

Database Design for Child Special Development Institution's Service Performance E-Dashboard (Case Study: Palembang Child Special Development Institution)

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ABSTRACT

The Child Special Development Institute (LPKA) is a place used to foster and educate correctional students (Andikpas). LPKA has a duty to provide services related to the fulfillment of Andikpas rights. In this study, LPKA services that became the focus of research were visits to Andikpas and services for processing leave requests, remissions, assimilation, complaints from the general public and Andikpas, as well as obtaining service users feedback from questionnaires. The development of information technology allows the integration of LPKA service data in an e-dashboard system with a centralized database. This study offers a database that can be used to store data processing for LPKA services. The research method used was a modification of the Database Application Life Cycle method. The result of the research is a database that can be processed on the e-dashboard system to facilitate the performance of LPKA services in the fields of visits, complaints, leave requests, remissions and Andikpas integration, obtaining feedback on service performance through filling out online questionnaires, and delivering information about Andikpas' records to Andikpas ('s family).

Keywords: Service Performance, e-Dashboard database, LPKA Palembang

1. INTRODUCTION

The Child Special Development Institution (LPKA) is one of the correctional institutions in Indonesia which has received the mandate to provide guidance to children as regulated in accordance with Law No. 11 of 2012 by adding to the Law on Juvenile Criminal Justice System (SPPA) [1]. LPKA is a place to foster and educate correctional students (Andikpas). The term correctional protégé is used to replace the term child prisoner which felt offensive and suggests something that is unpleasant to the child [2]. Even so, Andikpas itself is divided into 2 types, namely correctional students who are still in detention because there has not been a guilty verdict from the court, and Andikpas who are convicted because they have received a guilty verdict from the court. In LPKA, Andikpas received the same rights as children in general. Fulfillment of

children's rights referred to in this case is the right to survive and develop, the right to get protection and the right to participate in decision-making related to children's life [3]. Apart from these rights Andikpas also has special rights related to its status, namely the right to receive visits, the right to make complaints, the right to apply for leave, remission, and assimilation.

LPKA as a technical implementation unit that is positioned under and responsible to the Director General of Corrections certainly has a duty to provide services related to the fulfillment of Andikpas rights. What is meant by service here is an action or activity that is offered by one party to another, basically it is intangible and does not result in any ownership [4]. Basically, LPKA has two types of services, namely coaching services which cover all personality and independence activities and educational services including non-formal

education activities pursuing packages [5]. Apart from these services, LPKA also provides services in the form of facilitation of visits to Andikpas and services for processing leave requests, remissions, assimilation, and other programs related to the integration of Andikpas into the community.

This study used a case study in one of the LPKAs, namely LPKA Class I Palembang. LPKA Class I Palembang is one of 33 LPKA under the auspices of the Directorate General of Corrections [6]. In providing services, LPKA Class I Palembang still provides it conventionally. For example, to receive visits, registration of visits is carried out by visiting the prison directly. Only during the current pandemic period because in-person visits have not been allowed, visits are made online by registering first via Whatsapp. In receiving complaints from both Andikpas directly and from the general public, LPKA has a complaint box where the data is often scattered because it is still written in writing on paper. For requests for leave, remission, and assimilation, LPKA also still receives data in physical form so that there is no backup if the documents required for the application are lost or damaged.

LPKA has a questionnaire that is used to determine the responses of service users to services that have been provided. The questionnaire is in the form of a performance appraisal of the visit service as well as remission and integration application services which are still being recorded and calculated manually. In an organization that organizes public services, it is important to assess the quality of the services provided, this aims to measure the quality of services that have been provided, in the form of service perfection to achieve customer desires or expectations [7][8]. Service quality consists of five dimensions, namely: reliability, responsiveness, assurance, ease of access, and physical appearance [7][9][10].

Ease of access in providing quality services can be done easily in this era of information technology. One of them is the use of a computer-based system that has a database to store data on services that have been performed. Database is a collection of data that usually describes the activities of one or more related organizations [11]. Database processing can be done using a Database Management System (DBMS) which basically consists of archive functionality that allows the user to store data from database to system or can also be used for the purpose of database migration from the first or "source" machine to the second or "target" [12]. DBMS is software designed to help maintain and utilize large data collections [11] and has advantages in performance, integrity, independence, centralization, and security [13]. By storing data of LPKA services in a database, the data will be integrated and can be stored in

the same storage medium, and can accommodate data changes quickly.

