PROTOTYPING MODEL IN INFORMATION SYSTEM DEVELOPMENT OF AL-RUHAMAA' BOGOR YATIM CENTER FOUNDATION

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Abstract— The information system for providing donations at the Al-Ruhamaa' Bogor Yatim Center Foundation is still not computerized, through donors coming to the location directly or through bank services, then confirmed via social media such as WhatsApp, and receiving proof of donation in the form of a receipt. The management of the Al-Ruhamaa' Bogor Yatim Center Foundation stills using Microsoft Excel to prepare donation reports. Based on the existing problems, it is necessary to develop an information system for distributing donations that can facilitate the management and the donors of the Al-Ruhamaa' Bogor Yatim Center Foundation. The system will be developed using one of the techniques commonly used in software development is called the prototyping model. the prototyping model is a technique to collect certain information about the user's information needs quickly which focuses on aspects of the software to be presented that will be visible to the customer or user. After the system is implemented, it is found that by using this Information System, the donation transaction process becomes more efficient. Calculation of the number of donations collected can be done automatically and accurately. In terms of reporting, the system can be present donation reports automatically and is ready to print whenever needed. Data storage for documentation of activities carried out by the foundation also saves space because the information can be accessed anytime and anywhere.

Keywords: Prototyping Model, Information System, Donation System, Software, SDLC.

Abstrak— *Sistem Informasi pemberian donasi yang ada pada Yayasan Yatim Center Al-Ruhamaa' Bogor masih belum terkomputerisasi, yaitu dengan cara donatur datang ke lokasi secara langsung maupun melalui layanan bank, kemudian melakukan konfirmasi melalu media sosial seperti WhatsApp, dan menerima tanda bukti donasi berupa kwitansi. Dari sisi pengurus, pengurus Yayasan Yatim Center Al-Ruhamaa' Bogor juga masih perlu menyusun laporan donasi secara manual dengan menggunakan program Microsoft Excel. Berdasarkan permasalahan yang ada, perlunya dikembangkan sebuah sistem informasi penyaluran donasi yang dapat memudahkan para pengurus dan juga para donatur Yayasan Yatim Center Al-Ruhamaa' Bogor. Sistem yang dibuat akan dikembangkan dengan menggunakan salah satu teknik yang biasa digunakan dalam pengembangan perangkat lunak yaitu prototyping model. Model prototyping merupakan suatu teknik untuk mengumpulkan informasi tertentu tentang kebutuhan-kebutuhan informasi pengguna secara cepat yang dimana fokus kepada aspek-aspek perangkat lunak yang akan disajikan yang akan nampak bagi pelanggan atau pemakai. Setelah sistem implementasikan diperoleh hasil bahwa dengan menggunakan Sistem Informasi ini, proses transaksi donasi menjadi lebih efisien. Perhitungan jumlah donasi yang terkumpul juga dapat dilakukan secara otomatis dan akurat. Dalam hal pelaporan, sistem yang dibuat dapat menyajikan laporan donasi secara otomatis dan siap cetak setiap saat dibutuhkan. Penyimpanan data dokumentasi kegiatan yang dilakukan oleh yayasan juga menjadi lebih hemat tempat karena semua informasi dapat diakses kapan saja dan di mana saja.*

Kata kunci— *Model Prototyping, Sistem Informasi, Sistem Donasi, Perangkat Lunak, SDLC*

INTRODUCTION

The Al-Ruhamaa' Bogor Yatim Center Foundation is an institution engaged in social and community activities with a passion for contributing to efforts for improvement in society, especially orphans and women in West Java. In daily activities, the foundation receives donations from the general public to finance the activities. In the activities of collecting and reporting donations, they still used Microsoft excel. The current donation system still's carried out using donors coming to the location or through bank services. The donor then confirms through social media such as WhatsApp and receives proof of receipt via WhatsApp.

Management of the Al-Ruhamaa' Bogor Yatim Center Foundation also prepares donation reports manually using Microsoft Excel so that the foundation's management has difficulty in providing donation reports transparently (Sumada et al., 2021). The system an ineffective because it often takes a long time to find out the donation reports within a certain period and the data on donors who have made donations are also not well documented, so that active donors cannot be properly coordinated, especially in terms of delivering activities that require donations (Riskiono et al., 2020). It is necessary to develop an information system to overcome the problems that occurred.

