

Development of Online Allocation System for Learning Resources in Department of Education Division of Batangas

Elizalde L. Piol^{1*}, Elino S. Garcia², Sandy M. Gonzales³

¹Project Development Officer II, Department of Education-SDO Batangas, Batangas, Philippines

²Education Program Supervisor, Department of Education, Rizal, Philippines

³Associate Professor II, Batangas State University, Batangas, Philippines

Abstract: The Department of Education's Learning Resources Management Section (LRMS) is in charge of delivering a wide range of high-quality, accessible, cost-effective, and suitable learning resources to all sorts of students and teachers in public schools [1]. As a result, all received educational resources must be distributed equally among all schools. This study aims to develop a web-based book allocation system that will assist the Learning Resources Management and Development Section in managing its book allocation process and its users in allocating books and other learning materials and eventually identify all schools' learning resource needs. This project solves the issue of manual book distribution and allocation. The weaknesses in the current system are identified, which aids in constructing a more user-friendly and GUI-oriented automation system that is also integrated with the existing system.

The research method used was description and development research. Document analysis and study administration were part of the descriptive research, which used a structured questionnaire based on ISO 25010 system evaluation criteria. The system, on the other hand, was created through the use of developmental research. One of the participants in the study is LRMS Project Development Officer II, who was identified using random selection. The system is active, responsive, accurate, portable, and simple to manage, according to the findings.

Keywords: Web-based system, Book allocation, Department of Education, LRMS.

1. Introduction

Despite its recent efforts, the Department of Education still possesses over three million textbooks and other learning resources destined for public schools around the country. It is an urgent task for decision-makers in today's arena to make the best decisions quickly as an application for information technology advancement.

DepEd Batangas is a well-known division of Region IV – CALABARZON, in charge of the educational needs of 37 districts in the province's four congressional zones, comprising about 700 primary and secondary schools. Book allocation and distribution have become an issue with the growing number of students and schools in Batangas.

The primary goal of this research was to develop and implement an Online Allocation System for Learning Resources in the Department of Education Division of Batangas.

The effort's purpose is to monitor book distribution in the Department of Education's Batangas Schools Division. As a result, it set out to accomplish the following specific objectives:

1. Take a look at the present LRMS book allocation process.
2. Create a web-based allocation system that will allow you to conduct the following:
 - a. Distribute and assign the book.
 - b. Produce book distribution and allocation reports.
 - c. Evaluate the newly developed system according to the ISO 25010 software evaluation standards.

2. Related Works

"The difficulty of allocating resources to suit human needs is a global phenomenon that affects managers, administrators, corporations, and institutional leaders alike." [2]

A Student Residence Management System (SRMS) has been developed by Iraba [3], which can be deployed online and aids individuals in managing various residential operations such as reservation control, transfer requests, and space distribution. All space assignments may be communicated to students and validated in real-time through the Student Residence Management System. To alleviate user issues, the web-based method employed by the present Residence Administration system was designed.

Asmahani [4] was responsible for the creation of the College Student Allocation System. This project aims to design a student allocation system that uses the UiTM internet implementation and the wamp server platform to accomplish this goal. With the help of this study, the university distribution plan will be improved, allowing it to more successfully execute the College Student Allowance System (CSAS) in university leadership, which is based on need criteria. The project's restriction is that it only considers colleges located close to the

*Corresponding author: elizalde.piol@deped.gov.ph

institutions they are studying at.

Anjorin [5] came up with the idea in "Case study of Solton International Hotel and Resort: Online Hotel Reservation." As a result, the current system required thousands of student files to be manually processed. It was decided to build a website for the Solton International Hotel and Resort to save transportation costs for prospective visitors, provide a communication medium that can be utilized from anywhere, including the bedroom, and verify correctness. The system was built using PHP, MySQL, and the Apache Web server.

To replace the previous solution's manual file moving, Akanfe [6] constructed an online hotel reservation system (a case study of the Tamarin hotel). This circumstance can easily handle a considerable number of guests' data or information. Visitors should get relevant, accurate, timely, and well-formatted information. The technique provided tried to achieve this. The system uses MySQL as the database, PHP, HTML, and an Apache webserver. MySQL is an RDBMS. Automating all company operations and making quick judgments dynamically or interactively will boost efficiency and productivity.

