objectives. Master teachers are the key players in the utilization of technology in class as perceived by Cornelia (2015), considering the rapid and pervasive technological changes all throughout the country. Master teachers are capable of carrying over such tremendous improvement in the education sector for they are highly responsible for the improvement of the instructional competence of teachers in the department where they belong. The knowledge, expertise, and experiences of master teachers play a big part in the evaluation and improvement of learning resource materials leading to the attainment of producing globally competitive teachers and learners. However, not all of master teachers are doing such tasks because the majority of them are also suffering from a lack of knowledge and technical know-how in relation to technology utilization.

On the other hand, the competence of public school teachers was also of prime significance in the management of learning resources, and utilization of technology in the classroom, Rada (2015). Their knowledge and skills should be evaluated in terms of their ability to utilize Information and make it more responsive to the needs of students in a classroom. Assessing and evaluating of

teacher's competence can serve as the basis for designing a management program that will cater to the significant aspects of the teaching and learning process.

The above contentious ensures the need to identify the problems encountered by the teachers and school heads in terms of learning resource materials and the utilization of technology in order to provide a possible solution that will lead to better functioning of the school as a whole. With this, there is a strong need to identify the gaps that are existing and continuously contributing to an increasing problem in the Department of Education with regard to the management of learning resource materials, the utilization of technology in classrooms, and teachers' teaching competence. Therefore, the aim of the study was to develop a Learning Resource Management System for Aemilianum College Inc. that portrays a library system that could be generally small or medium in size. Books and user maintenance modules were also included in the system which could keep track of the users using the library and also a detailed description of the books a library contains. With this computerized system, there will be no loss of book records or member records which generally happens when a non-computerized system is used and also it can send messages to the borrower. In addition, the report module was also included in Learning Resources Management System. If the user's position is admin, the user is able to generate different kinds of reports like lists of users registered, lists of books, and issue and return reports. Also there modules were able to help librarian to manage the library with more convenience and in a more efficient way as compared to library systems which were not computerized.

This Learning Resources Management System described the standards, processes and guidelines of the systems developed to support implementation. A major objective of the system was to provide a technical basis for assessing, acquiring, adapting, developing, producing and distributing quality learning and teaching resource materials for students and instructional support materials for teachers.

The system aimed to develop, support, and strengthen education management and learning support systems for improved access to quality basic education. To contribute to the improvement in the quality of and access to basic education in the college system.

The Learning Resources Management System for Aemilianum College Inc. helped to manage all the resources. It's systematically maintained, arrange, and handle innumerable references. Having access to resources that support learning, teaching, and professional development in both digital and printed format files, and being able to easily print them out as needed.

This study dealt with the development of the Learning Resources Management System for Aemilianum College Inc. It aimed to provide an electronic process for the existing system of ACI. Support and strengthen education management and learning support systems for improved access to the quality of education at this college.

The Learning Resources Management System (LRMS) was designed to support increased distribution and access to learning, and teaching resources in this college. This provides access to learning, teaching, and professional development resources in digital format and locates resources in print format and hard copy, standards, specifications, and guidelines for assessing & evaluating, acquiring, modifying, developing, and production of resources.

Specific Objectives

Specifically, this study aimed to:
1. Strengthen Learning Resources Development System (LRDS) in the Aemilianum College Inc.
2. Improve instructional and learning materials in the implementation of LRMS assessment, acquisition, adaptation, development, production, and distribution of teaching/learning materials to schools.
3. Develop LRMS to provide access to quality teaching, and learning resources and digitized available student learning materials.

