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Web-based Management Information System of Cases Filed with the National Labor Relations Commission

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Abstract

This study was developed to describe the daily operations and encountered problems of National Labor Relations Commission Regional Arbitration Branch No. IV (NLRC RAB IV) through conducted observations and interviews. These problems were addressed and analyzed to be the features of the developed web-based management information system (MIS) of cases. The system covered managing filed complaints, Single-Entry Approach (SEnA), labor cases, and report generation. The findings, through the interview, of handling records were inconsistent and inaccurate. The research methodology utilized in this project was the descriptive developmental approach. The Agile Software Development methodology was followed to develop the system. It was used to quickly produce the desired output while allowing to go back phases without finishing the whole cycle. This study also focused on ensuring the Data Privacy Act of 2012, protecting the database's information using XOR Cipher Algorithm. This study was evaluated using standard web evaluation criteria. Using the criteria, the study's overall mean was 4.27 and 4.43, both with the descriptive meaning of Very Good, which showed that the system was accepted as perceived by experts and end-users, respectively.

CCS CONCEPTS

• Information systems → Enterprise information systems

Keywords: management information system, information technology, information systems, labor, labor relations

1. Introduction

Utilization of web technologies in today's era gives more ways of sharing information through the internet and local connections. As the development of web information systems (WIS) is rising globally, it makes businesses and companies more competitive [1]. Web technologies offer wide range of information-sharing possibilities, whether it is online or offline. Offline sharing of information through local area networks can be maximized by WIS in sharing locally connected devices. Online services of WIS allow users from different locations to access or manipulate information.

Usage of WIS has its advantages [1] and these are the reasons why even government agencies are investing in such information systems. WIS allows clients far from the organization or company to connect with, allowing them to communicate their needs and purpose. WIS also provides the advantages of transacting online, allowing clients to register information through web portals of government agencies. Several government agencies are currently enjoying the services offered by WIS. The Department of Foreign Affairs (DFA) is using WIS to allow clients to register for a passport application and renewal, providing the clients to only visit their office for

appearance of taking picture for the passport. This lessens the time consumed by the people in queuing at their offices. This also helps the clients to look for available schedules online of passport renewals, without effort of visiting the office and knowing that there are no available schedules anymore. Another government agency that is using WIS is the Department of Tourism (DoT). DoT shares, through WIS, the beauty of the Philippine islands. This helps the promotion of the local works and provides opportunities for foreigners to visit and see the beauty of the country. This helps the Philippines be recognized and honored by foreign countries. Recently, DoT is recognized and cited by Forbes.com as one of the hottest spots in Asia.

National Labor Relations Commission (NLRC), a government agency under the Department of Labor and Employment (DOLE), is a quasi-judicial court that handles labor cases filed by complainants against its respondents with a specific type of jurisdiction of labor arbiters. In the Philippines, according to the official website of NLRC, 31,785.2 cases were received and 31,885.4 cases were disposed by the regional arbitration branches (RABs) of NLRC from year 2001 to 2010 [19]. These cases received and disposed by the NLRC are falling under the jurisdiction of the labor arbiters. These jurisdiction of labor arbiters are unfair labor practice cases, termination disputes, cases involving wages, rates of pay, hours of work, money claims, and other cases as may be provided by law. These jurisdictions are mentioned in Article 217 of the Presidential Decree 442, otherwise known as the Labor code of the Philippines.

NLRC has many branches in the whole country, one of the biggest RAB is the Region 4, covering both Region 4A, which includes Cavite, Laguna, Batangas, Rizal, and Quezon (CALABARZON), and Region 4B, which includes Mindoro, Marinduque, Romblon, and Palawan (MIMAROPA). NLRC RAB IV is located at Calamba, Laguna, few meters away from the city's municipal hall. It has eight offices to cater the labor arbiters (LA) including the office of the executive labor arbiter (ELA). All offices have labor arbitration associates (LAA), these are the persons allowed to do the tasks of a labor arbiter if the labor arbiter is not present during the finalization of a filed case. Each labor arbiter handles several cases each day, around 2,000 cases a year, including Palawan cases, making their offices filled with filed complaints, crowding their offices with spaces occupied by the papers. With this, the branch even had a room just for the documents, and each offices of the labor arbiters are still filled with such documents. Dealing with the amount of cases received and handled by the RAB, a need for a better record management system arises.