Peter [7] proposed a web-based approach for booking classes. It was common to allocate classrooms to pupils manually. Effective combinations of courses for the same class can be automatically presented using a computer-assisted strategy to monitoring all schools on faculty and detailed information on those schools. An essential factor influencing the efficacy of the space was the appropriate utilization of the available space's total capacity. The most recent system incorporates the previously indicated primary variables. Other factors include ensuring that each course has enough space and funds and that the spaces meet the department's demands. Stakeholder meetings were held once a week to discuss existing and future activities. The system's SOA made it easy to separate the plan and show progress. Glassfish in NetBeans for Windows 7 The backend was MySQL, with Amahi Server for MySQL management and MySQL as the frontend.

3. Design and Methodology

The web-based allocation system was developed using the waterfall paradigm by the researcher. After collecting all relevant data, the researcher analyzed the system to create a new model to replace the institution's current system.

1) *PHP*

To interface with databases, Web developers can use the PHP Hypertext Preprocessor (PHP). It is a server scripting language.

2) *PostgreSQL*

PostgreSQL is a relational database that is available for free and open-source. It takes advantage of the structure's query language, is fast and dependable, and is simple to use, among other things.

3) *Apache*

Apache is an open-source web server.

4) *PHPMysqlAdmin*

The PostgreSQL database is free and easy to manage with PHP.

5) *Javascript*

This programming language is used in other programs to program object access. This is a JavaScript client for developing dynamic websites.

6) *Hypertext Transfer Protocol (HTTP)*

The hypermedia information system application protocol is collaborative. Using connected resources creates the World Wide Web.

The questionnaire was designed to evaluate the system's functionality, dependability, usability, and efficiency and the potential benefits of having an Online Allocation System for Learning Resources in the Department of Education Division of Batangas, specifically for the Batangas Schools Division. Random selection was used to pick respondents from the Department of Education for the study. The questionnaire was created using ISO / IEC 25010.

4. Results and Discussions

The Department of Education's LRMS currently assigns books to schools by manually encoding the details and manually computing the number of books allotted to the school that matches the book's details. The LRMS does not have up-to-date enrollment and book records because the current system is manual. It was determined to computerize the current allocation system to address the faults with it.

This project introduces a novel web-based book allocation mechanism that allows users to assign books without manually looking for and gathering information.

The system was built with a strict requirement for responsiveness in mind. The system adjusts to the type of device being used to access the application. The system detects the user's preferred resolution for using the application, ensuring that the presentation layout is acceptable.

The system is a web-based project that can be utilized simultaneously by two or more persons. Unauthorized individuals could gain access to the records using the login form.

A. *Results and Evaluation*

Using ISO/IEC 25010, the proponent established that feature requirements were prioritized last, even though efficacy, quality, and safety were preserved while maintaining maintenance, usability, and portability.

The term "functionality" refers to how capable, precise, interoperable, conformant, and safe a system is. The strength, fault tolerance, and recoverability of a system are called "system reliability." The readability, learning ability, functionality, and attraction of a system are referred to as "usability." Resource utilization and time management, on the other hand, are the foundations of efficiency. The system's analyzability, variability, strength, and testability will be evaluated during "maintenance." Finally, a system's ability to adapt, install, comply, and replace itself is referred to as "portability."

When it came to the system's overall effectiveness, the participants were united in their approval, evaluated at 4.62. The findings are summarized in Table 1.

The signal that "Web-based book allocation system works rapidly" was the most significant weighted average of 4.69. This shows that the program responds rapidly, even when multiple procedures are being performed simultaneously. The measure "Effective use of resources via a Web-based book allocation system" received the lowest average score of 4.53 and was deemed strongly acceptable. This means that the advanced system can perform at the same level as the primary system with the same resources.

Table 1
Efficiency Evaluation

Criteria	Mean	Verbal Interpretation
1. The web-based book allocation mechanism is quick to respond.	4.69	Strongly Agree
2. A web-based book allocation system efficiently allocates resources.	4.53	Strongly Agree
3. The user's command is quickly responded to by the Web-based book allocation system.	4.67	Strongly Agree
4. Depending on the requirements, the web-based book allocation system maintains reliable data.	4.58	Strongly Agree
Overall	4.62	Strongly Agree

The assessment findings in terms of functions as perceived by the participants are shown in Table 2. The overall weighted mean rating of 4.77 suggests that respondents have high confidence in the system's ability to do the tasks. Similarly, as seen by the overall weighted mean score of 4.73 and 4.60, respondents agreed that the system displays the user's expected outcome and interacts with other systems. At the same time, as seen by the weighted average complete rating of 4.59, the respondents strongly agreed that the website has security features because the system prohibits unauthorized access. The overall weighted average is 4.67, showing that the participants were very interested in how the advanced system worked. The feature is always vital in the design and development of a system.

