

Understanding of Requirements Engineering using The Three Dimensions of Requirements Engineering Method in Platform Development

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Abstract

Requirements engineering is a critical activity in a development system project, the increasing need for complexity of software development and the heterogeneity of stakeholders in motivating the development of methods and the need to evaluate the engineering requirements needed and aim to lead to a large scale. This study presents a paper in an empirical form that aims to identify and understand the characteristics of the advantages and limitations of the developed platform so that we can know the challenges that will be faced, such as expectations and input from experts for the development of the platform that we develop so that it can be in accordance with what users expect. We conducted this research with the aim of understanding the engineering requirements in the research we developed by utilizing the three dimensions of the requirements engineering method, which consists of requirement elicitation, requirement specification, and requirement validation and verification. The research we conducted managed to understand the stages of needs engineering by producing many documents that help the platform development process. We get the most important UI value from attractiveness, clarity, efficiency, accuracy, stimulation, and novelty, which is 63.2% with a very interest rating, 55.6 with a very interest rating, 57.9% with a very interest rating, 44.4% with a balanced rating between interesting and very interest, 52.6% with an interesting rating, 42.1% with a very interesting rating. We get product values consisting of attractiveness, clarity, efficiency, accuracy, stimulation, and novelty, namely 68.4% with a very interest rating, 52.6% with an interesting rating, 52.6% with a very interest rating, 47.4% with a balanced rating between interesting and very interest, 47.4% with a balanced rating between interesting and very interest.

Keywords: requirements engineering, requirement elicitation, requirement specification, requirement validation and verification, software engineering

I. INTRODUCTION

In the era of the industrial revolution 4.0, all activities focus on technological developments—IoT-based systems, Robotics, Cloud systems, to platform development in various fields. The platform is a means that brings together two or more parties to conduct meetings and transactions to advertise their products and services [1]. The success of the platform's development is judged by how satisfied users are with the information presented on the platform [2]. The popularity of platform development has made various fields use the platform in their business processes, such as matchmaking services bureaus that bring together two couples or platforms that bring together sellers and buyers online to health platforms that bring together patients and doctors to conduct health consultations tan online. However, the fact that many failures in the development of a platform are due to inconsistencies, incompleteness, or untruthfulness of a specification need [3].

Software development is becoming increasingly popular because it can provide process automation and offers, as well as providing features that match the user's functionality. The software also provides the introduction of new technologies and also provides a service to the user [4]. In software development, there is a process of engineering software needs. Software needs engineering is an approach process in building software where there are several processes, namely collecting, analyzing and applying all the requirements of a software product [5]. In engineering software needs, there is one method, namely the three dimensions of engineering requirements. The three dimensions of the requirements engineering method it is divided into three processes, namely: elicitation, specification, validation and verification [6]. The engineering stage of software needs is an important stage in the software development process because, at this stage, it has a significant impact on the results of the product to be developed [7].

Previous research designed an agricultural information guide application for farmers by applying the user-centered requirements engineering method to analyze the design of the needs used in the development of the

application [8]. The results of this study successfully describe the value of good quality of the application based on user needs and the accuracy of the information. Other research applies the Kotonya and Sommerville process model methods in creating an engineering need for web-based learning management system applications [9]. The results of this study have succeeded in helping to communicate the overall picture of the system used to users at the validation stage. Other research uses personal methods to increase user understanding of the process of extracting needs. This study aims to use the persona method by modifying the validation process of the user persona itself with the results obtained, namely making it easier for the user persona to eliminate what needs to be developed in a system and focusing on development based on the user.

Researchers are developing a prototype of the elderly control platform with the aim of this development in order to help the welfare of the elderly in the system of life and social livelihood, both material and spiritual, which is overwhelmed by a sense of safety, decency, and inner peace that has been regulated in the Law of the Republic of Indonesia Number 13 of 1998 concerning Elderly Welfare. With this regulation, a platform was built to realize optimal service by utilizing technology to make it easier for medical personnel, patients and the elderly community and patients' families to monitor the results of care and health developments of patients. To address the failures in platform development as previously described, researchers will focus on understanding the engineering needs of developing an elderly monitoring platform with the help of the three dimensions of requirements engineering. The contribution to the research is how important it is to understand engineering needs in platform development with the help of the three dimensions of engineering requirements.

II. METHOD

The focus of this research is to understand the importance of an engineering need. Needs engineering has the objective of analyzing, documenting and validating the requirements of the system to be developed [9]. This study will utilize the three dimensions of engineering requirements shown in Figure 1 to help focus the research to be carried out.

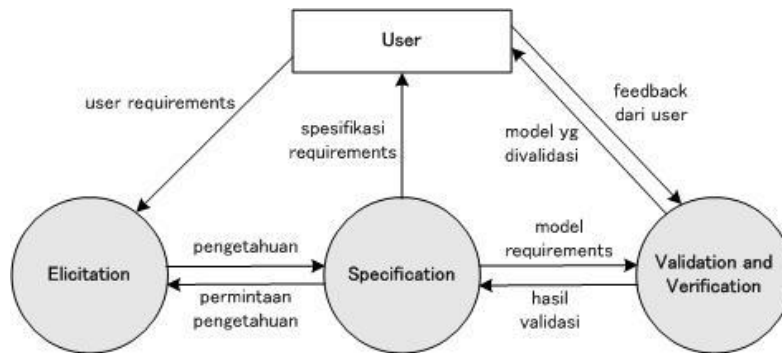


Figure 1 The Three Dimensions Of Engineering Requirements [3]

Engineering needs will focus on the user with the engineering process carried out there are three stages as follows;

A. Requirements Elicitation

Elicitation requirements are intended to summarize all information about the needs and objectives of the business and project [10]. Elicitation requirements relate to learning and understanding the needs of users and project sponsors with the ultimate goal of communicating these needs to system developers [11]. Figure 2 details the flow of the requirements elimination process.

