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Application of Prototype Method in System Design Integrated Database to Support Training Food and Nutrition Field at SEAMEO RECFON

Dodi Suswandi, Ivan Hanfi, Muhammad Yusro
Graduate Program, Faculty of Engineering, Jakarta State University
Correspondent Email: Doddysiswandi@gmail.com

ABSTRACT

This study discusses the application of the prototype method in the design of an integrated database system to support training in the field of food and nutrition. The case study used in this research is SEAMEO RECFON Southeast Asian Ministers of Education Organization Regional Center for Food and Nutrition (SEAMEO RECFON), which is an inter-ministerial organization of education in Southeast Asia in the field of food and nutrition. The research carried out is adjusted to the business processes running at SEAMEO RECFON, as well as according to ongoing events with current conditions. Researchers used a descriptive method in this study. The selected development method is the prototype method. The application of the prototype method makes it easier to design research that aims to describe and explain objects based on existing conditions. In the prototype research method, there is a prototyping section which makes it easier for researchers to make the necessary designs. This study aims to produce an integrated database system design. Based on the research results, this system has been successfully designed as expected so that the prototype that has been made can be used as a basis for continuing work on the system to be made. The results of this design can be used as a blueprint or documentation for the organization with the hope that later it can be used as literature to develop a database system to support training in the field of food and nutrition and all future program activities.

Keywords: D*atabase system, Food and Nutrition Training, descriptive method, prototype method, webserver.*

INTRODUCTION

In the SEAMEO Center Indonesia Strategic Plan 2020-2024 of the Ministry of Education and Culture, Secretariat General of the Seameo Center Indonesia Work Unit, it is stated that the Southeast Asian Mininsters of Education Organization Regional Centre for Food and Nutrition (SEAMEO RECFON) has a mandate to play a role in improving the nutritional knowledge and practices of communities in Southeast Asia as an effort to realize a society with good nutritional status (SEAMEO, 2019).

SEAMEO RECFON actively conducts education, research, training and community empowerment activities, so the need for up-to-date information on food and nutrition topics and services and facilities that support all these activities is very important. These important tasks must be supported by adequate facilities, including the procurement of data processing and communication equipment capable of supporting SEAMEO RECFON's daily activities, including the dissemination of information and knowledge derived from research results.

One of the missions that SEAMEO RECFON embraces is to be the only organization under the ministry of education, research culture and technology that is designated as a driving force pioneer in efforts to eradicate stunting and nutritional education from early childhood to high school and vocational children as well as in the world of work, has a special program division in which it has related units that play a role in running the program, Among them are the education and training unit or training, community development and partnership (CDP) unit, research unit, and information management and policy support unit or knowledge management and policy support, and under the SEAMEO RECFON administrative division includes the administration, finance and accounting unit, laboratory and consultancy unit, and human resources and general unit. On August 5, 2021, President Joko Widodo signed Presidential Regulation (Perpres) Number 72 of 2021 concerning the Acceleration of Stunting Reduction. The Perpres contains references that must be achieved by related parties in the implementation of accelerating stunting reduction, Presidential Regulation Number 72 of 2021 concerning the acceleration of holistic, integrative, and quality stunting reduction through coordination, synergy, and synchronization among stakeholders. This Presidential Regulation is a replacement for Presidential Regulation Number 42 of 2013 concerning the National Movement for the Acceleration of Nutrition Improvement, concerned about handling stunting because this is related to the future of the 2045 Golden Indonesian generation, which must be prepared, including by solving the problem of stunting. As of 2021, the prevalence of stunting in Indonesia is 24.4 percent.

The government targets the prevalence of stunting to drop to 14 percent by 2024. The Presidential Regulation on SPBE Architecture has been issued and this is an extraordinary driver to pursue increased government digitization in all lines, including in handling stunting, which is targeted to decrease by 14 percent by 2024. The program is then accelerated through a digital scheme through the implementation of an Electronic-Based Government System (SPBE). In this regard, SEAMEO RECFON organizes special training in the field of food and nutrition where trainees are aimed at teachers under the Early Childhood Care and Nutrition Education (ECCNE) program or my healthy and smart child for early childhood education and programs, Nutrition Goes to School (NGTS) or Nutrition for Achievement for elementary to high school / vocational school age, and the most recently promoted program is Nutrition Goes to Workplace (NGTW) or Nutrition for productivity in

the work environment. With various types of training related to the field of food and nutrition in collaboration with local governments, especially those with high stunting rates, training is carried out in the form of training of trainers (TOT), master of trainers (MOT), forum group discussions, seminars and webinars, post graduate training, which is not only for teachers in the context of alleviating stunting through education but participants also include increasing the competence of nutritionists at health centers and hospitals in the special field of food and nutrition and is carried out not only in Indonesia but in the region, especially Southeast Asian countries that are members of SEAMEO, carried out in online form during the pandemic and began to be carried out offline again after the pandemic. Based on the results of field searches, the SEAMEO RECFON database system has implemented information technology infrastructure but without using an enterprise architecture framework and so far only uses a manual system, namely Microsoft Excel and Acces. Without an enterprise architecture, several problems occur in its technological infrastructure, including hardware that has decreased performance, software that requires the latest version upgrade so that it can be used optimally, and networks that often experience problems in intranet and internet connections.

Before this research was carried out, several previous studies were carried out based on the needs of the types of data from each unit with different types of activity programs, and several surveys were conducted by investigating and seeking information on the use of applications in storing these data and the types of data used in each unit in order to fulfill information data. Problems were found in the storage and applications used in the SEAMEO RECFON database system, therefore it is necessary to plan a new technology architecture using a suitable system, namely web server based. Furthermore, it is necessary to upgrade all data owned by SEAMEO RECFON which is useful for supporting information dissemination and storage activities. This is expected to increase engagement with the general public and optimize the database functions owned by SEAMEO RECFON in storing information in the field of food and nutrition training at both the national and regional levels.

