



Research Paper

Implementation of a mail management application at the Provincial Assembly of North Ubangi, Democratic Republic of Congo, with a view to creating a modern, computerized, and secure administration

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Abstract

The purpose of this study is to modernize and increase the efficiency of the Administrative Secretariat of the Provincial Assembly of North Ubangi in the Democratic Republic of Congo. This involves designing a management application to set up a database for mail management, automate data and document searches, develop a user-friendly interface for data entry and recording, secure access to data via passwords, and reduce mail processing time. This research used MERISE, PERT, historical, descriptive, and documentary techniques, as well as observation and interviews. This investigation enabled the institution to have a centralized database, ensuring fast and efficient searching of archived mail, automating the process, thereby reducing the error rate when filling out and recording documents, facilitating the management and traceability of institutional exchanges through the digitization of mail, securing data through controlled access, ensuring the confidentiality and integrity of administrative information, and to set up a user-friendly interface, optimizing the use of the system and promoting the adoption of the new tool by administrative staff.

Keywords: Application, management, correspondence, assembly, provincial, North Ubangi, DRC

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I. Introduction

Mail and correspondence management is a strategic issue within political institutions. In an environment where information exchange is vital for guiding decision-making, it is essential to have an effective system for processing, organizing, and tracking correspondence (Ries, 1991).

These shortcomings hamper administrative efficiency and create an excessive workload for employees. Therefore, implementing a suitable digital solution would modernize the institutional document management system, optimize the speed and traceability of administrative exchanges, secure information, and structure the flow of mail (Calay, 2019).

However, advances in information and communication technology have demonstrated the positive impact of digitization on institutional performance. In light of these challenges, this study aims to propose the implementation of an electronic mail management application (EMM) to optimize the processing of administrative documents, facilitate their retrieval, and ensure their traceability (Bolaty, 2021).

The Provincial Assembly of North Ubangi, faced with exponential growth in the volume of administrative documents, is struggling to maintain smooth and secure management of its correspondence. The lack of a suitable IT tool has many consequences, including delays in processing, potential errors, and sometimes the loss of documents.

This institution faces several major challenges, including delays in processing administrative correspondence, which is due to manual mail management; difficulties in tracking and tracing documents; a high risk of loss and duplication in physical files; and problems with the circulation of information between departments.

The overall objective of this research is to modernize and increase the efficiency of the Administrative Secretariat of the Provincial Assembly of North Ubangi in the Democratic Republic of Congo.

Specifically, it aims to design a management application to set up a database for mail management, automate data and document searches, develop a user-friendly interface for data entry and recording, secure access to data via passwords, and reduce mail processing time.

II. Materials And Methods

Environment

The Provincial Assembly of North Ubangi is based in Gbadolite, the capital of North Ubangi Province in the Democratic Republic of Congo. Its administrative building is temporarily located at 53 Mobutu Boulevard, in the former Coca-Cola concession. This enabled the design of a computer project. An HP Probook computer was used to model the various diagrams and install the application, as well as for the internet connection. A Tecno SPARK 10 phone was used to install the application.

The geographical coordinates are between 4° 16' 41" North Latitude and 21° 00' 18" East Longitude, 300 m and 500 m above sea level. The city of Gbadolite has a tropical climate with an average rainfall of 200 mm per month; and annual rainfall can reach 1,500 mm (Ngbangu et al, 2024).

The city of Gbadolite has a hot and humid climate characterized by alternating heat throughout the year. Rainfall is unevenly distributed throughout the year, with an annual average of 1,600 mm (Molongo et al, 2022).

The city enjoys a tropical climate, with two alternating seasons: the dry season, which lasts from mid-November to mid-March of the following year, and the rainy season, which lasts from mid-March to mid-November of the same year. The soil covering the town hall of Gbadolite is generally sandy clay and very fertile for all crops, both industrial and food crops. The terrain consists of plateaus, hills, and wooded savannas to the south, with a large virgin forest known as the equatorial forest forming its border with Mobayi Mbongo, whose lowlands are occupied by rivers (Molongo, 2022).

