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A Web Based E-Archives Information System Design in Universitas PGRI Yogyakarta

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Abstract. Overloaded space and the inefficiency of document finding are the weakness of the academic archive system in Universitas PGRI Yogyakarta (UPY). Drawing upon the background, this study attempts to design an academic e-archive information system in UPY. This study aims to generate a digital archive information system using Microsoft Solution Framework (MSF) with Oriented Development (OOD) approach assisted by UML (Unified Modeling Language) tools. The Web-based e-archive designed at UPY provides convenience and security in terms of academic document storage as well as the efficiency of data searching.

Keywords: e-archive, MSF, UML, OOD

1. Introduction

   Archive management has a crucial role in the sustainability of an institution. Optimal archive management in an agency will be very helpful in determining an institutional policy and make a major contribution to the development of the institution [1]. Archive management properly and correctly allows employees to effectively process storage and retrieval of a document. In line with the statement, the Regulation of the Minister of Research, Technology and Higher Education Number 59 of 2018 requires every tertiary institution to prepare itself by making improvements, especially regarding student data at Directorate General of Higher Education Database (PDDIKTI).

Academic documents such as certificates, academic transcripts, and diploma supplements (SKPI) issued by higher education institutions must be necessarily archived in digital form. It is mandatory for every higher education institution. Therefore, Academic Administration Bureau of Universitas PGRI Yogyakarta (BAAk UPY) initiates the transformation form manual archiving to digital archiving. Currently, BAAk UPY uses manual archiving by storing the printed academic documents in a special storage room. Based on the retrieved data from BAAk, 13 data or 48,15% were recorded in the form of soft file (semi digital) and 14 or 51,85% were in the form on hard file (printed) as shown in Table 1.

Table 1 Academic Administration Bureau Data

No	File Name	Type of Document
1	Surat Keterangan Berhenti Kuliah / Mengundurkan Diri (Letter of course withdrawal)	soft file
2	Surat Keterangan Pindah Kuliah (Letter of Course Transfer)	soft file
3	Surat Cuti (Letter of Leave)	soft file
4	Surat Keterangan Aktif Kembali (Letter of Student Activation)	soft file
5	Surat Keterangan Lulus (Letter of Graduation)	soft file
6	Surat Keterangan Ijazah (confirmation letter of certificate) / Akta Mengajar (teaching certificate)/ Transkrip Akademik Yang Hilang / Rusak (confirmation letter of missing/damaged academic transcript)	soft file
7	Surat Keterangan Verifikasi Ijazah Verification letter of certificate	soft file
8	Surat Ijin Belajar Mahasiswa Asing (Foreign Student Study Permit)	soft file
9	Surat Keterangan Pengantar Ke LLDIKTI (Confirmation letter for LLDIKTI)	soft file
10	Surat Keterangan Pendamping Ijazah (SKPI) (Diploma Supplement)	soft file
11	Ijazah (Certificate of Graduation)	soft file
12	Transkrip (Academic Transcript)	soft file
13	Sertifikat Cumlaude (Certificate of Cumlaude)	soft file
14	Buku Wisuda (Graduation Book)	hard file
15	Buku Pedoman Akademik (Academic Guidebook)	hard file

No	File Name	Type of Document
16	Buku Bimbingan Akademik (Academic Supervision Book)	hard file
17	Buku Pedoman Penulisan Skripsi (Student Paper Guidebook)	hard file
18	Buku Pedoman Penulisan Tesis (Thesis Guidebook)	hard file
19	Buku Pedoman SKPI (Diploma Supplement Guidebook)	hard file
20	Buku Pedoman Akademik Pasca (Academic Guidebook for Postgraduate)	hard file
21	Kalender Akademik (Academic Calendar)	hard file
22	Buku Rekap Data Mahasiswa (Student Record Book)	hard file
23	Buku Daftar Lulusan (Graduates Book)	hard file
24	Buku Data Jumlah Mahasiswa (Number of Student Data Book)	hard file
25	Berkas Mahasiswa (Student Files)	hard file
26	Sertifikat Akreditasi Universitas Dan Program Studi (Certificate of Accreditation)	soft file
27	Surat Keputusan Akreditasi Universitas Dan Program Studi (Letter of Accreditation)	soft file

The ineffectiveness of the manual method includes limited space in terms of providing a cupboard or cabinet filling, the need for funds for photocopying, and purchasing expensive equipment. Along with the development of information systems, archiving is designed using computers where this system does not require a large area and does not require expensive costs. As a consequence of the old storage method, several files in the form of photocopies of certificates were damaged due to poor storage. Another disadvantage of the old method of data storage is the difficulty in finding data when the data is needed, especially the old one.

Based on the above constraints, this study is intended to create an information system that is able to overcome the problems. Additionally, this study is in line with the Regulation of the Ministry of Research, Technology and Higher Education no 59 [2]. The information system was developed to facilitate the academic staffs to access the archives needed in Universitas PGRI Yogyakarta.

This system was developed on a web base where the server was placed locally in BAAk. The design of this information system is adjusted to the needs of each section based on multi-user. However, the rights to access the system remains limited.

2. Method.

The research method of this study used the Microsoft Solution Framework (MSF). MSF is an application design and development method introduced by Microsoft. The system approach method used is object oriented development (OOD), namely the development of software / applications based on objects that exist in the real world. Generally, this method uses a tool, namely UML (Unified Modeling language). The data analysis method is the most decisive step in this study, the data analysis used includes the following stages:

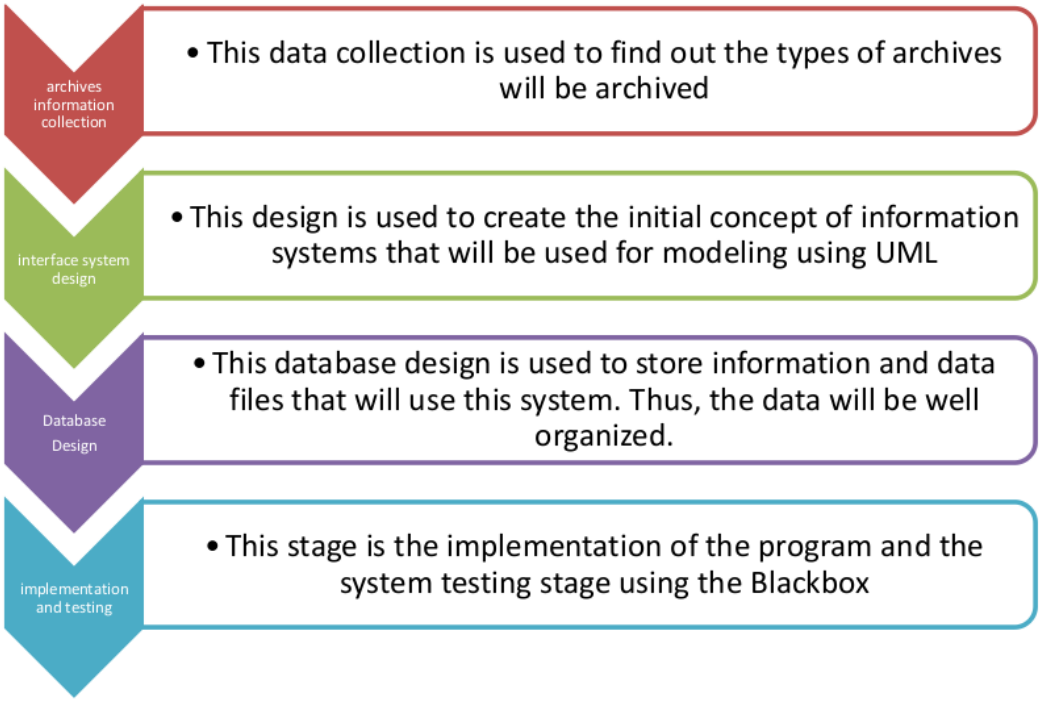

Figure 1 Research Stage

2.1.Data Collecting Technique

The data collection method in this study includes:

a. Observation

The method was carried out by direct observation of the object under study. The object is a digital archive that will be archived.

b. Interview

This method was carried out by direct interviews with the parties involved in this study. Interviews were conducted with archive users in an academic setting.

c. Questionnaire

This method was done by providing a questionnaire to system users to determine the quality level of the system that has been created.

2.1.Instrument for Data Collecting

a. Digital Data Checklist

The checklist in this study is used to measure the readiness of the system being developed in

Table 2

Table 2. Checklist Grid

No	Aspek
1	Jenis File
2	Bentuk File
3	Ukuran file

b. Alpha Testing

This checklist includes several aspects and is used to determine the quality of the system that has been developed.

Table 3. 4 Alpha Testing Questionnaire Grid

No	Aspects	Items
1	View	2
2	Content	1
3	Navigation Menu	2

4	Usage	2
5	Process	2

3. Result and Discussion

3.1.System Requirements Design

This research was conducted from April to June 2020 by compiling questions or the needs to develop an E-Archive system. The results of the system requirements being developed are in the following details:

1. Admin menu
2. User menu
3. User manage menu
4. Access rights menu
5. Uppload data menu
6. Data criteria menu

From the above requirements, a data flow diagram is made, here is a data flow diagram

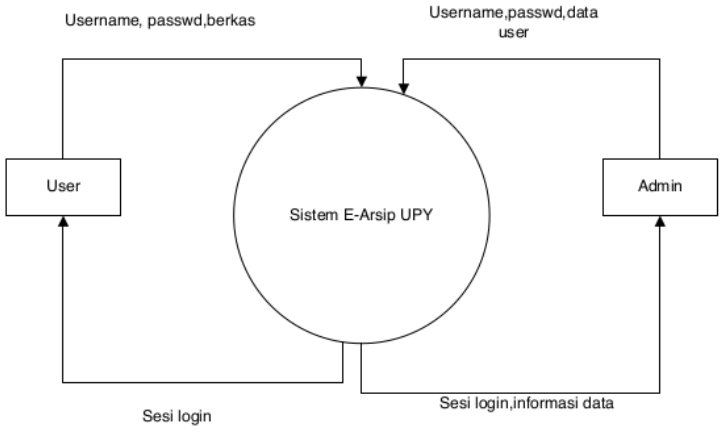

Figure 3.1 DAD Context

The diagram above illustrates that the system consists of two entities, namely user and admin in which the user only has access to upload data, while in the admin menu, there are several access rights that can access all menus including creating a user, setting user access rights, viewing data, uploading data. From the context diagram above, the system was translated into a level 1 data flow diagram as follows:

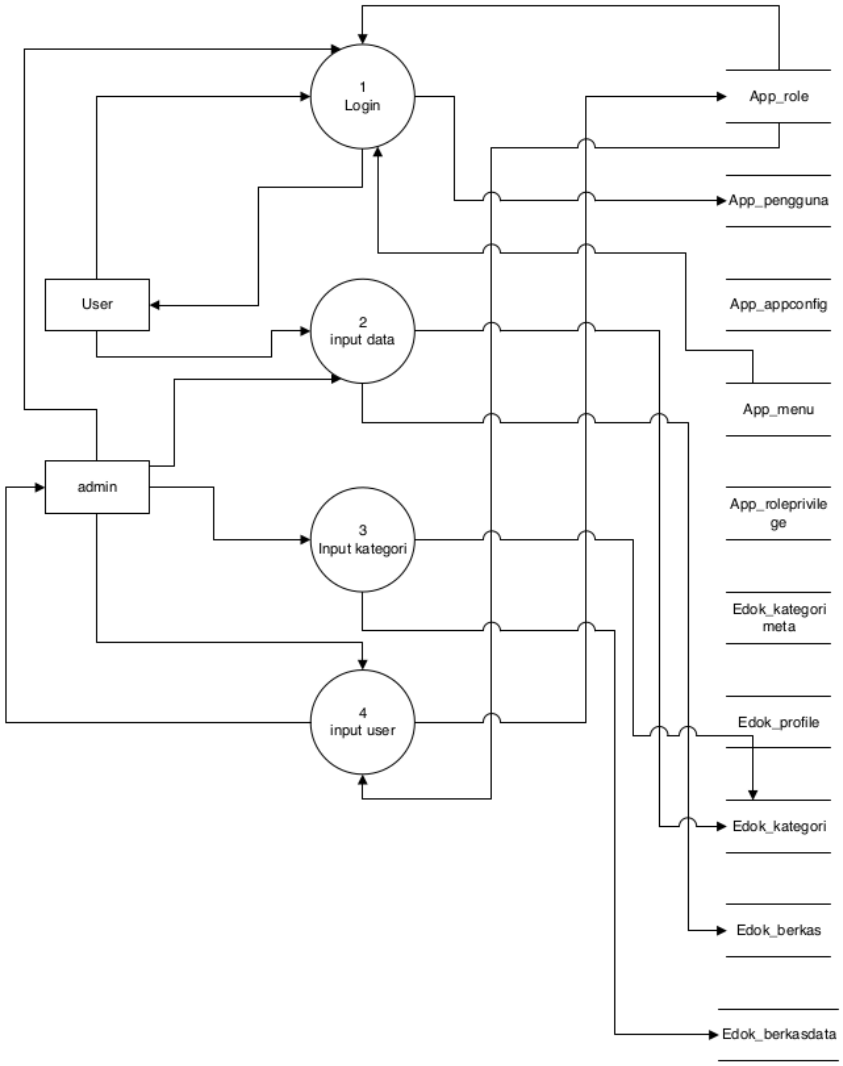

Figure 3.2 DAD Level 1

The image above is a more detailed description of the process flow on the system to be developed where users can only add data to upload files. User settings are carried out by the admin, the admin here acts as a controller of all users and the admin can set any menus that can appear on the user page.

3.2 Interface Design

The next step is to make a system design, namely by making a system interface design; here is the system interface design:

1. **Login Page Design**

   This page is used as the initial door or gateway to enter the E-Archive system

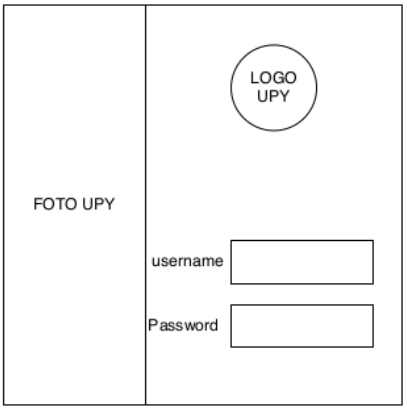

Figure 3.3 Login Page

Pada halaman ini didesain muncul pertama kali ketika user akan mengakses sistem, user harus memasukkan username dan password. Jika username dan password sudah sesuai maka pengguna akan masuk kedalam sistem, namun bila tidak sesuai maka akan muncul keterangan kesalahan username atau password.

This page is designed to appear the first time a user accesses the system, the user must type a username and password. If the username and password are correct, the user will enter the system, if they are incorrect, a username or password error will appear.

2. **Admin start page design**

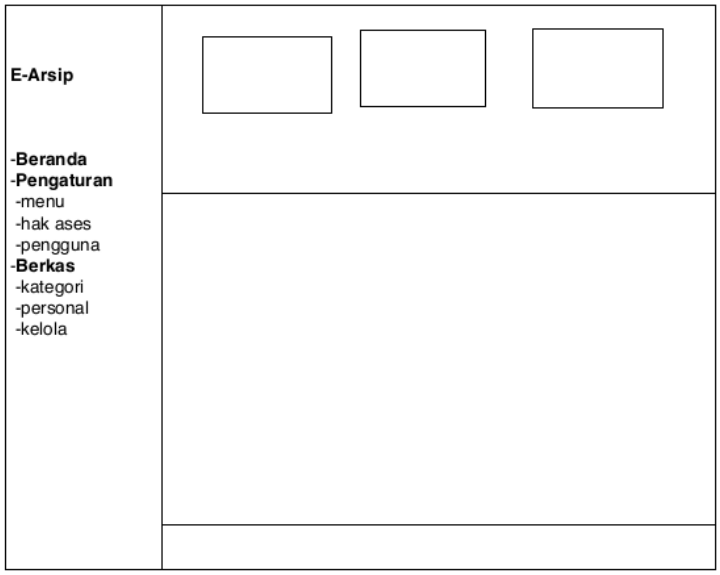

Figure 3.4 Admin Page

3. Setting Page Design

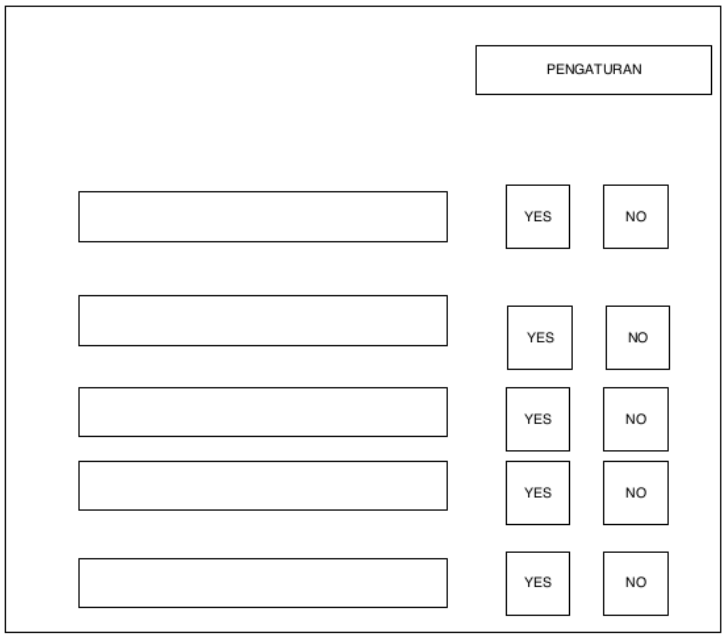

Figure 3.5 Setting Page

4. Access Rights Setting Page Design

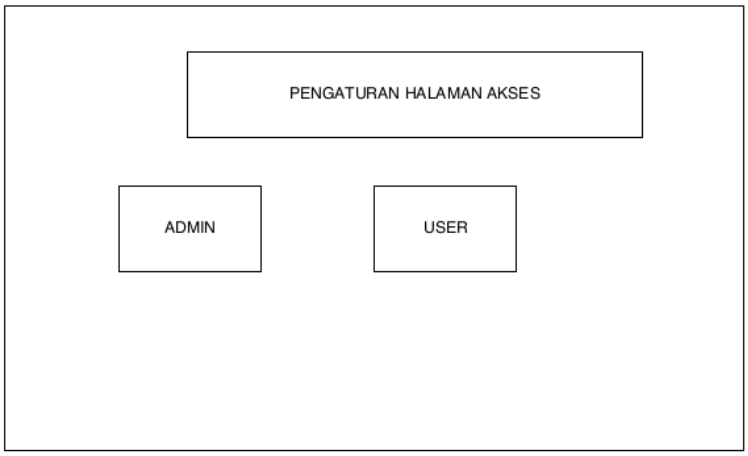

Figure 3.6 Access Rights Setting

The design of the interface on the access rights settings is used by the admin to set the menu for users and the admin has full access rights to the system. Meanwhile, user permissions can only view and upload files.

