




ANALYZING AND DESIGNING PUBLIC ASPIRATION CATEGORY AND DATA INFORMATION SYSTEM THROUGH AGILE SCRUM APPROACH

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ARTICLE INFO	ABSTRACT
<p>Published: August 31st, 2023</p> <p>Keywords: <i>Bappeda, agile scrum, laravel 9</i></p>	<p><i>Bappeda Malang City has problems in the implementation of community aspirations data collection which results in difficulty seeing the latest aspirations data and the long flow of data collection. In this case, the authors conducted an analysis and design of a web-based community aspirations data collection system which would make it easier for Bappeda to collect data on aspirations. This web-based aspiration data collection system will make it easier for Bappeda to see the actual aspirations conveyed by the community. The method in analyzing and designing a web-based data collection and categorization system with the Laravel 9 framework uses the scrum method with various customized activities. The process of activities carried out to produce the aspirational data collection system included condition analysis and data collection, system design, and system implementation. The process in this study goes through the stages of system design, which includes scrum (product backlog, sprints, scrum meetings) and also business design (flowchart diagrams, use case diagrams, ERD diagrams). The results obtained in this study are of good value and can be used after carrying out user testing carried out at the system implementation stage.</i></p>
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INTRODUCTION

Indonesia is a country that adheres to a democratic system in the administration of its government. The democratic system can be interpreted as a system that adheres to the government of the people by the people and for the benefit of the community (Addink, 2019; Ostrom & Ostrom, 2019; Sofwan & Suparnyo, 2023), and the realization of this system is through community participation in the process of administering government in the regions. Community participation in the implementation of public services can guarantee accountability and fulfillment of community service aspirations (Maani, 2012; Mustafa et al., 2020; Waddington et al., 2019).

In carrying out this process, in Malang City, one of the proofs of community participation in governance is the existence of city-level development planning meetings held by *Bappeda* of Malang City. *Musrenbang (Musyawarah Perencanaan Pembangunan, Development Planning Deliberation)* is a forum for the community to convey aspirations, criticisms and suggestions for both infrastructure and government programs (Nurdin et al., 2021; Rafinzar & Khairunnas, 2023; Widyawati & Purwaningsih, 2022). In this case, *Bappeda (Badan Perencanaan Pembangunan Daerah, Regional Development Planning Agency)* provides a forum for the aspirations of the people of Malang city to be able to submit their proposals to the government of Malang city through a form given to each village. The *Bappeda* of Malang City has the task of categorizing

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these aspirations/proposals according to their respective fields in each relevant agency, then all the aspirations/proposals that have been approved will be combined into a dictionary of proposals.

In the process of collecting and grouping proposals from the *Bappeda* community it tends to take longer than the allotted time, this is because this process still uses the conventional method whereby tracing the forms and putting them together in an excel file, after that they are grouped according to the relevant agencies and then entered into proposed dictionary. In this case, it can be seen that the *Bappeda* of Malang has not yet implemented Smart Governance, in which the implementation of Smart Governance is to realize effective, efficient, communicative governance and administration, and continue to improve bureaucratic performance through innovation and adopting integrated technology.

In the implementation that is still conventional, this is considered to be less effective and efficient and this can be seen from *Bappeda* still needing more time to accommodate and classify it. Based on the problems experienced by *Bappeda*, a website is needed to accommodate community aspirations/suggestions so that work can be done more efficiently so that it can be completed on time

Scrum research method in which the stages in this method will be carried out in determining and designing the system to be used by *Bappeda*. Using the Scrum method and its stages will produce prototypes and MVPs which will be tested for use in the community, sub-districts, and also *Bappeda*. In this study, the research method was used, namely the Scrum method, which in its method can adapt to the series of activities to be carried out. Several series of activities that will be carried out in this study include analysis and initial data collection as a form of mapping the problems experienced by *Bappeda* Malang City, designing a system that uses the scrum method in it which will produce an initial picture of the design product and the design process, and the end of the implementation in the form of a system implementation that will be carried out by user testing on related parties.