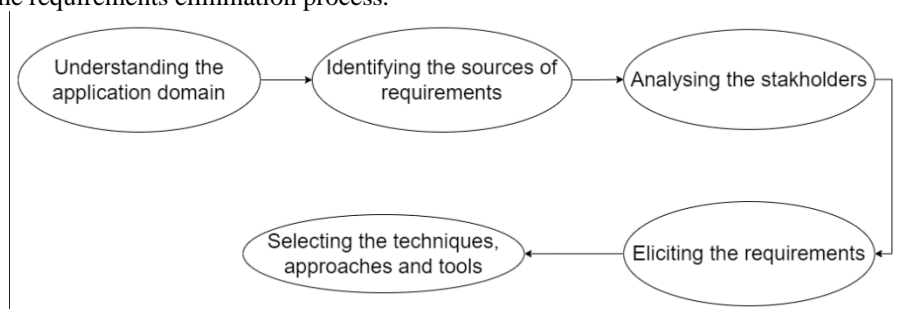


Figure 2 Requirements elicitation stages

This process involves a series of activities that allow communication, prioritization, negotiation to collaboration with relevant stakeholders. To start communication at this stage, there are several that must be understood, namely;

- Understanding the application domain
It is very important when starting the *requirements elicitation* process with the aim of investigating and examining the domain of the problem at hand. Not only to the system to be developed but also includes organizational, social and political aspects that are also related to the system itself by overcoming the obstacles that may be applied to the system and its development.
- Identifying the sources of requirements
Identifying the source of needs is important because there are many sources that are possible in addition to clear sources such as sources, customers, or material experts, with each providing different information.
- Analysis the stakeholders
Stakeholders have not escaped the analysis of this process. It needs to be analyzed so that stakeholders who do not have the same interests will not be affected in the same way by the development process.
- Selecting the techniques, approaches and tools
This stage is aimed at choosing good techniques and tools that are used during the system development process. Although some may suggest that only one elicitation technique is applied in general, it is undeniable that some techniques are used and suitable for some specific projects.
- Eliciting the requirements
In this stage, it is very important to establish the level of scope of the system that investigates in detail the needs and desires of stakeholders.



Figure 3 requirements elicitation technique

Techniques that are popularly used at this stage are based on research [12] based on Figure 3, namely Interviews, Document Analysis and Interface Analysis. Interviewing is indeed a traditional and commonly used technique because, basically, interviews are informational, and their effectiveness depends largely on the quality of interaction among participants [11]. Document analysis is a processing activity in analyzing all basic documents that are needed and in accordance with the information system being carried out [13]. According to [14], document analysis is a method used to carry out the identification of quality gaps between recommendations and practice. Research [15] explained that document analysis is research whose process is quantitative, which requires researchers to interpret documents to get the sound and meaning of each assessment topic. Conducting a document analysis and then combining the results of discussions from the team or the results of interview transcripts is carried out the analysis.

Research [16] explains that interface Analysis has a function to identify where, what, why, how, and for whom the information is provided between solution boundaries or solution components. Interface analysis is also an elicitation technique in business analysis that can help identify interfaces between solutions to determine the requirements in ensuring that components interact with each other effectively. This can be useful for determining the requirements for interoperability. This type of Interface Analysis includes analysis of user interfaces, both software and hardware so that it can help in determining what is needed and what is not needed.

B. Requirements Specification

Requirements specification is a document stage that explains what the software will do and how the expected performance will be and also discusses the functionality that the product needs to meet all stakeholder needs [17]. This specification contains the features and functions that the customer wants and does not discuss how the development method is at all. Requirements specification documents can contain function requirements, non-

functional requirements, performance requirements, external interface requirements, design constraints, or quality requirements [3]. In general, the models commonly used at this stage are ER diagrams and Data Flow Diagrams.

Entity-Relationship diagram or ER diagram is used in this study [18] for process facilities in the role of the database with the basic concept of the entity or entity is a collection of objects that can be identified differently or uniquely, and relationships or relationships are the number of interconnected entities derived from a collection of different entities, re LASI is also divided into three types, namely, one to one: each entity has only a relationship to one other entity, one to many: one entity has relationships with several entities, and many to many: each entity can have a relationship with other entities. Entity-Relationship [19] diagrams can display the database in the form of visual graphic objects.

A data flow diagram or DFD is a diagram that describes the flow of data coming from a process or information system. The data flow diagram also contains information about the input and output results of each entity and its processes. In its function the Data flow diagram has three functions for software development purposes, namely, explaining the system design, describing the system, and describing the model. Meanwhile, the way to create a data flow diagram [20] consists of preparing the data store, determining the number of inputs and outputs, and the relationships contained in the data store

C. Requirements Validation and Verification

This stage of requirements validation and verification ensures that the requirements made for the system are in accordance with the needs of the user and the expectations of certain parties [21]. This checking process will guarantee that the statement of needs that has been defined and specified is true, accurate and complete. It is also important to do so because it avoids mistakes in determining the needs of the entire process that follows.

Requirements validation [22] is the stage of checking the requirements set forth for development and determining the system needs that the user really expects to check the requirements in the process to validate the requirements that are usually used to perform error checks at the beginning of the balance is due to avoid errors in the process which if something goes wrong will affect the length of time in the development process. The validation process carried out includes: a completeness check, consistency check, validity check, realism check, ambiguity check, and verification.

Verification and validation is the process of checking whether the software system meets the specification standards and is in accordance with the required objectives. Barry hoemn explained the verification and validation as follows:

- Verification
Verification is the process of checking whether the software can run without any bugs. It is a process to ensure that the software in development is correct or not; in short, verification is static testing.
- Validation
Validation is the process of checking whether the software is up to standard or has reached high requirements. This is the process of checking software validation that is developed is exactly what is expected. In short, validation is dynamic testing.

III. RESULTS AND DISCUSSION

Before discussing the results obtained, the researcher will explain the development of the platform carried out. The purpose of developing this elderly monitoring platform is to help children who have a busy schedule to stay intensely monitoring their elderly parents. The author [23] designed an elderly health condition monitoring tool that was made portable, had a good track record with IoT access and utilized smartphones as a medium for visualization applications for the display of patients' health conditions. By combining body temperature detection and pulse detection sensors that utilize the Arduino nano microcontroller as a tool. The results obtained show that the tools made are very helpful for their children who are far from their parents in monitoring the health condition of the elderly in detail. The author [24] developed an elderly health monitoring information system with the aim of preventing the elderly from experiencing fatal diseases due to the lack of information received by the elderly's sons and daughters. The system developed can be monitored in healthcare and get a diagnosis of diseases suffered by the elderly. The results obtained are an elderly health monitoring information system with several functions that include monitoring the elderly in the system, the elderly registration process, providing daily and monthly reports and so on.

