

Designing a microsoft access-based administration letters and archives system at BPJS of employment regional office of East Java

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Abstract: The role of technology in an institution is beneficial for any activities, especially in managing documents administration, which is now most of the company used digital archive systems. That's because the manual archive system is considered less effective and efficient, where it takes a lot of space and time to search for document archives. Microsoft Access is a windows-based database processing program with Visual Basic for Application (VBA), commonly used to create a windows-based application. The purpose of this paper is to make an administration letter and archives system based on Microsoft Access. The results of this design have passed the trial process for approximately two weeks and received a positive response. The system design can be run well, and its functions correctly without errors. So it can help the secretary or other employees to manage all documents (letters and archives) more accessible and faster.

Keywords: microsoft access, VBA, letters administration, digital archive, database

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Introduction

Following technological advances globally, information technology has become a basic necessity for every individual and institution in carrying out their daily activities. In this situation, mathematics has made its contribution. Various applications and programs on computers can't be separated from applications of mathematics. For example, discrete mathematics is used as the foundation of computer science. One of them is the presentation of a database that uses concepts from mathematical relations [1].

The role of technology requires the institution to have an information system that can support the management to make decisions for its progress and prosperity. Implementing an institution's information system is beneficial for any activities, especially in managing the institution's letters and archives administration, such as using computer technology to support correspondence management activities and information management. Changing data from existing letters into the correct quality information will help company leaders make the right decisions. It also has an impact on work activities. Computers have many programs that can make it easier for employees of institutions to complete their work. One of them is Microsoft Access, which can simplify employees' work in managing computer-based data [2] [3].

There has been much research that designed a program based on Microsoft Access. For example, research by Safria Bintahir [4] design a sales system for PT Mitra Sukses Batam, and research by Fauzi Akbari and Bambang Seopeno [5], who design a sales system for CV. Mega Prima Mandiri Mojosari. The two studies above have similarities that develop a Microsoft Access-based sales system with the VBA programming language. The advantage of the system designed in the study is to make it easier for sellers to record their sales. In addition to using Microsoft Access, the seller no longer need to install any additional application to run this system.

In addition to the two studies above, research uses Microsoft Access to design a library information system conducted by Amiruddin Nahlah [6]. This research aims to manage information, book borrowing, book collection and book transactions in the library using Data Flow Diagram (DFD) as an overview of the system. The advantages of using this DFD is that the required data flow can be described in detail. Still, this system has a drawback: the absence of physical flow that occurs so that there will potentially be a condition of data redundancy in the system. Further research conducted by Hengki Tamando Sitohang [7] where research makes a web-based archiving system, the advantages of the system made in the study are to facilitate its users in managing mail data the web-based system has a more accessible look. It has the flexibility of an operating system where the system is made can be run both on desktop and mobile. But the shortcomings of the web-based system made in the study are the need for an internet connection to run it. This web-based system can be an obstacle if the system's intended area has a poor internet connection, making it less efficient. It will further hinder the user's work. Also, web-based systems have a low-security level, such as system users' unprotected sensitive data properly. Risk of essential components of the database can be stolen. Finally, web-based systems often do redirect or forward to other websites that direct users to phishing/malware [8].

In this research case study, The BPJS of employment is an institution that also has a secretarial and archival sub-section. In this sub-section, incoming, outgoing, and other letters still use the manual method. This manual method system is considered ineffective because it takes a long time to search for letters. Besides that, poor management and storage will make the letters be scattered and wasted. Based on this background, the author is interested in creating a mail management system based on Microsoft Access. Due to the ease in setting up an operating system where users do not need to install applications and incur additional costs because every computer that has Microsoft Office software certainly also has Microsoft Access. Also, Microsoft Access-based systems have a higher level of data security, which is very important for BPJS Employment because both corporate data and personal data of BPJS users are mandatory to be protected confidentially. The system made is expected to solve the problem, so it is expected that the management of mail data can be done more effectively and efficiently without reducing the data security of BPJS companies.

Letters and Archives

Letters are essential for an institution because every institution is still communicating using letters to obtain or send information. Letters are long-distance communication tools between people/institutions using written language and a piece of paper [9]. Letters can also be defined as written information, which needs specific requirements applicable in correspondence procedures [10]. According to the Great Dictionary of the Indonesian Language, another definition of a letter is a script that can mean a letter or a letter's contents. In a broader sense, the letter is written, printed, or visual information that still has uses as information for the people or an institution [11] [12].