The development of an information system requires clear planning and analysis. It's must be done so it not to cause new problems that will have an impact on the information system development process and will determine the success of the system to be developed (Purnomo, 2017). For software development to be successful and run according to plan, it must use software development methods that suit the needs. The software development method is the main framework used in the design and development of software to produce an information system its user needs(Budi et al., 2016)

The information system created will developed using a prototyping model software development techniques. The prototyping model is a technique of collecting information based on user needs quickly and the application presented will be a focus on the user (Susanto & Andriana, 2016). The model generated by this technique is an initial version of the systems and serves as a physical model of the system to be developed (Purnomo, 2017). The prototype model can be used to clarify specifications and technical matters that are not understood by the customer to the software developer regarding the specifications of the desired requirements (Firmansyah et al., 2019). System design using a highly adaptive prototype method can and easily be adapted to customer needs so that the system is very friendly and easy to operate(Sismadi, 2021).

Similar research has also been carried out but did not mention the information system development method used (Riskiono et al., 2020). Similar research was carried out using the waterfall method in the development of a donation management information system (Sumada et al., 2021). In this study using the prototyping model method with the requirements prototype technique.

This study chose to use the prototyping model technique compared to the waterfall method because in the prototyping model using prototype as a description system that will be built, so that users expect can see and interact directly with the description system to be developed (Susanto & Andriana, 2016).

Implementation of a web-based information system at the Al-Ruhamaa' Bogor Yatim Center Foundation is expected to assist donors and administrators in receiving donations.

MATERIALS AND METHODS

In system development, so that the software created can meet the needs, a software development method is needed that will serve as the basic framework for system development. This study using a model prototyping technique which is one a part of the system development method in the System Development Life Cycle (SDLC).

The prototyping method is a system development technique where the prototype is used to provide an overview of the system development that will be carried out to the user(Mulyani, 2016). In the prototype method, it allows users to know what the stages of the system are like so that the system can function properly according to user needs (Yoko et al., 2019). The prototyping method is also an iterative process where user requirements are transformed into a working system that is continuously improved through collaboration between users and analysts (Muharto & Ambarita, 2016). The prototyping method is good to use when a user cannot explain and determine in detail the input, process, and output stages that will be expected, so system developers are not sure of the efficiency of the algorithm made, making it difficult to determine the operating system and determine the form of interaction between humans and machines that will be used (Yurindra, 2017).
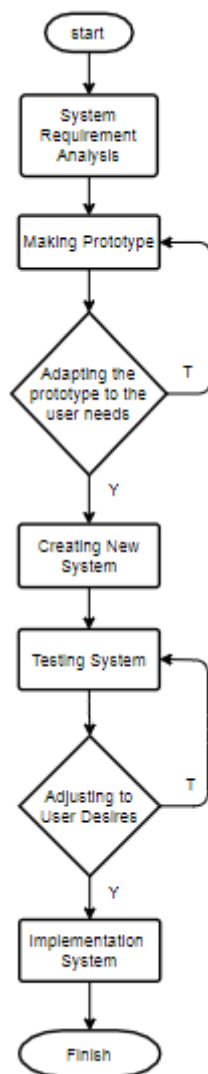
There are two types in the prototyping method technique (Mulyani, 2016) :
1. Evolutionary Prototype
   The prototype is developed continuously so that the functions and procedures produced are following the needs of the system are being developed.
2. Prototype Requirements
   Prototypes are made by developers by defining system functions and procedures where users or system owners cannot define system requirements properly

Source : (Bahar et al., n.d.)
Figure 1. Steps of the Requirement Technique in the Prototype Method

Figure 1 describes the steps of the requirements technique in the prototyping model method. The explanation of each stage is as follows:

1. Analyze User Needs
   Users and system developers discuss the system requirements needed by users
2. Creating a Prototype
   The system developer makes prototypes of the developed system has been describing by the user
3. Adjusting the Prototype to the User's Desire
   The system developer asks the user about the prototype that has been made whether it is under the system needs or not
4. Creating a New System
   System developers use prototypes that have been made to create new systems
5. Doing System Testing
   Users conduct trials on the developed system

6. Adjusting to User's Desires
   The system has been created adjusted to the user's wishes and system needs. if it's appropriate then the system is ready for use
7. Using the System
   The system used by a user

RESULTS AND DISCUSSION

The information system at the Al-Ruhamaa' Bogor Yatim Center Foundation was developed using the model prototyping method using the requirements prototype technique. The following describes the steps of system development carried out following the steps in the Requirement Prototype technique.