Based on the explanation, the researcher was interested in analyzing and designing public aspiration category and data information system through Agile Scrum approach. With the research analysis and design of a web-based community aspirations data collection system, it is hoped that it will be able to overcome the problems faced by *Bappeda* and can assist in the efficient process of data collection.

METHODS

The research methodology used is Scrum which in this method offers a way of working that can be adapted to the project being implemented and has other advantages such as flexible selection of requirements and no special procedures to follow (Srivasta et al., 2017). In implementing the Scrum method, there are several stages such as the product backlog, sprint planning, daily stand up meeting, sprint review, and also sprint retrospective (Warkim et al., 2020).

The following describes the stages of the Scrum method:

- 1) Product backlog: Determine priorities in sprint work;

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- 2) Sprint planning: All team members get together and determine the tasks of each member. It is important to run this process before running a sprint.
- 3) Daily stand up meeting: meetings held every day to describe the progress, planning, and problems experienced by each team member in working on the project. Daily stand up meetings are carried out with no more than 15 minutes.
- 4) Sprint review: is a demonstration of tasks that have been completed in a sprint period (Performed every sprint is completed).
- 5) Sprint retrospective: this activity is carried out at the end of the sprint. Each team member can report performance during the use of the Scrum method.

Based on the method used and the stages carried out, the following is the flow that will be carried out in the research:

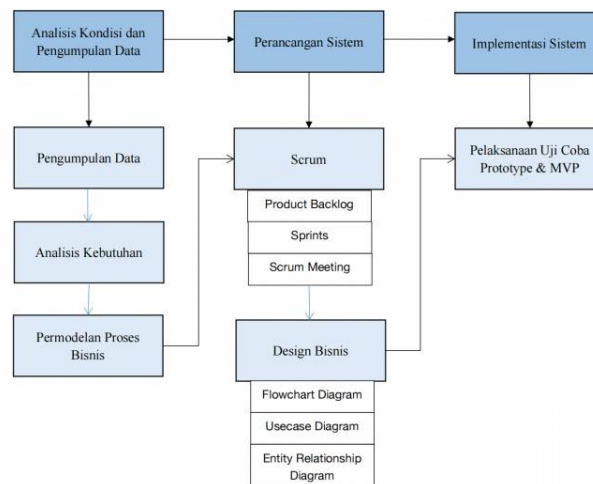


Figure 1. Research Flow

In the research flow that we have designed, the first activity is in the form of condition analysis and data collection which will be carried out with a series of activities to collect the necessary data and afterwards carry out a needs analysis so that it can produce basic points from the implementation of information system design. In the second stage we will design a system based on the research method, namely scrum . In this scrum activity there are several important points that are listed such as the product backlog, sprints, and scrum meetings. These 3 things will include the stages of implementation scrum carried out by the team during system design. Finally, system implementation which will explain the results of the information system and along with the system trial stages.

RESULTS AND DISCUSSION

Condition Analysis and Data Collection

In terms of condition analysis and data collection, the researcher conducted several stages of interviews with the Malang City *Bappeda* and collected data from the aspiration column which

was still in printed form. The following is a description of the data collection and needs analysis activities that we have carried out.

Data Collection

Condition analysis and data collection are the initial stages of system design. This stage begins with field research conducted at *Bappeda* Malang City. In this field research there was a process of initial data collection activities in the form of interviews and resulted in several problems faced by *Bappeda* Malang City. Apart from conducting interviews, we also saw several files in aspirational formats that were still in the form of printed files. From the interviews conducted, we found that the Malang City *Bappeda* still had difficulties in collecting community aspirations, resulting in other complex problems such as the length of time it took to collect problems which resulted in the problem being neglected for longer or not actual. This initial data collection will be followed by needs analysis activities aimed at mapping problems, solving problems appropriately, and also carrying out needed innovations.

Needs Analysis

The next stage is needs analysis in which researchers categorize problems with existing needs. Based on the interviews that have been conducted, there are problems with collecting data on community aspirations which are still done manually. This manual data collection led to other problems, such as the difficulty in knowing the actual problems and needs of the community, the data collection process took a long time, and the proposal process took a long time. By sorting these problems, it can be concluded that a way is needed so that the distribution and collection of community aspirations can be processed effectively.