4. Enhance instructional and learning materials for implementing Learning Resources Management Systems.
5. Develop a Learning Resource Management System intended for Aemilianum College Inc. with the following features:
    5.1 User-friendly and cross-platform support
    5.2 Save and store learning resources
    5.3 Generate reports and summary of learning resources
    5.4 Browse and search learning materials
    5.5 User Login Page
    5.6 User Logs
6. Determine the software quality of the proposed system based on ISO/IEC 25010:2011 in terms of:
    6.1 Functional Suitability
    6.2 Performance Efficiency
    6.3 Compatibility
    6.4 Usability
    6.5 Reliability
    6.6 Security
    6.7 Maintainability
    6.8 Portability

Table 1 - Identified Problem and Proposed Solution

No.	Problem Description	Proposed Solution
1.	Lack of access to resources: Some students may not have access to the necessary learning resources, whether due to financial constraints, geographic location, or other factors. One solution to this problem is to provide access to digital resources through a learning management system or other online platform.	Provide access to digital resources through a learning management system or other online platform. Offer access to a library of physical resources that can be checked out or borrowed. Provide financial assistance or scholarships to students who may not be able to afford the necessary resources.
2.	Limited resources: There may not be enough copies of certain resources to meet the needs of all students, or the resources may be outdated or otherwise inadequate. One solution is to supplement traditional resources with digital materials or to invest in new, updated resources.	Limited resources: Supplement traditional resources with digital materials or invest in new, updated resources. Consider sharing resources with other schools or institutions. Utilize open educational resources (OER) or other freely available materials.
3.	Inefficient resource management: Poor organization or management of resources can lead to waste and inefficiency. One solution is to implement a system for tracking and managing resources, such as a library management system or a resource reservation system.	Inefficient resource management: Implement a system for tracking and managing resources, such as a library management system or a resource reservation system. Train staff and students on how to use the system effectively. Regularly review and assess the efficiency of the system and make improvements as needed.
4.	Lack of student engagement: Some students may struggle to stay engaged with the material or may lack the motivation to use the available resources. One solution is to	Lack of student engagement: Provide additional support, such as tutoring or study groups. Incorporate more interactive and engaging learning activities. Offer incentives or rewards for

provide additional support, such as tutoring or study groups, or to incorporate more interactive and engaging learning activities.	student engagement. Encourage students to take ownership of their own learning and provide them with the tools and resources they need to succeed.

The researcher proposed the system "Learning Resources Management System" to resolve the current problems encountered by the College. The proposed system has provided an efficient and convenient learning resources process through the user interface. All data were kept in the database wherein only the admin can see for security purposes, however, users can view data only of their respective concerns. The users of the system has different function, thus, viewed data and level of accessibility to the system are not the same.

Context Diagram
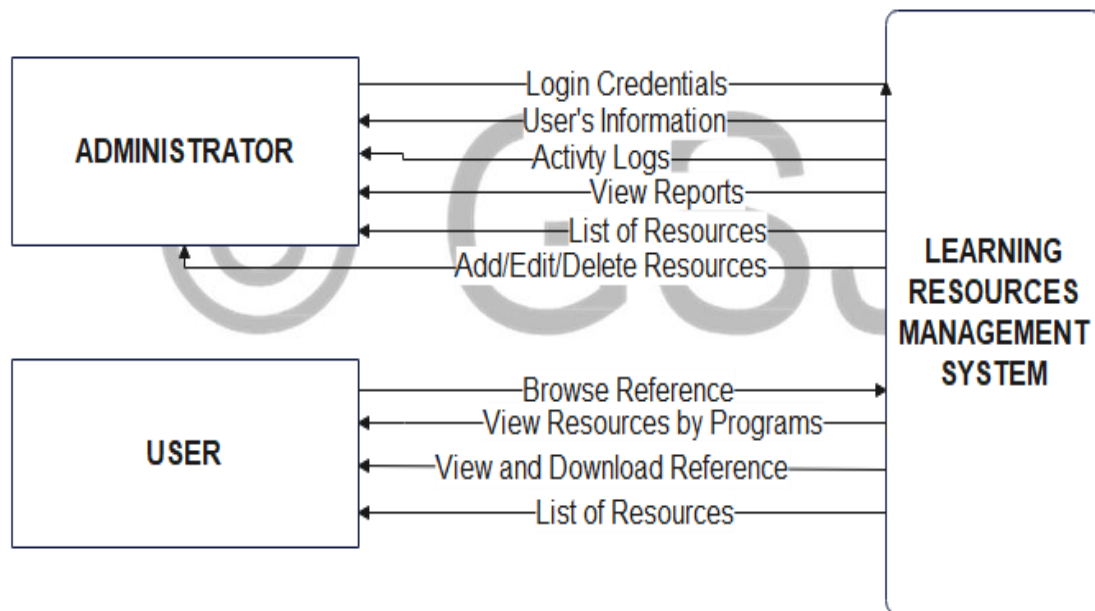
Figure 1 - Context Diagram

