

## Vokametri: Mobile Application for Observation of Attitude Aspects Based on KKNi in Vocational Students

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**Abstract.** Findings at Hasnur Polytechnic show that some aspects of attitude assessment still do not produce diverse scores. In one class, all students obtained the same grade. This problem arises because there are no guidelines for making observations. This research focuses on building a mobile app so that lecturers can more easily assess each learning session. The research method used as a framework in the development process is ADDIE (Analysis, Design, Development, Implementation and Evaluation). The result of this research is the *Vokametri* application, built with the Ionic framework for the Android platform. All functions of the application have worked well. Therefore, it can be used by lecturers to conduct KKNi-based attitude observations. This application works offline so that the assessment can be done without being connected to the internet. Lecturers can view student attitude score records and download Excel files that list the attitude scores of all students in a course.

**Keywords:** Attitude; KKNi; Mobile Application; Observation; Vocational Student

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### INTRODUCTION

The Indonesian National Qualifications Framework (KKNi) is a competency qualification framework that integrates education and vocational training (Presiden RI, 2012). The goal is to produce graduates who are competitive and bring the development of the nation and state in line with other countries (Sitepu & Mayasari, 2021). This framework is the direction of the meeting point to bridge the gap that occurs so that higher education and industry become more cohesive. Furthermore, this framework is a reference for structuring the Indonesian workforce (Siagian & Siregar, 2018). The expected competency qualifications are not only in the aspects of knowledge,

skills, and work experience but also attitudes.

In employee recruitment, this attitude aspect is an important point because it becomes a character that each prospective employee has internalized. For other aspects of the industry, such as knowledge and skills, if still lacking, job training can be carried out. However, it is different from attitude, where this aspect has usually become the main consideration in employee recruitment and termination of employment (Amaliah, 2019).

Repeated habituation in the attitude aspect is needed so that it is formed during the education period. Even so, in learning, the most difficult aspect to repeatedly assess is the attitude aspect.

Findings in the field show that the attitude assessment aspect is still carried out by lecturers subjectively and does not produce diverse values. In one class, the same score is often given to all students. This problem arises because there is no assessment guide.

On the other hand, the ten aspects of attitude formulation that are the reference as stated in the attachment to Permendikbud No. 3 of 2020 concerning National Higher Education Standards (Mendikbud RI, 2020) are still considered at a conceptual level, so that for operationalization a rubric is needed so that lecturers can assess objectively.

The attitude aspect is also an aspect that affects other aspects of learning outcomes. Attitude strongly influences cognitive (Richardo et al., 2023) and has a major effect on learning achievement (Das & Ali, 2023). Therefore, this aspect is not only important for the world of work but also important in the learning activity itself.

This research focuses on attitude observation based on KKNi. The observation is carried out with the help of mobile applications so that lecturers can more easily assess in each lecture meeting. The use of mobile applications for assessment is often called Mobile-based Assessment.

Mobile applications are practical because they run on compact and

portable mobile devices (Meletiou et al., 2012), allowing lecturers to assess by moving around the classroom. Not only that, Mobile-based Assessment is also practical for lectures conducted in the field or outside the classroom (Nikou & Economides, 2017). The application developed is offline so that it can be used without the need to connect to the internet and does not become an obstacle during the assessment (Stowell, 2015).

In addition, with a digital system, in this case, a mobile application, the assessment of the formulation of attitudes imposed on meetings in a course is also expected to be easier because the final assessment can be carried out with system automation that has been set up from repeated observations from each date the lecture occurs.

## METHOD

The research method used as a framework in the process of developing this application is ADDIE (Analyze, Design, Development, Implement, and Evaluation). An overview of the ADDIE Model can be seen in Figure 1 (Huang et al., 2019). The limitation of this research is only up to the development of system applications, so the implementation stage, which lecturers use directly, will be the next stage of this research.