A. System Requirements Analysis
   In this step, users and system developers discuss the system requirements to be developed. Information about the business processes, as well as the constraints faced, are obtained by the system developer from the users at these steps. Needs analysis is a step that requires system developers to find out exactly what the user needs in the hope that the system created can later be used.
   In designing system requirements, it's using use case diagrams. Use case diagrams can describe a complete description of the interactions that occurred between the actors and the system being developed. The first thing to do when making a use case diagram is identified the actors who will be involved in the system (Nugroho, 2009)
   Three users will be involved in system development, namely members, operators, and admins. The needs of each user are as follows:
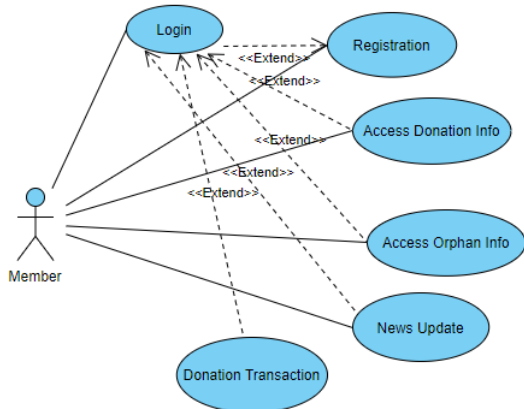a. Member
   Members can log in on the website, view news updates, view information on orphans, view contact info, view photo galleries, make donation transactions, change profiles and leave comments on the web.
b. Operator
   Operators can manage articles, manage news updates, manage photo galleries, validate donors who confirm donations and view and print donation reports.
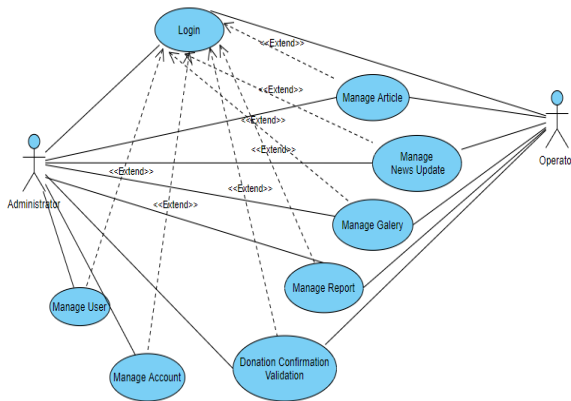c. Admin
   Admins can carry out activities as carried out by operators, but there are additional functions that can be performed by admins such as managing accounts, deleting comments, managing users, and managing categories on the web.

Source : (Bahar et al., n.d.)
Figure 2. Use Case Diagram Member of Al-Ruhamaa' Bogor Yatim Center Information System Foundation

Figure 2 is a description of the business process for members, where members can perform these activities when interacting with the system.

Source : (Bahar et al., n.d.)
Figure 3. Use Case Diagram Operator And Administrator of Al-Ruhamaa' Bogor Yatim Center Information System Foundation

Figure 3 is a description of the business process for operator and administrator, where they can perform these activities when interacting with the system

B. Making Prototype

After obtaining information about user needs, the next step is to make a prototype of the system that will be developed under the business processes described by the user. The design of the prototype system to be developed is divided into three main parts, namely the master form design, transaction form, and report.

1) Master Form Prototype Design

The prototype master form design consists of pages for adding, editing and delete category data
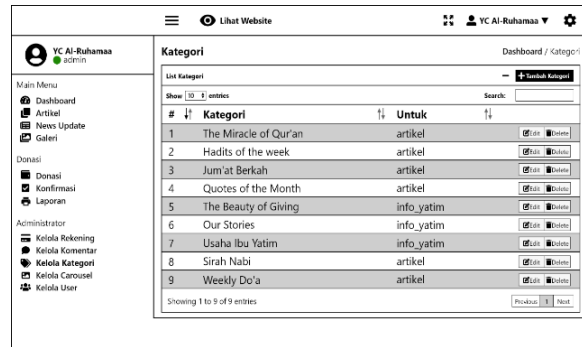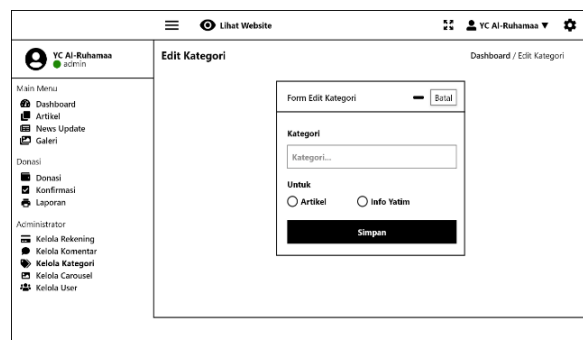