5. User Page Design

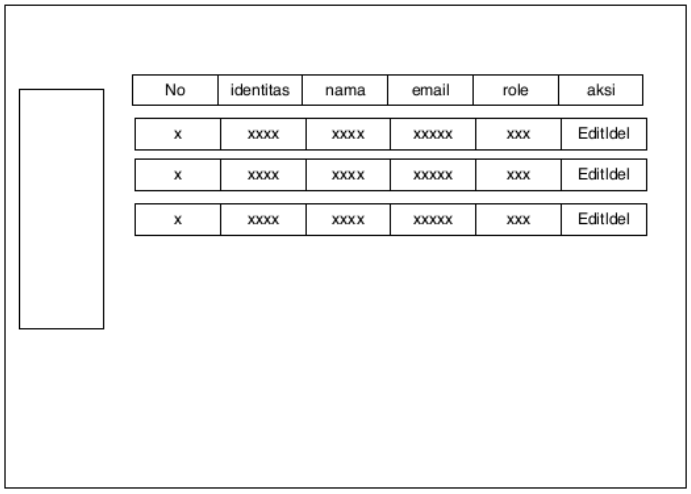

Figure 3.7 User Page

3.3. Database Design

3.3.1 Table Design

ini adalah langkah untuk membuat database dan table yang akan digunakan dalam sistem E-Arsip UPY. Table-table tersebut akan digunakan untuk menyimpan data dan file uppload. Berikut adalah nama-nama table yang digunakan dalam pembuatan sistem.

Table design is the process to create databases and tables that is used in the UPY E-Archive system. The tables will be used to store data and upload files. The following tables are the names of the tables used in the system creation.

Table 3. 1 Table App_role

Field	*Type*	*Size*	*Atribut*
Role_id	Integer	10	Primary key
Role_code	Varchar	25	
Role_desc	Varchar	50	

Table 3. 2 Table edok_kategorimeta

Field	*Type*	*Size*	*Atribut*
Kategorimeta_id	integer	11	Primary key
Kategorimeta_kode	varchar	50	
Kategorimeta_label	varchar	255	
Kategorimeta_deskripsi	Varchar	255	

Table 3. 3Table app_config

Field	*Type*	*Size*	*Atribut*
Appconfig_id	integer	11	Primary key
Appconfig_name	varchar	255	
Appconfig_desc	varchar	255	
Appconfig_key	Varchar	255	
Appconfig_value	Varchar	400	
Appconfig_type	Enum		

Table 3. 4Table edok_berkas

Field	*Type*	*Size*	*Atribut*
Berkas_id	integer	11	Primary key
Profil_id	Integer	11	
Kategori_id	Integer	11	
Berkas_hash	Varchar	255	
Berkas_nama	Varchar	255	
Berkas_mimetype	Varchar	255	
Berkas_ukuran	Decimal	10.0	
Berkas_syscreate	Datetime		
Berkas_sysupdate	Datetime		
Pengguna_idlast	Integer	11	

Table 3. 5Table app_roleprivilege

Field	*Type*	*Size*	*Atribut*
Roleprivilege_id	integer	11	Primary key
Role_id	Integer	11	
Menu_id	Integer	11	
Roleprivilege_isshow	Enum	T,f	

Table 3. 6Table edok_profil

Field	*Type*	*Size*	*Atribut*
Profil_id	integer	11	Primary key
Profil_identitas	Varchar	100	
Profil_nama	Varchar	255	
Profil_email	Varchar	100	
Profil_phone	Varchar	20	
Profil_flag	Varchar	20	

Table 3. 7Table app_pengguna

Field	*Type*	*Size*	*Atribut*
Pengguna_id	integer	11	Primary key
Profil_id	Integer	11	
Role_id	Integer	10	
Pengguna_username	Varchar	255	
Pengguna_password	Varchar	255	
Pengguna_nama	Varchar	255	
Pengguna_email	Varchar	255	
Pengguna_password_	Varchar	255	
Pengguna_status	Enum	F,T	
Pengguna_created	Datetime		

Pengguna_modified	Datetime		
Pengguna_lastlogin	datetime		

Table 3. 8Table edok_kategori

Field	*Type*	*Size*	*Atribut*
Kategori_id	integer	11	Primary key
Kategori_kode	Varchar	50	
Kategori_nama	Varchar	255	
Kategori_syscreate	Datetime		
Kategori_sysupdate	Datetime		
Pengguna_idlast	Integer	10	

Table 3. 9Table app_menu

Field	*Type*	*Size*	*Atribut*
Menu_id	Integer	11	Primary key
Menu_urutan	Integer	11	
Menu_kode	Varchar	255	
Menu_title	Varchar	255	
Menu_icon	Varchar	255	
Menu_link	Varchar	255	
Menu_idparent	Varchar	255	
Menu_status	Enum	Header,detail	

Table 3. 10Table edok_berkasdata

Field	*Type*	*Size*	*Atribut*
Berkasdata_id	integer	11	Primary key
Berkasdata_kode	Varchar	255	
Berkasdata_label	Varchar	255	
Berkasdata_isi	Text		
Berkasdata_syscreate	Datetime		