The International Standard Organization (ISO) states that archives are information stored in various forms, including data on computers, created or received and managed by organizations and people in business transactions and store as evidence of activity [13]. According to The Georgia Archives, it is summarized and collected to be accessed and used [14].

Archives for an institution are one of the most important supporting elements for operational activities. From libraries, authentic information and data can be obtained quickly and accurately. One of the functions of the archive is as a tool for storing letters [15]. In general, there are two types of archives:

1. Manual Archives

Manual archives are stored and still managed in the paper, CD, or another physical form (manually). The manual archives system is less popular because many institutions have started implementing paperless office programs and digital archives [3].

2. Digital Archives

It is an archives management with electronic media in the system or application made explicitly by the institution. Many benefits can be obtained using digital archives; here are some of the benefits of a digital archive system [15] [16] [17]:

- a. The digital archives system is easy to process, research, and present the required information.
 - b. The digital archives system didn't need a lot of saving place.
 - c. The digital archives system is easy to do back-up files.
 - d. The digital archives system is fast and efficient for access and does a data distribution.
- Other than benefits, digital archives also have some drawbacks [18]:
- a. The cost of creating a digital system is relatively expensive.
 - b. The possibility of file corruption without any indication, such as a server affected by computer viruses or a personal error that accidentally deletes the file permanently.
- But it can be solved by the selection of software devices and restrictions on system access.

Concept of Relations in Information Technology

The contribution of mathematics is substantial in building and developing information technology and computers because [19]:

1. Mathematics knows the science of logic, which in information technology and computers was created as the basis of programming.
2. Programming languages in information technology and computers use binary numbers, i.e., 1 and 0, and their operations use mathematical algebra operations.
3. Application of Boolean algebra in electrical circuits, which is a mathematical science
4. Basic hardware and software development
5. Basic development and determination of bits in the computer
6. Basic application and development of network programming

Discrete mathematics is a branch of mathematics that deals with everything that is discrete objects. Discrete mathematics plays a lot in the development of information technology. One example is the concept of relations and functions in discrete mathematics, which has a role in databases. This relationship is an application of the n-array procedures and relations concept [1].

In discrete mathematics, a function is related to the requirement that each domain area's value leads precisely one value of the result area. Meanwhile, the n-array relation is a relation that connects more than two sets. For example, there are sets $A_1, A_2, A_3, \dots, A_n$, then the n-array relation R from the sets is a subset of $A_1, A_2, A_3, \dots, A_n$, or it can be written as $R \subseteq A_1, A_2, A_3, \dots, A_n$ where the sets $A_1, A_2, A_3, \dots, A_n$ is called the origin or domain area, while n is called the degree [1].

Database

The database is data from collecting files that have a relationship between one file and another file to form unity data to inform an institution [20]. The database is similar to a library that stores many books from different categories. One book stores various data involving book title, author name, content summary, publisher, year of publication, etc. In the mid-1960s, computer storage emerged with computer storage equipment, and data management was also introduced during this period. Database storage technology has improved significantly for an institution's benefit [21].

The database can also be defined as collecting data or information consisting of one or more tables related to one another and systematically and systematically, making it easy to access a computer program to obtain data information. The computer program used to manage or create this database is called a database management system (DBMS), for example, Microsoft Access, Microsoft SQL Server, Oracle, MySQL, PostgreSQL, Sybase, etc. A DBMS makes it possible for users to create, read, update and delete data in a database [21] [22] [23]. Meanwhile, according to Simarmata et al., the database contains essential information by the organization/ institution/ company [24]. In the database, there are three components [25]:

1. Data is a record or collection of facts.
2. A field is a group or category of data.
3. Record is a collection of data fields.

Methodology

Microsoft Access and Visual Basic for Applications

Currently, computers have provided programs that make it easier for employees to complete their work; one of them is Microsoft Access. Microsoft Access is a windows-based database processing program issued by Microsoft Office. The various facilities provided by Microsoft Access will help create and present data in the form of important information that is accurate and efficient. Microsoft Access can work with earlier popular database systems such as dBase, Microsoft SQL Server, Oracle, MySQL, PostgreSQL, etc. [24] [25].

