MATICS : Jurnal Ilmu Komputer dan Teknologi Informasi ISSN : 1978-161X(p); 2477-2550(e)
Volume 16, No. 2(2024), pp 62-68 DOI : 10.18860/mat.v16i2.27614
Received : June 13th 2024; **Accepted** : August 28th 2024 ; **Avalaible Online** : September 20th 2024

Implementation of the Fast Method in Android-Based New Student Registration Application

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***Abstract*— As the information and technology sectors develop, Android smartphones become a means of disseminating information that offers many benefits. In the current era, information technology has a huge impact on every aspect of daily life. Improvements in information technology in the education sector will become more user-friendly. One of them is SMP N 5 Medan, which requires IT assistance to register new students who still use paper forms. The current system presents challenges as it hinders the collection of data and the creation of reports. The goal of this research is to create an Android application that prospective students can use to register and aid SMPN 5 Medan in tracking their registration data. Application development in this research uses the FAST method, which includes scope definition, problem analysis, requirements analysis, logical design, decision analysis, physical design and integration, development and testing, and delivery. The developed application facilitates information access and registration, as well as aids SMP N 5 Medan in generating new student registration reports.**

***Index Terms*— Android, Application, FAST Method, Registration, Student.**

I. INTRODUCTION

Information technology currently information technology has a significant impact on the business sector. Information technology also impacts every aspect of life. The development of this information technology will benefit effectiveness, productivity, and competitiveness [1]. The information technology employed uses computer technology to process data [2].

Manuscript received May 13, 2024. This work was supported in part by Informatics Engineering Department of Maulana Malik Ibrahim Islamic State University.

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With the advancement of technology and information, an Android smartphone is a versatile device that provides numerous conveniences for accessing and presenting information. The internet offers the advantages of rapidity and ease. In today's age of information technology, it has become essential for everyday living, including its role in education. SMP N 5 Medan is a junior high school located in Medan City. SMP N 5 Medan still uses a non-computerized method for registering new students. Prospective students must personally visit the school to gather information and complete the new student registration process. Prospective students are required to complete the registration form and gather the necessary documents for the registration process. However, this process continues to face numerous issues and barriers. Prospective students must allocate a significant amount of time and financial resources and exert substantial effort to complete the registration procedure. Additionally, SMP N 5 Medan encounters challenges in efficiently processing the data for new student registrations.

The purpose of this project was to develop an Android-based application for registering new students and resolving issues at SMP N 5 Medan. We developed the application using the Kodular framework and Airtable database, then implemented it using the FAST (Framework for the Applications of System Thinking) methodology. This methodology encompasses the following stages: scope definition, problem analysis, requirements analysis, logical design, decision analysis, physical design and integration, construction and testing, and installation and delivery.

A 2020 research study found that the Ichtus Jakarta school still processes new student admissions manually. This involves parents physically visiting the school to register their children, fill out multiple forms, and provide all the necessary data. This manual process increases the likelihood of errors occurring. As a result, the authors used the MySQL database as a server and the PHP programming language to create a novel student admissions information system. This research is expected to assist new admissions staff and prospective students in

the enrollment process, according to the Ichtus Jakarta School [3].

A similar study in 2020 focused on the registration of potential students at Harapan Jaya High School, which still uses manuals and distributes forms or brochures to prospective students. The school uses Microsoft Word to track potential students, but it still faces numerous instances of fraud or data loss. In response to the issues, the authors created a web-based registration information system to make it easier for schools and potential students to handle registration and eliminate fraudulent data loss. The author uses PHP and MySQL to build a website using the prototype paradigm. According to the findings of this study, Harapan Jaya High School's web-based new student registration information system can make the registration process more convenient and save time, so students don't have to waste time getting to school [4].

The lack of information provided to prospective new students regarding the registration procedure for new students, including the registration flow, information on registration fees, and others, was the subject of a similar study in 2022. We created this information system to provide prospective new students with online registration information, eliminating the need for them to physically visit the school. We use the waterfall design methodology, which includes analysis, system design, coding, and testing, to develop a new web-based student registration information system, using the PHP programming language and MySQL as the database server. With the aid of this brand-new web-based student registration information system, prospective new students will be able to receive and access online registration information, including details on prerequisites, test dates, registration costs, and graduation announcements, as well as features on test cards that they can print out themselves. This will then be required for the selection exam. In addition to assisting the school in generating online reports for new students, this will enhance the efficiency of information distribution and the processing of new student admission data [5].