Information technology applied to the data storage process includes a database storage system at SEAMEO RECFON which has the main task of providing scientific information needs for researchers and stakeholders to support various SEAMEO RECFON activities that have not yet implemented Information Technology, hereinafter referred to as IT is the SEAMEO RECFON database system.

Over time, the management of the SEAMEO RECFON database system continues to strive to meet the needs of information technology. Progress and success in the field of information technology in the SEAMEO RECFON database system does not escape obstacles and problems in various aspects. The lack of effectiveness in managing the current database indicates that the database is still not integrated in one system for the needs of each work unit. Each unit still has a different database and the software used still uses Microsoft Excel

and Microsoft Access which are still manual and have not integrated data between units and divisions. This results in redundant data and no data synchronization in each activity, thus making the need for information technology quite large and complex. It is expected that the database system that will be developed can be used as a reference for the implementation of monitoring and evaluation activities to support the SEAMEO Center Indonesia Strategic Plan by default.

METHOD

A. Descriptive Method

The research conducted is tailored to the business processes that run at the Berlian Agency and is related to ongoing events and with regard to current conditions, so in this study researchers used descriptive methods. Nazir explained the descriptive method is as follows:

Descriptive method is a method for examining the current state of human groups, subjects, conditions, systems of thought, or categories of events (Mega Linarwati, Aziz Fathoni, 2016). The purpose of descriptive research is to describe or describe systematically the relationship of each event experienced.

B. Prototype Method

Prototyping is a process used to assist software development in forming a software model that must be made (Siregar & Sudarmilah, 2019), (Rifa'atunnisa, Eri Satria, 2014), (Otto Fajarianto, 2016). Prototype is an early version of the stages of a software system that is used in presenting an overview of ideas, experimenting with a design, finding as many problems as possible and solving these problems (Purnomo, 2017). Systems with prototype models allow users to know what stages the system is made so that the system is able to operate properly. The prototype method used in this research is intended to get a representation of the application modeling that will be made (Yoko et al., 2019). The initial application design is initially in the form of a mockup and then will be evaluated by the user. After the mockup is evaluated by the user, the next stage of the mockup becomes a reference material for software developers to design applications (Putri et al., 2020).

The prototyping development model starts from gathering needs or analyzing user needs, prototyping development, prototyping evaluation, system coding, system testing, system evaluation and system use (Rahayu Dewi et al., 2021).

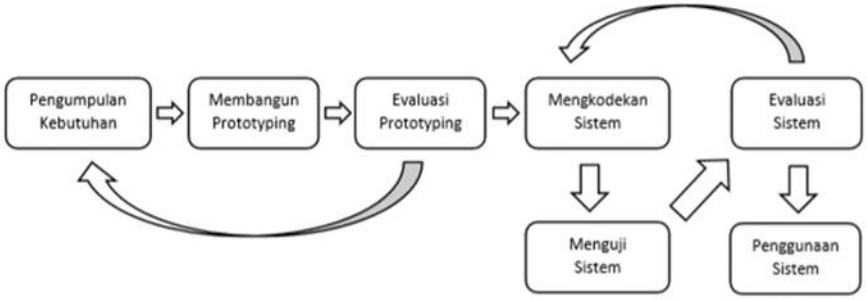

Figure .1 Stages of Prototyping Development Model, Source (Susanto, 2016)

The prototype model aims to allow users to interact frequently with the proposed prototype. States that the Prototype will propose a basic version that can be developed to be larger according to user needs. (Nurcahya et al., 2022) say that the stages in the development of the prototyping method include:

The prototype method has the following advantages:

1. Prototyping gets users involved in the analysis and design process.
2. Prototypes are able to understand everything that is needed not in the abstract but in reality.
3. Can be used to clarify the SDLC (Nurcahya et al., 2022).

There are several stages in prototyping. The following are the stages of the prototype:

1. Needs Gathering Stage
   The format of the software is defined jointly by the developer and the client, as well as when identifying the needs and the system being built.
2. Prototyping Stage
   This stage is the stage of making temporary designs with a focus on the wishes of customers or clients such as making the required inputs and outputs.
3. Prototyping Evaluation Stage
   At this stage, the client will check the prototype that has been built with the aim of ensuring that the system that has been designed is in accordance with the objectives and needs of the client or not.
   If the prototype built is not suitable, corrections and improvements will be made by returning to the previous stage.
4. System Coding Stage
   The prototype that has been approved at the previous stage will begin to be made in the form of code or coding at this stage, by translating it into a programming language [14].
5. System Testing Phase

The system that has been converted into a programming language and has become a software will be tested first to determine whether the software can be used or not. The tests carried out have the aim of ensuring that the errors generated by the system are as minimal as possible. Usually used Black Box testing, White box, Architecture testing, Base path and others.

6. System Evaluation Stage
   At this stage, the evaluation is carried out by the client to ascertain whether the program or system that has been built is as desired or not. If so, the system can be used. But if it is not appropriate, the developer must return to the previous stage to correct the discrepancy.
7. Stage of Using the System
   The system that has been built and successfully passed the system evaluation stage can be used.

DESCRIPTION

A. Needs Analysis

This integrated database system design has two system requirements. System functional requirements consist of several main functions that are interrelated and support each other. While the non- functional needs of the system have a function as a supporting tool so that the smooth operation of the main function operates as expected.