Source : (Bahar et al., n.d.)
Figure 4. Category Page Prototype Design

Figure 4 is a category page. On this page, admins or operators can see what categories already exist and can add, edit and delete category data.

Source : (Bahar et al., n.d.)
Figure 5. Prototype Design Of Add Category Pages

Figure 5 is an added category page, where the admin or operator on this page can input new category data.

Source : (Bahar et al., n.d.)
Figure 6. Prototype Design Of Edit Category Pages

Figure 6 is a category edit page, where admins or operators can edit the existing categories

2) Transaction Form Prototype Design

The prototype design of the transaction form described is the donation form page and confirmation of donation payment's
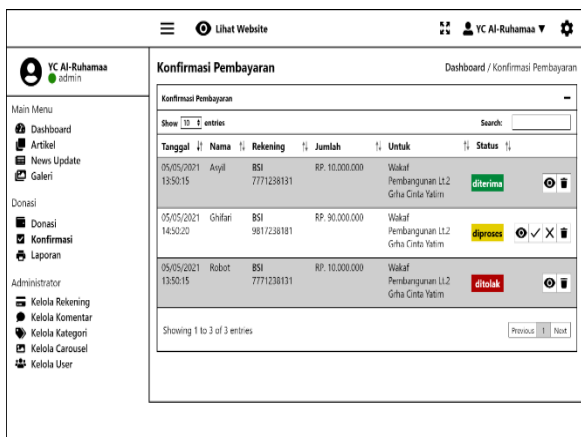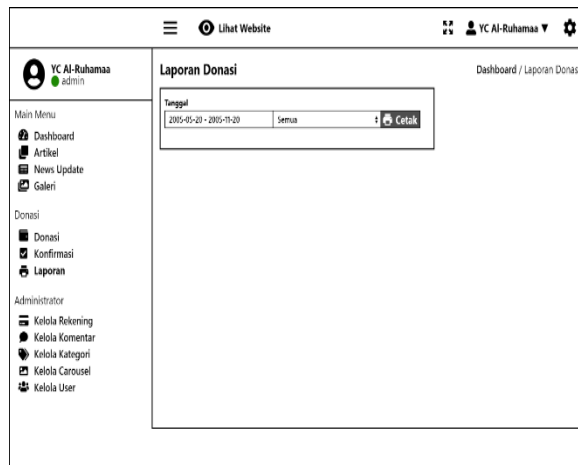
Source : (Bahar et al., n.d.)
Figure 7. Prototype Design Of Donation Confirmation Pages

Figure 7 is a donation payment confirmation page. Those who use this page are operators or admins. The operator will provide validation in the form of a statement of acceptance or rejection of the donation payment data entered by the member or donor.

Source : (Bahar et al., n.d.)
Figure 8. Donation Pages Prototype Design

Figure 8 is the donation page. On this page members or donors can input data on donations that have been made by filling in payment data and uploading proof of transfer of donation payments that have been made.

3) Report Prototype Design
The prototype report design created is a page to display the donation reports

Source : (Bahar et al., n.d.)
Figure 9. Design of Report Page Prototype

Figure 9 is a report page. On this page, operators or admins can view and print donation reports with a choice of reporting periods that can be selected according to their needs.

C. Adjusting the Prototype to the User's Desire
After the system prototype has been created, the next step for the system developer is to ask the user whether the prototype is made following the system requirements. If there are still things that are not appropriate, then the developer will re-adjust the prototype to the user's needs

D. Creating a New System
After the prototype design is by the user's needs, then the system developer will use the prototype that has been made to build a new system. The system developed is a web-based information system using the PHP programming language.
In making the new system, the database design that will be used is also carried out using the Entity-Relationship Model using the Entity-Relationship Diagram (ERD) (Kusrini, 2007). The database is a collection of interconnected data which is one of the main components supporting the application program because it is used as a data storage area (Pahlevi, 2013). Database created by using MySQL.