Business Process Modeling

In modeling the business process of the aspiration collection system, there are steps on how to access the website and the roles of several parties, such as filling out a form that will be carried out by the LPMK as a representative of the community, the process of verifying data by the urban village and categorizing LPMK aspirations by *Bappeda* to be sent to the relevant regional apparatus. The following is the design of the aspiration collection system business processes listed in the business process diagram in Figure 2.

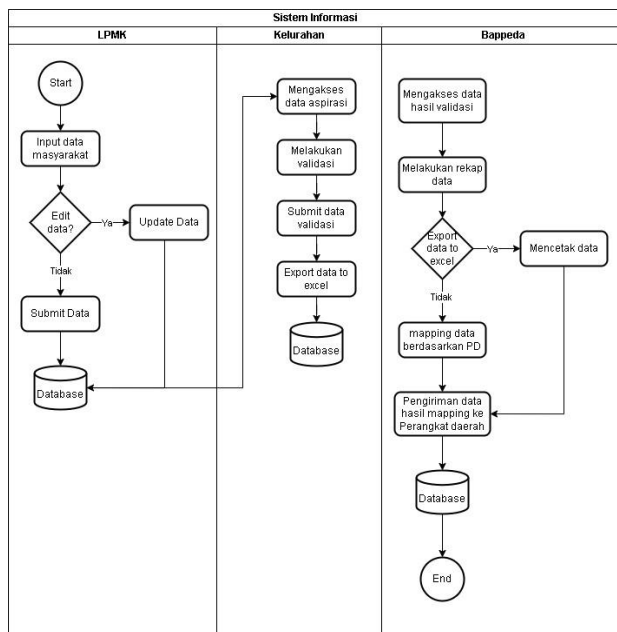


Figure 2. Business Process Diagrams

The business process diagram above presents the activities of system users, a) LPMK, starting with the community finding problems that want to be channeled through aspirations, LPMK as a representative of the community can write down and send aspirations to convey, and after conveying these aspirations LPMK can view history aspirations. b) Kelurahan, starting from the kelurahan who received the aspiration data sent by LPMK, the kelurahan can sort out which aspirations will and deserve to be verified, after verifying the aspirations of the kelurahan can submit aspirations, then for aspiration data can be printed if needed , the kelurahaan can see the aspirations that have been submitted to the history. c) *Bappeda*, the role of *Bappeda* here is to receive community aspirations that have been verified by the sub-district office, can take action on aspirations, and also submit aspirations data to OPD.

System Planning

Agile Scrums

This stage uses the Scrum method, including several activities, from the design that has been carried out, such as the product backlog, sprints, and scrum meetings.

- 1) Product Backlog: At this stage we group user needs resulting from the needs gathering process or are called backlog items which consist of a list of features and products that are completed in order and according to the priority scale (Efendi, 2018). The activities carried out in this product backlog are the creation of an information system for collecting data on community aspirations based on the business processes that have been carried out. Priority levels in table 3.1 below are determined based on the duration of the sprint, (1) Very High Priority: 12-14 days; (2) High Priority: 10-12 days; (3) Medium priority: 7-9 days; and (4) Low Priority: 4-6 days (Dewi et al., 2018).

Table 1. Product Backlog

No	Feature Description	Priority
1	Login Feature	Low
2	Aspiration History Dashboard	Medium
3	Feature Added Aspiration	Medium
4	Guide Feature	Low
5	Aspiration Submit Feature	Medium
6	Aspiration Edit Feature	Low
7	Changing Passwords	Low
8	Aspiration Remove Feature	Low
9	Aspiration Verification Feature	Low
10	Aspiration Page Sent	Medium
11	Print Feature	Medium
12	Export Feature	high
13	<i>Bappeda</i> Dashboard	high
14	Category Feature	high
15	Search Feature	Low
16	Add Account Feature	Medium

Source: Research Results (2022)

- 2) Sprint: This stage is an exposure to activities and time for working on an information system website for collecting data on community aspirations which begins with the stages of condition analysis and data collection.