1) Functional Requirement Analysis: In the design of an integrated database system for training in the field of food and nutrition, there are two accesses, namely the main admin and the admin of each unit. The activities or scenarios that can be carried out by HRD and Applicants are as follows:
   1. Administrators can create, update, and delete master data, namely Schools, Partners, Students, and Teachers.
   2. Administrators create new trainings, register students as participants, and also give grades to trainees.
   3. Administrators can also Create, Update, and Delete activity data, namely Research, and MoU.
   4. Report is divided into training reports, training participants, research, and MoUs, Administrators can print the results of these reports
   5. Administrators can create, update, and delete user data for students, teachers, and backend users.
   6. Students or Teachers can register through the registration page and login to the application.
   7. Students can register for the selected training and also update their profile.
   8. Teachers can update their profile on the teacher master page

2) Non-Functional Requirements Analysis: The non-functional requirements included in this design are hardware and software (Nugraha, W., & Syarif, 2018):

1. Hardware

   The minimum hardware specifications required for this system are. Processor: 1.5 GHz Dual core
   Memory (RAM): 2 GB DDR3
   Hard disk: 120 GB

2. Software

   The minimum software specifications for using and designing this system are as follows: PHP 5.4, Javascript, HTML, & CSS
   Code Igniter Framework
   LTE Admin Template 2
   Database : Mysql
   Web browser: Mozilla Firefox, Edge, Google Chrome, UC Browser, Opera.

B. Building a Prototype

In building a prototype, a temporary design of the software to be created is made, the design made is a context diagram, ERD, conceptual database and interface design.

1. Flowchart / System Application Logic Design

Used to design the logic in a program. The following is the design of the Menu Interface that will be implemented in a program.