1) Database And Table Design
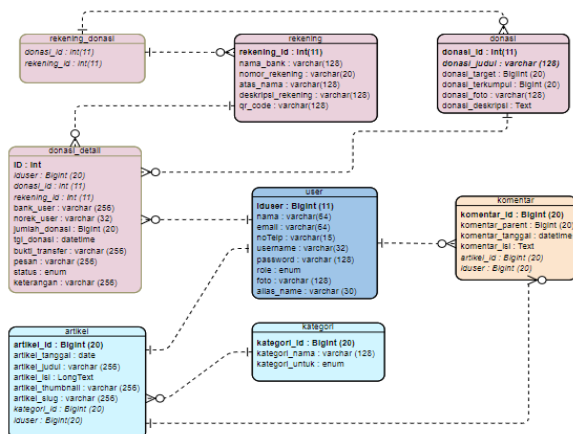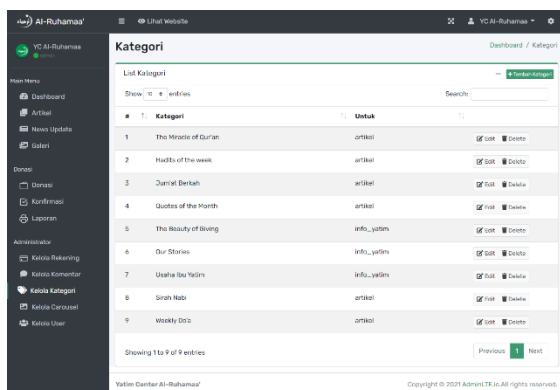
Source : (Bahar et al., n.d.)

Figure10. Entity Relationship Diagram of the Al-Ruhamaa Foundation Information System

Figure 10 illustrates the ERD design for the developed system. after the ERD is designed, the next step is to create a database containing the files that are the result of the ERD transformation using MySQL. The file created is stored in the "alruhama" database. The following are some examples of file specifications created in the development of information systems at the Al-Ruhamaa 'Bogor Foundation.

The user file is used to store user data consisting of members, operators, and admins. Each user can be given different access rights to access the system developed according to the system requirements that have been defined.

2) User Interface Design

The next step is to display the program user interface based on the prototype design that has been designed and approved by the user (members, operators, and admins). The following are some examples of the display of programs that exist in the information system at the Al Ruhamaa orphan foundation:

Source : (Bahar et al., n.d.)
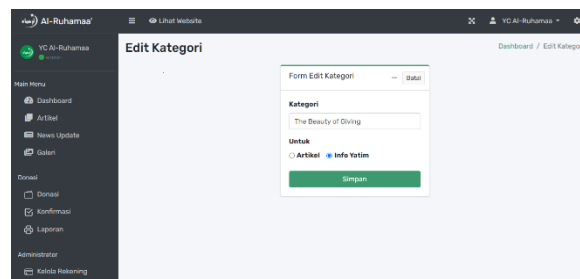
Figure 11. Category Page Display

Figure 11 is on the category page. The operator or admin can see all the category data that has been inputted. Users can also add, edit, search or delete categories.
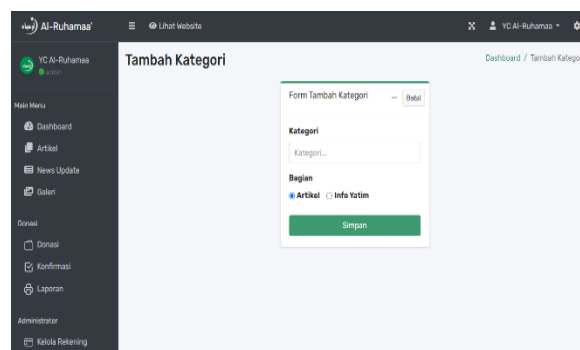
Source : (Bahar et al., n.d.)
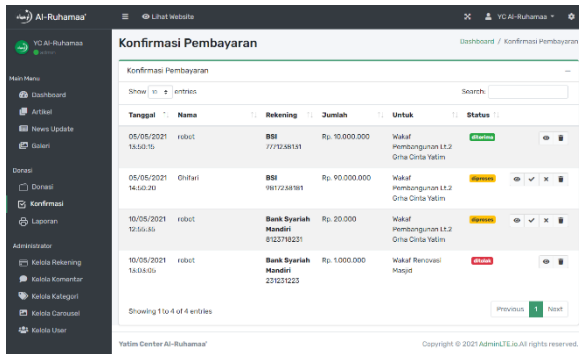
Figure 12. Add Category Page Display