Some employees of the agency visits Palawan, including the ELA, one of the farthest places covered by Region 4, to accommodate filed cases on the said location, doing this every other month. With this, people complained from Palawan only allow them to ask about the progress of their filed complaints every other month, making them wait for a month or two to know what has happened on their case.

Development of a management information system of cases for the NLRC RAB IV helped reduce paper works [2] and store information in a centralized database [3]. Each labor arbiter is handling different sets of cases making the centralization of the database be per office of the labor arbiter. Also, with this, only the employees of each office have the right to log in on the system to fully use the management information system. Moreover, the system has a labor case status tracking system that allowed complainants or respondents to view the status of their labor case online. This helped the complainant or respondent to lessen efforts and time of visiting the office for case status inquiry. The system also has a report generation needed by each labor arbiters' offices to be submitted to the main office of NLRC. This reduced the use of spreadsheets which cause, sometimes, data inconsistency.

1.1 Project Objectives

The study aims to develop a web-based management information system accommodating labor cases filed with NLRC RAB IV in the Philippines.

Specifically, this also answered the following questions:

1. What are the common problems being encountered by the National Labor Relations Commission Regional Arbitration Branch No. IV in their daily operations?

2. How may the identified problems at the NLRC RAB IV be addressed through the design and development of a web-based management information system?

3. How may the integrity of Data Privacy Act of 2012 of the Philippines be ensured upon the implementation of the developed system?

4. How may the acceptability of the system be described using standard web evaluation criteria as perceived by:

4.1. IT Experts; and

4.2. End-Users?

2 Experimental And Computational Details

2.1 Research Methodology

A descriptive method was applied to this study as it described the daily operations of NLRC RAB IV, where the researcher digitized the work of managing filed cases through the use of the developed system. Information gathered in analyzing human behavior in accepting and adapting to change through the use of the descriptive method was the best approach [4]. It aimed to be more familiar with a specified topic and focuses about an area of interest that naturally occurs on the environment of the intended subject, or in this study, the end-users. The researcher conducted observations on the daily operations of NLRC RAB IV that determined the current state of system and technology used by the agency. The researcher conducted an interview to the executive labor arbiter, to which additional information were gathered, and assurance of the observed data was validated. With these gathered data, the researcher also identified the problems encountered on the daily operations of NLRC RAB IV [20]. On each of the stated problem, the researcher, during the interview, provided suggestions on how to improve the operations of the Commission to be part of the features of the developed system.

For consistency, accuracy, and effectiveness of the developed system, the researcher applied the developmental research. On this type of research, the researcher studied the process systematically, developed, and evaluated processes that must meet the set criteria for user's acceptance to the developed system. After gathering data and additional information through observations and interviews, after going through the descriptive method process, the researcher, then, adapted the developmental research. The gathered data on daily operations and problems encountered by the client was analyzed which led to the development of the web-based management information system of labor cases which improved the daily operations on handling filed cases.

2.2 Software Development Methodology

The system was developed by following and applying the processes and phases of a System Development Life Cycle (SDLC). The developed system focused on using Agile software development methodology as its primary SDLC method [16]. This enabled the researcher in developing the web-based system by going back and forth on different phases, to revisit a phase if there are changes on the latter phases, and to modify contents from past phases if there are inconsistencies or anomalies happened during the development of the system. Agile software development is suitable in developing fast-paced systems as it allows quick iteration of its phases and it also allows revisiting past phases if there are modifications to be done.

2.2.1 Requirements. The data gathering through the use of interview and survey questionnaires were done in this phase. The purpose of the interview and survey questionnaires was to identify the daily operations and problems encountered by NLRC RAB IV. With these gathered data, planning of features and proposal of a web-based management information system of labor cases to the Commission were able to be done.

2.2.2 Plan. in this phase, the possible features and functionalities included on the web-based system were identified. With the help of the gathered data, the researcher was able to propose to NLRC RAB IV some features made on this phase.

2.2.3 Design. The researcher designed a database using entity relationship diagram that serves as the storage of complaints, SEnA, and filed labor cases. With this phase, user interface was also designed that fits the requirements. Data flow diagram and use-case diagram were used that identified how each data flow and which functionalities each type of user shall be able to access.