The development of this research utilizes platforms and technologies based on IoT, AI, and Big Data. The platform is designed in such a way as to make it easier to monitor the elderly. Not just a platform, researchers also design products that are used as a tool to obtain elderly health information, which will later be sent to the platform to notify the condition of the elderly at that time. The products that are designed consist of De1.0, which is a modified smartwatch with the intention that the elderly who use it are comfortable. Equipped with sensors to detect elderly activities such as footsteps, sleep quality, heart rate, and blood pressure. In addition, the De1.0

program can provide alerts sent to the platform if unwanted things happen, such as the elderly falling or fainting until the elderly are out of reach of the house.

Another product there is De2.0, a smart bottle modified as a data transmitter on the nutrition of elderly beverages and equipped with a sensor to find out the amount of total fat, saturated fat, protein, total carbohydrates, sugar and salt in the drink that will be included in this De2.0. The product design is illustrated. Yes, the function is the same as De2.0, but the implementation of its functions is different. De3.0 products are smart scales modified as data transmitters on elderly food nutrition. Equipped with sensors to find out the amount of total fat, saturated fat, protein, total carbohydrate, sugar and salt present in the food. Product Design is illustrated on. It will also consider the elements of engineering needs in software engineering development. Therefore, this research will try to understand the dimensions that exist in an engineering need in the process of creating a platform.

A. Requirements Elicitation

The first stage carried out in this study is to identify the existing problem domain. Relating to that, this stage of elicitation resulted in the discovery of a possible relationship between building solutions and business process needs illustrated in this figure. The correlation between the information and also the interviews conducted results in a relationship between users and stakeholders.

1. Understanding the application domain

Based on the results of interviews conducted and analysis of existing literature studies, it is determined that the domain of engineering this need is how to help children who have daily activities which have an obligation to take care of elderly parents by utilizing technological developments. Then how to mix and match machine learning related to data management and build the ability to adapt and expand the needs of g development teams in the development of this platform.

2. Identifying the sources of requirements

According to the identification carried out, platform development requires sources of needs in development by identifying the sources needed that are presented in Table 1. In this development process, at least nine sources are needed who will interact on this platform. The roles of each source are divided into three types: users, clients and partners. Users here are intended to direct use the platform and products of this study. Clients here are meant to provide capital while investing in platforms and products. Partners are referred to here as workmates who are to provide their services.

Table 1 Identifying the sources of requirements

Source	Kind		
	Potential	User	Client
Patient Guardian		X	
Nurse		X	
Doctor		X	
Investor			X
Nutritionist		X	
Administrator		X	
Nursing home owners			X
Pharmacy			X
Expedition			X

3. Analysis the stakeholders

The stakeholder analysis explains the roles contained in the platform containing stakeholders, stakes in the project, and. What the project expects the stakeholders to the platform, which is useful in the platform development process. Table 2 details the results of stakeholder analysis where the pointed Stake in the project explains how stakeholders play a role.

Table 2 Analysis of the stakeholders

Stakeholders	Stake in the project	What does the project expect the stakeholder to platform
Patient Guardian	People who monitor the product	<ul style="list-style-type: none"> Managing Profiles View all health data from guardian patients View health data by category
Nurse	<ul style="list-style-type: none"> In charge of monitoring elderly patients Expertise in caring for elderly patients 	<ul style="list-style-type: none"> Processing nurse profiles Processing patient activity data Processing patient data Processing patient health data

		<ul style="list-style-type: none"> ● Processing the provision of food ● View reviews from guardians
Doctor	In charge of examining elderly patients	<ul style="list-style-type: none"> ● Processing a doctor's profile ● Manage patient health data ● Manage patient diagnosis data
Investor	Providing funds for the development of the platform	<ul style="list-style-type: none"> ● Processing investor profiles ● See the progress of the invested project
Nutritionist	In charge of providing nutritional recommendations for elderly patients	<ul style="list-style-type: none"> ● Providing services, nutritional consultations and procedures to patients ● Determining and planning the patient's diet ● Checking the quality of food and beverages
Administrator	Manage and supervise the platform	<ul style="list-style-type: none"> ● Manage data on patient guardians, nurses, doctors, investors, nutritionists and care homes ● Manage Dejaga.in products ● Manage transaction data Dejaga.in
Nursing home owner	Manage and supervise nursing home activities	<ul style="list-style-type: none"> ● Processing data on patients, employees, medical equipment, employees, home inventory ● Open a discussion forum for patient guardians
Pharmacy	Providing medicines and medical equipment	Manage data on patients' drug and medical equipment needs
Expedition	In charge of delivering goods	Manage order data

4. Selecting the techniques, approaches and tools

In techniques approaches and tools choosing techniques and tools used in the platform system development process, by explaining the steps in the elicitation process, there are several processes such as understanding the application domain, identifying sources, analyzing stakeholders, selecting techniques and determining requirements as described in *Table 3*.

Table 3 Selecting techniques and tools.

Step – Rare Elicitation Process						
	Domain Analysis	Interview	Observation	Brainstorming	Analysis	Scenario
Understand application domains	X	X	X		X	X
Identify the source		X		X		
Analyzing stakeholders		X				
Choosing a technique	X					
Determining Requirements	X	X	X	X		

At the elicitation requirement stage, which can be concluded from several problems, namely the development of a platform that has an application domain, namely how to help children who have daily activities and have obligations in caring for elderly parents by utilizing technological developments. Ology. Platform development requires several sources of need in platform development by identifying the sources needed, such as users, clients and partners. In platform development, there are stages of stakeholder analysis that explain the roles in the platform that contains stakeholders, Stake in the project, and. What the project expects the stakeholders to a platform which are useful in the platform development process. In the next stage, there are techniques, approaches and tools to choose the techniques and tools used in the platform system development process by explaining the steps in the elicitation process, and there are several processes such as understanding the application domain, identifying sources, analyzing stakeholders, choosing techniques and determining requirements.