Unlike previous studies with similar characteristics, the author develops an Android-based application that is accessible online through a smartphone. The authors of this study use the FAST (Framework for the Applications of System Thinking) approach in their system development methodology. This approach consists of several stages, namely scope definition, problem analysis, requirements analysis, logical design, decision analysis, physical design and integration, construction and testing, and installation and delivery. The authors employ the Kodular framework and the Airtable database to develop Android applications. With an Android smartphone, prospective students can use this application to enroll, obtain information, and submit reports for new student registrations at SMP N 5 Medan.

II. METHODS

A. *System Development Method*

The author of this paper models the system using diagrams created using the Unified Modeling Language (UML) according to the FAST (Framework For The Applications of System Thinking) technique [6]. FAST (Framework for the Application of System Thinking) is a framework that represents a system development model. The FAST model is a component of agile modeling that aids in the quick creation of systems and applications, as well as the analysis and design of object-oriented and structured systems [7].

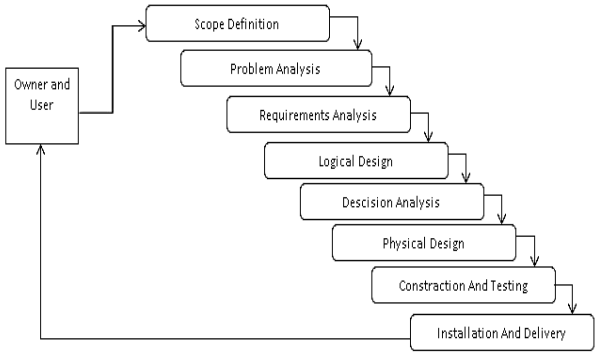

Fig. 1. The stages of the FAST method [8]

This study employs the FAST approach in seven stages [9]:

- Scope Definition. At this stage, the researcher establishes the parameters of the system-building process as well as the problem's scope and the application development process' goals.
- Problem Analysis. At this stage, researchers examine the functioning system and then analyze it to identify any issues that may arise as potential sources of information for system development.
- Requirement Analysis. Researchers are now analyzing the system's needs, including both functional and non-functional requirements.
- Logical Desain. In this phase, requirements are created, and the system is modeled using a variety of UML (Unified Modeling Language) diagrams.
- Decision Analysis. This phase specifies what hardware and software are incorporated into the developed system.
- Physical Desain. At this stage, the system interface and database design are done.
- Construction and Testing. The system development stage follows the completion of the developed system and is when the system is tested further.

Weaknesses of the FAST method:

- The phases used are too many and take a long time
- Each stage requires proper development
- Does not have specific standards for user satisfaction levels

B. *Method of Collecting Data*

Data collection, which begins with obtaining the data that serves as the study's main objective, is the main technique used in research. Of course, without knowledge of data collection techniques, researchers

cannot gather data that can enhance the current standards [10].

To collect the data needed to support this research, the author took the following actions:

- Observation. The author conducted in-person observations at the study site to watch the registration and admissions procedure for new students and to hunt for issues that cropped up during this process at SMP N 5 Medan.
- Interview. The process of registering and accepting new students, as well as the issues that have arisen in that process, were topics of discussion between the author, SMP N 5 Medan, and prospective students.
- Literature review. The author searches books, journals, the internet, and other sources for references to the theories required for research tasks.

III. Result and Discussion

A. *Scope Definition*

Both prospective students and the SMP N 5 Medan admin have access to the new student registration application. Prospective students can create an account by providing the necessary information. Prospective students can access the application by logging in with their registered username and password after creating an account. After successfully logging in, the prospective student can register by providing their personal and parental information. The information available to prospective students also covers the registration procedure for new students at SMP N 5 Medan.

Administrators can log in to the program using the provided username and password. The administrator can access prospective student registration information and generate reports on the registration of prospective students after successfully logging in. Additionally, the administrator can process registration-related data. They can add, modify, and delete data.

B. *Problem Analysis*

The SMP N 5 Medan system for prospective student registration still employs a manual process. Prospective students must complete the registration process in person at SMP N 5 Medan. SMP N 5 Medan has previously provided a form for prospective students to fill out, containing the necessary information to complete the registration procedure. This process still presents problems or barriers. These issues consist of:

- The registration process for prospective students at SMP N 5 Medan requires a lot of money, effort and time.
- It is difficult for prospective students to get registration information at SMP N 5 Medan.
- The process of creating reports on new student registration at SMP N 5 Medan presents challenges.
- Checking the completed registration information is challenging.
- The new student registration form necessitates physical storage and space.