Figure 12 is To add a new category, press the Add Category button. After the Add Category page appears, type the name of the category. Then select for the article section or orphaned info. Then click Save, then the page will be redirected to category data again.

Source : (Bahar et al., n.d.)

Figure 13. Edit Category Page Display

Figure 13 is to edit a category, press the Edit button on one of the category rows. Once the category edit page appears, change the category name or select an orphaned article or info section. When finished, click the save button then the page will be redirected back to category data. To search for category data, type the name of the category in the search field, then the category data will appear. To delete a file, press the Delete button on the row of the category you want to delete.

Source : (Bahar et al., n.d.)
Figure 14. Edit Category Page Display

Figure 14 is admin can change the status of the donation confirmation that has been made by the member on the payment confirmation page by pressing the eye icon button to view the donation details. Checklist icon to accept donations, the cross icon to reject donations, and the trash icon to delete data.

Source : (Bahar et al., n.d.)
Figure 15. Donation Page Display

Figure 15, users can input the donation data that has been given by first inputting the bank name, account number, donation amount, uploading proof of payment, and can also add a message if needed. Furthermore, the user just waits for confirmation of the status of the donation by the admin.
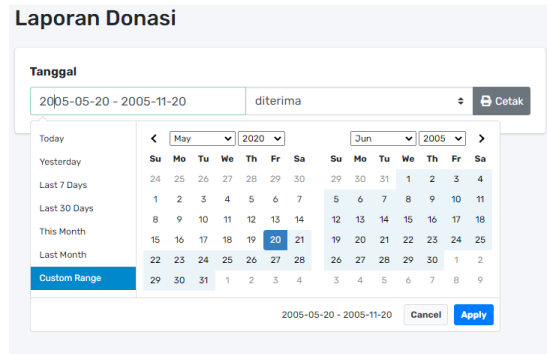
Source : (Bahar et al., n.d.)
Figure 16. Donation Report Page View

Figure 16, to print the report, the user selects the period of donation that he wants to print, then selects the status of the donation, and then clicks the print button.

E. Testing System

After the system has been created, the next step is user testing the system developed using the BlackBox testing method. Blackbox testing is done by observing the results through test data and checking the functionality of the software (Habibi & Aprilian, 2019) In BlackBox testing, the software is tested in terms of functional specifications to find out whether the input and output functions of the software made are in accordance with the required specifications (Cholifah et al., 2018). Table 2 shows some of the test results from the user acceptance test (UAT) that have been carried out
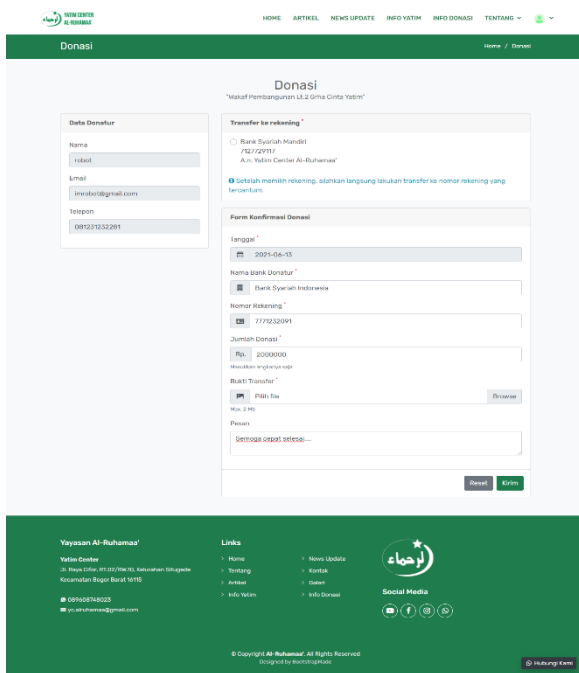
Table 2. User Acceptance Test (UAT)