5. Eliciting the requirements

This stage establishes the level of scope of the system that investigates in detail the needs and desires of stakeholders. The level of system scope has been presented in Table 2. And the details of the needs are presented in Table 4.

B. Requirements Specification

This stage will describe in more detail the results of the requirements elicitation. Where this section further specifies needs such as platform flow, details of functional requirements, non-functional requirements, ERD and DFD modeling of the platform development. The platform flow is illustrated in Figure 4, which explains how platform usage works.

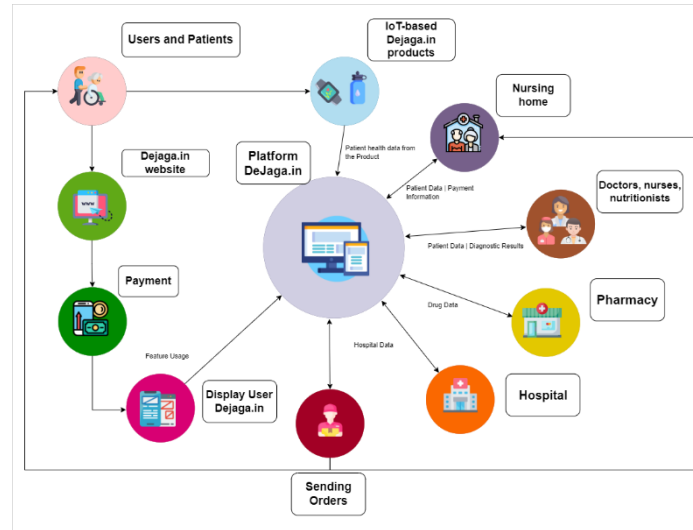


Figure 4 Platform flow

Here's a detailed description of the platform flow.

1. User and patient are people who use the DeJaga.in a platform where the user is in the form of family or relatives of the patient/elderly.
2. The website DeJaga.in, is used when users register by filling out the form that has been provided by the DeJaga.in the party to join the platform.
3. Payment made after the user fills out the form on the website DeJaga.in this payment includes products from DeJaga.in
4. The user displays DeJaga.in, after completing the payment, the user will get an email notification in the form of a unique code that is used to enter the user display DeJaga.in from here the user can use the existing features of the DeJaga.in platform
5. DeJaga.in In this case when the user has made a payment and joins the DeJaga.in, these IoT products will be sent directly for use by patients/elderly in the form of De.1.0, De.2.0, and De.3.0 products
6. A nursing home is a partner of the DeJaga.in platform that can be a place for the elderly to live, in this case, patients can use the services of a nursing home partner as a place for the elderly to live or can live in their own home.
7. Doctors, Nurses, and Nutritionists are partners in the DeJaga.in a platform in charge of tracking the health and nutrition obtained by patients/the elderly.
8. Pharmacy is a partner of the DeJaga.in a platform which is used as a place to buy medicines for patients / elderly with prescription records from doctors who are partners of the DeJaga.in a platform.
9. The hospital is a partner of the DeJaga.in platform that patients / elderly use when experiencing an urgent.
10. Sending Orders, is a partner of the DeJaga.in platform that is used to deliver drug orders from pharmacies that have been ordered by users through the DeJaga.in feature, in this case it can be delivered directly to the user or directly to the nursing home

Functional needs are intended to find out what processes or services must be provided by the system. Non-functional needs are aimed at emphasizing the properties owned by the system. Table 4 details functional and non-functional needs designed based on the results of previous analyses.

Table 4 Functional requirements and Non fungsional

No	Platform Actors/ Users	Necessity	
		Functional	Non-functional
1	Patient/Elderly	Users Using the AI Products provided	● AI DeJaga.in Products

			<ul style="list-style-type: none"> ● Internet Network
2	User (Guardian/Family)	<ul style="list-style-type: none"> ● Users can Login user display platform ● Users can view patient health data ● Users can view and read health data by category ● Users can see the results of the patient's health diagnosis ● Users can consult with a doctor ● Users can manage profiles ● Users can provide reviews of the platform ● Users can log out of the platform 	<ul style="list-style-type: none"> ● Mobile phone with android KitKat 4.4.x and iOS operating system specifications ● Connect to the internet network
3	Doctor	<ul style="list-style-type: none"> ● Users can login the doctor display platform ● Users can manage data from AI products used by patients to diagnose patients ● Users can input patient health data ● Users can input the results of the patient's diagnosis ● User can manage doctor's medical profile ● Users can log out of the platform 	<ul style="list-style-type: none"> ● Personal Computer/Laptop windows/ios operating system specifications ● Intel Core i3/ AMD FX-6300 processor ● Internet Network ● Web browser
4	Nurse	<ul style="list-style-type: none"> ● Users can login the nurse display platform ● Users can manage data from AI products that patients use to manage patient activity data ● Users can input patient activity data ● Users can input patient data ● Users can input the patient's health condition ● Users can input the patient's meal schedule ● Users can manage profiles ● Users can provide platform reviews ● Users can log out of the platform 	
5	Nutritionist	<ul style="list-style-type: none"> ● Users can login the nutritionist's display platform ● Users can input patient nutrition information from the AI product data used by patients ● Users can provide services in the form of nutritional consultations to patients ● Users can provide recommendations on patient patterns and foods ● Users can manage profiles ● Users can provide platform reviews ● Users can log out 	
6	Admin	<ul style="list-style-type: none"> ● Users can login admin view ● Users can manage guardian and patient data ● Users can manage nurse data ● Users can manage doctor data ● Users can manage nutritionist data ● Users can manage investor data ● Users can manage nursing home data ● Users can manage DeJaga.in products ● Users can manage transaction data DeJaga.in ● Users can manage admin profiles ● User can log out admin view 	
7	Home Owner	<ul style="list-style-type: none"> ● Users can login home view ● Users can manage patient data ● Users can manage employee data ● Users can manage medical equipment ● Users can manage food data ● Users can manage the inventory of homes ● Users can discuss with the patient's guardian from the forum provided ● Users can manage profiles ● Users can see the review of the orphanage ● Users can provide platform reviews ● Users can log out of the platform 	