C. *Requirement Analysis*

This research's requirements analysis consists of functional and non-functional requirements. Functional requirements include the program's ability to complete the registration process and manage registration information, which is essential for its functionality. The application has the capability to neatly store data, thereby simplifying its retrieval. Applications can generate registration reports for new students. Meanwhile, non-functional requirements include that the application must be simple to install on an Android smartphone, simple to use, and have training and socialization materials available for users. We must address these non-functional requirements.

D. *Logical Desain*

The process of system modeling using UML diagrams is now underway. We employ various UML diagrams such as use case diagrams, sequence diagrams, activity diagrams, and class diagrams.

- Use Case Diagram

  A use case diagram is a representation of some or all of the system's actors with the goal of identifying how they interact. When describing the anticipated functionality of the system, use case diagrams emphasize what the system does, not how it does it. An ellipse with the name of the operation inside serves as the description for the use case. A straight line connects the actor performing the action to the use case diagram [11]. Figure 2 displays use case diagrams.

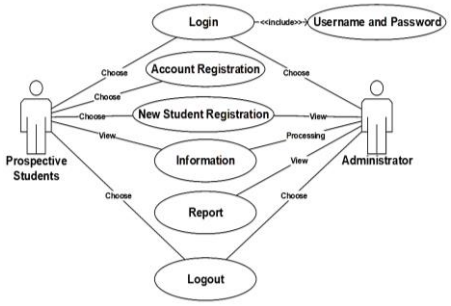

Fig. 2. Use Case Diagram

- Sequence Diagram

  Sequence diagrams depict the interactions between items within and outside the system as messages that unfold over time. When describing a scenario or series of actions conducted in reaction to an event to create a specific output, sequence diagrams are frequently employed [12]. Figure 3 displays sequence diagrams.

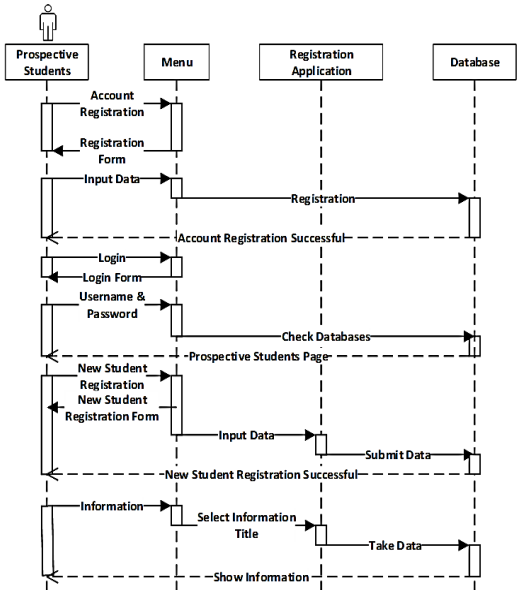

Fig. 3. Sequence Diagram

- Activity Diagram

  The design phases of use case diagrams lead to the creation of activity diagrams. An "activity diagram" is a flow diagram for the activities that occur within a system [13]. Figure 4 displays activity diagrams.

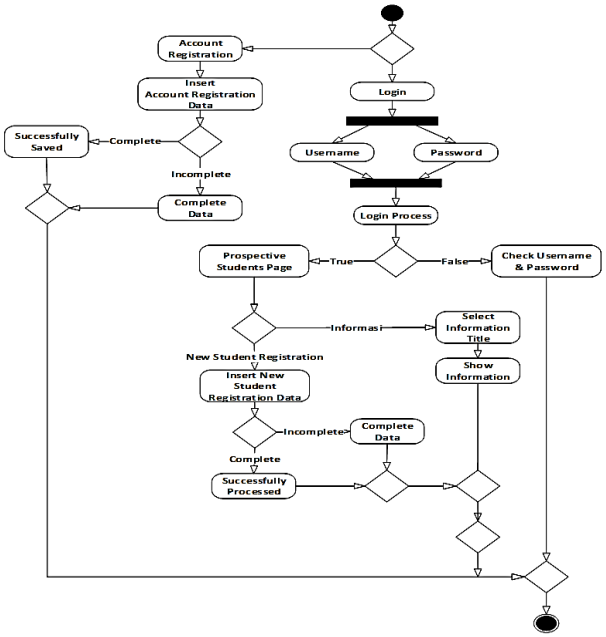

Fig. 4. Activity Diagram

- Class Diagram

  The fundamental basis of object-oriented development and design is in the class diagram, which serves as a blueprint that, when instantiated, generates an object. Class offers functions to alter the state of a system while also describing the state of the system. Class diagrams also detail the composition and description of classes, packages, and objects, as well as their interrelationships via inheritance, association, and other mechanisms [14]. The registration application's classes or tables include administrative tables, user tables, registration tables, and information tables. Figure 5 displays class diagrams.

