Design And Build The AMANAH Vocational School Main Book Application Using The Waterfall Model

Nur Ali Farabi1), Hasta Herlan Asymar2), Rachmat Hidayat3), Dimas Muslim Setiawan4)
1) Universitas Bina Sarana Informatika, Jl.Kramat raya No.98, Jakarta Pusat, Indonesia
2) nur.naf@bsi.ac.id, 3) hasta.hsh@bsi.ac.id, 4) rachmat.rch@bsi.ac.id, 5) dimasmuslim21@gmail.com

ABSTRACT
The benefits of information technology in the field of education include improving educational services, facilitating the collection and dissemination of educational information, educational data storage media, improving teaching skills, motivating students, thus helping communication activities in education. The concept of this information system has the effect of transforming the filling of the conventional ledger into digital form, by carrying out this transformation it can affect the easier filling of the master book and secure data storage and a longer time. After the process of accepting new students at SMK AMANAH is completed, the administrative officer or administrative administration enters student data, the value of student report cards per semester into the student master book, the difficulties encountered by administrative officers during the process of entering the data, officers have difficulty in terms of The main book used has a large size and the storage of the master book is still ineffective and not durable because it can be damaged, even though the master book should be able to be used for a long time as a document that is needed at any time. The research method used to design a student master book system is to use the waterfall or waterfall method to produce a design for the school's main book information system (SIBIS). Starting from the login page, the new student registration page, the grade submission page, and reports to help the school.

Keywords: academic, student master book, data storage, master book information system, waterfall

INTRODUCTION
Along with the development of information and communication technology today, it encourages human activity to be more forward-thinking in the use of technology. Information technology plays an important role in supporting all human activities such as providing information services, especially in the field of education. The application of information systems provides convenience such as obtaining information quickly and precisely when needed, according to (Anna A, Nurmalasari, N, Yusnita, 2018) explaining that information is designed for data processing purposes with the application of computer technology so that all process activities can be managed into reliable information, beneficial. The use of this information system affects the transformation process of filling out the conventional main book into digital form, by doing this transformation it can affect the filling of the main book which is easier and safe data storage and a longer time, where after the process of admitting new students at SMK AMANAH is complete administrative officers will enter student data, student report cards per semester into the student master book, the difficulties encountered by administrative officers during the data entry process the main book used has a large size and storage of the main book is still ineffective and not durable because it can be damaged, even though the master book must be used for a long time as a document that is needed at any time. According to (Prabandari, Cintya, Putu, 2019) in the educational journal, the student master book is a large book that is used to record all student data since the establishment of an educational institution. In the past, how to fill in the student master book was still done manually, namely by writing student data on the book. The author's purpose of conducting research is to find out how the constraints of the current student book input process system in addition to the problems above from the field analysis are expected to produce information that is easy to find and data that can be stored for a long time and produce fast and accurate information in finding student data, to design a student book system using the waterfall model.
LITERATURE REVIEW

System
The system can be defined as a collection of various kinds of components or subsystems that form a unity, where each of these components is ordered regularly, interacts with each other, and works together to achieve the same goal according to (Gobai Enggelbertus, Zulkarnain, 2020) explaining that a system can be interpreted as a collection or set of component elements, or variables that are organized, interact with each other, depend on each other and are integrated.

Information
In today's digital world, information plays a very important role in decision-making from business, politics, economics, or the system you want to create. According to (Kristina, 2019) Information is a collection of data/facts that are organized or processed in a certain way so that they have meaning for the recipient.

Information Systems
The information system is a system model that is often used in today's technological developments in terms of building access to make it easier for humans to find and manage data according to their goals. According to (Kristina, 2019) Information System is an orderly combination of people, hardware, software, communication networks, and data resources that collect, transform, and disseminate information within an organization. So following the above opinion, that the information system that you want to create is a combination of people, namely students, hardware, namely the devices used to record students, namely laptops or computers, the software used is a web browser to access the student book information system site, the communication network is the internet, and the data resources used for data collection are family cards, birth certificates, and report cards.