8	Investor	<ul style="list-style-type: none"> • Users can login investor display platform • Users can invest in products and systems of the Dejaga.in platform • Users can manage and view the progress of the invested project • Users can manage investor profiles • User Gives a review of the platform • Users can log out of the platform 	
9	Pharmacy	<ul style="list-style-type: none"> • Users can login pharmacy display • Users can manage orders for medicines and medical equipment of patients • Users can manage profiles • Users can see purchase reviews • Users can provide platform reviews • Users can log out 	
10	Expedition	<ul style="list-style-type: none"> • User can login expedition view • Users can manage order data • Users can manage expedition profiles • Users can see delivery reviews • Users can provide platform reviews • Users can log out of the platform 	<ul style="list-style-type: none"> • Mobile specifications operating system android KitKat 4.4.x and iOS • Internet Network

To complete this stage, researchers also designed an ERD aimed at explaining the relationship between the database and DFD, describing the flow of data. Figure 6 illustrates the ERD, and Figure 5 illustrates the DFD of the platform's design.

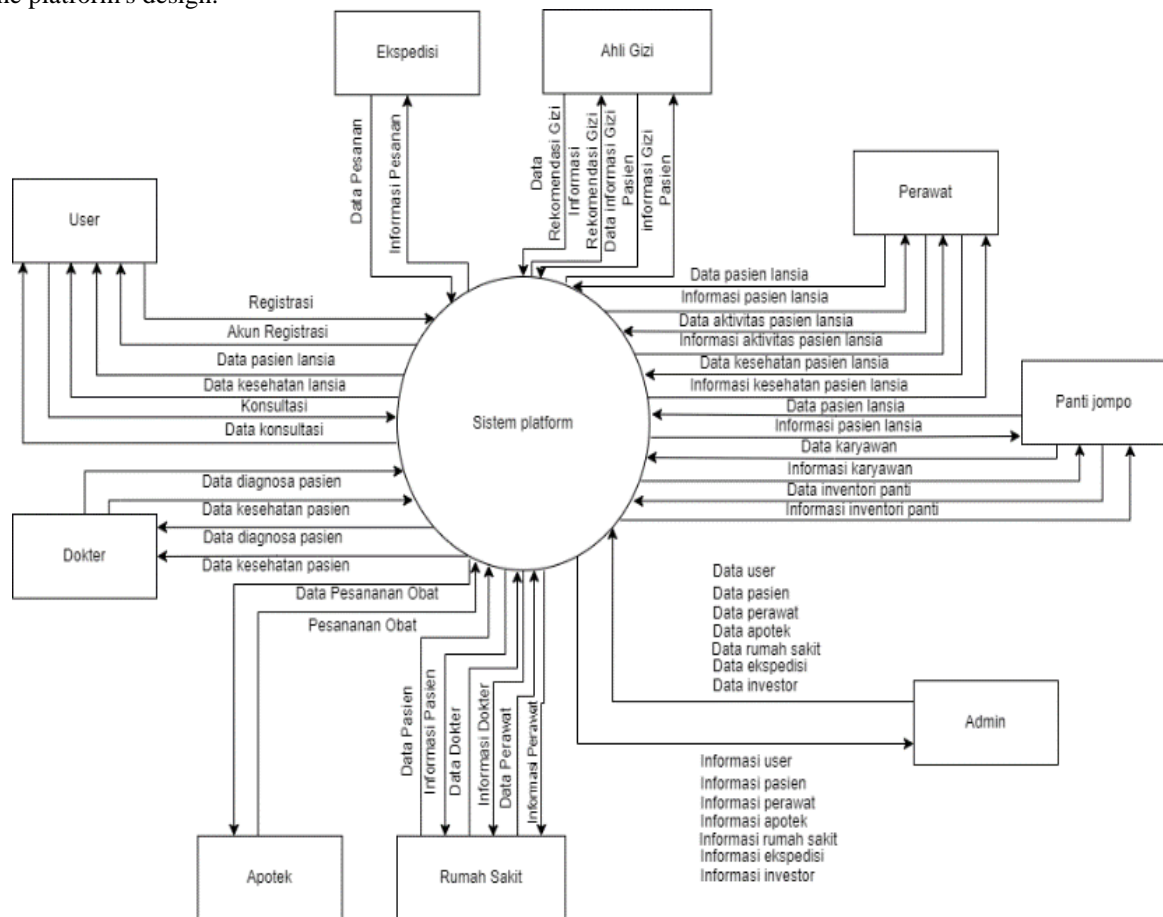


Figure 5 Data flow diagram

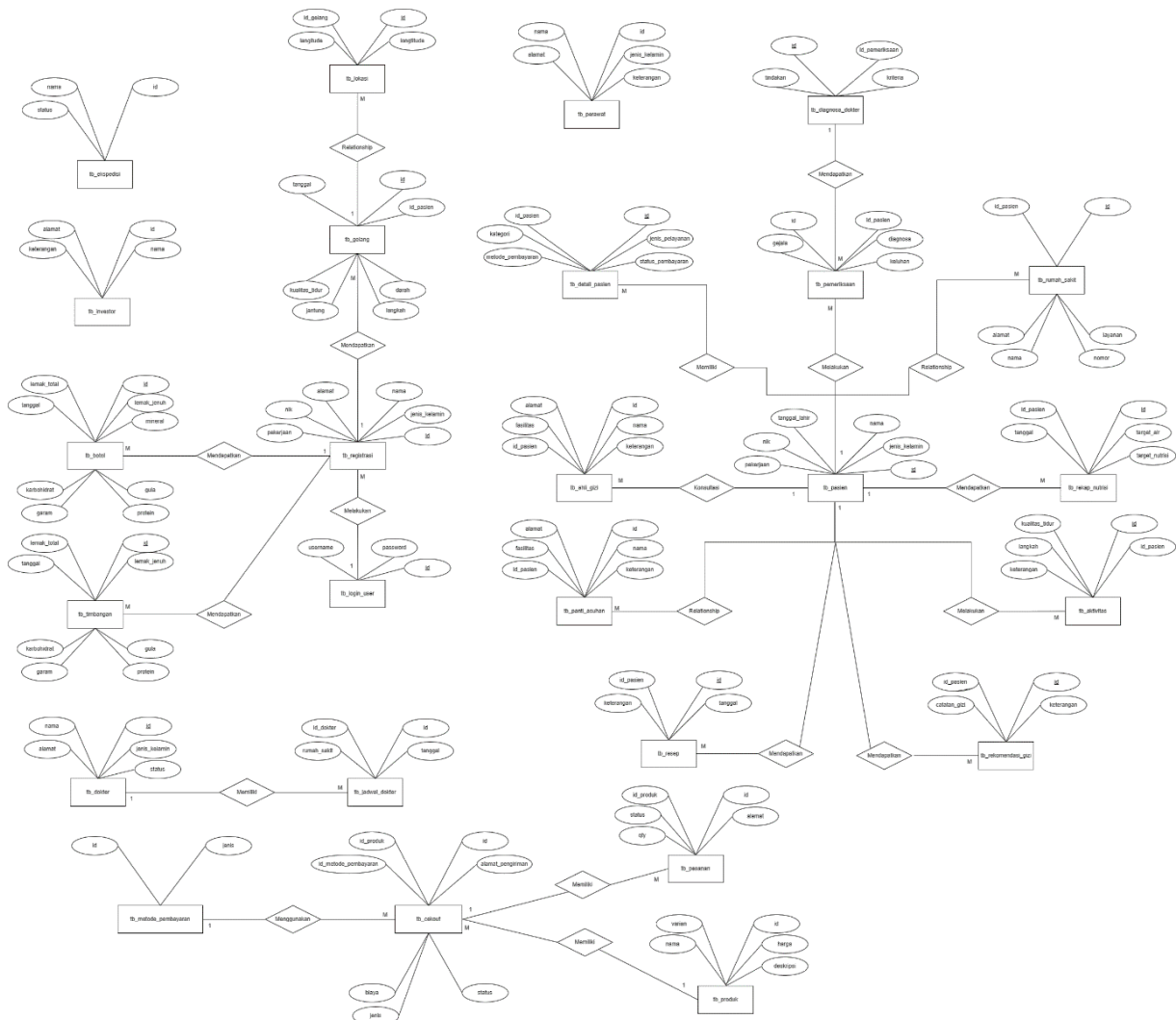


Figure 6 ER Diagram

C. Requirements Validation and Verification

As explained earlier, at this stage, we use a prototype model to validate and verify. Prototype development can help discover and understand user requirements and allow users to get involved at this stage. Figure 7 is a detail of the platform that has been created.

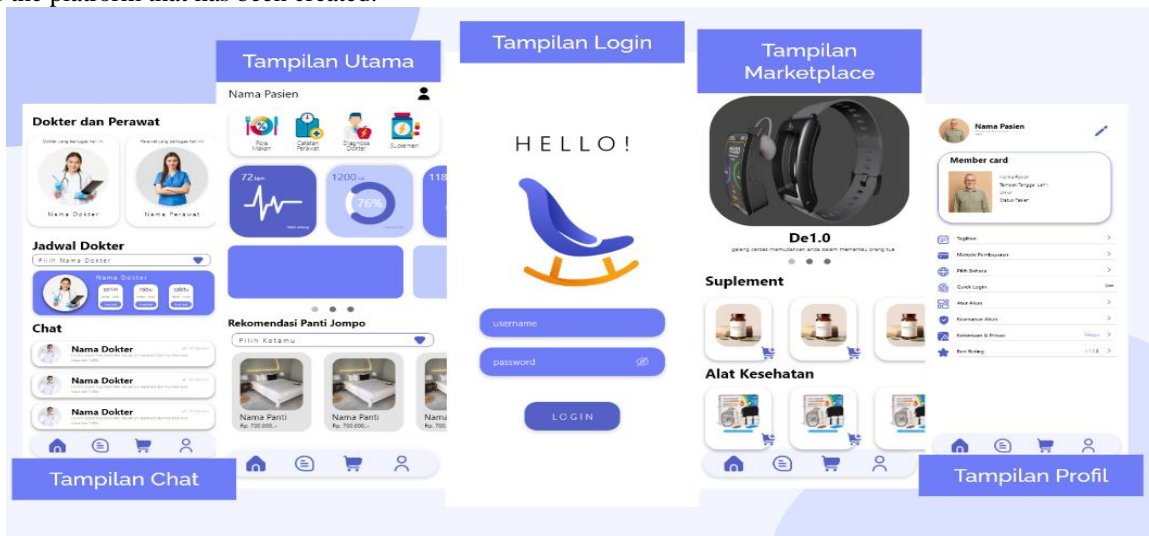