One of Microsoft Access's advantages from a programmer's perspective is its compatibility with the programming language, Structured Query Language (SQL); queries can be viewed and edited as SQL statements. SQL statements can be used directly in VBA. In Microsoft Access, programming adds functionality to the database using Visual Basic for Applications (VBA). VBA is a software released by Microsoft company. VBA lets adding automation and other functionality to Microsoft, which programmers generally use to create windows-based applications. For example, adding a command button to the form that, when clicked, opens the report [21] [26]. Microsoft Access and VBA is the right combination that can make a database processing system that is easy, accurate, and efficient.

Method of Collecting Data

In this research, the authors designed an administration letter system based on Microsoft Access 2016. The data used is secondary data with the data collection techniques below:

1. Observation
Collecting data by direct observation on the object of research. In this case, the authors directly collect letters data, arranges letters, and archives them manually.
2. Interview
Collecting data by interviews with people who can provide information related to the issues. In this case, the authors collect data by consultation with the secretary and archival employees of the BPJS employment Regional Office of East Java.

Design the System

Identification of Problems

This administration letter system's model is made from the BPJS of employment Regional Office of East Java problems, hoping to facilitate existing employees. These problems are the ineffective management of letters or storage in the archives, which causes some letters to be scattered and difficult to find back—the inefficient data collection of letters is done manually.

Choosing a Programming Language

In designing this administration letter system, the Microsoft Access 2016 program is used, equipped with Visual Basic for Application.

Application Design

1. Analysis of data collection
The data needed are employee data and samples of incoming letters, outgoing letters, internal memos, and warrants of the BPJS employment Regional Office of East Java.
2. Design of login page
The login page is beneficial for the initial display when opening the administration letter system. On this page, there will be two possible users who will log in. First, the secretary/archive, and second is employees, where both have differences when entering the next page.
3. Design of the home page
The home page is designed to be visible after logging in. There are three types of scripts on this page, first the script for the button to the letter menu page, second, the script for the letter report page, and last, the script for the log out button. The authors will provide a hand when the username log is an employee for the letter page button. The letter menu button

will be locked. When the login username is a secretary/archive, the letter menu button will be open.

4. Design of letter input and edit page
The letter input and edit page is designed following the data from the letter of the BPJS of employment Regional Office of East Java
5. Design of letter report page
The letter design's report page displays the primary data of the letter and attachments of the letter that the secretary/archives have inputted. This page can be accessed both by secretaries/archives and employees of other sections.
6. Creating a startup page
The startup page is designed to set what facilities and page will appear first, so the page will determine whether the system can be run or not. In this system, the authors will use the login page as a startup.

Design Testing

After the system design is complete, then the results of the invention are tested. At this stage, the system is tested whether it can function properly or it has an error. The testing technique is used in the test scenarios provided by the BPJS employment Regional Office of East Java.

Results and Discussions

System Design Result

Login Page

The login page is used for the initial display when opening the administrative letter system. There will be two possible users who will log in on this page, first the secretary/archive and second the other employees, where both of them have differences when entering the next page. The display for this login page is shown in Figure 1.

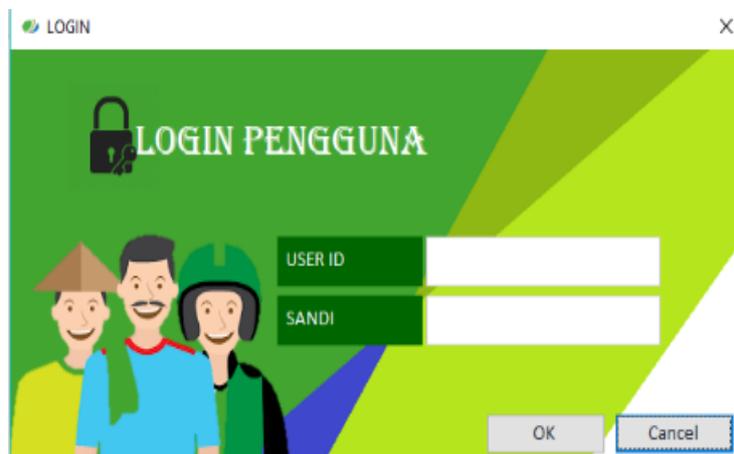


Figure 1. Display of login page

Home Page for Secretary/Archive and Employees

The home page is used for the display that will be seen after logging in. In this form, the secretary/ archive and other employees will have a different page design. For secretary/ archives, all menu buttons will open and have full access to the system. In contrast, other employees don't have full access to this system. The letter menu button will be locked, so only the secretary/ archive can process the letter data.