Figure 1 showed the process and people involved in the proposed Learning Resources Management System. Presented in the diagram were the exchange of information and activities between the systems and its users. It also shows how the user of the developed system interacts with the system itself.
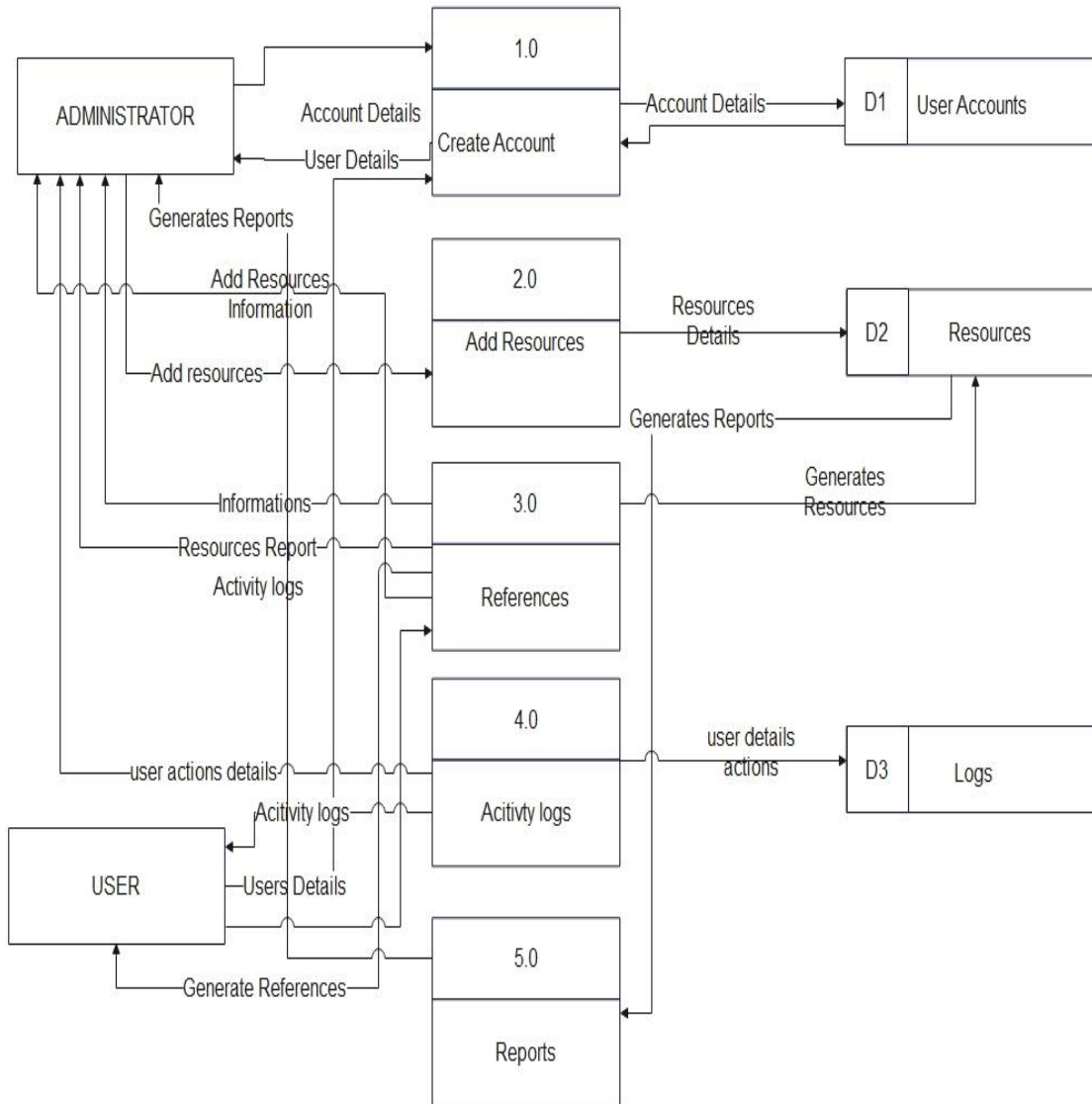
Data Flow Diagram