Ease of access and physical appearance in the field of information technology can also be obtained with an e-dashboard system that processes all existing service data. E-dashboard is a performance dashboard in electronic form. The performance dashboard provides the main function as a tool to monitor, analyze, and organize in order to improve decisions so that organizational goals can be achieved [14]. Apart from being used to process and interact with data, the dashboard can also be seen as a story-telling tool used to visualize complex data [15].

This study offers a database model that can be used as a centralized storage medium for all service data owned by LPKA. The existence of data integration is expected to facilitate data access so that the measurement of service quality can be carried out at any time. The database built is flexible and can be implemented in an e-dashboard system that presents the data in a better way so that it is easily understood by data readers.

2. RELATED WORKS

There had been previous studies related to database design and construction. Hafidzah et al conducted a study on building a database model for a monitoring system for land subsidence phenomena in Indonesia. The DBMS used in this research is PostgreSQL / PostGIS. The research stages are data inventory, database model design, database development. The result of the research is a database containing information on land subsidence which can be used as material for policy formulation and decision making regarding various matters relating to earth issues [16]. Another research is building a database at a distribution company using Oracle as its DBMS. In this study, the use of constraints and triggers serves to facilitate testing the validity of data and to minimize writing program code in the event of data insertion in several interrelated tables [17].

The other research was about database development using MySQL as its relational DBMS [18][19]. In a relational DBMS, the conceptual schema describes all data relations stored in the database [20]. The results of the study are a database for applications that can assist counseling teachers in processing student self-understanding data in schools [18] and a database of a product promotion website produced by UKM in Pedado Village [19].

Research on database design was conducted by Suryadi et al by modeling data on the mobile payment information system of the sport hall center [21]. The database modeling in this study has a constraint check that can provide a constraint on the inputted data, so that

the input data can filter out data that is not in accordance with the constraint check given to the data.

3. RESEARCH METHODOLOGY

In designing and building an application or system database, several stages are needed, which is called the database lifecycle [22]. The steps carried out in this research methodology were a modification of the Database Application Lifecycle stages in previous studies [23][19][24]. The stages of the research carried out were:

1. System definition. At this stage, the boundaries and scope of the database to be created are determined based on the system to be built, namely the e-dashboard system.
2. Data collecting and needs analyzing. At this stage, the identification of user needs is carried out, analyzes and reviews existing data, and determines the possibility of new data needed in making e-dashboard.
3. Designing database. At this stage the database design is carried out which consists of several series of activities, namely conceptual, logical, and physical database design.
4. Selection of the DBMS. At this stage the DBMS to be used is selected based on the database to be built.
5. Implementtion. At this stage, the implementation of the database design that has been made into the DBMS that has been selected in the previous stage is carried out.
6. Testing. At this stage, database testing is carried out and validates it against the needs of previously identified users.

4. RESULT AND DISCUSSION

4.1. System definition

The database to be built is a storage medium for service data collection at LPKA which can be accessed using the e-dashboard system. Therefore, the limitations and scope of making the database adjust to the limitations and scope of the e-dashboard system to be built.

The e-dashboard system used to improve services and monitor service performance in LPKA has the following functions:

1. Registration of visits online
2. Apply for leave, remission, and assimilation online
3. Process complaints from the general public and Andikpas online

4. Completing online questionnaires to obtain feedback from service users
5. Information about personal data and the latest status about Andikpas

4.2. Data collecting and needs analyzing

Based on the functions that the service e-dashboard has, data collected from ongoing business processes are:

1. Andikpas data displayed on the existing self-service system and can only be accessed in LPKA, through the SPD system which can only be accessed by LPKA officers.
2. The files required in applying for leave, remission, and assimilation.
3. Visiting service questionnaire form and remission and integration service questionnaire form.
4. Visit data that is input into the SPD system.
5. Apply for leave, remission, and assimilation online

Basically, Andikpas data management, visits, and other submissions have been managed into an SDP system which can be accessed at <http://sdp.ditjenpas.go.id/>. This system is a centralized system used for data reporting and consolidation of data management for assisted citizens at LPKA to the Directorate General of Corrections which later can be used by the Correctional Technical Implementation Unit according to its function. However, this system can only be accessed by LPKA officers who have an account, and by Andikpas through a self-service system that is only available in LPKA.