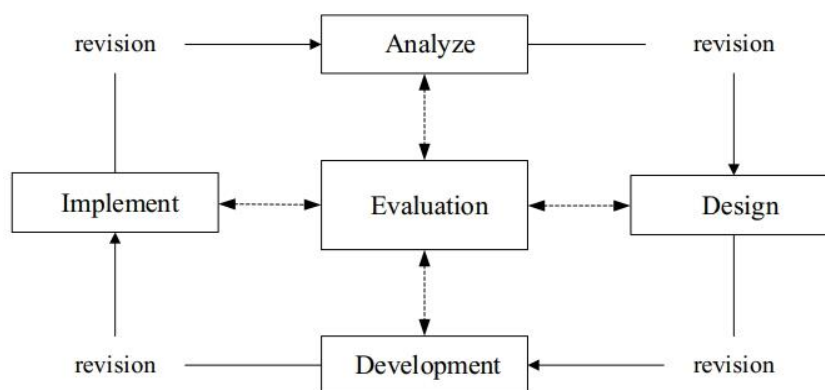


Figure 1 ADDIE Model

### **Analyze**

At this stage, the analysis was carried out with a case study taken from attitude assessment at Hasnur Polytechnic, located in Barito Kuala South Kalimantan. Identification of system requirements is done at this stage to obtain a list of required features. The development of rubrics as an indicator of attitude assessment is carried out separately to become a separate activity outside the development of mobile applications. The form of assessment during the observation was mutually agreed upon in advance by the internal research team consisting of 3 experts from education, informatics, and statistics expertise so that application development could be carried out in parallel with rubric development and validation.

### **Design**

In the design stage, the system was designed using Figma, a popular design processing application used for application and website interface design. Emphasis is placed on User Experience Design to obtain a system that is easy, friendly, and beautiful. To achieve the expected design, four FLIP stages were used, namely:

- a. Flow, creating a user flow so that it can operate the application easily
- b. Lo-Fi creates a Low-Fidelity system in the form of sketches or wireframes that contain friendly communication sentences and error messages.
- c. Interface: create a neat layout harmonization between images, text, and other visual elements to make it look beautiful.
- d. Prototype, testing the principles of easy, friendly, and beautiful that have been made in the previous three stages to make revisions for improvement again

### **Development**

In the development stage, programming is carried out regarding the design determined in the previous stage. Development requires a database and program code generation using the Ionic framework. The application built is an offline application used by lecturers without requiring internet access, so the database used is local data storage included in the application package with all required components (Azmi et al., 2017). The Android operating system was chosen because it is more widely used in Indonesia, which is 88.44% compared to iOS 11.42% (Statcounter.com, 2023). Unit testing is done during development to ensure no bugs or errors in the program code.

## **RESULTS AND DISCUSSION**

In developing applications for assessment, the needs analysis is adjusted to the assessment model being built (Ridhoni et al., 2022). The identification of system requirements has been carried out with internal discussions of the research team, obtaining a list of required features as follows:

1. login and logout
2. create account
3. course
4. meeting in the course
5. students in the course
6. assessment aspect settings
7. account settings and change the password
8. setting aspect assessment in a course
9. student assessment for an aspect at a meeting
10. student grade profile in a course
11. download the Excel file of all student grades

The flow of use when operating the application is illustrated in Figure 2 below.