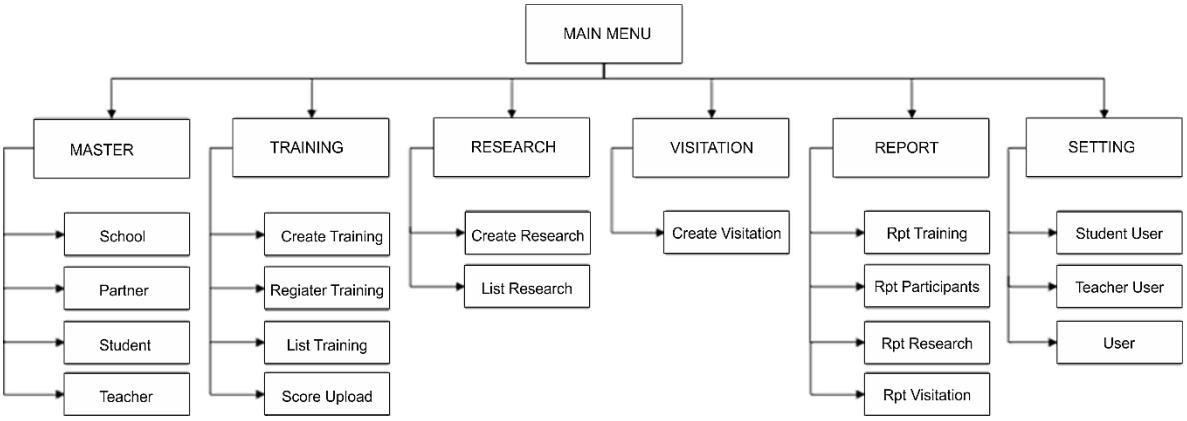

Figure 2: Flowchart / System Application Logic Design

2. ER Diagram Design: Database Input

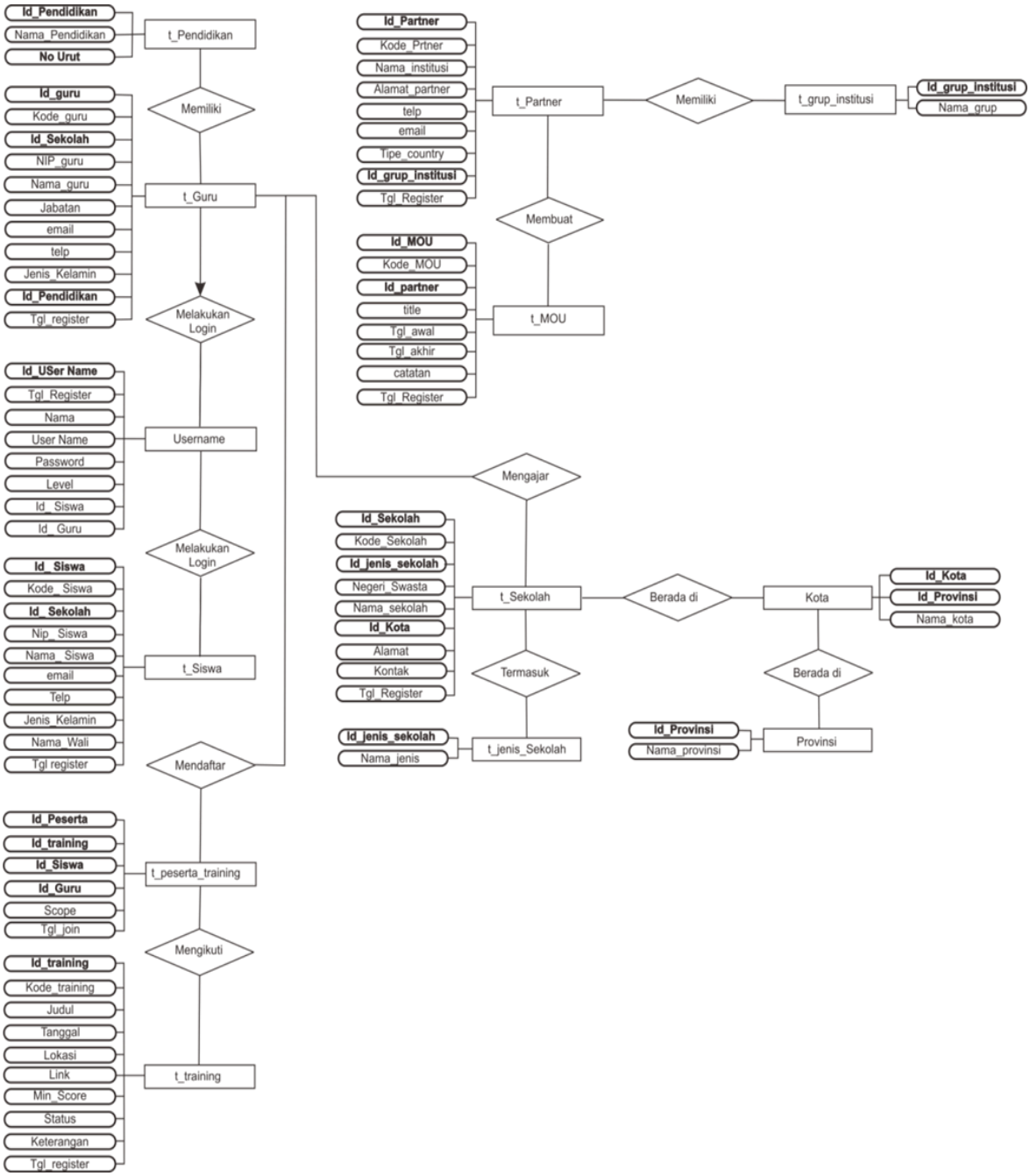

Figure 3: ER Diagram Design: Database Input

3. ER Diagram

After the database design is made in the ER Diagram, it is adjusted to the needs of the system feature design. Relationships between tables in the database.

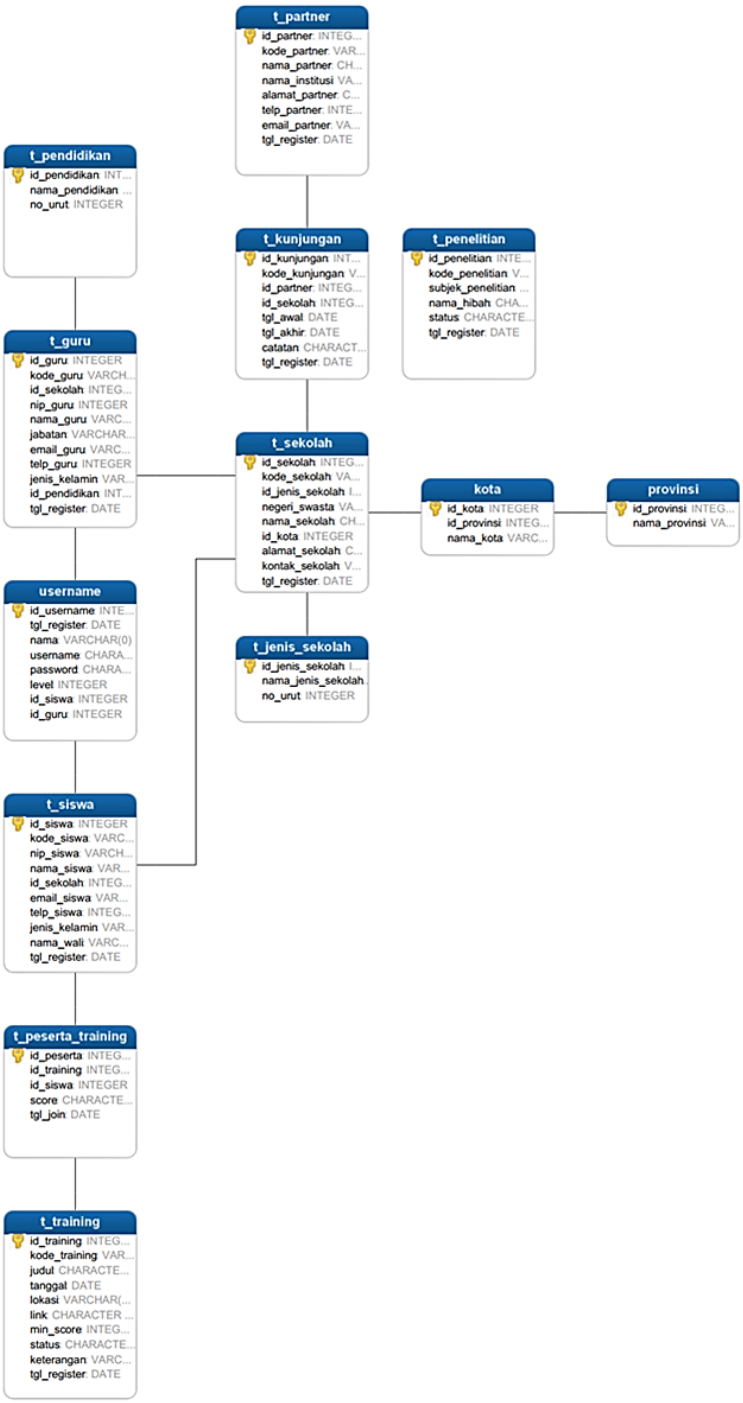

Figure 3 : ER Diagram

4. Interface Design: Interface design is a basic description of the form and design of the system display that will be created later. This design is useful for knowing the making of the display on the system which will then be implemented (Fauziah Lubis STMIK Royal, 2017). The following is an explanation of each of the draft interface designs that have been built.

C. Admin view

a. Login Form

After the user can access the webserver IP address, the display will appear as below.

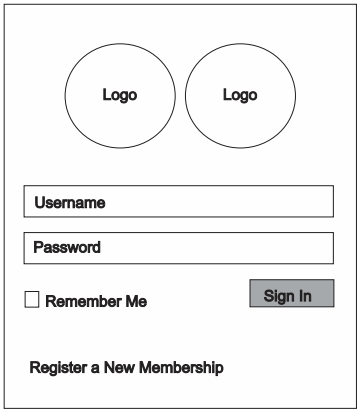

Figure 4. Login Menu

Figure 4 is an interface for the admin login form, where when the admin wants to log in to the system he must first log in using his username and password. There are login buttons for admin and staff.