Table 2
Functionality Evaluation

Criteria	Mean	Verbal Interpretation
1. The duties required are completed by a web-based book allocation system.	4.77	Strongly Agree
2. The result is as expected	4.73	Strongly Agree
3. Other systems connect with a web-based book allocation system.	4.60	Strongly Agree
4. Unauthorized access is prevented through a web-based book allocation mechanism.	4.59	Strongly Agree
Overall	4.67	Strongly Agree

With a well-designed, user-friendly environment, this system is called user-friendly. Security is another factor that the researchers believe is important in keeping the user's security and confidence and ensuring that they are protected from hackers.

Table 3 shows the effectiveness of the designed system. This indicates that the system's accessibility has performed admirably, implying that users are pleased with the system's

performance.

The failure tolerance feature of the system shows an insufficient level of performance. They responded emphatically that the system is designed to handle errors, as seen by the weighted average of 4.55. This demonstrates that the system humbly accepts faults or flaws. According to the 4.52 and 4.41 weighted averages, respondents believe that most system failures can be resolved at the moment and recovered even when they fail. The system's recoverability qualities are of the highest possible quality. It also features a high-quality function that allows it to restore the original condition even if faults have occurred. Overall, most respondents thought the devised method was trustworthy because all signs were verbally translated as Strongly Agree.

Table 3
Reliability Evaluation

Criteria	Mean	Verbal Interpretation
1. The errors in the system can be remedied over time.	4.52	Strongly Agree
2. Errors are dealt with by the system.	4.55	Strongly Agree
3. Users are notified by the software when they have entered incorrect information.	4.34	Strongly Agree
4. In the event of a system breakdown, the system is capable of restoring data.	4.41	Strongly Agree
Overall	4.46	Strongly Agree

Table 4 shows how respondents felt about the system's usability. The system received a weighted mean rating of 4.68 from the participants, suggesting that it was simple to use. They can also quickly comprehend the instruments required for the device method and use the system without problem, with a weighted mean of 4.64 and 4.50, respectively. Furthermore, as evidenced by the weighted mean score of 4.43, they all felt that the GUI interface is appealing. The website received an overall composite mean score of 4.56, suggesting that it is generally applicable. Users' familiarity with the currently implemented system is no longer a big concern. They'd already learned how to operate a range of computer programs and features. Web usability is crucial for attracting and retaining visitors.

Table 4
Evaluation in Terms of Usability

Criteria	Mean	Verbal Interpretation
1. The system is straightforward to operate.	4.68	Strongly Agree
2. The system can be taught in a short time.	4.64	Strongly Agree
3. The system is being used without difficulty.	4.50	Strongly Agree
4. The graphical user interface (GUI) appears to be of high quality.	4.43	Strongly Agree
Overall	4.56	Strongly Agree

The evaluation of the system produced in terms of maintenance experienced by respondents is shown in Table 5. Because the operation has an average of 4.69, the participants slowly determined that it can be easily examined.

Similarly, most respondents felt that the system could be

simply adjusted and that problems could be easily recognized. It scored 4.57 and 4.51, respectively, in the weighted mean. In short, a general average of 4.55 indicates that the system produced can be modified, which could include hardware changes, upgrades, or alternatives to changes in the environment, needs, and functional specifications.

Table 5
Maintainability Evaluation

Criteria	Mean	Verbal Interpretation
1. Errors may be recognized quickly and easily using the system.	4.51	Strongly Agree
2. It is simple to edit and customize.	4.57	Strongly Agree
3. If any revisions are made, the request can move to the following process stage.	4.42	Strongly Agree
4. It is simple to put the system through its paces.	4.69	Strongly Agree
Overall	4.55	Strongly Agree

Table 6 reveals that respondents do not worry about the system's mobility. The highest average rating was 4.58 for "the software may be transferred to numerous environments." It means the technology was designed to be easily moved between computing environments. The software can be easily replaced by alternative software that had a mean score of 4.51. The designed system's weighted mean is 4.52, indicating ease of implementation. The overall mean is 4.54, indicating that the system can adapt to changes in its environment or requirements.