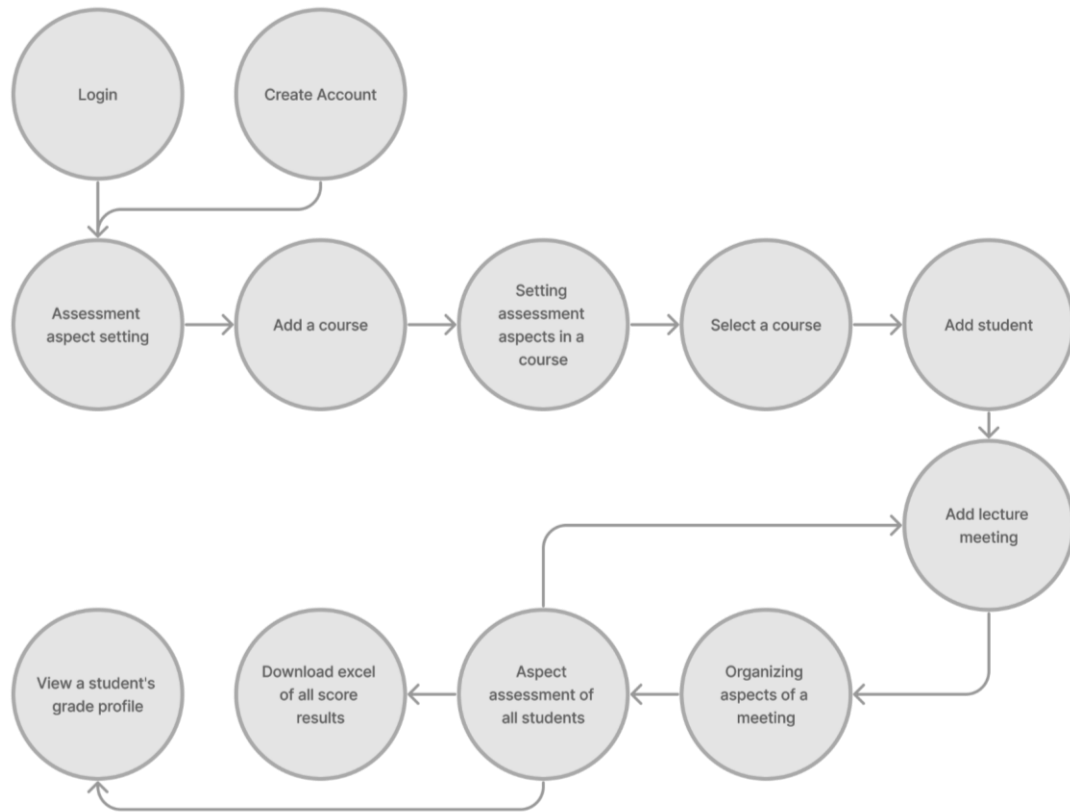


Figure 2 User Flow

When first run, the application will start with a login, but if you have never created an account, the flow starts with creating an account. After that, the user sets up the assessment aspects. If it is correct and there are no changes, then the user can add a course. Every time a new course is added, aspects from the settings menu are selected, which will be charged to the course.

Once the courses are created, usually more than one for each lecturer, then the user can select one of the courses and add who are the students taking the course. Next, the user adds the meeting day/date and sets what aspects are assessed on that day's meeting. Assessment of all students for a particular aspect at a meeting can be done afterward.

Users can add the next week's meeting or download an Excel file containing the grades for all aspects of the course. In addition, users can view a student's profile to find out the value of observation results. The final result of the value of an aspect, if the aspect is assessed repeatedly, is the average result.

Next, for each stage in the user flow, a wireframe was sketched before proceeding to the interface design. A wireframe is a two-dimensional skeletal outline (Alao et al., 2022). These wireframes are built iteratively with the intention that when it comes to interface design, not too many more changes are made. Some of the wireframes that have been fixed are shown in Figure 3.