1. The login menu is the initial display of the system
2. Username box to enter the user name
3. Password box to enter the keyword
4. Remember Me box to remember the saved User and Password
5. Register for new user creation request
6. Sign In button is a button to go to the login for admin and staff.

b. Dashboard Menu

After the user has successfully logged in, the display will appear as below

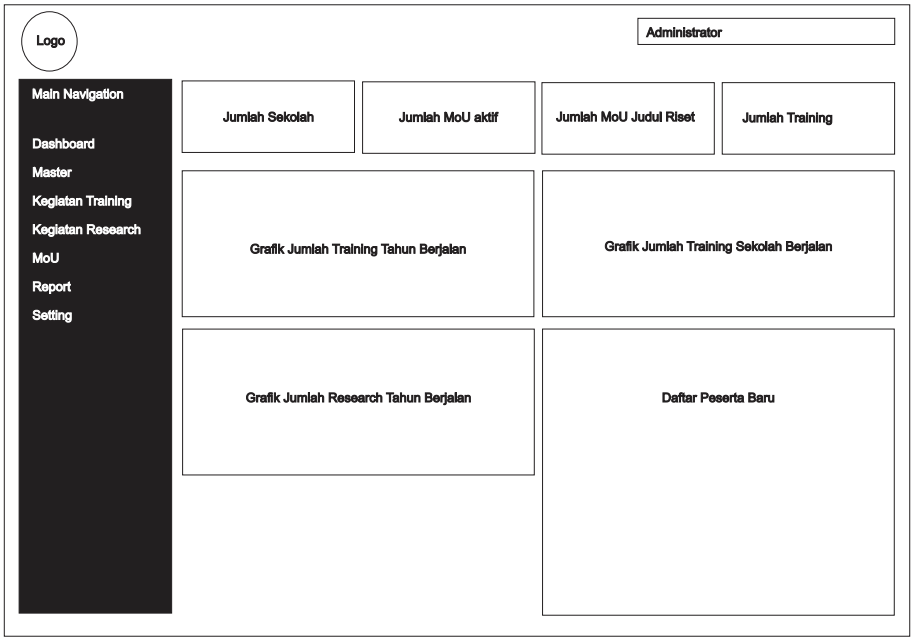

Figure 5. Dashboard Menu

When the admin successfully logs into the webserver, the display will appear in Figure 5 above. In the admin account there are several menus on the main Navigation, namely the dashboard menu, master menu, training activities menu, research activities menu, MoU menu, Report Menu, and Settings menu. The explanation of each menu is as follows:

1) The dashboard menu is the initial display that appears when the admin successfully logs into the system.
2) The master menu contains several submenus, namely the school submenu, partner submenu, student submenu, teacher submenu, the admin can manage all the data in the master menu.
3) The training activities menu is a menu that displays input information on activities related to training activities, the training activities menu contains several submenus, namely the Create Training submenu, the Training List submenu, the List Training submenu, and the Upload Value submenu. Admin can manage (edit, add, delete) data in the Training Activities menu.
4) The Research activity menu is a menu that displays information on activities related to research activities. The Research activities menu contains several submenus, namely the Create Research submenu and the List Research submenu. Admins can manage (edit, add, delete) data in the Research Activities menu.

5) The MoU menu is a menu that displays information on the number of memoranda of understanding or cooperation carried out by SEAMEO RECFON from the start of the term and the active status of the registered cooperation. On the MoU menu there is one Create MoU submenu. Admin can manage (edit, add, delete) data in the MoU menu.
6) The Report menu is a menu that displays report information containing data on each previous menu such as Training reports, Training Participants, Research Reports and MoU Reports. The Report menu contains several submenus, namely the Rpt Training, Rpt Training Participants, Rpt Research and Rpt MoU submenus. Admins can access and display reports according to the period of the beginning and end of the activity.
7) The Setting menu is a menu that contains settings if you are going to create users for admin purposes, student users and teacher users, containing several submenus, namely the student user submenu, teacher user submenu and admin user. Admins can access and make settings for student users and teacher users.