Table 2. Sprints

Backlog Items	Tasks	Owner	Estimation
Design Stages	Databases	Programmer	2
	Coding	Programmer	2
Sprints 1	4		
Program Stages	PRD	Analyst	5
	Coding	Programmer	5
	Interfaces	Programmer	4
Sprints 2	14		
Implementation Stages	Scientific Publications	Analyst	5
	Coding	Programmer	5

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	Implementation	product owner	1
	User testing	product owner	1
Sprints 3			12

Source: Research Results (2022)

- 3) Scrum Meeting: Scrum meeting is a meeting activity that is held every day with approximately 15 minutes. In this scrum meeting, each team member must convey the progress that has been made, the plans that will be carried out, and also the problems that are being faced while in progress. This scrum meeting aims to find out the details of the process of each team member in working on the project.

Business Design

- 1) Flowchart Diagram: Flowchart diagram is a type of diagram that presents an algorithm or sequential instruction steps with the system. The use of flowchart diagrams as documentation evidence to logically describe the system to be built.

The following is a flowchart diagram of the LPMK which explains the flow of the community (LPMK) in accessing and using the "Di-Rangkul" website in filling out aspirations that will be sent to the Kelurahan and *Bappeda*. First, the community can open the "Di-Rangkul" website, then the community can log in, after the login process the community can add aspirations by filling out the aspirations form provided, after that the community can submit aspirations, besides that if there is an error in writing community aspirations can edit the aspiration form and return to submit afterwards. After submitting aspirations, the public can see the history of aspirations that have been sent.

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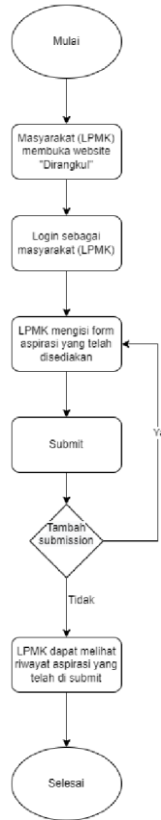


Figure 3. LPMK Flowchart Diagram

Next in Figure 4 there is a flowchart diagram of the kelurahan where in the flow the kelurahan can log in, after that the kelurahan can access community data and verify data by checking the data, and if the data is approved the data can be submitted. The next step is to print the verified data by exporting excel data and printing the data.

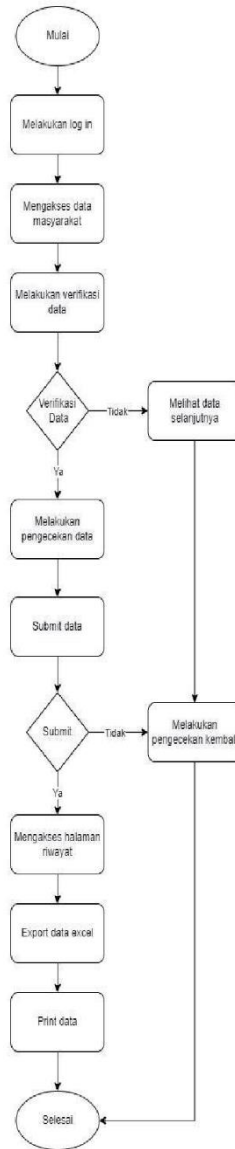


Figure 4. Sub-district Flowchart

In the following figure there is a flowchart diagram of *Bappeda* which in its flow explains the flow of *Bappeda* in using the "Di-Rangkul" website, including the following, *Bappeda* can open the "Di-Rangkul" website and log in by entering a username and password, then the user will see dashboard and aspiration data will appear, then *Bappeda* will conduct mapping by categorizing data according to regional apparatus and sending data that has been categorized.