Figure 2 - Data Flow Diagram Level 0

The level 0 diagram showed the details of the system operations that were expected to happen. It was shown in Figure 2 in which it was divided into modules (processes). Shown in the diagram were the flow of information, and system functions that capture, store, manipulate and distribute data between the system and its environment as well as between components. This provided a good way of communication between the user and the system developer due to its visual representation. The Level 0 data Flow Diagram of the system represented the detailed format of the context diagram wherein actual processes of the system were shown such as: creating an account, adding resources, managing resources details generating reports. Included in each process are the input and output data. The diagram above showed a broad overview of the system and lets the succeeding level work down to a hierarchy of detailed diagrams, the detailed process of each module. The following diagram showed level 1 of the data flow diagram, each module (process) is exploded to represent the specific processes within the module. This provided details on the specifics of each process in the system.
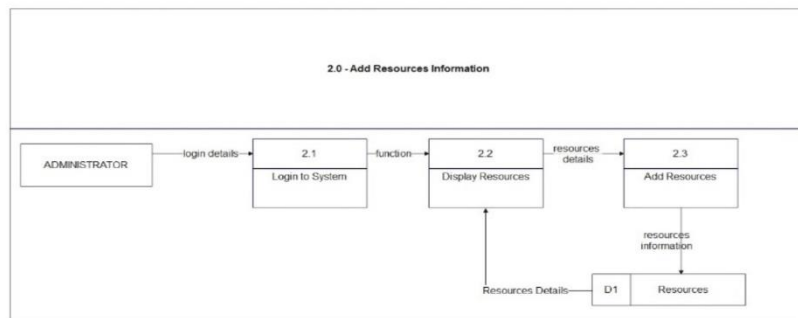

Figure 3 - Data Flow Diagram Level 1 (Add Resources)

Figure 3 above showed the processes of adding resources. This diagram showed the process of communication between the user and the added resources in the system. Presented were the processes, data input and output, and the storage of all the data.
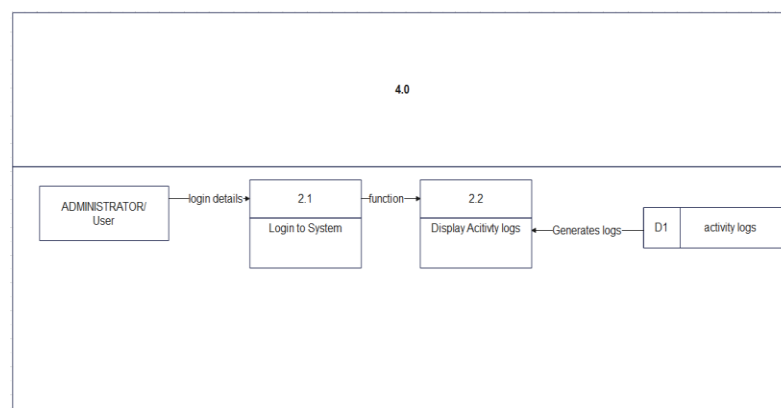
Figure 4 - Data Flow Diagram Level 1 (Activity logs)