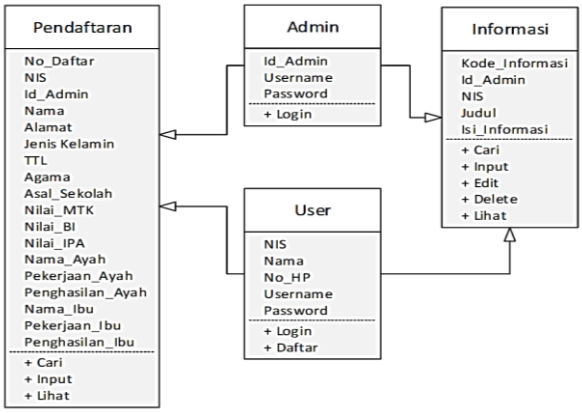

Fig. 5. Class Diagram

E. *Decision Analysis*

We construct the system with facilities and infrastructure, including system hardware and software requirements, based on the results of our system design.

- Specifications of the hardware. The Acer Aspire E5-471G-5251 laptop with its specified features The system includes an Intel Core i5-4210U processor, an NVIDIA GeForce 820M GPU with 2GB of memory, 4GB of DDR3 RAM, and an ASUS Zenfone Max Pro 1 Android smartphone with its respective characteristics. The device is equipped with Qualcomm Technologies, Inc. SDM636 processor, Adreno ™ 509 GPU, 6 GB of RAM, and 16 GB of internal memory.
- Software Specifications. The software and tools being used are Windows 10 Pro, Microsoft Word 2019, Kodular framework, Airtable database, Microsoft Visio 2019, Mozilla Firefox, and Os 9.1 Pie.

F. *Physical Desain*

The physical design step comes next. At this point, we create a system interface design. The interface design includes an account registration menu, login menu, new student registration menu, information menu, and report menu.

- Account Registration Menu

  This website lets prospective students create an account and log in. In figure 6, you can see the page display.

Fig. 6. Account Registration Page

- Login Menu
  Prospective students must first log in with a username and password in order to access the registration application. In figure 7, you can see the page display.

Figure 7. Login Page

- New Student Registration Menu
  On this page, prospective students can register new pupils by providing predefined data, including personal and parental information. In Figure 8, you can see the page display.

Fig. 8. New Student Registration Page

- Information Page
  Potential students will see the administrator's edited data on this page. It entails input, editing, deletion, and viewing. In Figure 9, you can see the page display.

Fig. 9. Information Page

- Report Menu
  On this website, the administrator can view statistics about potential students who have registered. Figure 10 illustrates the page display.

Fig. 10. Report Page

G. *Construction and Testing*

The construction step is the implementation of program codes into computer languages, as well as the linking of apps and databases using the Kodular framework and the Airtable database. Kodular is a website that provides tools for creating Android applications using block programming. In other words, developers don't need to type program code manually to create Android applications. Airtable is a spreadsheet-database hybrid, with database features but applied to spreadsheets. Fields in an Airtable table are like cells in a spreadsheet, but have types such as 'checkbox', 'phone number', and 'drop-down list'. Users can create databases, set column types, add records, connect tables to each other, collaborate, sort records and publish views to external websites.

Using Airtable as a database when creating Android applications using the Kodular framework can make it easier for developers to process data. The Kodular and Airtable frameworks are web-based tools so they can be accessed online using a browser. Airtable has a spreadsheet-like appearance consisting of columns and rows so that it can be easily understood by developers. In integrating Airtable with the Kodular framework, an API Key and Base ID are needed in Airtable which are then connected to the Kodular framework. So Airtable can be used as a database in developing Android applications using the Kodular framework

After completion, we will test the system. We conducted the testing using the black box testing approach. Black box testing is a type of testing approach that focuses on the product's functional specifics. The tests operate by disregarding the control layout, concentrating on the data region. While using the black box testing method, developers can create numerous information conditions that satisfy all criteria for all functional limitations on the framework [15]. Table 1 displays the application testing results.