2.2.4 Develop. After the finalization of the required elements on the design phase, the web-based management information system, using and maximizing web technologies, was developed. On this phase, all the features of the developed system were delivered. As part of the development of the system, debugging of the system was also done. Debugging assures that the developed system operates properly and correctly as debugging allowed the researcher to correct all errors encountered on the development of the system. The user acceptance testing shall also be done in this phase. All user requirements were verified and validated, and modifications to be done were identified before the implementation of the developed system. Different development tools were used that achieved the development of the web-based management information system. Hypertext Markup Language (HTML), Cascading Style Sheet (CSS), JavaScript (JS), and Hypertext Preprocessor (PHP) to develop both front-end and back-end of the web-based system were used. Framework, such as jQuery, was also used as a development tool. My Structured Query Language (MySQL) was used as the database of the system where all data were and will be stored to be used by the web-based system.

2.2.5 Release, Track, and Monitor. in the release phase, the system is deployed and shall be operational to the agency and used by its intended users. After the deployment, track and monitor phase shall be done for the maintenance of the system. These phases were no longer covered by the study as the study only covers up to the testing of the developed web-based management information system.

2.3 System Evaluation: Standard Web Evaluation Criteria

To improve the quality of the developed system, an assessment of acceptability was conducted by the researcher to the respondents of the developed system. This helped the researcher to identify if the needs and satisfaction of the Commission and its employees were obtained through the development of the web-based management information system of labor cases. According to the case flow at the regional arbitration branch level, SEnA and complaint officers are the first to process and to gather the information of the complainants and the respondents before proceeding to an actual case handled by the labor arbiters.

The researcher used expert or judgment sampling [21] to 30 IT experts and professionals, that assessed the acceptability of the developed system. Experts' responses were included as part of the researcher's respondents that provided evaluation of the developed system's technicalities. On the other hand, the researcher used convenience sampling [22] to 30 employees of NLRC RAB IV. These employees were the end-users and are categorized as labor arbiters, including labor arbitration associates and the executive labor arbiter, SEnA officers, and complaint officers.

The researcher conducted a survey to the employees of NLRC RAB IV, including labor arbiters, labor arbitration associates, SEnA officers, and complaint officers that assessed the level of acceptability of the developed web-based management information system of labor cases. To assess the acceptability of the developed system, the researcher used standard web-evaluation criteria that were computed using the five-point Likert-type Scale. The researcher analyzed the data as quantitative data and was obtained using such scale.

Numerical Rating	**Interpretation**
4.50-5.0	Excellent
3.50-4.49	Very Good
2.50-3.49	Good
1.50-2.49	Fair
1.0-1.49	Poor

The standard web evaluation criteria were based from the models that were analyzed by Valavičius and Vipartienė [6], which formed three models that were used to evaluate a website, namely: (1) Quality model, (2) Usability model, and (3) Satisfaction model. These models were from other existing models that was compiled by Valavičius and Vipartienė [6] to develop a better website evaluation model. Quality model identifies the data quality presented in the system. This model was derived from the International Organization of Standardization (ISO) of Quality models [7]. Usability model [8] determines how the user will use and interact with the system. The authors [10, 11, 12] have incorporated in their research the usability model [8]. Satisfaction model [9] identifies the user's perception in terms of presentation of system design and how well each component is connected from one another. These studies [13, 14, 15] are few of those that used the satisfaction model.

3 Results And Discussion

3.1 The Common Problems being Encountered by the National Labor Relations Commission Regional Arbitration Branch No. IV in their Daily Operations

The Executive Labor Arbiter of the NLRC, Atty. Generoso V. Santos, described and discussed their daily operations during the interview. Fig. 1 presents a better understanding on the flow on how a labor case, under a regional arbitration branch level, flows from filing a complaint to the case's decision.