D. Initial view of Database Information System

1. Master menu School submenu

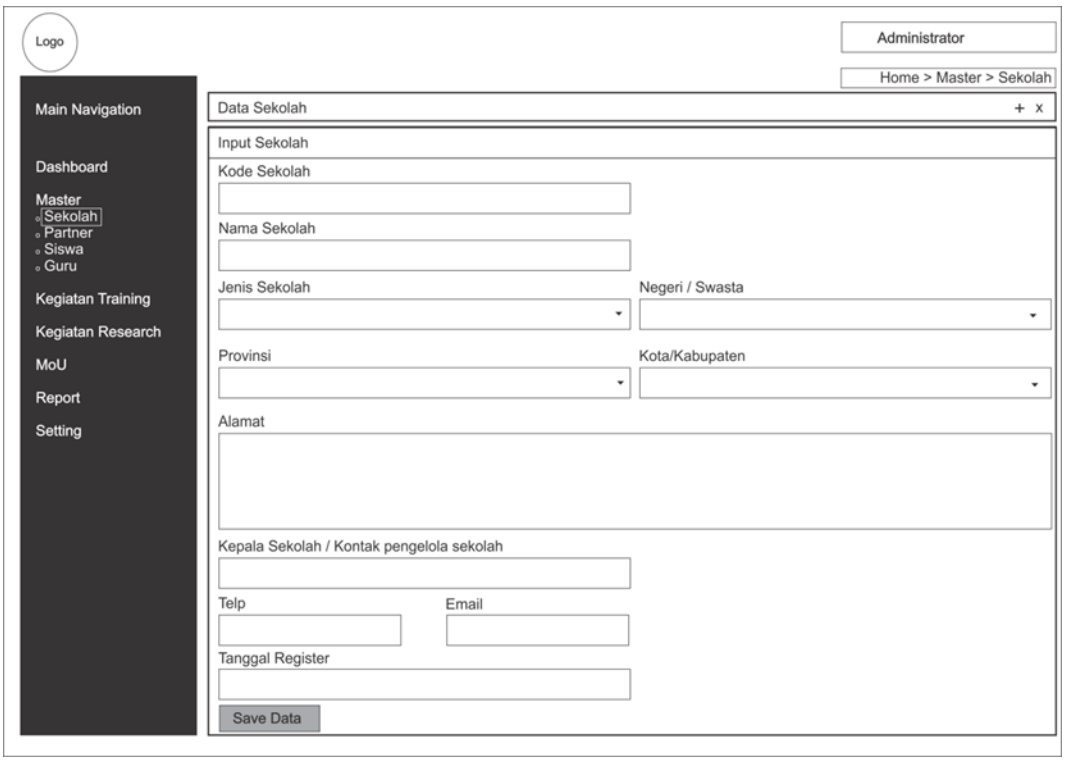

Figure 6. Master menu School submenu

Figure 6 is a display of the school submenu contained in the master menu containing school data, school input forms that can be filled in by admin users if they want to input new school data that will be entered into the database.

2. Partner Submenu Master Menu

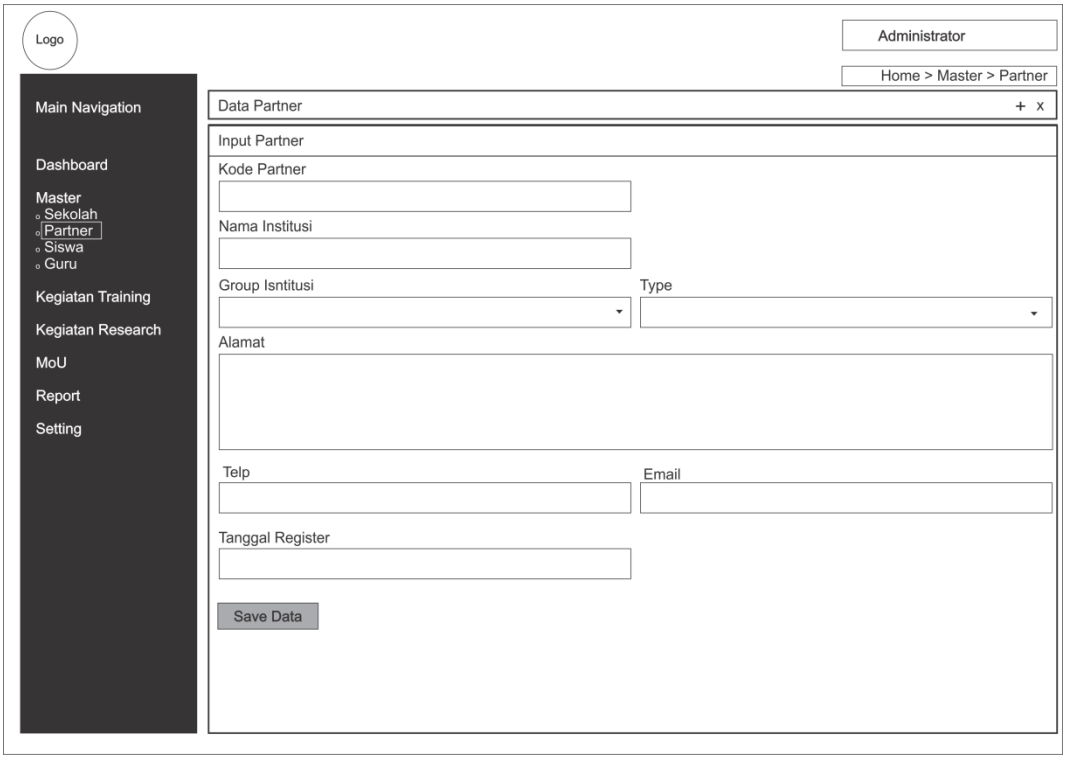

Figure 7. Partner Submenu Master Menu

Figure 7 is a display of the partner submenu contained in the master menu containing partner data, partner input forms that can be filled in by admin users if they want to input new partner data that will be entered into the database.

3. Student Submenu Master Menu

Figure 8 is a display of the student submenu contained in the master menu containing student data, student input forms that can be filled in by admin users if they want to input new student data that will be entered into the database.