Figure 1 Self Service Tool for Prisoners (WBP).

Apart from being accessible to LPKA officers according to their respective access rights, the e-dashboard can

also be accessed by the general public or the Andikpas family through their respective Andikpas accounts. The user's need for data processing on the e-dashboard are shown in Table 1.

Table 1. Results of User Needs Analysis of Data

User	Needs
Admin 1 (Registration and Classification Field)	Modify Andikpas data
Admin 2 (Field of Strengthening Supervision)	Input progress / actions on complaints from the public/Andikpas
Admin 3 (Public Service Quality Sector)	Modify the data of the visit service questionnaire questions as well as the integration and remission questionnaires
Andikpas	Input Andikpas specific complaint data
Andikpas (Family)	Read visit data
General Public	Input visit data
Leader	Read all existing data on the e-dashboard
Superadmin	Manage all data on the e-dashboard, except for modification of the value of the questionnaire
Admin 1 (Registration and Classification Field)	Modify Andikpas data
Admin 2 (Field of Strengthening Supervision)	Input progress / actions on complaints from the public/Andikpas

4.3. Designing database

At this stage, database modeling begins with a conceptual database design. Conceptual database design is the process of building a database model based on information used by a company or organization without considering physical planning and is independent of all physical considerations [24]. The data processed in the e-dashboard system are grouped by object and identified as entities as shown in Table 2.

Table 2. Identification of Entities in Database

Entity Name	Description Entity	Function in the System
Andikpas	Contains Andikpas data in the form of Andikpas names, names of parents, date of birth, gender, citizenship, type of prisoner, type of crime, date of entry, date of exit, registration data, data	Information about personal data and current status about Andikpas.

	mutation, final decision data, PN decision data, PT decision data.	
Visit	Contains visit data in the form of date of visit, destination Andikpas, type of visit, and visit status.	Visit registration
Visitor Details	Contains the details of the visit in the form of the visitor's name, contactable mobile number, visitor's address, and visitor's relationship with Andikpas.	Visit registration
Public Complaint	Contains complaint data in the form of complaint date, type of complaint, status of complaint, and complaint material.	Process complaints from the general public
Public Complaint Details	Contains details of the complaint in the form of the reporter's identity number, name of the reporter, the reporter's active mobile number, information / action of the complaint.	Process complaints from the general public
Andikpas Complaint	Contains complaint data in the form of complaint date, type of complaint, status of complaint, and complaint material.	Process complaints from Andikpas
Questionnaire Questions	Contains data in the form of questionnaire questions.	Filling out a questionnaire
Questionnaire Value	Contains data in the form of questionnaire value and date of filling.	Filling out a questionnaire
Questionnaire Respondents	Contains questionnaire respondent data in the form of gender, age, education and occupation.	Filling out a questionnaire
User	Contains user data in the form of user name, username, password, and user access.	Provide different access for each type of user

To see the relationships of each entity, the important relationships that exist between the entities are shown using the E-R Conceptual Diagram as in Figure 2.