Methods

This study used MERISE, PERT, historical, descriptive, and documentary techniques, as well as observation and interviews (Nemiché, 2013). The MERISE method was used to model and structure the development of the application in connection with relational databases (such as MySQL, PostgreSQL, or Oracle) and languages such as PHP for web interfaces. The Unified Process associated with object-oriented languages such as Java, C#, or Python based on the UML language was used and helped us to ensure a methodical and adaptable design, limiting the risks associated with functional changes and guaranteeing the sustainability of the software.

The PERT method was essential in ensuring that deadlines were met and optimizing the sequence of activities, while improving coordination between the different stages of the project (source). The historical method provided us with a comprehensive and essential perspective for understanding the issues and challenges associated with the transition to computerized mail management, and the descriptive method was adopted to accurately document the current state and provide factual data justifying the implementation of a digital solution (Kubicki, 2006).

The Clinical Method ensured alignment between the proposed solution and institutional requirements, taking into account operational constraints and user habits (Bonnefond, 2017).

With regard to data production, documentary research was used to understand the legislative and organizational frameworks governing mail management in public administrations. Direct observation provided a realistic insight into operational challenges, highlighting the internal dynamics of mail management, as mentioned on the website <https://localhost:4200/dashboard>, which is typical of an application developed with Angular, a TypeScript-based frontend framework, implying that the frontend is probably in Angular, and the backend could be in Node.js, Java (Spring Boot), or C# (.NET Core). The interview consisted of discussions with institutional stakeholders, which allowed us to directly involve end users, ensuring better acceptance and integration of the future application, the product of our research.

The clarification consisted of using a few concepts and notions, including:

- (i) Web: a system of public web pages interconnected via the Internet, literally meaning "spider's web",
- (ii) HTTPS: Hypertext Transfer Protocol Secure (Akamai) is a security protocol that encrypts communication between your browser and a website. It makes the connection secure, protecting sensitive information such as passwords or credit card details from interception,

- (iii) Org: is short for “organization.” In the context of the Internet, it generally refers to the .org domain name extension,
- (iv) Hotmail: was one of the first webmail services, launched in 1996 and acquired by Microsoft. It is now integrated into Outlook.com,
- (v) Gmail.com: is the domain name used by Google for its email service, called Gmail. It refers to the server address that receives and sends emails, and is an integral part of any Gmail email address (e.g., utilisateur@gmail.com),
- (vi) MySQL: Database Service is a fully managed database service for deploying cloud-native applications using the open database,
- (vii) PostgreSQL: also known as Postgres, is a relational and object database management system,
- (viii) Oracle: specializes in databases and cloud solutions,
- (ix) PHP: is a free scripting language, specially designed for web development, which runs on the server side to create dynamic web pages.

II. Results And Discussion

Results

This study was conducted with the collaboration of information systems analysts, designers, and programmers, and the various results obtained are presented in the figures below.

User authentication

Figure 1 illustrates the procedure followed by Provincial Assembly agents to authenticate themselves before accessing the software menu.



Figure 1: User authentication

The interface allows members of the Permanent Bureau to access the dashboard, as well as secretariat staff to register, modify, or delete correspondence.

Submission of correspondence by visitors

Figure 2 shows the interface for visitors, allowing them to submit correspondence remotely to the Provincial Assembly of North Ubangi.