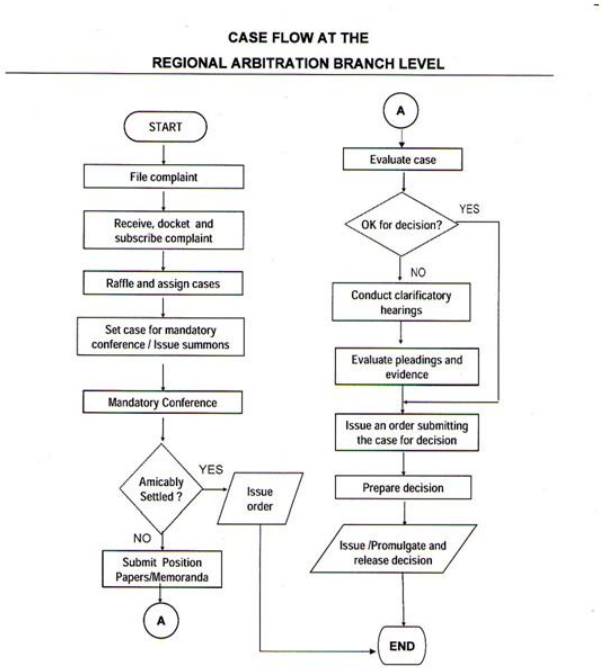

Figure 1: Case flow at the RAB level

During the interview, when asked about the problems they encounter when sharing information on case transition from SEnA to a proper labor case, ELA mentioned that sometimes, the data is incomplete and inconsistent, specifically the information of the complainants and the respondent. The attention of the SEnA officer shall be called to clarify the details and information of both parties including the nature of complaint filed by the complainant. Fig. 2 shows the cause-effect diagram of the encountered problems of the Commission which led to data inconsistency and redundancy, transferring data from one office to another.

Figure 2: Cause-effect diagram of the encountered problems in the Commission's daily operations led to data inconsistency and redundancy

Raffling from one labor arbiter to another is one of their significant problems. The information from the other office sometimes is changing if re-shuffled to another labor arbiter. With that, the new administering labor arbiter is having difficulty assessing the case and needs the office's attention where the case is shuffled initially. Another problem encountered in sharing information is when both parties need to identify the status of their filed case. Any or both parties shall visit the Commission for a simple inquiry of their labor case's status. It burdens both parties to spend money, time, and effort just to know such little detail. These problems are the common problems they encounter, mostly in their daily operations.

3.2 Design and Development of the Functional Requirements of the Web-based Management Information System

The study focused on designing a database using an entity-relationship diagram, as shown in Fig. 3, that serves as the storage of complaints, SEnA, and filed labor cases at NLRC RAB IV. Provided also are the user interfaces for the developed system. Fig. 4 shows the used context diagram [17] that helped the researcher

determine how the data flows from one entity to another. Moreover, a use-case diagram [18] was used that identified the specific functionalities allowed to be used by each user level, as shown in Fig. 5.