User Acceptance Test (UAT) Result				
No	Usecase	Success/ Failed	Test ed By	Date of Test
1.	Test Name: Login Test Description: Registered users can access web pages according to the access rights granted Test Case: - Username : <correct> - Password : <correct> Expected results : - If true, the system receives a login to access and then if the admin/operator will be directed to the dashboard page if a member it will go to the home - If wrong, the system will deny login access and display the message "Username not	success	Asyil	22 June 2021

User Acceptance Test (UAT) Result

No	Usecase	Success/ Failed	Tested By	Date of Test
	found!" or "Wrong password"			
2.	**Test Name:** Donation Transaction Confirmation **Test Description:** Member confirms the donation paid via the web by inputting the required data **Test Case:** input bank name, account number, donation amount, and upload proof of payment, and you can add a message if necessary. Then click send, then the next donation will be confirmed by the admin **Expected results :** - If successful, the system will accept the delivery and redirect to the donation history page - If it fails because there is still empty data or an error in uploading the proof of transaction file type, the system will refuse delivery and display the message "The filetype you are trying to upload is not allowed" in the proof of transfer column and display the message "The field is required " in the column that is not allowed is empty	success	Asyil	22 June 2021
3.	Test Name: Print Donation Report Test Description: Operators or admins print donation reports based on the selected time range Test Case: Selecting date and status column Expected results : The system will accept the request and display a new page according to the date period with the selected status and ready to print	Success	Asyil	22 June 2021

Source : (Bahar et al., n.d.)

F. Adjusting to User's Desires

Testing of the systems that have been developed is carried out to adjust to user needs. If the results of system testing are by user needs and the organization's business processes, then the system is ready to be implemented. If it is not appropriate, then the developer must make adjustments to the systems created. Testing of the admin and member interfaces is carried out by the management of the Alruhama Foundation. For testing the member interface, it was tested by four BSI university lecturers

Tabel 1. Member Interface Test Result

Partici pan	Registr ation	Logi n User	Acces			
			Dona tion info	Orph an Info	News Update	Donati on Transa ction
1	√	√	√	√	√	√
2	√	√	√	√	√	√
3	√	√	√	√	√	√
4	√	√	√	√	√	√
Succee d	4	4	4	4	4	4
Result	100%	100 %	100 %	100 %	100%	100%

Source : (Bahar et al., n.d.)

Tabel 2. Operator and Administrator Interface Test Result

Partici pan	Don ation confi rmat ion valid ation	Manage					
		acco unt	art icl e	us er	New s Upd ate	Galery	Report
1	√	√	√	√	√	√	√
2	√	√	√	√	√	√	√
3	√	√	√	√	√	√	√
Succ eed	3	3	3	3	3	3	3
Resu lt	100 %	100 %	10 0 %	10 0 %	100 %	100%	100%

Table 1 and Table 2 show that the results of system testing are in accordance with user needs and organizational business processes. Thus it can be concluded that the system is ready to be implemented.

G. System Implementation

After going through a series of processes and stages, the last stage of this method is the system used by the user. Before the system is used, the system handed over to the user first. The system that has been created can then be accessed online via the https://yatimcenter-alruhamaa.org/

Source : (Bahar et al., n.d.)

Figure 16. The Handover Activities of the Information System Application of the Al-Ruhamaa' Bogor Yatim Center Foundation

CONCLUSIONS

The information system at the website-based Al-Ruhamaa' Bogor Yatim Center Foundation has been completed and implemented. It concluded that by using the Information System, the donation transaction process became more efficient. Donors no longer need to come to the location directly to donate. Donors can confirm the donation has been giving from the web. Donors only fill out the form provided and upload proof of transfer for further verification by the management. Donors can also directly print proof of donation or invoice after confirming. Calculation of the number of donations collected can be done automatically and accurately. Management of the Al-Ruhamaa' Bogor Yatim Center Foundation does not need reports using Microsoft Excel. Managers only need to press the print button to print reports with a period as needed and ready to print whenever needed, to facilitate the work of the administrators. For further system development, it's recommended to update the donation feature using a payment gateway so that transaction activities between donors and administrators become easy and more efficient. In addition, it is also necessary to create a live chat feature to replace WhatsApp to make it easier for donors to contact the management directly when the donor is accessing the web https://yatimcenter-alruhamaa.org/.

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