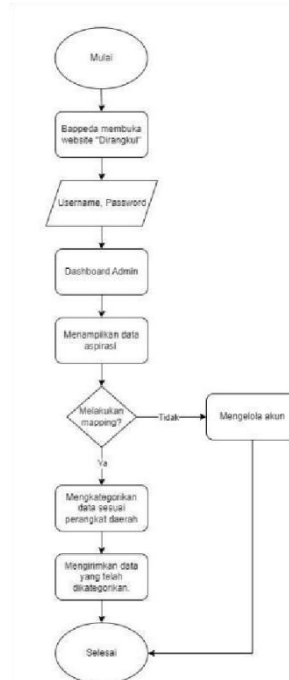


Figure 5. *Bappeda* Flowchart Diagram

- 2) Use Case Diagram: Use case diagrams that have the function of showing the process of activity in a coherent manner in the system and describe business processes. The following is a use case diagram of several users of the aspiration data collection information system. In Figure 6 there is an LPMK use case diagram that explains the process and flow of system use by LPMK. When the user logs in , a column for filling in the username and password will appear on the login page, after entering the data needed when logging in and making a submission, the user will be shown an aspiration form and the system will display the aspirations form, fill out the form, submit, and make edits.

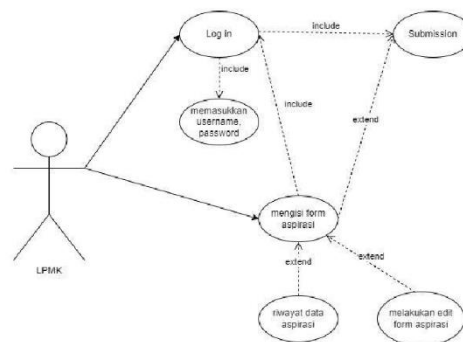


Figure 6. *LPMK* Use Case Diagram

Furthermore, in Figure 7 there is a village use case diagram in which village users are shown logging in, verifying data, and also submitting data.

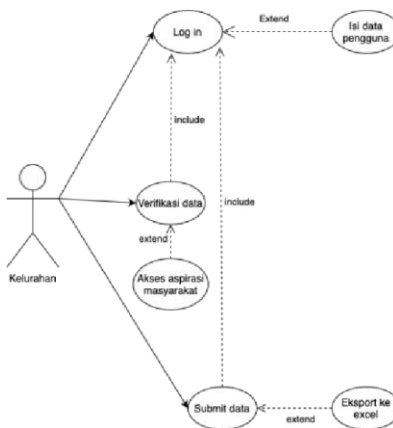


Figure 7. Use Case Village Diagram

Finally, in the *Bappeda* use case diagram, there are several actions that can be carried out by *Bappeda*, such as logging in, collecting village data, displaying data, and mapping.

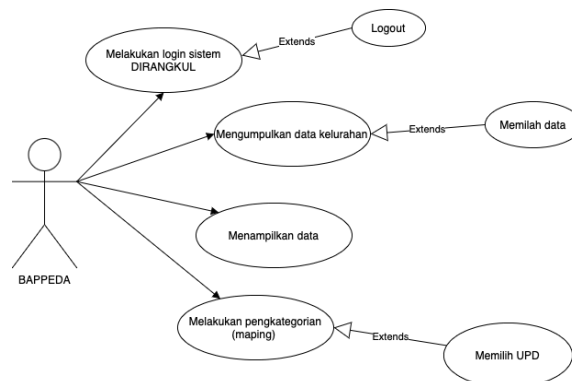


Figure 8. Use Case Diagram *Bappeda*

3) Entity Relationship Diagram: Entity relationship diagram, or commonly abbreviated as ERD, is a diagram that describes database design by showing the relationship between objects and their attributes in detail. The following is the ERD of the design of the community's aspirations data collection system.

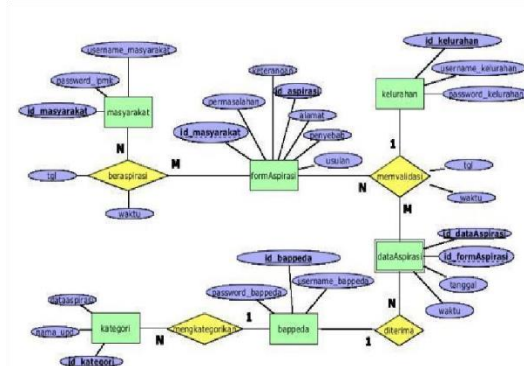


Figure 9. Entity Relationship Diagrams

System Implementation

At the system implementation stage, a small-scale prototype trial will be carried out involving user representatives. This prototype trial activity will produce an analysis of the results of system planning. The purpose of carrying out the analysis of the results of this plan is to justify or evaluate the prototype. Next is the implementation of the MVP trial which will produce analysis.