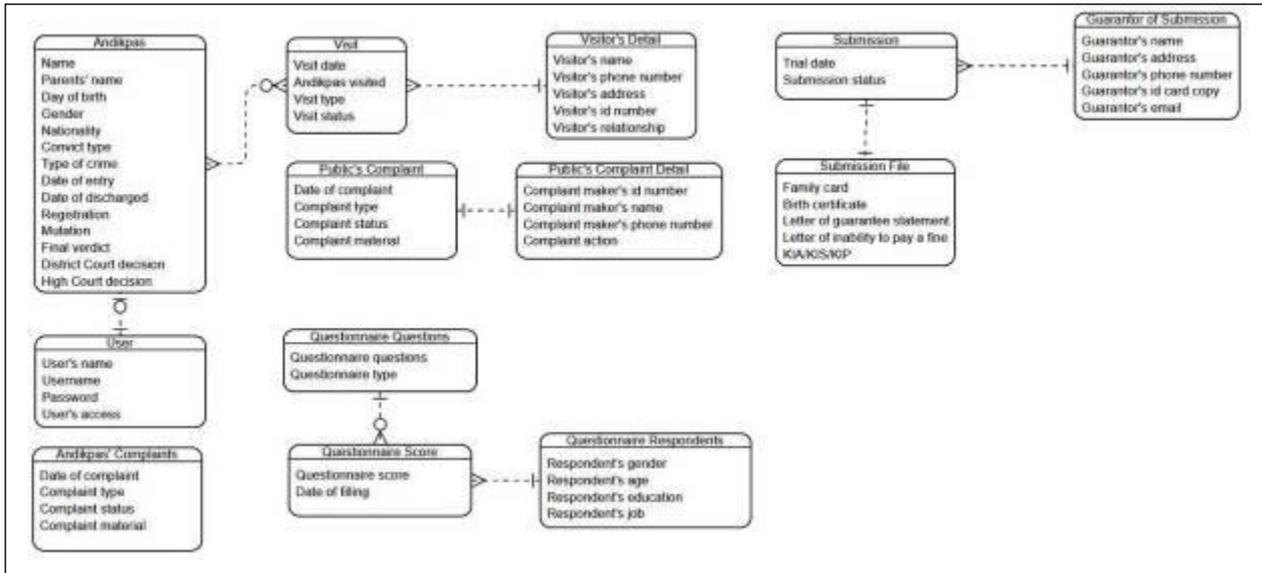


Figure 2 E-R Conceptual Diagram

The E-R diagram in Figure 1 does not show the unique attributes of each entity. In a logical database design, the unique attributes of each entity are added along with its foreign key. In addition, many-to-many

relationships in entity relationships are broken down by forming new entities and adding relationships to these new entities with one-to-many relationships. The results of this logical database design are shown in Figure 3.