Berkasdata_sysupdate	Datetime		
Pengguna_idlast	Integer	11	

3.3.2 Relation Table

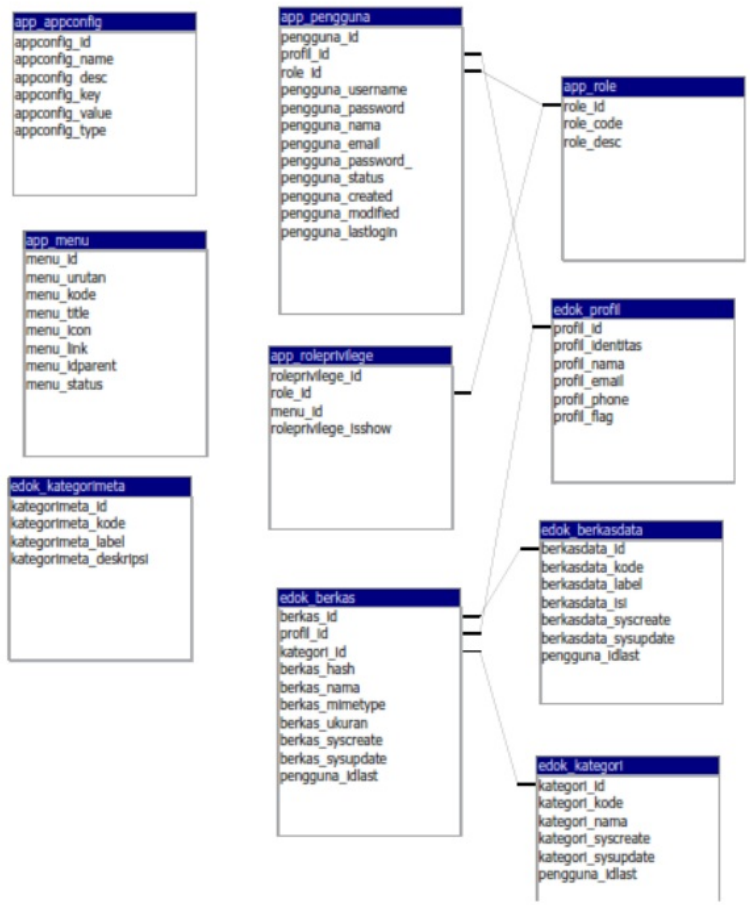

Figure 3.8 Relation Table

Table relations are relationships that occur in a table with the other tables that represent object relationships in the real world and function to regulate the operation of a database. The relationship aims to connect Table 1 with other tables, therefore, the table no longer stands alone and can be connected to one another so that it becomes a unit. The relationship between tables is also called normalization so that the table looks easy to navigate. The purpose of data relations is to emphasize data independence and to overcome inconsistencies and duplication of data.

3.4 System Implementation

System implementation is the stage where the system was created and transformed into a real application based on the results of the previous design so that the system is ready to be operated. Thus, it can be seen that the system that has been created can be used in accordance with the objectives of the design.

3.4.1 Login Page Implementation

Login means giving access rights to the following menus; therefore, each user has limitations in accessing the menu. The following figure is the implementation of the login page figure:

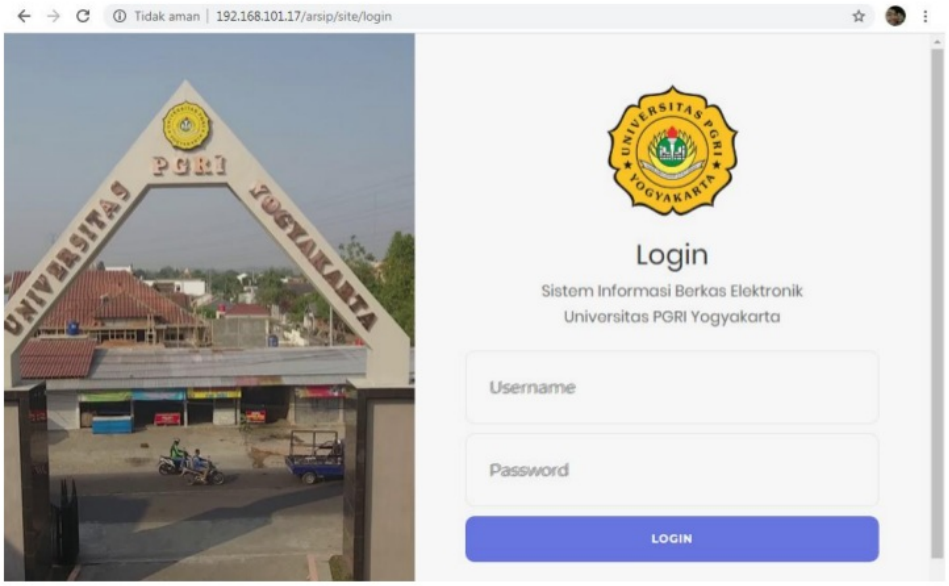

Figure 3.9 Login Page

3.4.2 Admin Page Implementation

The admin page was displayed for users who logged in as administrators, the page has several menus, including: settings menu, access menu, user roles menu, file menu, category menu, personal and archive. The following figure is the implementation of the admin page

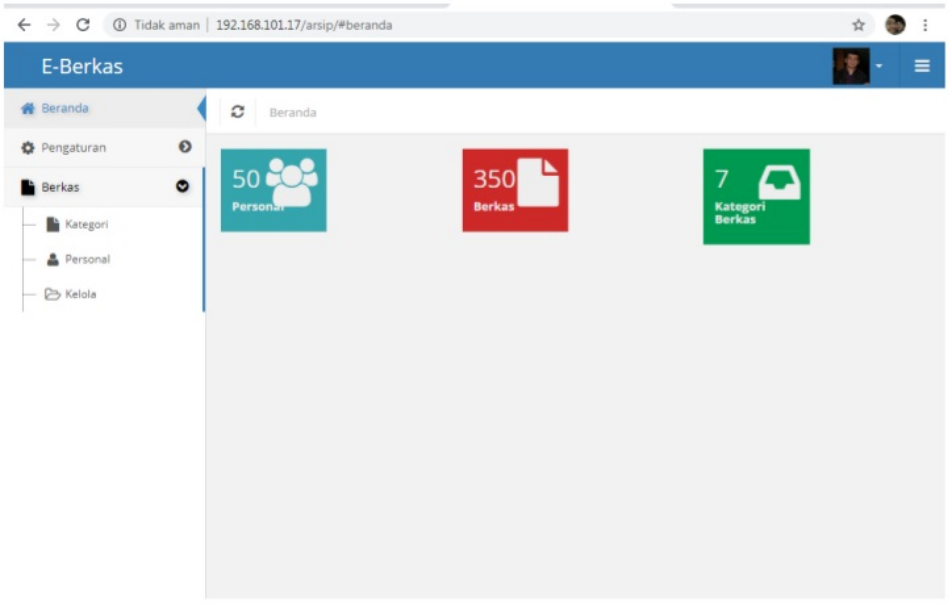

Figure 3.10 Admin Page

3.4.3 Menu Setting Page Implementation

This page is used by the administrator to manage what menus given to users who use the UPY E-Archive system. Some of the access menus include user permissions, file categories, personal and manage. The following figure is the display of the access settings page.