Implementation

1) Public

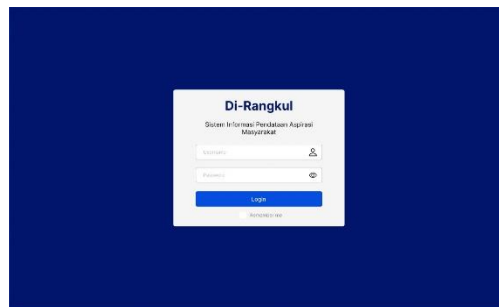


Figure 10. Login Page

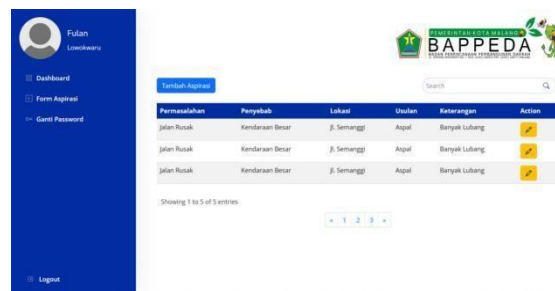


Figure 11. Dashboard Page

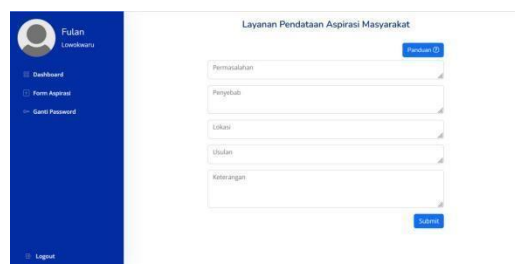


Figure 12. Aspiration Form Page

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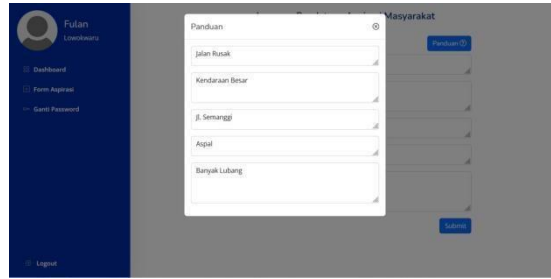


Figure 13. Pop-Up Page for Filling in Aspiration Data

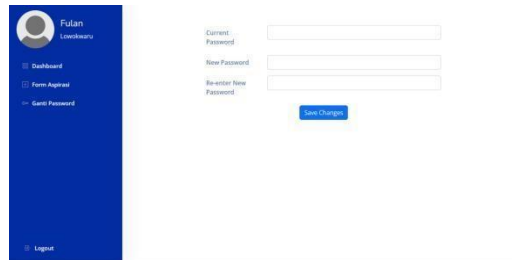


Figure 14. Change Password Page

2) Hamlet



Figure 15. Aspiration Table Page



Figure 16. Sent Aspirations Page

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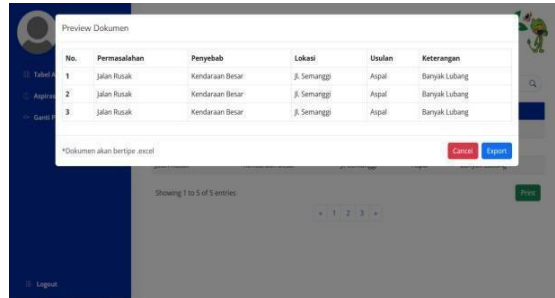