Figure 7 UI Platform



Health Care Center for Elder

Figure 8 Product Design

Figure 8 illustrates a product designed for the elderly to use to make monitoring easier. The results of this prototype are shared with respondents or users who will later use this platform to assess whether what has been compiled and designed is in accordance with the initial purpose. Where our respondents are 19 respondents. After we conducted a survey with questions given to respondents about the platform, we developed with 10 question points, namely five questions about UI and five questions about the products we developed are seen in Table 5 and have five levels of values, namely very interesting, interesting, neutral, less attractive, and not attractive.

Table 5 Assessment criteria

Criterion	Value
very interesting	5
interesting	4
neutral	3
less attractive	2
not attractive	1

The highest respondent value regarding the attractiveness UI that we developed received a very interest rating with a percentage value of 63.2%, the highest respondent value regarding the clarity UI that we developed got a very interest rating with a percentage value of 55.6%, the highest respondent value regarding the UI efficiency that we developed got a very interest rating with a percentage value of 57.9%, the highest respondent value regarding the accuracy of the UI that developed got a balanced rating between very interest and interesting with a percentage value of 44.4%, the highest respondent value regarding the UI stimulation that we developed got an interesting rating with a percentage value 52.6%, and the highest respondent score regarding the novelty UI we developed received an interesting rating with a percentage value of 42.1% seen in Figure 9.