1. Home Page Views for Secretary/ Archive
The Home page display for the secretary/ archive is shown in Figure 2, where all buttons are unlocked, so the secretary/ archive has full access to this system.



Figure 2. Display of home page for secretary/archive

2. Home Page Views for Employees

Home page display for employees shown in Figure 3, where the letter menu button is locked, means that employees other than secretary/ archives cannot add/ subtract/ edit the letter's contents already in the system.



Figure 3. Display of home page for employees

Administrative Letter System Page

Display the administrative letter system page shown in Figure 4, where this view can only be seen or accessed by the secretary/ archive before processing existing letter data.



Figure 4. Display of administrative page

Enter and Edit Letter Page

This page is used for inputting or adding letter data as well as editing data that already exists in a letter that has been previously inputted. This page consists of incoming letter pages, outgoing letter pages, internal memo pages, and warrant pages. Each display is shown in Figure 5, Figure 6, Figure 7, and Figure 8.

Figure 5. Display of entering/ editing incoming letter page

Figure 6. Display of entering/ editing outgoing letter page

Figure 7. Display of entering/ editing internal memo page

Figure 8. Display of entering/ editing warrant letter page

Report Letter Page

The report letter page is designed to display letter data that has been stored in the database. Secretaries/archives and employees can access this letter report page. In this administrative letter system, there is 4 page according to the types of the letter; they are the incoming letter page report, the outgoing letter page report, the internal memo page report, and the warrant page report. Each display of the letter report page is shown in Figure 9, Figure 10, Figure 11, and Figure 12.



NO.	No. dan tgl Agenda	Pengirim	Lampiran	Nomor, tanggal Surat	Disposisi Kepala Unit Kerja	Perihal	Pemroses	Lampiran File
1	00001 04 01 2019	Kantor Pusat BPJS Ketenagakerjaan	1 berkas	B/25237/122018 31 12 2018	Bagian Umum & SDM	Feedback Laporan Pelaksanaan Kegiatan Coaching di BPJSTK Th.2018 dan Permintaan Data Pelaksanaan Kegiatan Coaching	Deputi Direktur Wilayah	D:\Sistem Manajemen Surat\kno ns\contoh surat.pdf
2	00002 04 01 2019	Kantor Cabang Karimunjawa		B/29819/122018 29 12 2018	Kepala Bidang Umum & SDM	Permohonan Koreksi Upah	Bidang Umum & SDM	

Figure 9. Display of incoming letter report page



NO.	nomor Surat	Tanggal Surat	Nomor Surat	Dari	Perihal	Kepada	Klasifikasi	Lampiran File
1	00001	08-01-2018	B/25237/122018	Kantor Wilayah Jawa Timur	Breakdown Target Kepesertaan dan Iuran Tahun 2019	All Kacab & KCP	KP.02.06	

Figure 10. Display of outgoing letter report page



NO.	nomor Surat	Tanggal Surat	Dari	Perihal	Tujuan	Klasifikasi	Lampiran File
1	00001	07-01-2018	Bidang Umum & SDM	Pengadaan Kupon BBM	Deputi Direktur Wilayah	KP.02.06	
2	00002	08-01-2019	Bidang Umum & SDM	Penggantian Ban Mobil Toyota Fortuner W 1211 SH	Deputi Direktur Wilayah	KP.02.06	

Figure 11. Display of internal memo report page



NO.	nomor Surat	Tanggal Surat	Dari	Perihal	Kepada	Klasifikasi	Lampiran File
1	00001	08-01-2018	Bidang Umum & SDM	Pertemuan Teknis Bidang Keuangan dan TI BPJS Ketenagakerjaan Kantor Wilayah Jawa Timur	Bidang Umum & SDM	KP.02.06	