UML (Unified Modeling Language)
Is a "language" that has become the industry standard for visualizing, designing, and documenting software systems. UML offers a standard for designing models of a system. By using UML, we can create models for all types of software applications, where these applications can run on any hardware, operating system, and network, and are written in any programming language. In UML there are diagrams as follows:
1. Use case diagrams
2. Class diagrams
3. Statechart diagram
4. Activity diagrams
5. Sequence diagram
6. Collaboration diagrams
7. Component diagram
8. Deployment diagram

Web Browser
According to (Ade, 2020) explains that Web browsers are used to display and test program results. Some CSS3 and Html5 scripts exist that only support certain web browsers and do not support others, so using more than one web browser is better. Although for most browsers the latest version already supports almost all CSS3 and html5 features. Examples of Web browsers are Google Chrome, Mozilla Firefox, Microsoft Edge, Opera.

Database
According to (Khudri, Akhmad; Aristi, 2020) explains that the database is a medium for data storage so that it can be accessed easily and quickly. From the opinion above, it is following the purpose of making a web-based student book information system to make it easier to access student data when needed.

* Corresponding author
Student's Masterbook

The student main book is a collection of lists of names of students studying at the school. Notes in the student master book usually include student biodata and student report cards per semester. Usually, in terms of filling out the student's main book, it is done by the administrative officer at the school.

Software Development Model (Waterfall)

The Waterfall method provides systematic and sequential approaches to the development of information systems, also has several stages of the model in it. According to (Muthia, Nurul; Amalia, Hilda; Puspita, Ari; Fitria Lestari, 2019) explaining that the waterfall model used is communication, by conducting the initial project and the requirements needed in this study data collection methods. The second stage is planning, which is planning in this research planning is done by analyzing system requirements. The third stage is modeling by analyzing the design using UML diagrams. The fourth stage of construction is typing the program code and testing the program.

![Waterfall Model](image)

ERD (Entity Relationship Diagram)

According to (Efrinaldi, Saputra; Ropianto, 2020) explaining that ERD or Entity Relationship Diagram is a technique used to model the data needs of an organization, usually by systems analysts in the requirements analysis stage of a system development project.

**ERD constituent components:**

- **Entities**
  A collection of objects that can be uniquely identified or distinct from one another. The symbol of the entity is usually represented by a rectangle. In addition, there is also a "Weak Entity" which is symbolized by the image of a small rectangle inside a larger rectangle. It is called a weak entity. After all, it must relate directly to other entities because it cannot be uniquely identified.

- **Attributes**
  Each entity must have elements called attributes that function to describe the characteristics of the entity. Key attributes are things that distinguish attributes from entities.

- **Relationships**
  The relationship between some entities that come from different entity sets. The relationship image is represented by the rhombus symbol.

- **Line**
  The line that connects the attributes to shows the relationship between the entities on the ER diagram.

**Relationship Cardinality**

- **One to one (One to One)** Each element of Entity A corresponds at most to an element in Entity B. Likewise, each element of B relates to at most one element in Entity A.
- **One too many (One to Many)** Each element of Entity A corresponds to a maximum number of elements in Entity B. And conversely, each element of Entity B corresponds to at most one element in Entity A.
- **Many to one (Many to One)** Each element of Entity A corresponds to at most one element in Entity B. And vice versa each element of Entity B corresponds to a maximum of many elements in Entity A.
• Many to many (Many to Many) Each element of Entity A corresponds to the maximum number of elements in Entity B and vice versa.

**METHOD**
The research stages in Figure 2 below are a brief description of the development of the waterfall model

![Figure 2. The stages of the research used](image)

- **Needs analysis** The researcher collects all information on constraints and problems regarding the current system and collects all documents for the purposes of designing the student book information system. Researchers conduct questions and answers or interviews with resource persons, namely prospective students who register for school after which the school administration officer will enter the required data according to what is listed in the student parent book, and the officer will collect student report cards for inputting grades into the main book so that it is recorded as student progress. While studying at AMANAH Vocational School, the officer searches for student development data from the student master book as requested by the principal so that the principal can make decisions based on the student's progress data.

- **System design** after information and documents are obtained, the researcher develops several stages of the design needed to become an information system, namely making activity, use case diagrams, entity relationship diagrams, class diagrams, sequence diagrams and prototypes of student book information system designs to be developed into applications.