The Figure 4 displayed the process of showing reports details. The administrator can view all activity logs within the system, while users are only able to view their own activity logs. This allowed the administrator to keep track of system usage, identify any potential issues and ensure compliance, while also allowed users to see their own actions and usage of the system.
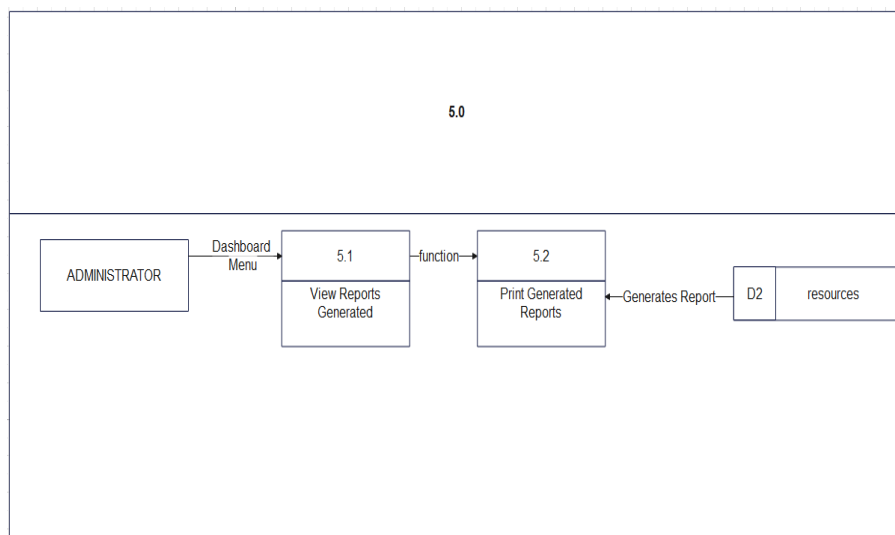

Figure 5 - Data Flow Diagram Level 1 (Report)

The Figure 5, the diagram that was being presented illustrates a report of all the resources that were available in the system. This report can be generated for all resources that have been uploaded, providing a comprehensive overview of all available content. This report was a powerful tool that can be used to track resource. It can also be used to make informed decisions about resource allocation and management. By reviewing this report, users can gain valuable insights into the usage of the system and take action to optimize performance and maximize efficiency.

Login Form

The first thing that the user of the system sees het login form. The proposed system has different type of users.
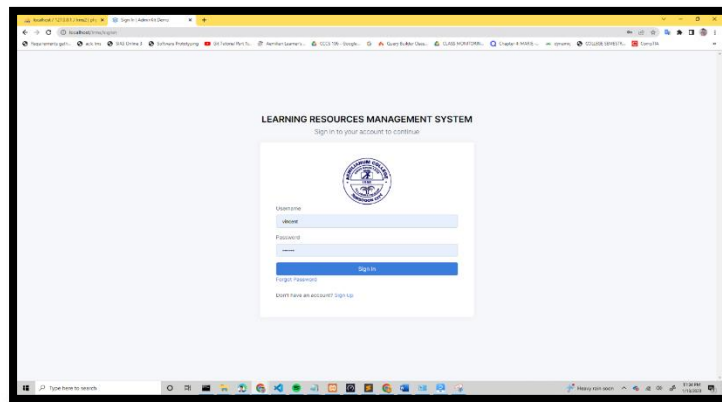

Figure 6 - Login Form

The login form in figure 4.8 showed the request for login credentials such as the

email as username and password from the user in order to continue with the system. Each

user has their own unique login credentials provided only by the system admin. In case of a

forgotten credential, users can ask for assistance from the system admin.