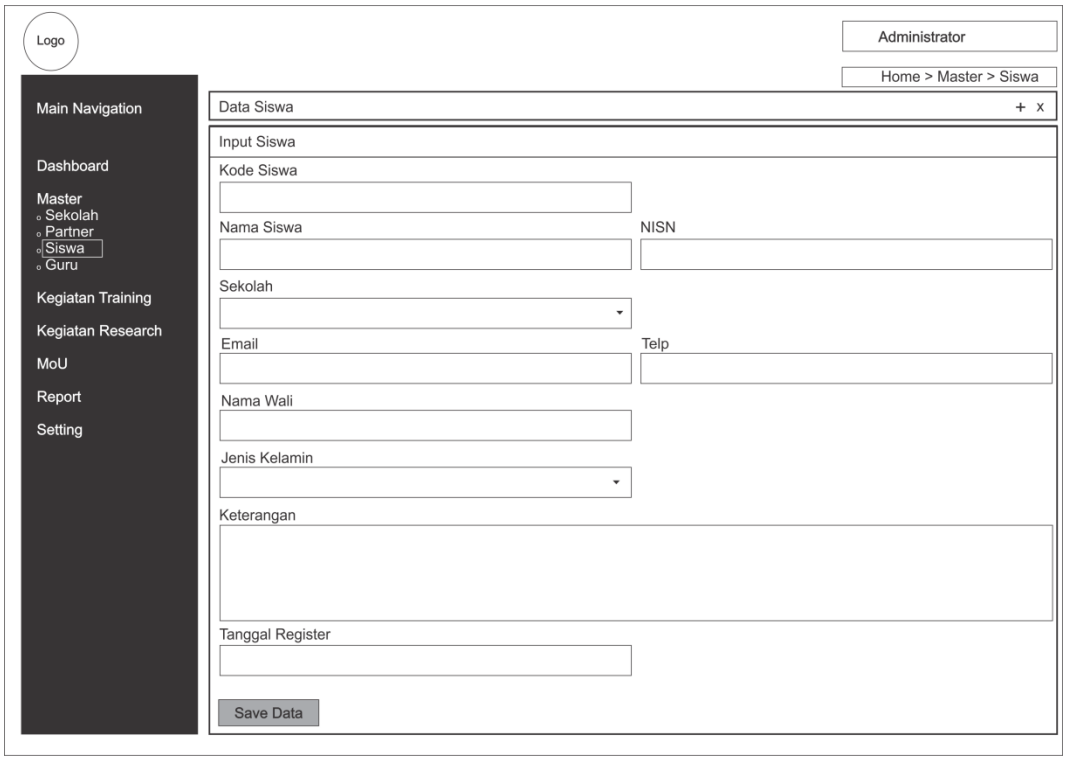

Figure 8. Student Submenu Master Menu

4. Master Menu Teacher Submenu

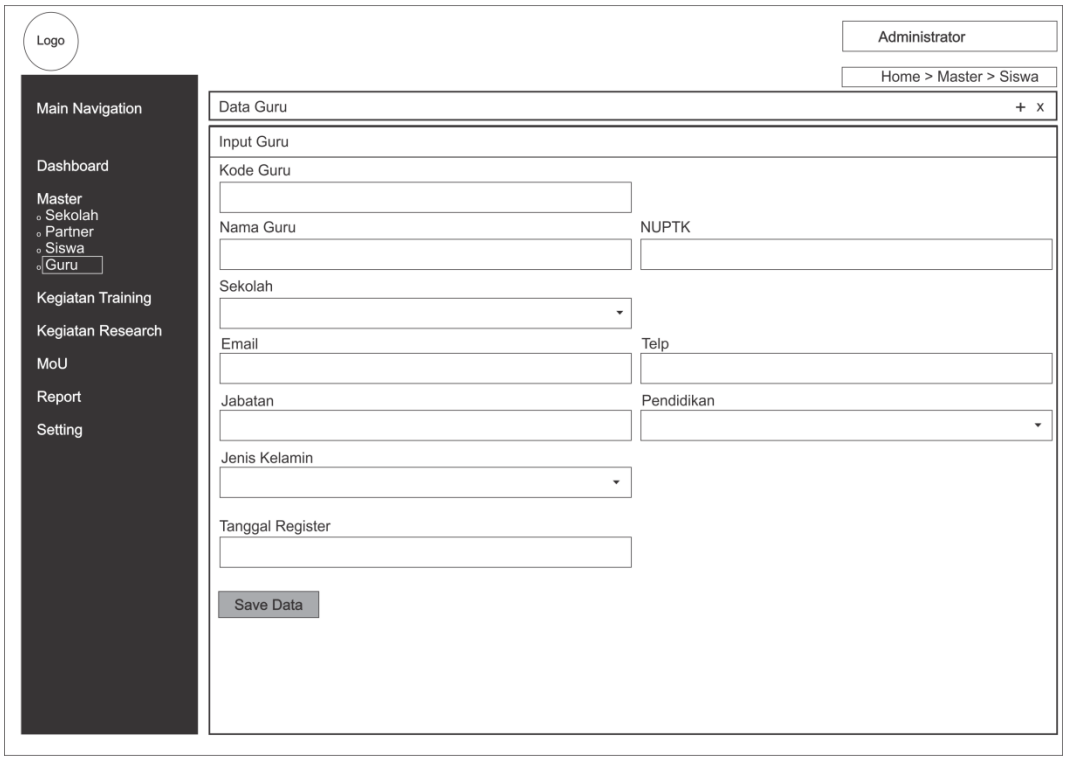

Figure 9.Teacher Submenu Master Menu

Figure 9 is a display of the teacher submenu contained in the master menu containing teacher data, teacher input forms that can be filled in by admin users if they want to input new teacher data that will be entered into the database.