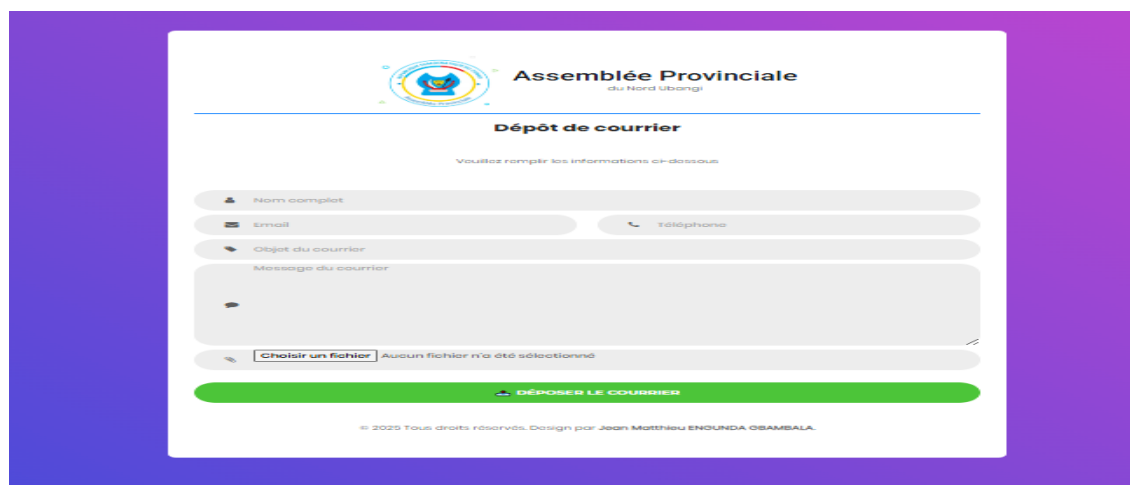


Figure 2: Mail deposit by visitors

This figure illustrates the option available to visitors to deposit their mail remotely when the application is deployed online. This facilitates the management of deposits by Provincial Assembly agents, while also integrating mail delivered directly by visitors.

Application home page

The application dashboard poster is shown in Figure 3.

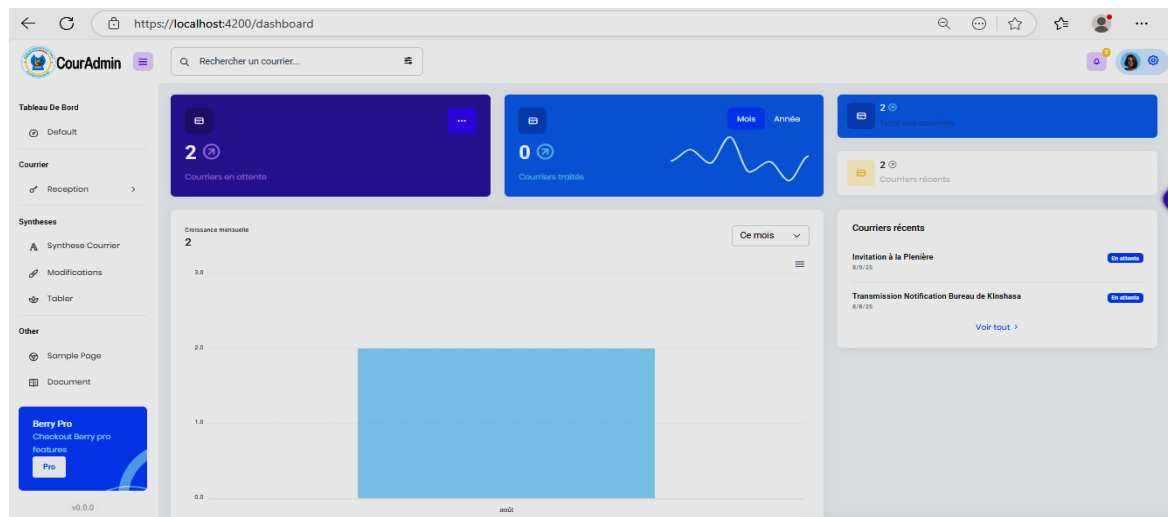


Figure 3: Application home page

This interface serves as a dashboard and allows users to search for letters already stored on the server, register new letters, view the number of letters processed during the day, and modify or delete received letters.

Screen interface for the secretary

The screen interface for the secretary to register mail is shown in Figure 4.