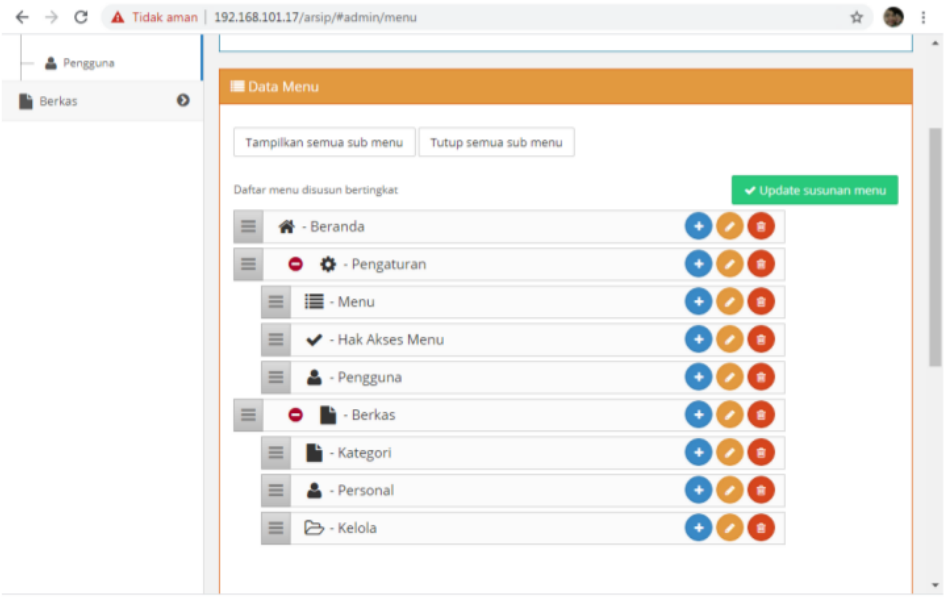

Figure 3.11. Menu Page

3.4.4 Access Rights Page Setting Implementation

This page is used by administrators to control user access to the system. Admin menu and user menu have different views; here is a view of access rights for administrators.

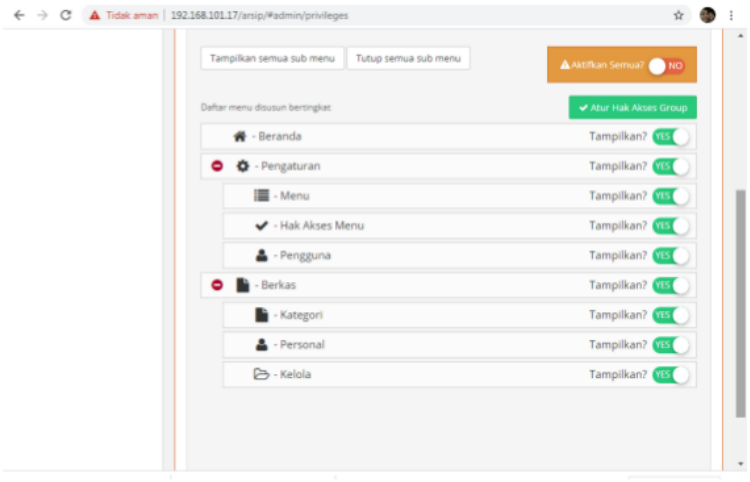

Figure 3.12. Access Page

3.4.4 User Page Implementation

This page is used by administrators to add new users and delete users who are no longer active. Here is the implementation of the user page

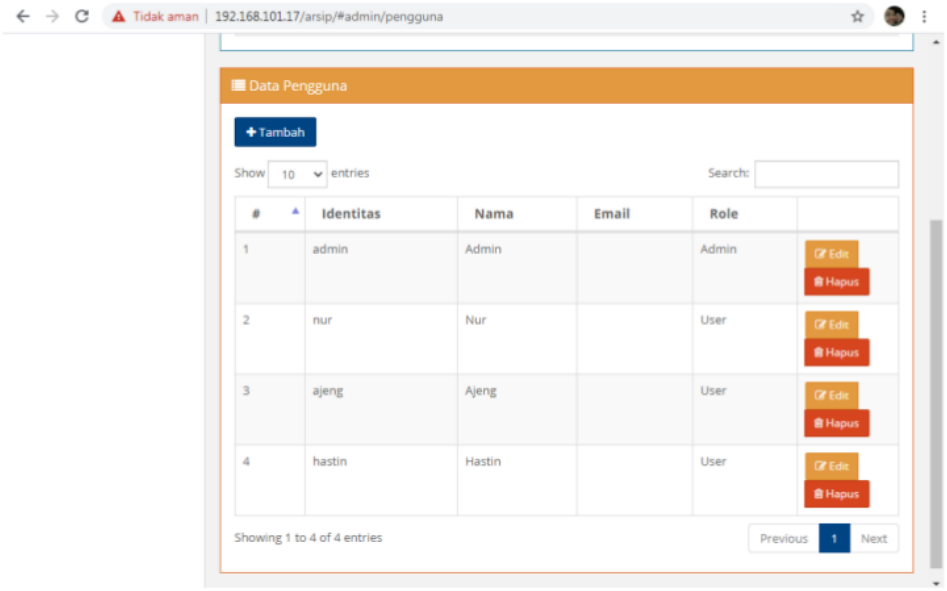

Figure 3.13. User Page

3.4.5 Category Page Implementation

This page is used by administrators to input categories of files to be stored in the UPY E-Archive, including: certificate of graduation, academic transcripts, SKPI, graduation letters. Here is the result of the category page implementation.

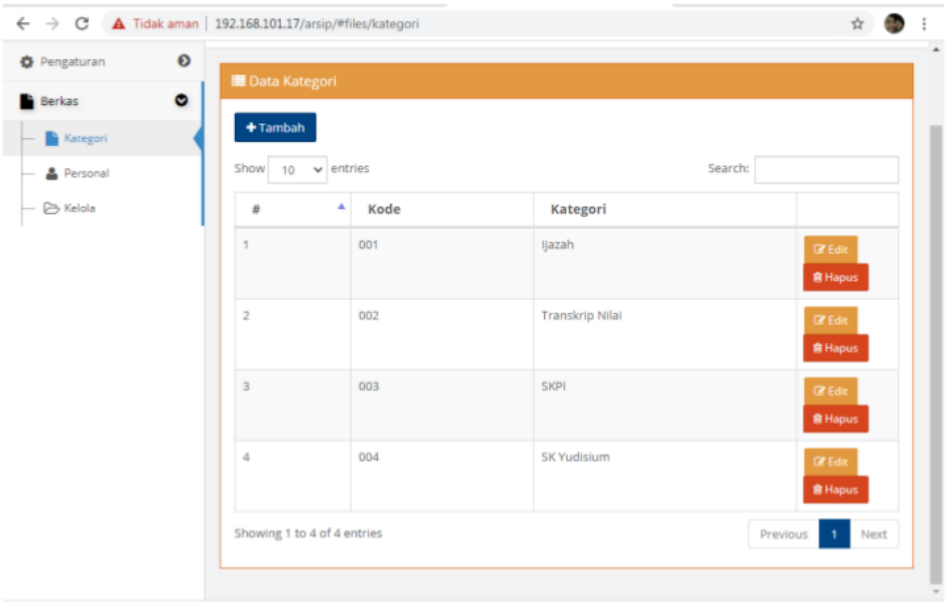

Figure 3.14. Category Page

3.4.6 Profile Page Implementation

This page can be accessed by administrators and users, this page aims to add students who have graduated and also letters that are uploaded. The following is the result of implementing the profile page.