RESPONDENT VALUE (UI)

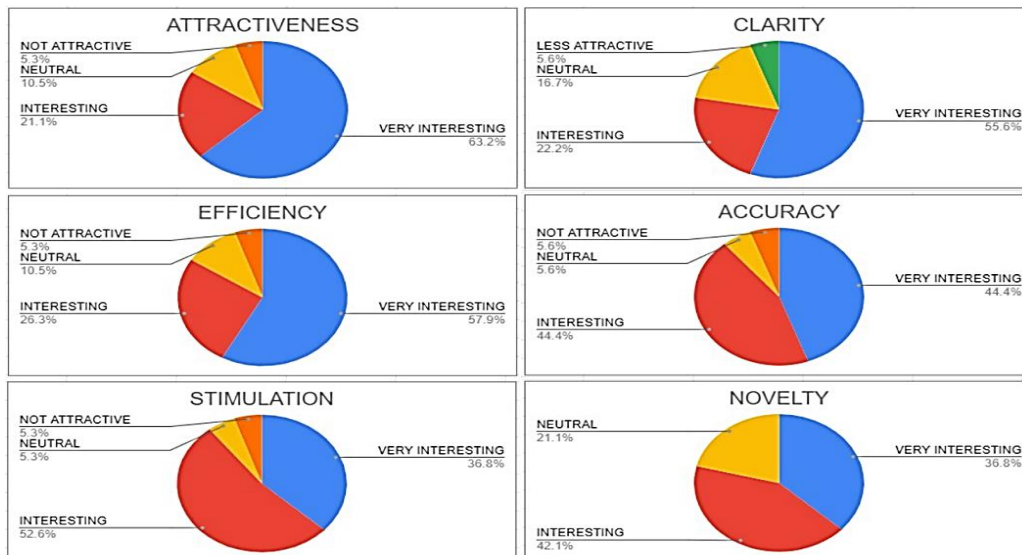


Figure 9 Respondent value UI

The highest respondent value regarding the attractiveness of the product we developed received a very interest rating with a percentage value of 68.4%, the highest respondent value regarding the clarity of the product we developed got a rating interesting with a percentage value of 52.6%, the highest respondent value regarding the efficiency of the product we developed got a very interest rating with a percentage value of 52.6%, The highest respondent value regarding the accuracy product that we developed received a balanced rating between Very Interest and Interesting with a percentage value of 47.4%, the highest respondent value regarding the stimulation product we developed got a balanced rating between Very Interest and Interesting with a percentage value of 47.4%, and the highest respondent value regarding the novelty product we developed got a balanced rating between very interested and interesting with a percentage value of 47.4%, seen in *Figure 10*.

RESPONDENT VALUE (PRODUCT)

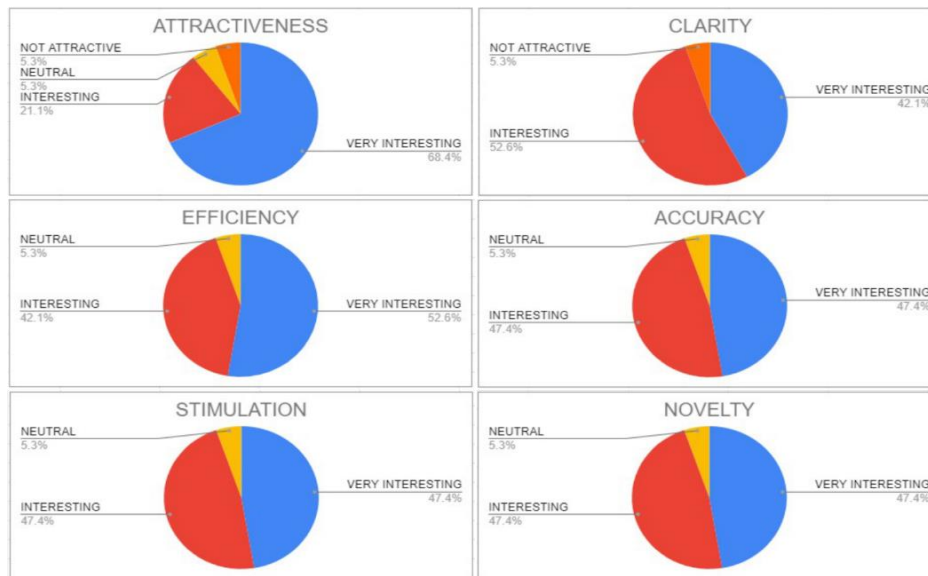


Figure 10 Respondent value product

IV. CONCLUSION

The purpose of this study is to determine how the process of understanding related to engineering needs in the development of a platform by utilizing the three dimensions of the requirements engineering method. Where it is known that the dimensions of engineering needs there are three stages, namely requirement elicitation, requirement specification, and requirement validation and verification. This research succeeded in understanding the stages of needs engineering by producing several documents above, such as details of problem domains, details of stakeholders and their duties with the help of requirements elicitation. The design of the platform workflow, the details of functional and non-functional requirements needs, and the ERD and DFD design were also successfully understood. This research also produces a fairly impressive value from the results of validation and verification for the assessment of whether what has been designed is in accordance with the initial objectives. The highest respondent value regarding the attractiveness of UI that we developed received a very interesting rating with a percentage value of 63.2%, and the highest respondent value regarding the attractiveness of the product we developed received a very interesting rating with a percentage value of 68.4%. This research can be good but not enough, and will continue to develop later. The hope is that future research will use a different assessment from what researchers currently use to produce good enough scores.

REFERENCES

- [1] R. V. Martono, *SUPPLY CHAIN 4.0: Blockchain-Based and Platform-Based*. Jakarta: PT Gramedia Pustaka Utama, 2020.
- [2] N. F. Lawita and W. L. Hardilawati, "Factors Influencing the Successful Use of Accounting Information Systems in Pekanbaru City Cooperatives," *J. Akunt.*, vol. 3, no. 2, pp. 1–13, 2019.
- [3] R. S. Wahono, "Reinvigorating Understanding of Requirements Engineering," 2006. <https://romisatriawahono.net/2006/04/29/menyegarkan-kembali-pemahaman-tentang-requirement-engineering/> (accessed Jan. 01, 2023).
- [4] A. C. Pereira and R. de F. S. M. Russo, "Design thinking integrated in agile software development: A systematic literature review," *Procedia Comput. Sci.*, vol. 138, pp. 775–782, 2018, doi: 10.1016/j.procs.2018.10.101.