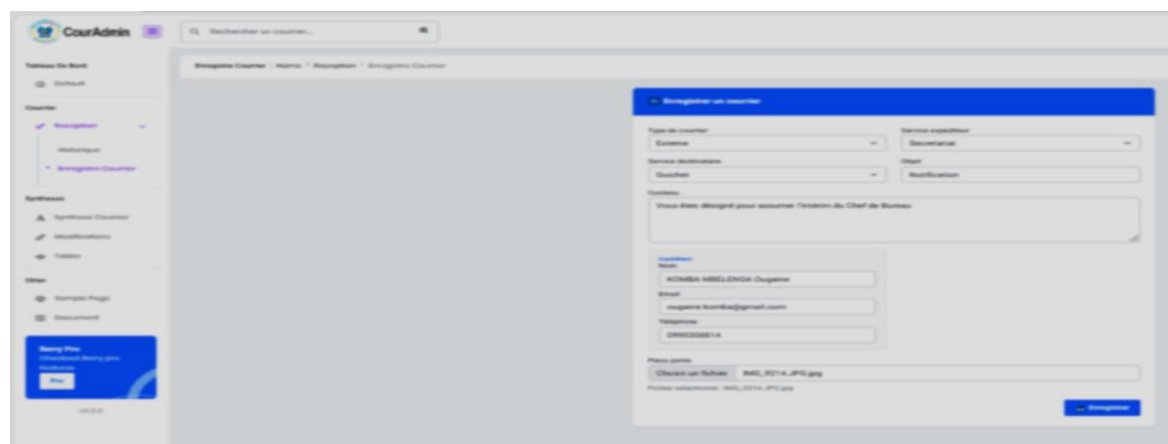


Figure 4: Registering correspondence

It was observed that the interface allows the secretary to register new correspondence as soon as it is received.

Annotations on correspondence by the Honorable President or Chief of Staff

Figure 5 shows a screenshot illustrating how members of the Permanent Bureau of the Provincial Assembly annotate letters received.

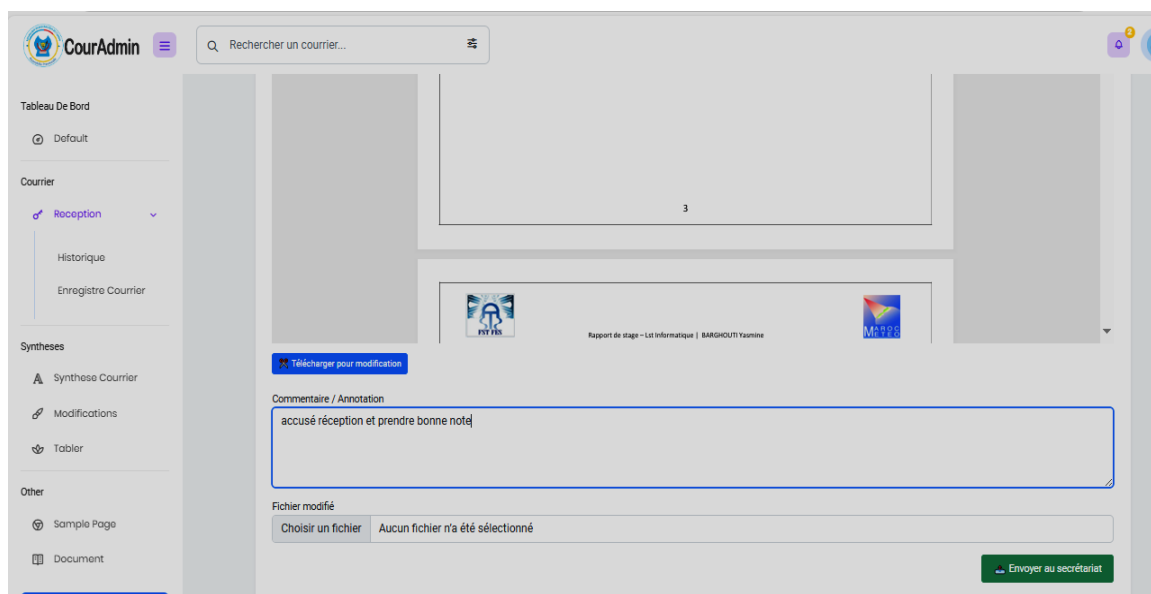


Figure 5: Annotation of letters by the Honorable President or Chief of Staff

This figure shows that the software interface allows the President of the Assembly, or his or her acting representative, to add annotations to letters. It can also be used by the Chief of Staff to forward documents to the appropriate advisors.

Summary of letters at the end of the day

Figure 6 shows a summary of the letters received during the day.