Figure 12. Display of Warrant Report Page

System Design Testing

The system design will be tested using the test scenario that BPJS has made of the employment Regional Office of East Java. So it can be seen whether the system created can function properly or has an error. BPJS will create the testing scenario by following the following testing procedure:

1. Test the login page
Testing this login page is a valuable test to test whether the login page works according to the username data that has been created or not, where the username is designed differently for the secretary and employees of other divisions.
2. Test the home page
When the home page opens, it determines whether the previous login page works according to the username created. For the home page secretary, all access button for all letter editing will be active. Also, home page testing is used to test whether all existing buttons will move to a page that matches its function when pressed.
3. Test letter menu pages and letter recaps
Similarly, when testing the home page, testing for the letter menu page is done to test whether all existing letter menu buttons will move to the corresponding letter page when pressed. The letter recap button is tested to whether all the data entered in the database has been stored correctly in the letter recap or missing. The letter recap button is also tested whether the attachment button functions correctly in displaying scans of the original letter.
4. Test letter input
Testing letter input is done by trying to insert some new letter data and inserting letter's attachments in the form of scans to be known if the system managed to save new data or cause errors.

The system testing results are shown in Table 1.

Table 1. System Testing Result

Testing page	System status	Testing scenario	Testing result
Login	The login page is open	Enter username and password data	the main page opens according to the entered username and password
Home	The home page is opened with the secretary/archive username	Clicking the letter menu button, report letter, log out	<ol style="list-style-type: none"> 1. After clicking the letter menu button, the page moves to the administrative letter page 2. After clicking the report letter button, the page displays all report letters 3. After clicking the log out button, the page moves back to the login menu
Administration letter	The administrative letter page opens	Clicking the incoming/outgoing letter/internal memo button/warrant letter button and report letter button	<ol style="list-style-type: none"> 1. After clicking the incoming/outgoing/internal/memo/warrant letter button, the page moves to the incoming/outgoing/internal memo/warrant letter input page. 2. After clicking the report letter button, the page displays all report letters

Letter input	Form of input incoming/outgoing/internal memo/ warrant letter is already open	Enter letter data/edit letter data	The system managed to save letter data into the database
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The table above indicates that all pages in this administration letter system can run and function properly without any errors. The login page test shows that the data was entered to match with the database, and there is no error. This system design is practical because it can run by Microsoft Access under Microsoft Office without installing additional software. Although this system design can be run and functions well, there are still shortcomings. This application is not yet integrated with the scanner machines system, so to develop further this system design, adding a connection system to the scanner application automatically, so it will make the job easier and more efficient. Also, for the following similar application research, the suggestions are (a) need to know the application well, so that the application can fit its function and purpose; (b) in making an application, it is designed not only using Microsoft Access but with Php or MySQL, so that the final product results can be converted into an executable format to be installed on the computer.

User Experience

In this study, the authors only engaged 12 respondents to provide feedback on implementing the system that has been created. The number of respondents is only 12 people representing each division in the BPJS employment office of the East Java region. This respondent includes the region's deputy director, secretary, archival officer, regional examiner officer, and other divisions (each one person in each division). In this case, the author used an exploratory interview to gather feedback from the respondents, namely by asking some questions about the system that has been tested for approximately two weeks, including:

1. Do respondents like the system that has been created?
2. Has the system been made more efficient in making it easier for respondents to search letter and archives?
3. Is the system made more efficient in saving time to record and search letter and archives?

From the exploratory interview, 10 respondents stated that they liked the system design because it is easier and faster to search for letters and archives. Only 2 respondents stated that they do not like the system design that has been created. The reason is that respondents do not understand how to operate the system. This is understandable because both respondents are older than the ten respondents who like the design, both people are less accustomed to technology, so it takes more effort to learn the new system. Also, both respondents are familiar with the existing manual system.

Conclusion

The design administration letter and archives systems based on Microsoft Access have been created and proven to function properly from the test scenario results. The trial process of this system design shows that the output and process results match expectations and function well without any errors. This system design has passed the trial use process for approximately two weeks and received positive responses from the BPJS employees. A positive response from users was shown by 10 of 12 respondents expressing their love for this system design. This is because This system design can manage all existing letters and archives easier and faster for secretaries even though other employees in BPJS of employment Regional Office of East Java.

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