Resources List

Resources list provided users with detailed information and list of all the resources
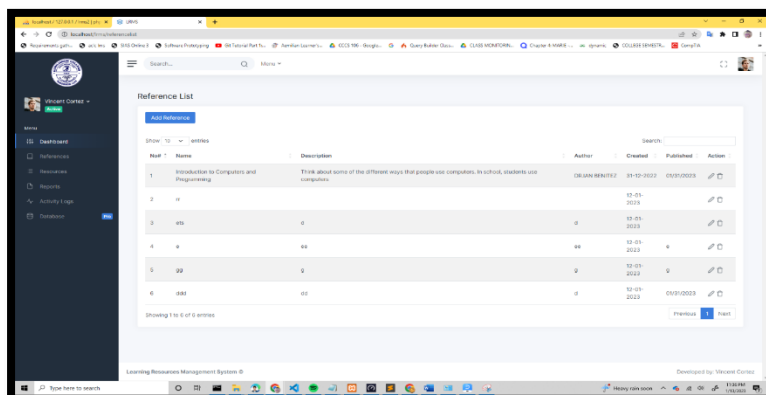
available in the system.

Figure 7 - Resources

Figure 7, the resources list was a key feature of the learning resources management system. It provided users with detailed information about all the resources available in the system. This included information such as resource name, type, author, date created, and other relevant data. The resources list can be sorted and filtered to easily find the desired resource. It also provided a visual representation of the resources to make it easy to find the desired resource. The resources list was an essential tool for managing and organizing resources within the system, and it was designed to be user-friendly and easy to navigate.

Summary of Resource per Program

The summary of resources per program is a valuable tool for understanding the distribution of resources within the learning resources management system.
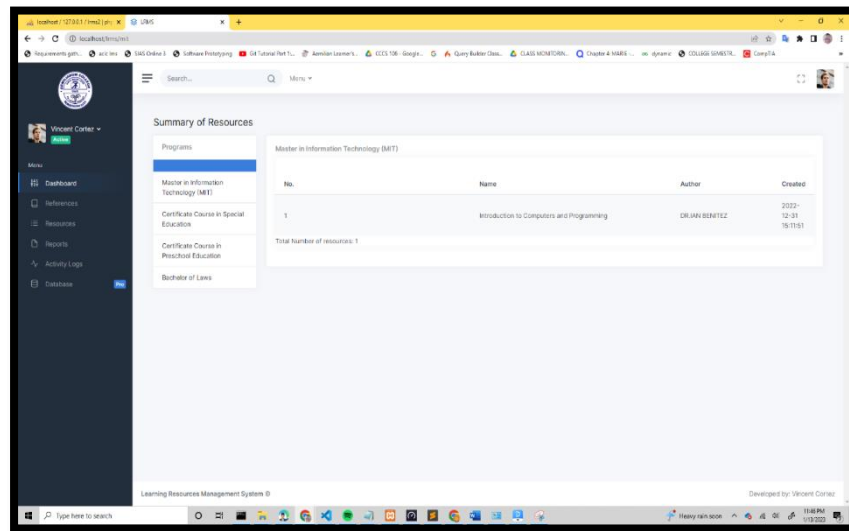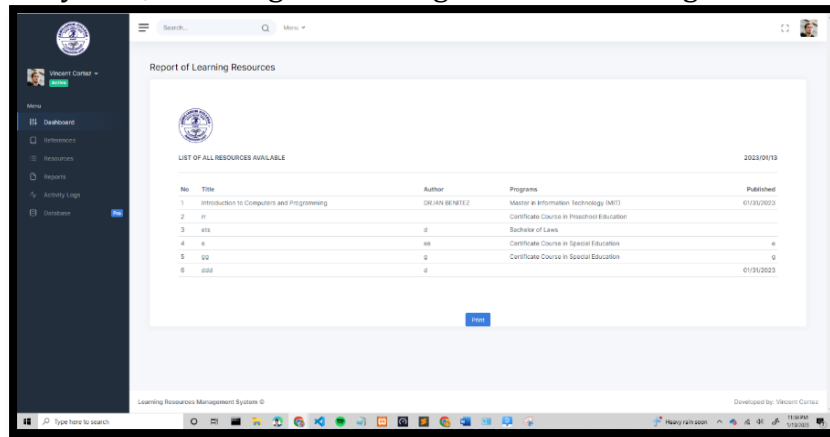