- [5] I. Udousoro, "Effective Requirement Engineering Process Model in Software Engineering," *Softw. Eng.* , vol. 8, no. 1, p. 1, 2020, doi: 10.11648/j.se.20200801.11.
- [6] K. Pohl, "The three dimensions of requirements engineering," *Lect. Comput Notes. Sci. (including Subser. Lect. Artific Notes. Intell. Lect. Notes Bioinformatics)*, vol. 685 LNCS, pp. 275–292, 1993, doi: 10.1007/978-3-642-36926-1_5.
- [7] D. H. Bangkalang, N. Setiyawati, R. Tanone, H. P. Chernovita, and Y. T. B. Tacoh, "a Requirement Engineering in Reporting and Counseling-Based Assistance Application for Victims of Violence Against Women," *J. Ris. Inform.* , vol. 3, no. 4, pp. 311–318, 2021, doi: 10.34288/jri.v3i4.256.
- [8] A. Nurriqhi, S. Widowati, and M. Imrona, "Implementation of User Centered Requirements Engineering in the Design of Applicationsi Agricultural Information Guides for Farmers," *J. Comput.* , vol. 4, no. 2, pp. 9–20, 2019, doi: 10.21108/indojc.2019.4.2.256.
- [9] R. Kusuma and N. Setiyawati, "Engineering the Needs of Web-Based Learning Management System (LMS) Applications Using Kotonya and Sommerville Process Models," no. 5, pp. 50–59, 2022.
- [10] C. Mauger, T. Schwartz, J. Y. Dantan, and L. Harbouche, "Improving users satisfaction by using requirements engineering approaches in the conceptual phase of construction projects: The elicitation process," *IEEM2010 - IEEE Int. Conf. Ind. Eng. Eng. Manag.* , no. December, pp. 310–314, 2010, doi: 10.1109/IEEM.2010.5674471.
- [11] C. Coulin and D. Zowghi, "Requirements Elicitation: A Survey of Techniques, Approaches, and Tools," *Eng. Manag. Softw. Requir.* , pp. 19–46, 2005.
- [12] D. Gobov and I. Huchenko, "Software requirements elicitation techniques selection method for the project scope management," *CEUR Workshop Proc.* , vol. 2851, no. Itpm, pp. 1–10, 2021.
- [13] J. Duval Jensen, L. Ledderer, and K. Beedholm, "How digital health documentation transforms professional practices in primary healthcare in Denmark: A WPR document analysis," *Nurs. Inq.* , no. November 2021, pp. 1–11, 2022, doi: 10.1111/nin.12499.
- [14] T. Lantta *et al.* , "Prevention and management of aggressive behaviour in patients at psychiatric hospitals: a document analysis of clinical practice guidelines in Hong Kong," *Int. J. Ment. Health Nurs.* , vol. 29, no. 6, pp. 1079–1091, 2020, doi: 10.1111/inm.12742.
- [15] M. Harris *et al.* , "Barriers to management of opioid withdrawal in hospitals in England: a document analysis of hospital policies on the management of substance dependence," *BMC Med.* , vol. 20, no. 1, pp. 1–11, 2022, doi: 10.1186/s12916-022-02351-y.
- [16] J. Richardson, T. C. Ormerod, and A. Shepherd, "The role of task analysis in capturing requirements for interface design," *Interact. Comput.* , vol. 9, no. 4, pp. 367–384, 1998, doi: 10.1016/S0953-5438(97)00036-2.
- [17] C. Lane and N. Kruger, "How to Write a Software Requirements Specification (SRS Document)," *perforce*, Dec. 16, 2021. <https://www.perforce.com/blog/alm/how-write-software-requirements-specification-srs-document> (accessed Jan. 02, 2023).
- [18] T. A. Vakaliuk, O. V. Korotun, and S. O. Semerikov, "The selection of cloud services for er-diagrams construction in it specialists databases teaching," *CEUR Workshop Proc.* , vol. 2879, pp. 384–397, 2020, doi: 10.55056/cte.295.
- [19] J. Hakim Lubis and E. Muisa Zamzami, "Relational database reconstruction from SQL to Entity Relational Diagrams," *J. Phys. Conf. Ser.* , vol. 1566, no. 1, 2020, doi: 10.1088/1742-6596/1566/1/012072.
- [20] E. S. Mulyani, I. W. Agustin, L. Herfiyanti, and C. M. Sufyana, "Designing an Information System for the Completeness of BPJS IGD Claim Files Using Visual Studio at Muhammadiyah Hospital Bandung," *JATISI (Jurnal Tek. Inform. and Sist. Information)*, vol. 9, no. 3, pp. 1784–1798, 2022, doi: 10.35957/jatisi.v9i3.2167.
- [21] X. Fei, C. Bin, and Z. Siming, "A Methodology of Requirements Validation for Aviation System Development," *Proc. 32nd Chinese Control Decis. Conf. CCDC 2020*, no. 525, pp. 4484–4489, 2020, doi: 10.1109/CCDC49329.2020.9164301.
- [22] F. Lang and A. Mjöberg, "Prototyping as a Requirements Engineering Technique. (thesis)," *Lu-CS-EX*, 2020.
- [23] D. N. Chasanah, A. N. Handayani, and I. A. E. Zaeni, "Microcontroller-Based Health Monitoring in the Elderly," *Pros. Lemonmen. Nas. Technol. Electro Terap.* , vol. 02, no. 01, pp. 123–128, 2018.
- [24] D. Arifin, I. S. Alafgani, C. Silaban, L. Marlinda, and R. Y. Hayuningtyas, "System Information of Elderly Health Monitoring," *J. Inf. Syst. Applied, Manag. Account. Res.* , vol. 4, no. 4, pp. 167–102, 2020, [Online]. Available: <https://journal.stmikjayakarta.ac.id/index.php/jisamar/article/view/292>.