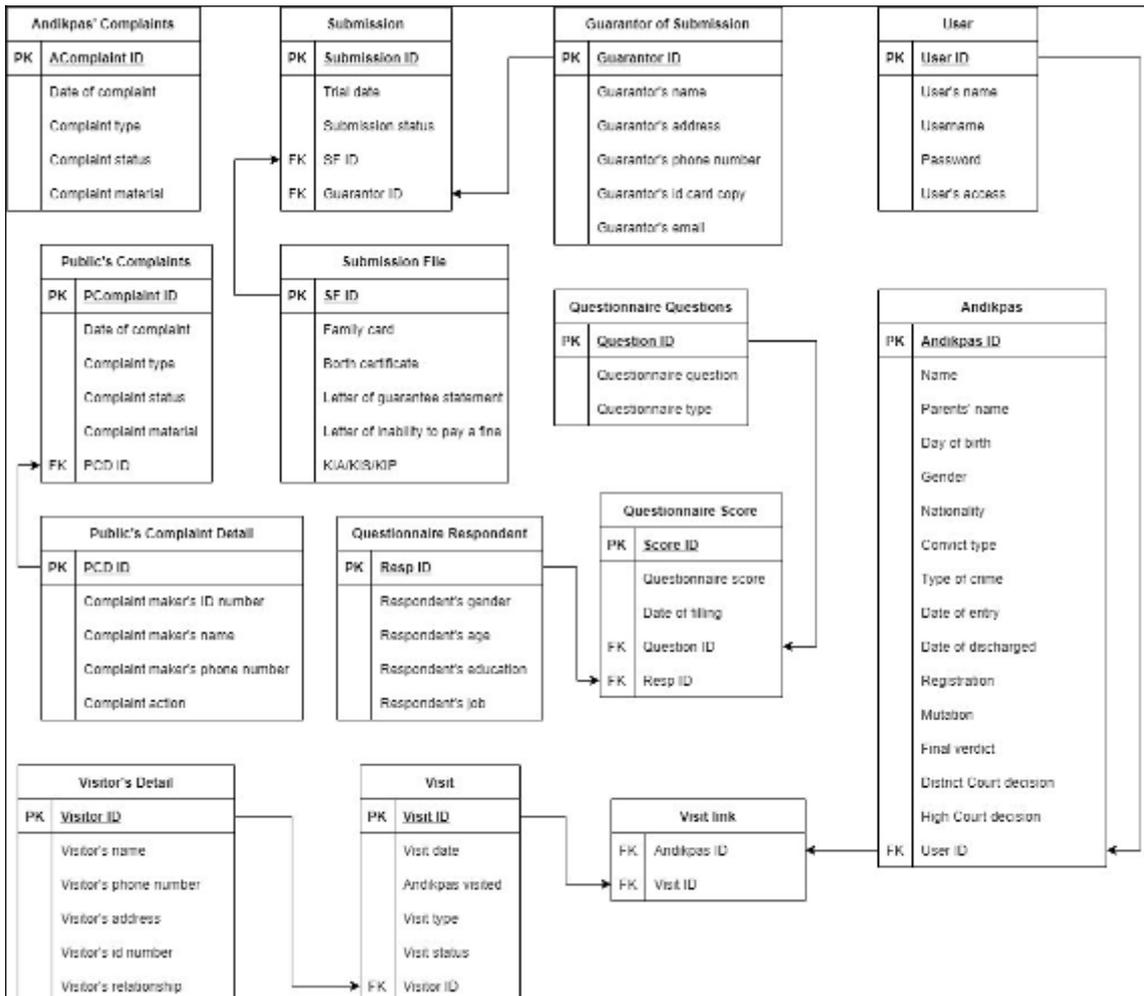


Figure 3 Logical Database Design

The final stage of database design is to physically model the database. The model formed from this stage is a table structure in accordance with the DBMS to be used, in this case MySQL.

4.4. Implementation

At this stage, the implementation or creation of a database is carried out based on the design results

obtained in the previous stage. Creating databases and tables required is done using the MySQL Data Definition Language (DDL) statement in the form of create a database and create a table.

The results of database implementation and the relationships of each table are shown using the Designer menu found in phpMyAdmin (Figure 4).