Figure 17. Aspiration Data Print Pop Up Page

3) Bappeda



Figure 18. Bappeda Dashboard Page

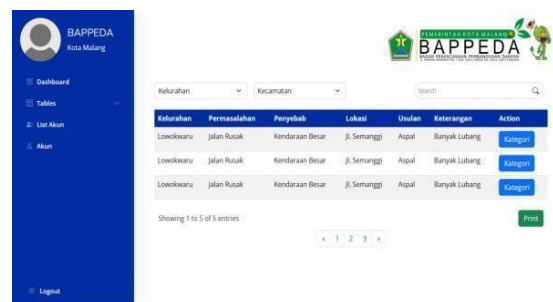


Figure 19. Aspiration Table Page

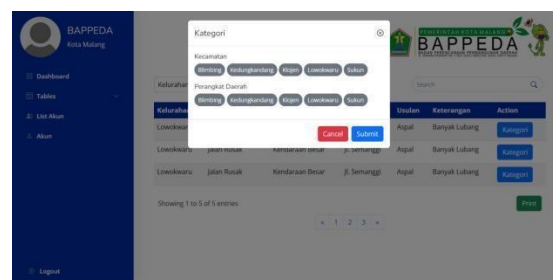


Figure 20. Category Pop-Up Page

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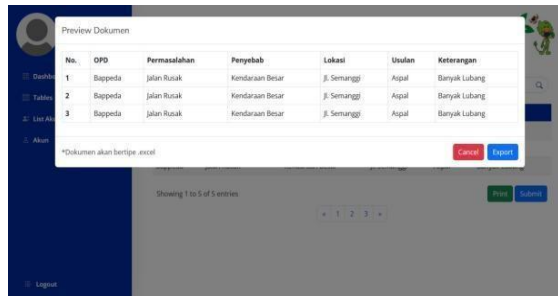


The screenshot shows the BAPPEDA Tables Page. It features a sidebar with navigation options: Dashboard, Tables, List Akun, and Akun. The main content area displays a table with the following data:

OPD	Permasalahan	Penyebab	Lokasi	Usulan	Keterangan
Bappeda	jalan Rusak	Kendaraan Besar	J. Semanggi	Aspal	Banyak Lubang
Bappeda	jalan Rusak	Kendaraan Besar	J. Semanggi	Aspal	Banyak Lubang
Bappeda	jalan Rusak	Kendaraan Besar	J. Semanggi	Aspal	Banyak Lubang

Below the table, it indicates "Showing 1 to 5 of 5 entries" and includes pagination controls (1, 2, 3) and buttons for "Print" and "Submit".

Figure 21. Tables Page

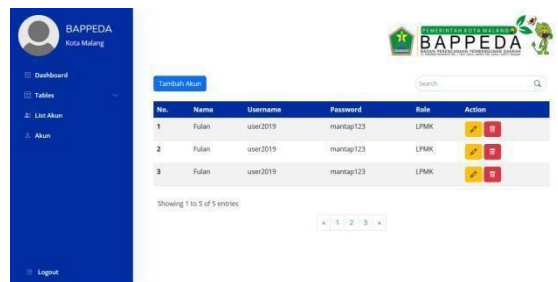


The screenshot shows the BAPPEDA Aspiration Form Page. A "Preview Dokumen" dialog box is open, displaying a table with the following data:

No.	OPD	Permasalahan	Penyebab	Lokasi	Usulan	Keterangan
1	Bappeda	jalan Rusak	Kendaraan Besar	J. Semanggi	Aspal	Banyak Lubang
2	Bappeda	jalan Rusak	Kendaraan Besar	J. Semanggi	Aspal	Banyak Lubang
3	Bappeda	jalan Rusak	Kendaraan Besar	J. Semanggi	Aspal	Banyak Lubang

The dialog box also includes a "Cancel" button, an "Export" button, and a note: "Dokumen akan bertipe excel".