Figure 8 - Summary of Resources

Figure 8 provided an overview of the resources available for each program, giving users a clear picture of which resources are readily available for use. The summary of resources per program is an effective way to identify gaps in resources and plan accordingly. It can also be used to track resource usage and understand which resources are most in demand. The summary of resources per program is an essential tool for resource management, and it is designed to be user-friendly and easy to understand.

Reports

The summary of resources report offered a comprehensive view of the resources available in the system, allowing users to gain detailed insights into their usage and distribution.

Figure 9 - Reports

Figure 9 displayed the report of resources output provided a detailed breakdown of all the resources available in the learning resources management system, including information such as resource name, type, author, date created, and other relevant data.
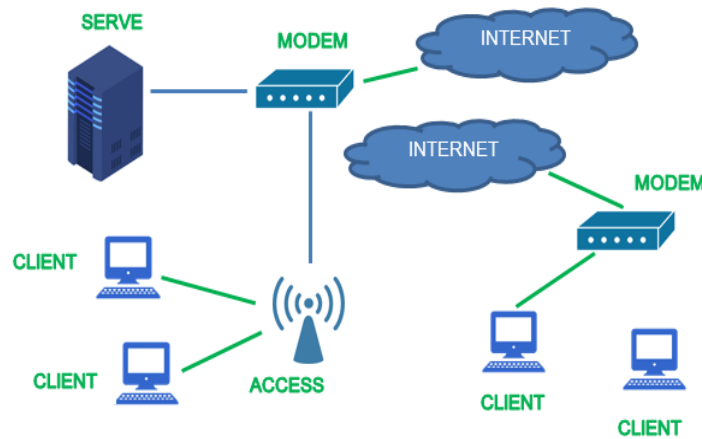
System Architecture

Figure 10 - Wireless Network Topology

Figure 10 showed the wireless network topology of the proposed system. In a wireless network, no physical connection is required in order to communicate with the system and other computers if it is connected to the internet.

Summary of Acceptance Testing

The last table is the summary of acceptance testing result of the Learning Resources Management System. The summary result was based on the criteria of the conducted system testing.

Table 1- Acceptance Testing Result Summary

Criteria	Average Weighted Mean	Remarks
System Functional Suitability	4.91	More than what is expected
System Performance Efficiency	5.00	More than what is expected
System Compatibility	5.00	More than what is expected
System Usability	5.00	More than what is expected
System Reliability	5.00	More than what is expected
System Security	4.88	More than what is expected
System Maintainability	4.85	More than what is expected
System Portability	4.88	More than what is expected
Average Weighted Mean User Acceptance Testing	4.94	More than what is expected

Table 1 shows the average weighted mean of 4.94 as the result of the conducted user acceptance test. The result means that the system achieved more than what is expected, thus it is acceptable. The user acceptance test covered the system functionality, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability. This means that the system is capable of providing its intended function and output to its respondents. The result of the evaluation showed that the system requirements and expectations of the clients were met. The expected output was achieved and properly presented. Clients were satisfied with the features of the proposed Learning Resources Management System. And is highly recommended and needed for Aemilianum College Inc. in providing the appropriate results and satisfying the requirements needed by the end-users.