Table 6
Portability Evaluation

Criteria	Mean	Verbal Interpretation
1. The system is adaptable to a variety of additional applications.	4.58	Strongly Agree
2. Putting the system in place will be a simple process.	4.52	Strongly Agree
3. The system conforms with all applicable portability standards.	4.53	Strongly Agree
4. The system is capable of replacing other software with relative ease.	4.51	Strongly Agree
Overall	4.54	Strongly Agree

A weighted general average score of 4.57 was obtained based on the findings of the examination, which are provided in Table 7. That the respondents have judged that the system presented is appropriate is demonstrated by this response. The system classification requirements are "Functionality" 4.67, "Reliability" 4.46, "Usability" 4.56, "Efficiency" 4.62, "Maintainability" 4.55, and "Portability" 4.54. The system classification requirements are "Functionality," "Reliability," "Usability," and "Efficiency." Functionality, dependability, usability, and efficiency are the prerequisites for system classification, and they are listed in the table below.

According to most responders, the system is operational, safe, effective, mobile, and accessible. According to the respondents, the system's features, quality, efficacy, usability, maintenance, and mobility have a substantial acceptability variable.

Table 7
Evaluation Summary

Criteria	Mean	Verbal Interpretation
Functionality	4.67	Strongly Agree
Reliability	4.46	Strongly Agree
Usability	4.56	Strongly Agree
Efficiency	4.62	Strongly Agree
Maintainability	4.55	Strongly Agree
Portability	4.54	Strongly Agree
Grand Mean	4.57	Strongly Agree

Most respondents believe the system is web-based, runs in real-time, and interacts wirelessly with minimal human intervention, as indicated in Table 7. Because it aids in acquiring and retrieving knowledge and is employed regularly, the characteristic is the first to be classified as the system's weighted average of 4.69. Although the accuracy has a low weighted average grade of 4.48, it displays the system's ability to handle problems, runs smoothly, recovers from failure, operates appropriately, and warn users when a mistake occurs. With a weighted mean of 4.58, usability is a description of usability, usability, and proof of comfort and comfort. On the other hand, the respondents strongly endorsed the system, who gave it a weighted average of 4.64.

The results suggest that the system is beneficial in method, reaction, precision, capture, and display. The description further highlights that the system can respond swiftly and effectively. Furthermore, the outcome demonstrates the system's potential to achieve the objectives of the research. It is possible to maintain a system's performance in error detection, computational complexity, reaction to changes, fault adjustment, and viability due to system maintenance. When it comes to portability, the data show that respondents value the system's ability to satisfy the degree of portability, layout compliance, simplicity of implementation, and coexistence of system software or hardware, among other factors.

5. Conclusion

The researcher came to the following conclusions based on the objectives:

In the current system, the DepEd Batangas, on the other hand, uses a manual approach to allocating books. The user instructs LRMDS workers to carry out the present procedure, manually encodes book details, and selects the list of recipient schools. The system now includes a school account that allows schools to update their enrollment information.

Respondent design meets the needs and demands of users who want and deserve greater convenience. As a result of eliminating the time spent manually looking for data and conducting data allocation at fast speeds, the suggested method reduces overall time. It would be necessary for the user to go through each item of data or information one by one, carefully reading the contents of each, if the system had not been developed. When the Book Allocation system encounters a match, it returns the results in a fraction of a second instead of manual matching.

The feature was scored 1 in the evaluation results. The system is practicable and operational in method, reaction, speed

and accuracy, data collection, and display. The portrayal also emphasizes how quickly the system reacts. The result also shows the system's ability to meet the study's objectives. The system can be maintained in error detection, testability, fault correction, and feasibility. At the same time, respondents approve of the system's ability to meet portability requirements, construction conformity, ease of deployment, and software/hardware cohabitation. It has been proven that accuracy increases the system's ability to handle errors, run efficiently, recover from faults, and perform properly.

After completing the system development, the researcher found that the established system widely specifies an innovation to repair the traditional and obsolete ways of allocating books in DepEd Batangas. As a response to the developed system's objectives:

1. The designed method is an attempt to improve the DepEd Batangas' existing book allocation process.
2. A search engine application can be developed using PHP, Javascript, Notepad C++, and PostgreSQL.
3. The system received a very high grade in functionality, efficiency, reliability, maintainability, portability, and

usability.

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