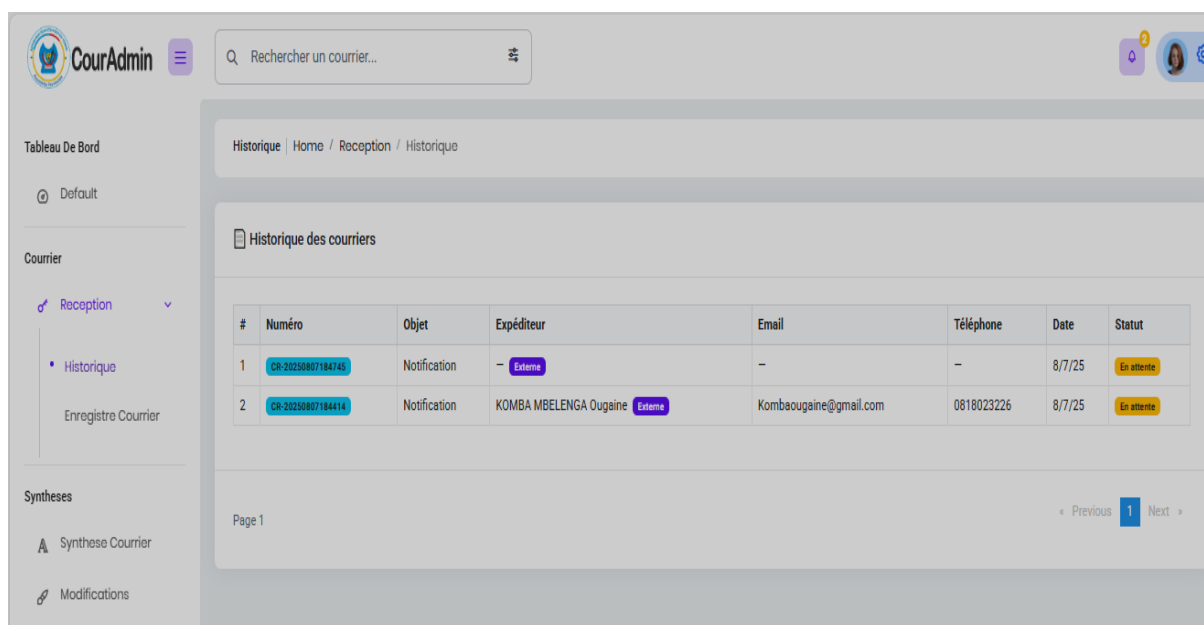


Figure 6: Summary of mail at the end of the day

This figure provides a summary showing the number of items of mail received and the number of items processed at the end of the day.

Searching for mail stored in the database

The search bar for finding a letter by name is shown in Figure 7.