- **Implementation and Evaluation** after the prototype that has been developed into an application before being used, the next stage is testing the program codes to ensure the correctness of the program. This test is carried out to find errors caused by writing errors or programming errors. In testing the sales system, the research uses the black box testing method. This is done to find the position of the error (error) and ensure that the output produced is as desired.

**DISCUSSIONS**
Design and Build a School Main Book Information System (SMBIS) a School AMANAH using the waterfall method (Figure 1) is the waterfall model used in the first stage, namely communication with
The method of determining the initial project and the requirements needed in this research is the data collection method. The second stage is planning, namely planning in this research planning is done by analyzing system requirements. The third stage is modeling by analyzing the design using UML diagrams. The fourth stage of construction is typing the program code and testing the program. The last stage is Development, namely feedback from the program based on the testing carried out

* Corresponding author
A. Communication

At the communication stage, prospective students meet with registration officers who want to register the officer gives a brochure and explains about the facilities, the teaching process, costs, and so on related to the school brochure provided, if the prospective student agrees with what is explained then pays the registration fee according to what has been determined, the officer gives the registration form and notifies the files needed for registration that is:

a. Photocopy of ID card
b. Photocopy of birth certificate
c. Photocopy of Family Card
d. Photocopy of diploma

Figure 3 Activity Diagram of student registration
After that the officer collects the files of the prospective students and sorts them according to the type of file, then the officer enters the required data according to what is listed in the student master book, the officer collects student report cards for inputting grades into the main book so that it is recorded as a student's progress during school at Amanah Vocational School, the officer searches for student development data from the student master book as requested by the principal so that the principal can make decisions based on student development data.

**Figure 4 Activity Diagram of Student Report Data Collection**

**B. Planning**

At the planning stage, planning is carried out regarding the desired information system. Planning about what is needed and what can be done by the information system to be developed. In this research, planning is carried out by making
a system requirements analysis.

In the student book system, two users interact with each other in the system environment, namely:

**User Needs**
1. Data collection officer
2. Principal

The two users have differences in terms of interacting with the system and different information needs as well, as follows:

**System Requirements**
1. Users must log in first if they want to access the website by entering their username and password because each user has a menu according to what is needed
2. Users must log out after accessing the website
3. The system makes a recap of student data per group according to the selected school year
4. The system calculates the number of students
5. The system makes student progress reports per semester according to the selected students

**C. Modeling**

At the modeling stage, the information system that will be built is described using UML diagrams. Use case diagrams, Entity Relationship Diagrams, Class diagrams, Sequence Diagrams, Interface Design, and testing.

Starting from making Use case Diagrams, the following diagrams are used:
1. Use case diagrams

Activities carried out in one use case are the login use case in Figure 5 Data collection officers log into the system, data collection officers can perform, Manage the Academic Year, Manage Classes Manage Student Data, Manage Report Values, View student data recaps per group, Check student data
Figure 5 Use Case Diagram of the Student Parent Book

Logical Record Structure
Figure 6 Logical Record Structure

Figure 7 Class Diagram

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2. Sequence Diagram

![Sequence Diagram of Student Data Management](image)

Figure 8 Sequence Diagram of Student Data Management

3. Aktivitas Diagram

* Corresponding author

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D. Construction
At this stage, the design of the desired school book information system is made and testing is carried out on the program created.

1. Login Interface Design
The login page is used for user verification so that only registered users can run the app. The login page consists of username input and inputPassword then click the login button. Every new user who will use the system must first be registered in the user form.
Figure 9 Student Report Input Interface (Data Collection Officer)

Figure 10 Enter Student Data

* Corresponding author

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2. Student Report Input Interface

Figure 11 View Student Data

Figure 12 input lesson data

* Corresponding author
CONCLUSION
The design of the student master book system at A School AMANAH is one solution in the field of data management. From the research results, the authors make conclusions, make it easier for data collection officers in terms of managing student data that has been inputted, no need to carry the main book which is quite heavy, makes it easier for school principals in terms of finding the desired student data before making decisions, making it easier for data storage because already integrated with an online database that does not age, because the system is still in the form of a design, it is better if it is made into an application in the form of a web or desktop program, providing training to officers if the system will be created.

REFERENCES

* Corresponding author

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