Figure 22. Aspiration Form Page

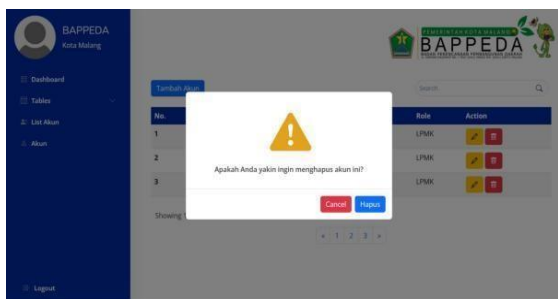


The screenshot shows the BAPPEDA Account List Page. It features a sidebar with navigation options: Dashboard, Tables, List Akun, and Akun. The main content area displays a table with the following data:

No.	Name	Username	Password	Role	Action
1	Fulan	user2019	mantap123	LPMK	[Edit] [Delete]
2	Fulan	user2019	mantap123	LPMK	[Edit] [Delete]
3	Fulan	user2019	mantap123	LPMK	[Edit] [Delete]

Below the table, it indicates "Showing 1 to 5 of 5 entries" and includes pagination controls (1, 2, 3) and buttons for "Print" and "Submit".

Figure 23. Account List Page



The screenshot shows the BAPPEDA Aspiration Account Delete Pop-Up Page. A confirmation dialog box is open, displaying the message: "Apakah Anda yakin ingin menghapus akun ini?". The dialog box includes a "Cancel" button and a "Hapus" button.

Figure 24. Aspiration Account Delete Pop-Up Page

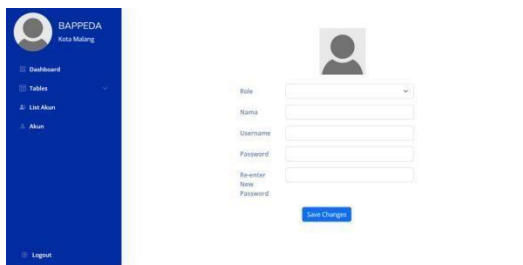


Figure 25. Create Account Page

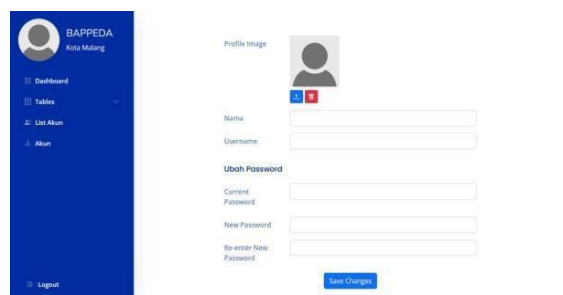


Figure 26. Account Page

Testing

After the Minimum Viable Product (MVP) can be used by users, testing is carried out to find out and ensure that the implemented application runs according to the previously defined system requirements. Testing is done by validating the system to the user.

At the testing stage, it is carried out starting from the main activities of the system that has been developed, one of which is the activity of sending community aspirations data. Testing is done by defining the requirements specifications, inputs, and expected results or outputs. Validation testing was carried out on three different actors, namely five people from the community with various backgrounds. Furthermore, there are village officials and two *Bappeda* officials.

Table 3. Testing Results

Test Code	Function	Expected Results	Results
TV-01	Login	The system can authenticate accounts according to roles	Valid
TV-02	Input the Aspiration Form	The system can send inputted complaints	Valid
TV-03	Edit Data	The system can update data	Valid
TV-04	Validation	The system can validate aspiration data	Valid
TV-05	Submit	The system can send validated aspiration data	Valid
TV-06	Export Data	The system can export data into excel form	Valid

TV-07	Search	The system can display the data you are looking for based on the keywords entered by the user	Valid
TV-08	Dashboards	The system displays the number of incoming aspiration data by sub-district and sub-district	Valid
TV-09	Create an account	The system can create new accounts with predefined roles	Valid
TV-10	Category tables	The system can display data based on regional device categories	Valid
TV-11	Village tables	The system can display data by village	Valid

Source: Research Results (2022)

CONCLUSION

Based on the explanation of the process of analyzing and designing a data collection system for community aspirations using the scrum research method , it can be applied in the future development of the *Bappeda Bappeda* Malang City "Di-Rangkul" website. This is due to using the Scrum framework which is divided into 4 sprints and each sprint has its own goals and the existence of a product backlog can facilitate the development stage of prioritized features. The results of the MVP testing of the *Bappeda* concluded that this system was acceptable and could utilize it in the process of submitting development proposals from the community and facilitating the internal performance of the Malang City *Bappeda* bureaucracy.

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