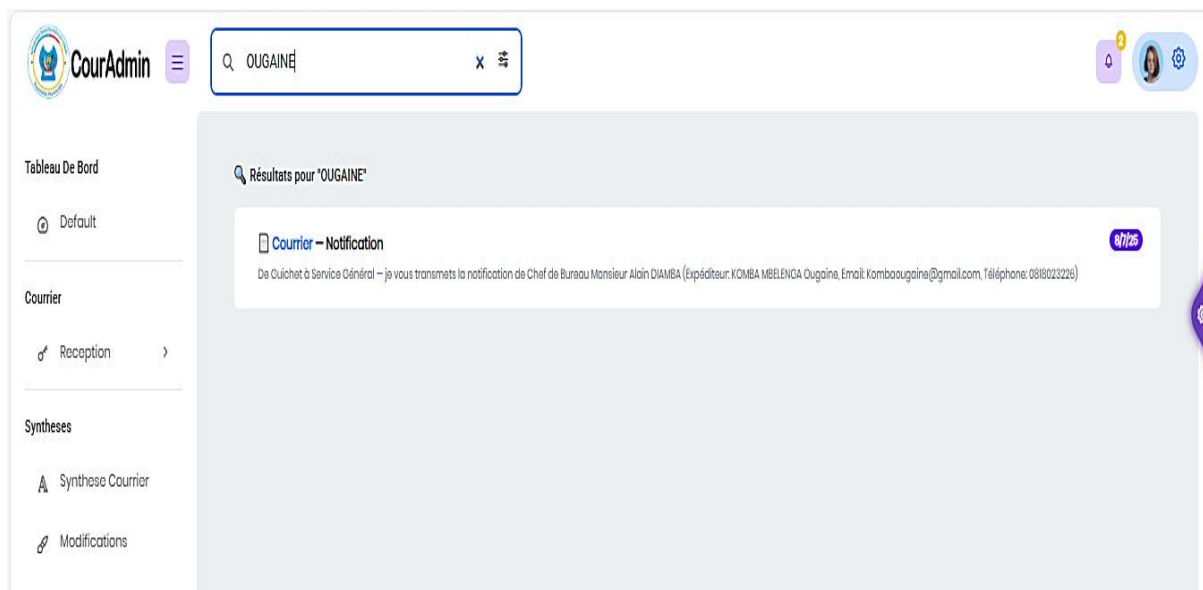


Figure 7: Searching for registered mail in the database

This figure illustrates the mail search function. It eliminates the need to manually consult filing cabinets, as it is sufficient to search by name or by the content recorded when the mail was deposited.

IV. Discussion

The aim of this research is to modernize and increase the efficiency of the Administrative Secretariat of the Provincial Assembly of North Ubangi in the Democratic Republic of Congo.

Bellon et al. (2024) demonstrated the impact of computerization in modern administrations. Today, information technology is a cross-disciplinary field that influences virtually all sectors of society, whether social, economic, legal, or administrative. Its evolution has enabled institutions to modernize their internal processes, improve their efficiency, and strengthen the organization of their work.

However, despite technological advances and the adoption of digital solutions by several administrations, some institutions, including the Provincial Assembly of North Ubangi, continue to manage their mail manually. This practice leads to many of the operational difficulties mentioned above (Ouboumlik & Ouazzani, 2024).

Manual mail management in an institution as strategic as the Provincial Assembly of North Ubangi poses several major problems, including a high volume of documents processed manually, as each piece of mail requires manual registration, which increases the workload and slows down the administrative process. An increased risk of errors in the preparation and transmission of documents, including typos, duplicates, or omissions, which can affect decision-making and the reliability of information (Leta, 2025).

A laborious and slow search for archived letters, in this case the absence of an organized database, complicates the location of documents and slows down administrative procedures. A growing difficulty in storing paper letters, in particular the excessive accumulation of documents, makes archive management complex and exposes the institution to regular losses of essential information (to be discussed).

These administrative shortcomings directly affect the quality of employees' work and undermine the overall efficiency of the administration. In light of these findings, it is imperative to reform the mail management system by adopting a suitable digital solution, an electronic mail management application that can speed up mail processing, reduce administrative delays, improve document traceability and archiving through a centralized database, ensure better security for the institution's sensitive information, and automate repetitive tasks, allowing staff to focus on higher value-added tasks (to be discussed) (Tapsoba, 2017).

V. Conclusion

The purpose of this study is to implement a mail management application at the Provincial Assembly of North Ubangi, contributing to the improvement of incoming and outgoing mail management within this provincial political institution. The aim is to replace manual mail processing with an efficient and secure digital solution.

The specific objectives pursued were to set up a database for managing the mail of the Provincial Assembly of North Ubangi; automate data and document searches; develop a user-friendly data entry interface; secure access to data with passwords; reduce the time spent on manual tasks; and improve the quality of service provided to the public.

The results of this research led to a solution that enabled the institution to:

- Have a centralized database, ensuring fast and efficient searching of archived mail,
- Automate the process, thereby reducing the error rate when filling out and recording documents,
- Facilitate the management and traceability of institutional exchanges through the digitization of correspondence,
- Secure data through controlled access, ensuring the confidentiality and integrity of administrative information,
- Implement a user-friendly interface, optimizing the use of the system and promoting the adoption of the new tool by administrative staff.

Based on the modeling carried out, we can confirm that the objectives of our study, as previously defined, have been achieved thanks to a well-structured scientific and technical approach. This approach has resulted in an innovative solution, adapted to the realities of public administration. The application developed represents a strategic lever for improving traceability, speed, and efficiency in mail processing, while contributing to a sustainable digital transformation.

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