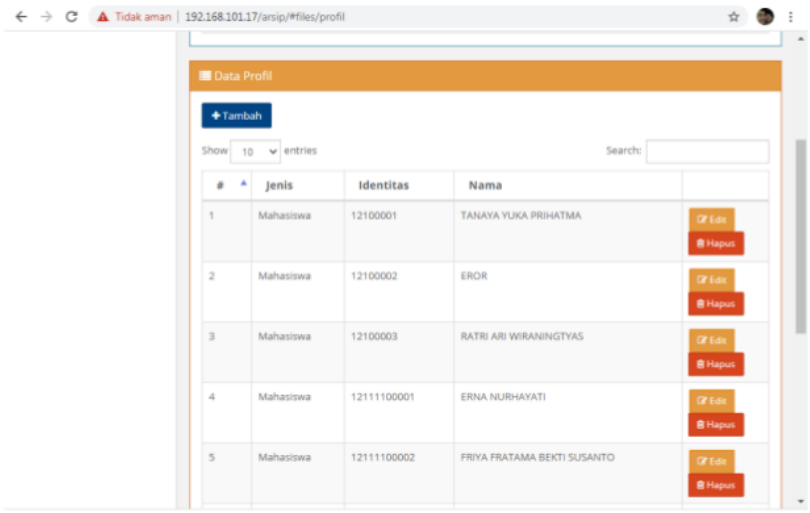

Figure 3.15. Profile Page

3.4.7 File Page Implementation

This page is used by the user to upload data according to the file name, as students can have more than one file. Here is the implementation of the file page.

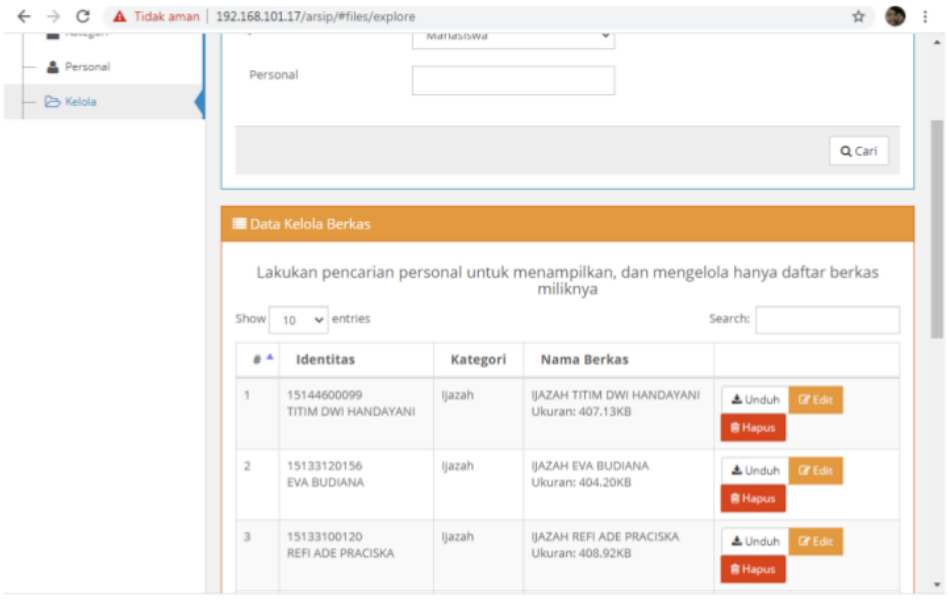

Figure 3.16. File Page

3.5. System Device Specifications

In order for the application to run properly, supporting devices are needed, one of the devices is a computer. Computers are devices that have components consisting of hardware and software. The two components cannot be separated from one another. The following are the specifications to make the application run properly.

a. Hardware

The minimum hardware specifications needed for this e-archive application are as follows:

1. Intel Pentium 4 2.8 GHZ or above
2. Memory (RAM) 512 MB
3. Free disk space capacity is better above 2 GB
4. Color monitor at least 14 inch
5. Memory (VGA) at least 64 MB
6. Keybord
7. Mouse
8. Speakers

b. Software

The minimum specifications of the software required in the process of building and operation of the application system as follows:

1. OS : Above Microsoft windows XP
2. Web Server : Apache
3. Database Server : MySQL
4. Programming language: PHP and ActionScript 2.0

3.6. System Testing

E-Archives System at Universitas PGRI Yogyakarta was then continued to test the application using two methods, namely:

a. Black Box Testing

Testing is carried out by system users (in this case BAAk). This test was done by executing the program, then selecting the available menus and content and seeing the output

Table 3.11. System Testing

Testing Module	Testing Details	Functioning	
		Yes	No
Login	Verifikasi username dan password.	Yes	
Account Update	Change user data	Yes	
Add Role	add, edit, and delete data	Yes	
Add user	Edit, and edit user data	Yes	
Add Profil	add, edit, and delete data	Yes	
Category Menu	add, edit, and delete data	Yes	
Access Right Menu	add, edit, and delete data	Yes	
Manage Menu	add, edit, and delete data	Yes	

b. Alpha Test

The implementation of Alpha testing was carried out by 10 respondents to run the program. The results of the alpha test can be concluded as follows:

1. Do you agree that the display system is attractive?

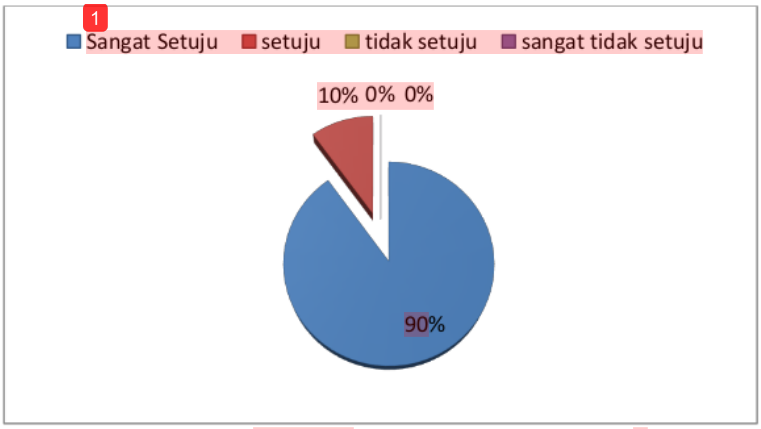

Figure 3.17 Diagram from Question Number 1

2. Do you agree that the content presented is complete?

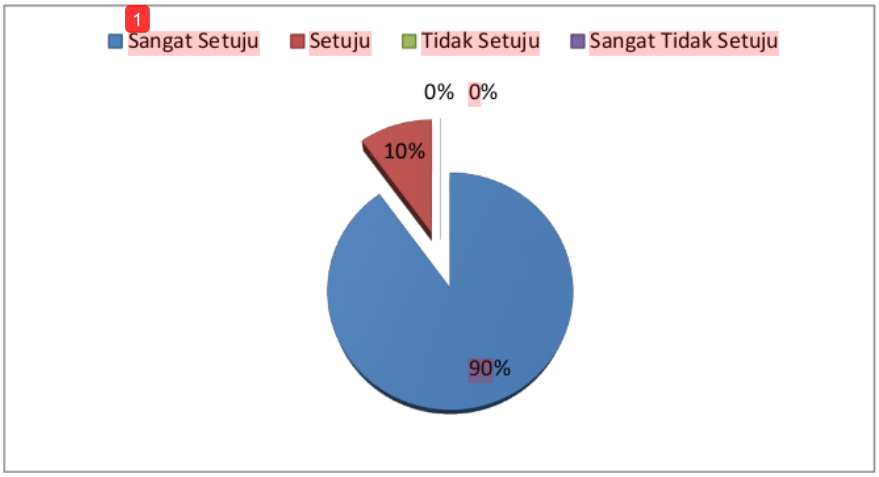

Figure 3.18 Diagram from Question Number 2

3. Are the language and navigation menus easy to understand?

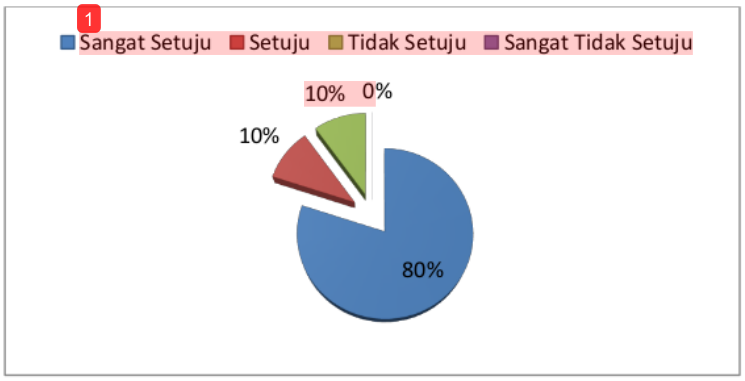

Figure 3.19 Diagram from Question Number 3

4. Is the system easy to use?

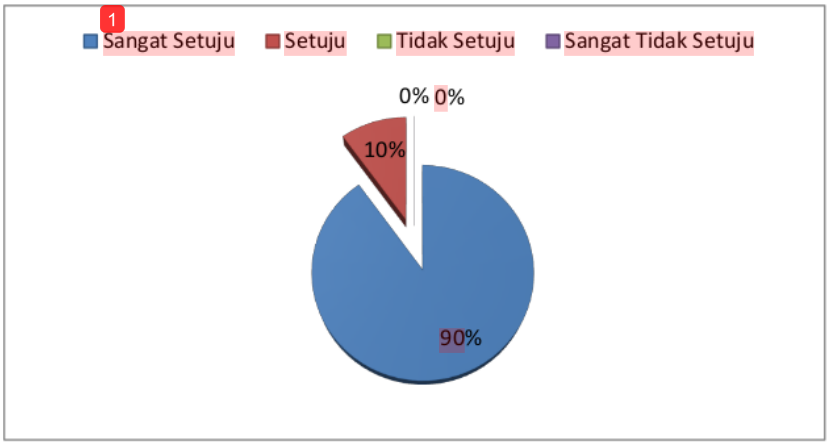

Figure 3.20 Diagram from Question Number 4

5. Is the upload time fast?

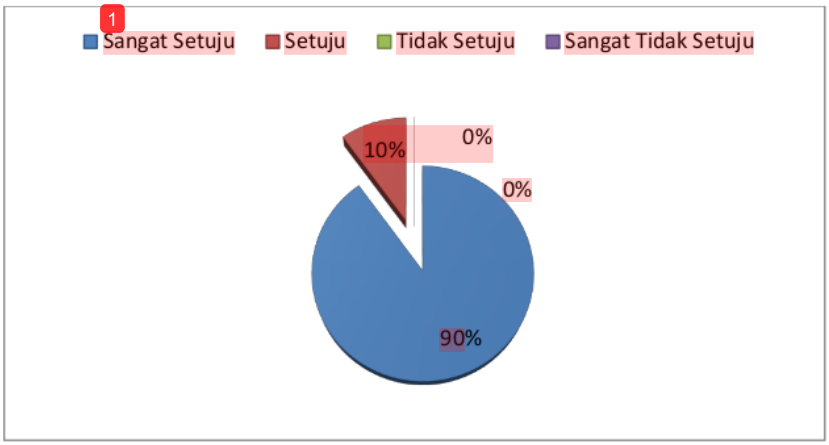

Figure 3.21 Diagram from Question Number 5

4.Conclusion

The E-archive information system in Universitas PGRI Yogyakarta was built on a web-based, which is a media that can be used and can convey information online. Therefore, it can be concluded that:

1. E-archive information system simplifies the files storage without requiring a large space.
2. By implementing the E-archive information system, the stored files are safer since they are stored in digital form.
3. This system facilitates the data searching in finding archives.

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