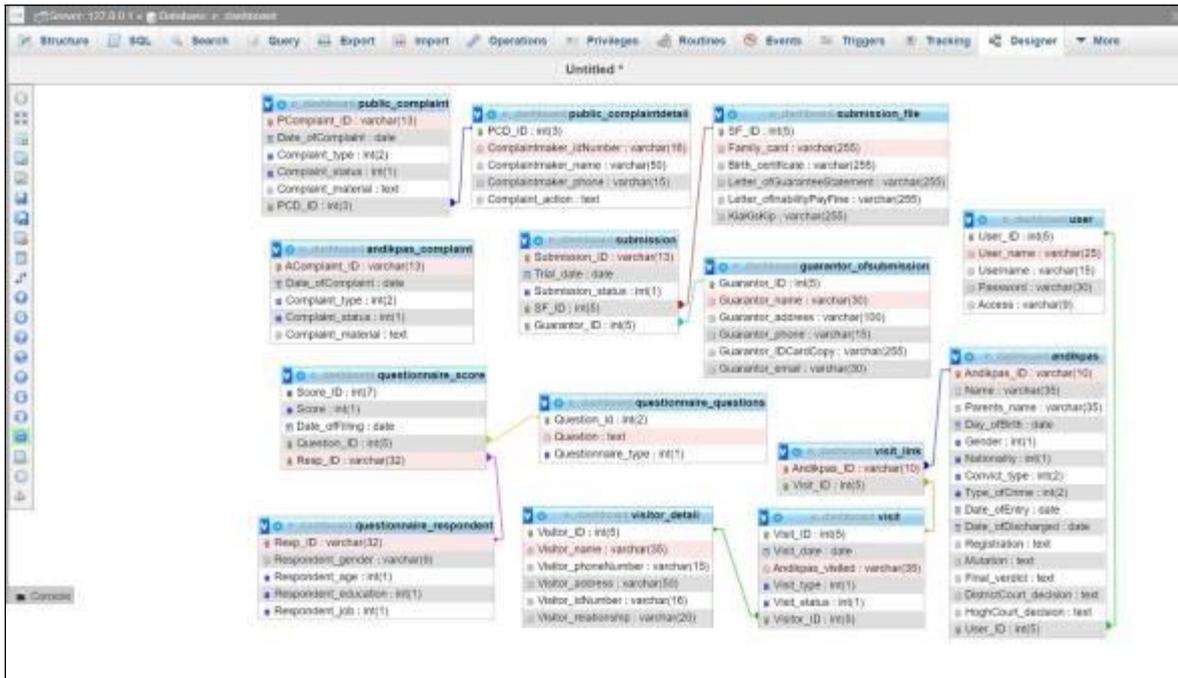


Figure 4 Results of Database Implementation on MySQL

4.5. Testing

Testing is done by checking the function and availability of tables in the database that can be used to process data in meeting the needs of each user in Table 1. The test results are shown in Table 3.

Table 3. Results of Testing of Database Functions and Availability in Meeting User Needs

User	Needs	Testing Activities
Admin 1 (Registration and Classification Field)	Modify Andikpas data	CRUD on Andikpas table
Admin 2 (Field of Strengthening Supervision)	Input progress / actions on complaints from the public/Andikpas	Update record on Andikpas_complaint (complaint_status)
Admin 3 (Public Service Quality Sector)	Modify the data of the visit service questionnaire questions as well as the integration and remission	Create record on questionnaire_questions table

	questionnaires	
Andikpas	Input Andikpas specific complaint data	Create record on Andikpas_complaint table
Andikpas (Family)	Read visit data	Read record from visit, visitor table
General Public	Input visit data	Create record on visit, visitor_detail table
Leader	Read all existing data on the e-dashboard	Read record from all tables
Superadmin	Manage all data on the e-dashboard, except for modification of the value of the questionnaire	Read record from all tables CRUD on user, Andikpas, questionnaire_questions table Update record on visit (visit_status), submission (submission_status),

		public_complaint detail (complaint_action)
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In addition to testing the availability and ability of tables to store service data, testing is also carried out to test the database performance of its capacity in handling loads. Testing is done using an open source tool JMeter which can be used to assess the performance of a database.

The query given as a sample is a select query for the users table. The number of threads or users is 20 people with a ramp-up period of 1 second. The test results in Figure 5 show the OK status for each user sample, and the test results in Figure 6 show the error value for the total test of 100 users is 0.

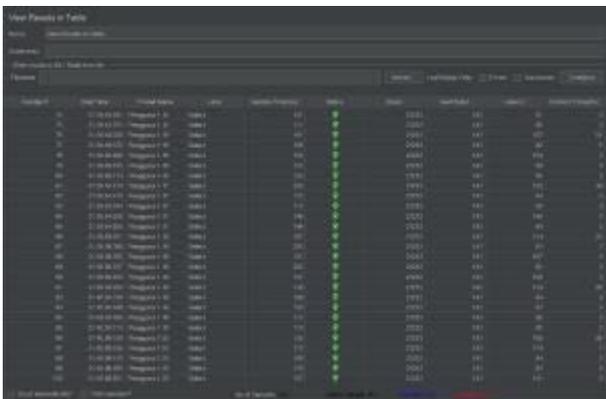


Figure 5 Testing Status of Each Sample



Figure 6 Average error of all samples

5. CONCLUSION

Based on the research conducted, a database was generated that can be used as a storage medium for data collections that are processed on the e-dashboard system to facilitate the performance of LPKA services in the fields of visits, complaints, requests for leave, remissions and Andikpas integration, and service

resulting database consists of 14 main tables that can store the data needed by the e-dashboard system to improve service quality with the InnoDB type and measure 336 Kb without data records. The test results show that the developed database can be used properly based on their respective functions in meeting the needs of every user of the e-dashboard system. The database built could also handle several request simultaneously for the number of samples given.

AUTHORS' CONTRIBUTIONS

The first author contributes in data collection and analysis of user needs. The second writer contributed to the socialization of the system and communicated with partners, in this case is the LPKA Palembang. The third author or correspondence writer contributed to the construction and testing of the database and the writing of the manuscript.

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