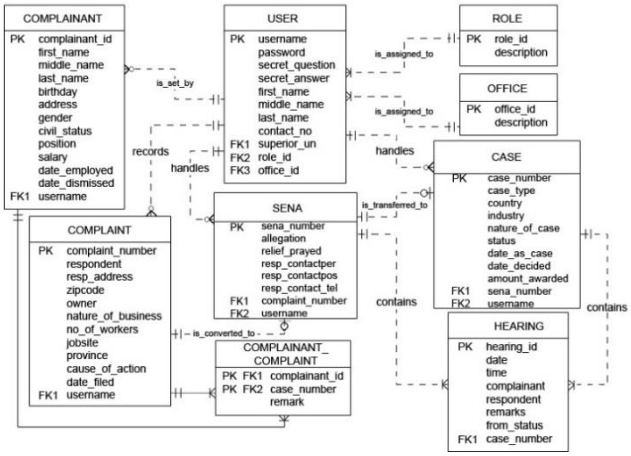

Figure 3: The entity-relationship diagram of the developed system

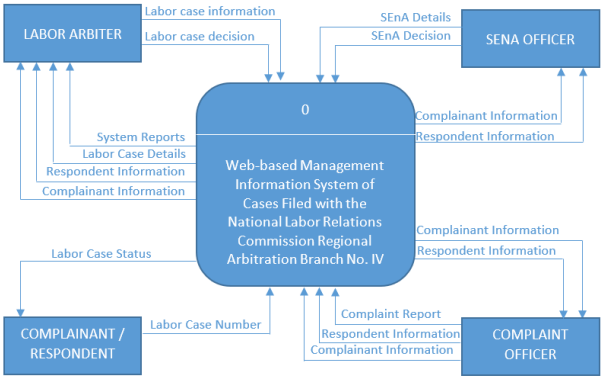

Figure 4: The context diagram of the developed system

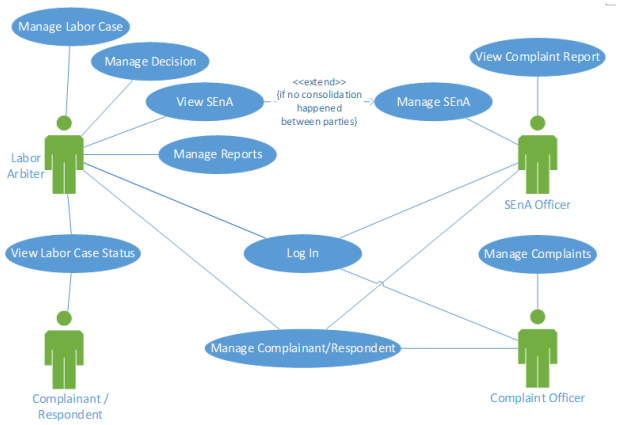

Figure 5: The use-case diagram of the developed system

The requirements for the web-based management information system were drawn from the encountered problems in the Commission's daily operations that were gathered through the interview. The researcher designed a data flow diagram, use-case diagram, and entity relationship diagram that determined the system's flow and the structure of the database utilized by the system. The researcher also utilized and maximized the use of Software Development Tools (SDT) to develop the system. The developed system aimed to improve the daily operations of the Commission, specifically in managing records properly.

The system provided access to different user levels: Complaint officers, SEnA officers, labor arbiters, labor arbitration associates and the executive labor arbiter, and the complainants and respondents. The system provided complainants and complaints management for complaint officers, SEnA management for SEnA

officers, report generation for labor arbitration associates, and case management for labor arbiters. Generated reports of the system were provided in portable document format (PDF). This generation was done to view, print, or save the report for future use. Fig. 6 shows the Complaints folder page.

Figure 6: Complaints folder page

Complaints Folder provides the list of all filed complaints registered and stored by a complaint officer of the Commission. Complaints Folder page displays all the complaints and to whom each complaint was assigned. The assignment of a complaint is the role of the complaint officer. The complaints folder page addressed the situation of gathering complainant's information and the type of complaint they are filing against the respondent. This feature also addressed a better way of distributing a complaint to a SEnA officer by selecting an officer who will administer the SEnA, providing all gathered information upon transferring. Fig. 7 shows the SEnA page.

Figure 7: SEnA page

SEnA page provides the list of all SEnA handled by the administering SEnA officer. The assignment of SEnA is the role of the complaint officer. This feature addressed the managing of complaints that were transferred to a SEnA officer. It allowed the SEnA officer to manage all SEnA assigned by the complaint officer. Fig. 8 shows the Case Maintenance page.

Figure 8: Case maintenance page

The Case Maintenance page provides the list of all cases and the logged user's actions to each of the filed case records. Cases are viewed and filtered by the office. That means cases that fall under the logged labor arbiter's office, or labor arbitration associate, are the displayed cases on the case maintenance page. The Case

Maintenance page allowed the labor arbiters to easily view all details related to the filed labor cases they are handling. Case status could be changed from time to time by the labor arbiter, providing details from the minutes of the past hearing meeting. Fig. 9 shows a sample of a generated report in a PDF file.

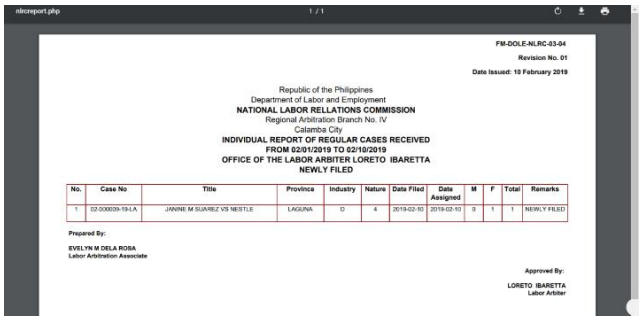

Figure 9: A generated report in a PDF file format

The Reports Generation page provides access to generate necessary reports needed by the Commission in PDF format. Only the ELA, labor arbiters, and labor arbitration associates can generate reports. The logged user could choose a report type of regular or Overseas Filipino Workers (OFW) cases and choose a remark needed. As per the Commission's report on the main office, each report shall be by remark or status of the case. Fig. 10 shows the Status Tracking System.