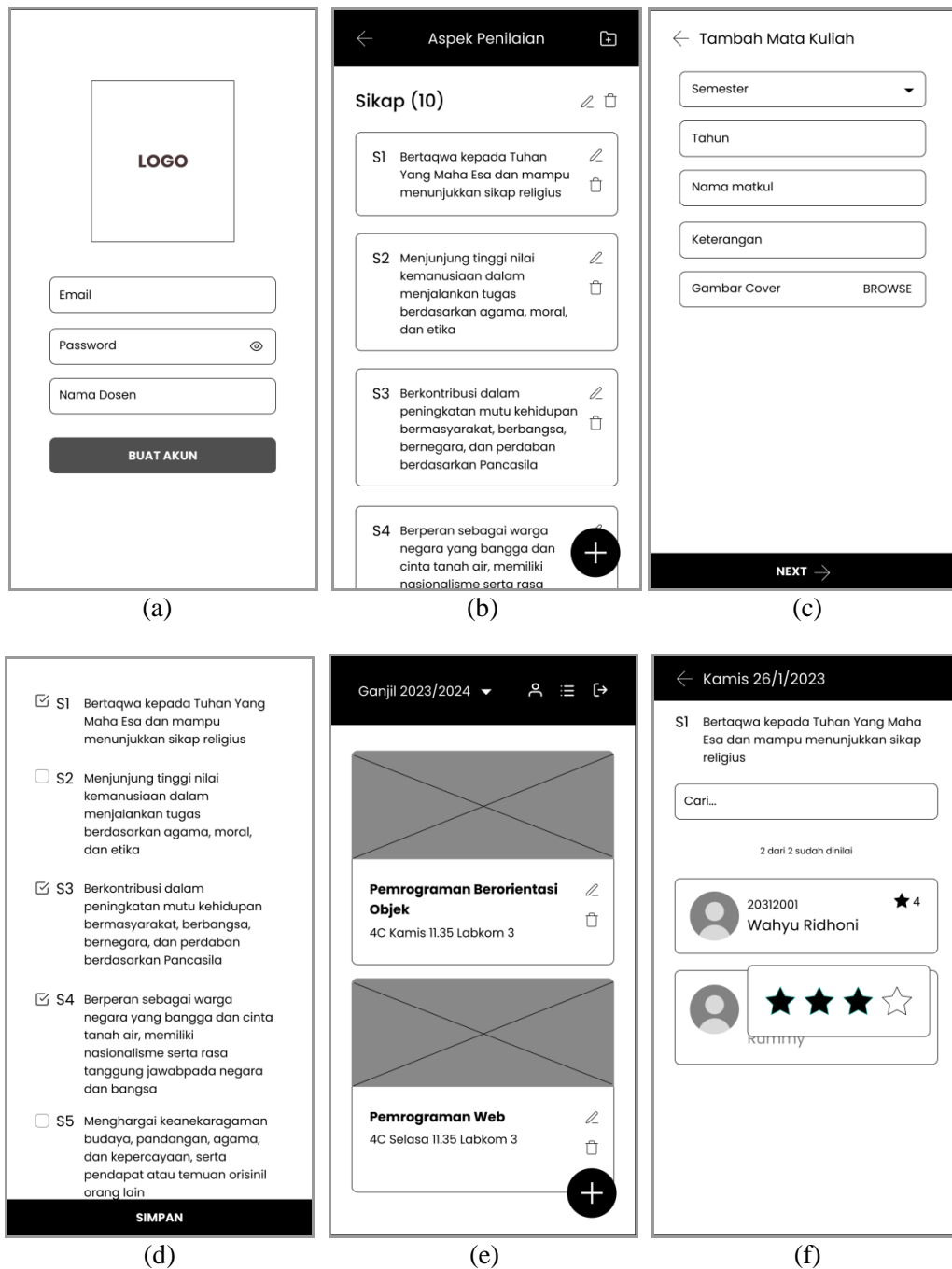


Figure 3 Wireframe

In Figure 3a, the create account page contains a logo, username, password, and lecturer name. If the button is pressed, it will enter the application. The aspect menu (3b) automatically contains ten items according to the SN-Dikti attitude formulation. The contents can

be edited, deleted, or added if there are editorial changes or the reduction and addition of items.

When a new course is created (3c), there is a semester combobox to select odd, even, or short. In addition, there are year fields, course names, descriptions

to fill in class, room, schedule, or other info, and a cover image. Press next, and the course will choose from a list of aspect items that will be charged to the course (3d). Courses are grouped

according to their semester (3e). Students can be searched and rated on a scale of 1 to 4 with a star shape (3f). If 0 and light gray, it means that it has not been assessed.