5. Training Menu Create Training Submenu

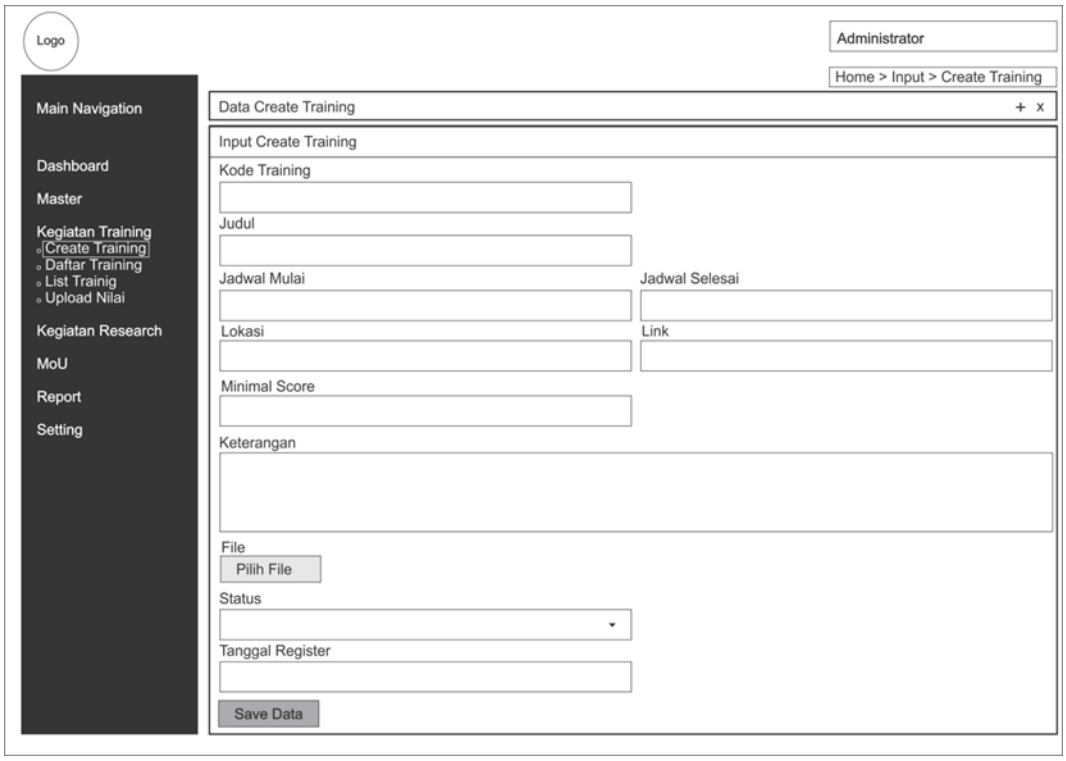

Figure 10. Training Activity Menu Create Training Submenu

Figure 10 is a display of the Create Training submenu contained in the training activities menu containing training name data, Create Training input form that can be filled in by admin users if they want to input new training data that will be entered into the database.

6. Training Menu Training List Submenu

Figure 11 is a display of the Training List submenu contained in the training activities menu containing Training List name data.

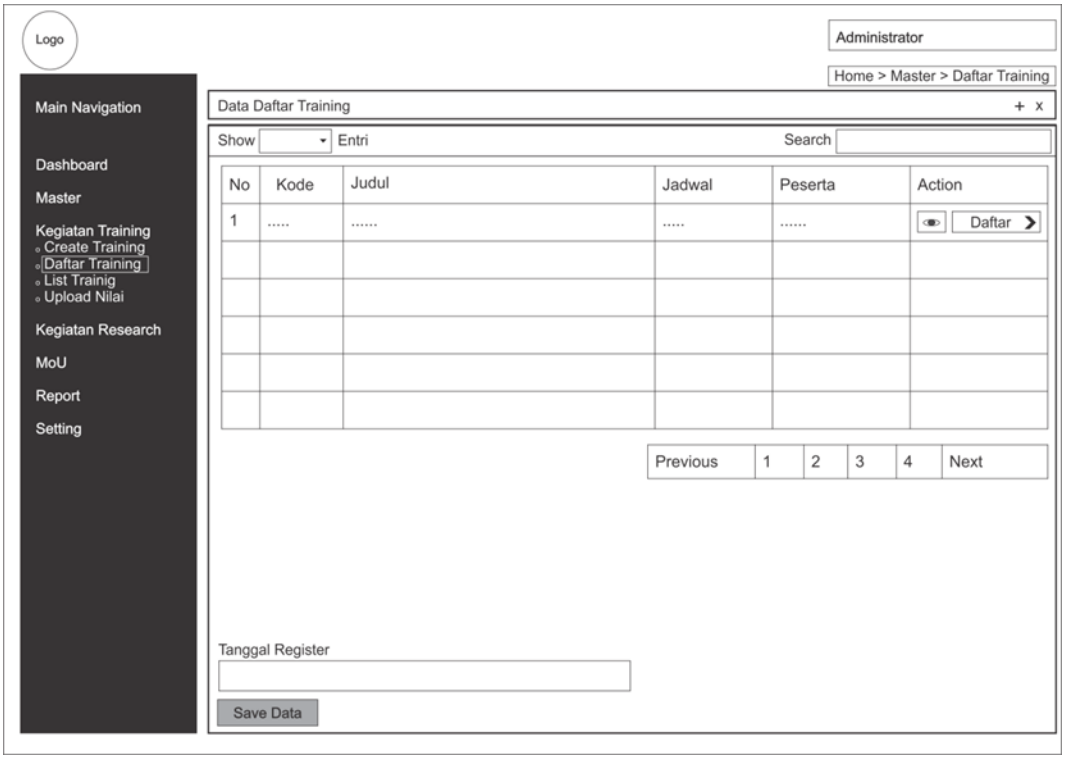

Figure 11. Training Activity Menu Training List Submenu

The Integrated Database information system for the Food and Nutrition Training Program in this study aims to make it easier for SEAMEO RECFON to manage data, information, especially the Training Program for Food and Nutrition to be more effective and efficient. This information system is intended to make it easier for admins (operators and staff) for data storage services, processing. From the results of the assessment that has been carried out, the product in the form of an integrated database system for managing training programs in the field of food and nutrition is considered to have qualified as one of the data sources used in monitoring and evaluating the achievements of training programs at SEAMEO RECFON, provided that there are several things that must be completed and continued to be refined.

This service information system was built using PHP, Javascript, HTML, & CSS programming languages and the database storage is MySql where XAMPP is a stand-alone server (localhost). This makes it easier for developers to redevelop this system. Besides that, the application in several operating systems can make it easier for users to access the information system. This information system was developed using a prototyping

development model. The stages in Prototyping development generally include collecting system requirements, building prototypes, evaluating prototypes, coding systems, testing systems, evaluating systems and implementing systems.

CONCLUSION

Based on the results of the research that has been discussed, it can be concluded that the design of an integrated database system design system to support training in the field of food and nutrition at SEAMEO RECFON has produced a prototype design described by a context diagram, entity relationship diagram, conceptual database and interface design. Prototypes or design results that have been made, can later be used as a reference for developing the system to the coding stage or can be used as documentation by SEAMEO RECFON. The design that has been made can be evaluated and further developed so that the system that will be built can be much better. With the design of an integrated database system to support training in the fields of food and nutrition at SEAMEO RECFON, it can store data more effectively and efficiently and support training in the fields of food and nutrition at SEAMEO RECFON can be optimized.

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