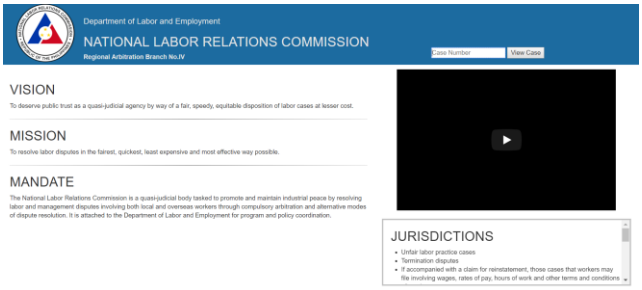

Figure 10: Complainants and respondents use the case status tracking system

The status case tracking system provided a way of addressing issues on spending time, effort, and money by visiting the office for an inquiry on the update of the filed complaint. This tracking system provided information for people living far away from the Commission to be updated on their filed complaint with less effort.

3.3 Data Privacy Act of 2012 of the Philippines Integrity Ensured on the Developed Web-based Management Information System

The system used PHP's PASSWORD_HASH method to secure the passwords of all user accounts on the system. PASSWORD_HASH method creates a 64-character hashed string that changes every time the same word is hashed. PASSWORD_HASH method is the safest and more secure method of hashing as there are no ways to decrypt the method compared to the other hashing methods such as md5 and sha1.

The Exclusive OR (XOR) Cipher Algorithm was also used that applied information encryption to secure the records, specifically the names of both complainants and respondents. XOR Cipher Algorithm is one of the cipher algorithms that is difficult to be decrypted without knowing the key used in encryption, allowing this algorithm to be secure.

This method and algorithm were used to ensure data integrity and security in the system as per the Data Privacy Act of 2012 [5].

ALGORITHM 1: XOR Cipher Algorithm

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name ←*complainant's* or respondent's name

xorKey ← encryption key

nCtr ← 0

charInName ← every character in the *name*

charInKey← every character in *key*

for *each* *nameChar* ***in*** *charInName*, **do**

for *each* *keyChar* ***in*** *charInKey*, **do**

name[*nCtr*] ← *nameChar* ^ *keyChar*

end

nCtr ← *nCtr* + 1

end

return *name*

3.4 System Acceptability Using Standard Web Evaluation Criteria

Its intended users and experts evaluated the developed web-based management information system of cases to measure the system's acceptability [6]. The acceptability of the system was measured into three groups: Quality, Usability, and Satisfaction models. The quality model was measured through accuracy, accessibility, appropriateness, efficiency, confidentiality, availability, portability, and recoverability. The usability model was measured through navigation and interactivity. The satisfaction model was measured through layout, information, and connection. The system's acceptability was evaluated as perceived by the intended end-users and experts in IT.

3.4.1 IT Experts. The evaluation's overall result as perceived by the experts was 4.27 with a descriptive interpretation of *Very Good*. It shows that the system provided quality data for the users and the system will improve the daily operations of the Commission upon the implementation of the system, and shows that the experts were satisfied with how the data was presented and displayed on the system but suggested and commented on the system's layout itself.

Table 1: Overall Summary of the Respondents Rating as Perceived by IT Experts to the System

Item	Mean	Interpretation
Quality	4.20	Very Good
Usability	4.42	Very Good
Satifaction	4.19	Very Good
Total Mean	**4.27**	**Very Good**

3.4.2 End-Users. The system evaluation's overall result as perceived by end-users was 4.43 with a descriptive interpretation of *Very Good*. It shows that end-users were satisfied with how data were presented in the system and how data were presented clearly, displaying what data were needed.

Table 2: Overall Summary of the Respondents Rating as Perceived by End-Useres to the System

Item	Mean	Interpretation
Quality	4.42	Very Good
Usability	4.50	Excellent
Satifaction	4.38	Very Good
Total Mean	**4.43**	**Very Good**

4 Conclusions

In summary, the researcher has performed phases of the software development methodology to deliver the system's functionalities following the Commission's data. The system addressed the Commission's problems and issues in managing records of complaints, SEnA, and proper labor cases. The system ensured that the database's information was encrypted and was only accessible by a specific office. The system was evaluated by experts and its intended users and received a descriptive rating of *Very Good*, which presents that the system performed its functionalities, presented information as needed, provided good navigation, and was accepted by both experts and its intended users.

5 Recommendations

The following recommendations were drawn considering the findings and the conclusion of the study. They can be used by future researchers in the field of Information Technology or Information Systems who want to develop the same kind of study:

1. Provide additional printable documents that include documents such as the mailing to both complainants and respondents.
2. Complete the Agile software development methodology phases, continuing up to release, track, and monitor phase to finish the cycle.
3. Develop a further study that would identify the impact of using a web-based management system in a government agency.

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