Table 1. Blackbox Testing Result

Testing Module	Testing Procedure	Output	Result
Account Registration	- Open application - Select the account registration menu - Enter the complete account registration data - Click register	Account registration successful	Valid
Login	- Open application - Enter username “10900001” and password “123456” - Click login	Login success and enter the application	Valid
New student registration	- Open application - Login - Enter the complete new student registration data - Click register	New student registration successful	Valid

After testing, the author created a questionnaire to obtain evaluation results from the use of the application that had been built. Questionnaires were given to ten prospective new students and SMP N 5 Medan. The questionnaire instrument created is related to the ease of use of the application, the appearance of the application, and the performance of the application in helping to simplify the process of registering new students and recapitulating prospective new students who have registered. Figure 11, Figure 12, and Figure 13 are the results of the questionnaire.

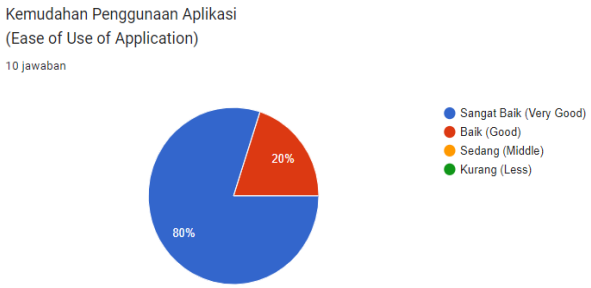

Fig. 11. Report Page

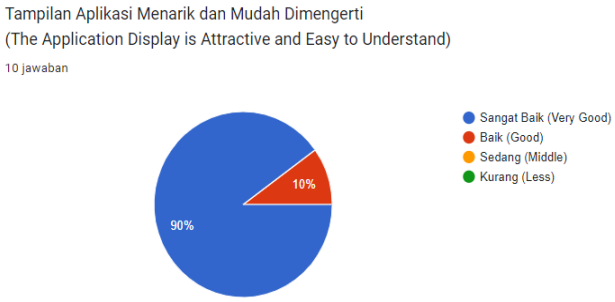

Fig. 12. Report Page

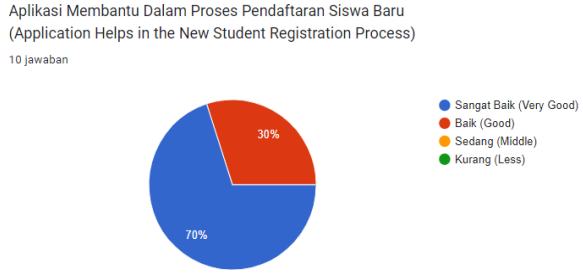

Fig. 13. Report Page

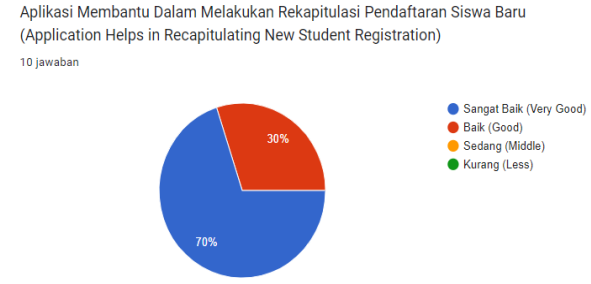

Fig. 14. Report Page

IV. Conclusion

The FAST model system development method, used in this research, includes structured and complex stages in system development to create applications that meet user needs. These stages include scope definition, problem analysis, requirements analysis, logical design, decision analysis, physical design and integration, development and testing. The author conducted a survey on the application's ease of use, its attractive and easy-to-understand appearance, its benefits in facilitating the registration of new students, and its ease in recapitulating the registration process. Out of the ten respondents who completed the questionnaire form, 80% rated the application's ease of use as very good, while 20% rated it as good. 90% of respondents answered very well, and 10% answered well regarding the application's appearance. 70% of respondents answered very well, and 30% answered well regarding the application's benefits in helping to make it easier to register new students. 70% of respondents answered very well, while 30% answered well about the application's ability to simplify the process of recapitulating new student registration. We can conclude that 77.5% of the respondents provided positive feedback about the application's ease of use, appearance, benefits for streamlining the new student registration process, and its ability to assist in recapitulating new student registration. This means that the application can assist prospective students in registering new students using an Android smartphone and assist SMP N 5 Medan in streamlining the new student registration process. This newly developed student registration application has the potential to transform the manual student registration process into an information technology-based with smartphone android.

For further research, you can develop the application by adding a notification feature, uploading files or photos needed in the registration process as well as a location sensor feature for prospective new students that is connected to the Google MAP application to register using Zonasi criteria.

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