Project Deployment

The Aemilianum College Inc. planned to adopt the proposed learning resources management system under the oversight of the Institution. The college believed that this system is an invaluable tool in managing of all the resources in the college. Although users were eager to use the system, the implementation process involved following necessary policies and procedures, which may take some time before it can be fully deployed within the college.

Findings

1. The proposed learning resources management system can be used to effectively manage and monitor the use and distribution of learning resources within the college. It can provide valuable insights into resource usage, identify trends, and troubleshoot issues. The system can also generate reports and summaries that can be used to make informed decisions about resource allocation and management.

2. The developed system improved the instructional and learning material system through support for the assessment, acquisition, adaption, development, production, and distribution of teaching/learning material to ACI.

3. Provided access to quality teaching and learning resources and digitized available student learning materials.

4. The enhanced system used by the college in providing instructional and learning materials.

5. The developed system was user-friendly, saved and stored learning resources, and generate reports.

6. Based on the conducted system evaluation, the researcher determines the system and specifies that it achieves the ISO 25010 level of acceptability. The functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability of the developed system were all assessed. The group of evaluators was composed of (20) people from Aemilianum College Inc. as the end-users, and (10) IT experts, with an overall mean of 4.94, with a verbal interpretation of more than what is expected.

Conclusions

After the conduct of evaluation and test performed by the end users of the Learning Resources Management System, the researcher concluded the following:

1. Learning Resources Development System in the Aemilianum College Inc. has been achieved through a combination of efforts in updating and expanding the college's resources, as well as improving access and support for students and faculty. This has resulted in a more robust and effective system that better serves the needs of the college community and contributes to their academic success. The continued development and maintenance of these resources will be crucial in ensuring that Aemilianum College Inc. remains at the forefront of education.

2. Improving the instructional and learning materials through the implementation of a Learning Resources Management System (LRMS) has been met. The assessment, acquisition, adaptation, development, production, and distribution of teaching and learning materials to schools have been streamlined and made more efficient through the use of the LRMS. This has led to an increase in the quality and availability of materials for teachers and students, resulting in a more effective and engaging educational experience. The continued use and development of the LRMS will be key in maintaining and improving the instructional and learning materials available to schools.

3. Learning Resources Management System (LRMS) to provide access to quality teaching and learning resources and digitized student learning materials has been successfully achieved. The LRMS has enabled the wider distribution of digital resources, making them more easily accessible to students and teachers. This has improved the quality and effectiveness of educational materials and provided more

opportunities for student engagement and success. The continued development and maintenance of the LRMS will ensure that access to high-quality resources remains available to all students and teachers.

4. The Learning Resources Management System (LRMS) for Aemilianum College Inc. has improved the process of providing learning materials in the college.

5. The LRMS has been designed with user-friendly and cross-platform support to make it accessible to all users. It has the ability to accept and store learning resources, generate reports and summaries, and allow for browsing and searching of resources. Additionally, it includes a user login page and user logs to ensure security and accountability. The implementation of this LRMS has improved the efficiency and effectiveness of managing learning resources in Aemilianum College Inc. and will continue to support the educational goals of the institution.

6. The developed system passed the evaluation based on the ISO 25010 standards; thus, it is very much acceptable and ready for deployment. Having a learning resources management system in place would be a significant benefit to both the teachers and management. With this system, there would be no delays in finding the right resources for a subject, and online instruction would be made much more efficient due to easy access to all the resources uploaded in the system.

Recommendations

1. The developed Learning Resources Management System may be utilized to strengthen the services to the faculty and students of the college.
2. The developed system may be used to improve digital instructional and learning materials storage and accession.
3. The system may provide access to quality teaching and learning resources and digitized available student learning materials if installed.
4. The enhanced system used by the college in providing instructional and learning materials is utilized.
5. The user-friendly developed system, may save and store learning resources, and generate reports for stakeholders if installed and utilized by the college.
6. Based on the high ratings from the evaluators, the developed system may be utilized and serve its purpose.

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