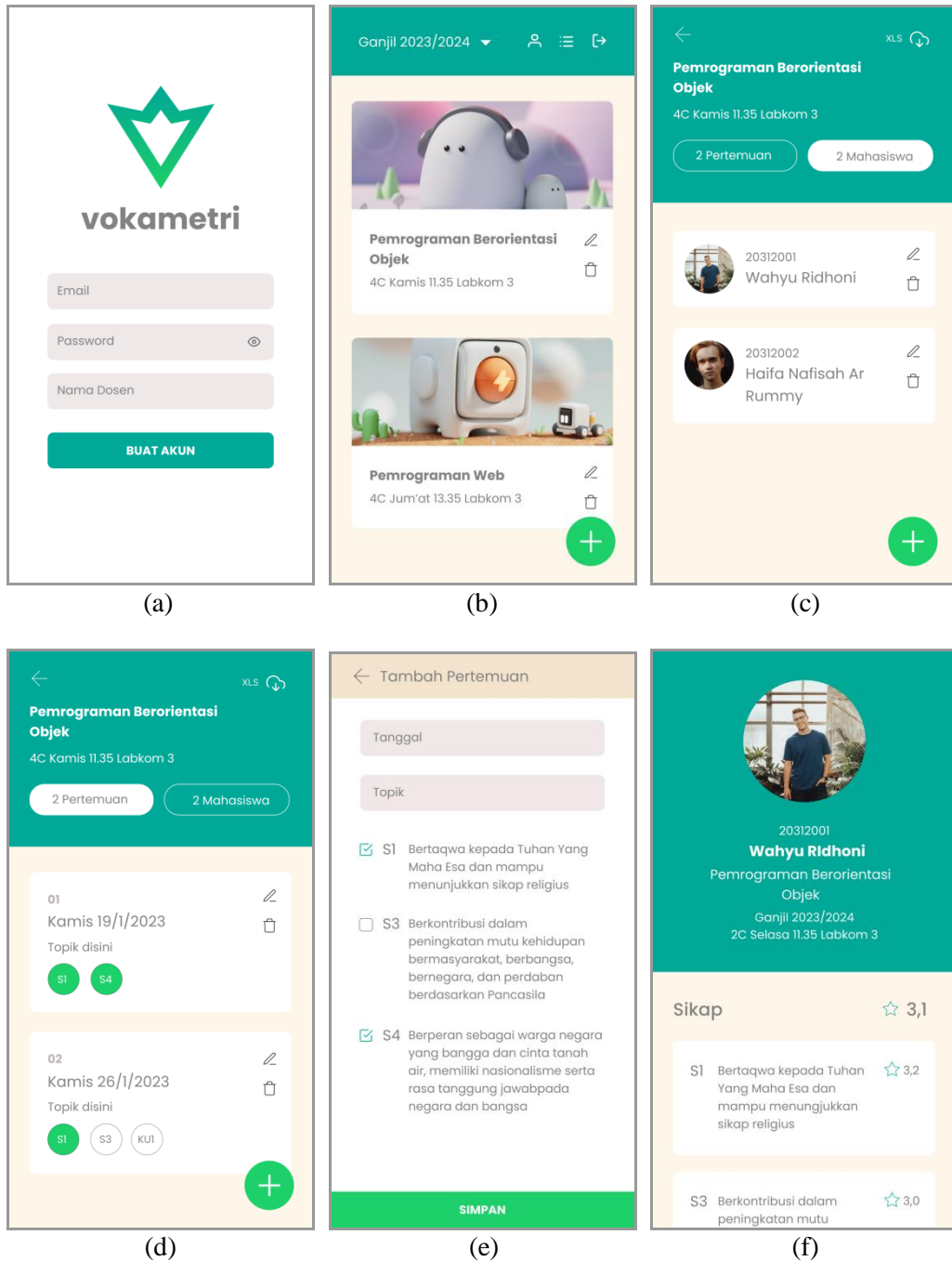


Figure 4 Interface Design

After the wireframe is complete, the design continues to create the interface to be tested in the prototype. Figma's strengths are mainly its mirroring app for viewing prototype results in real-time on a mobile (Sharma & Tiwari, 2021). Here, the visual elements already use actual logos, icons, colors, and images. The result is as similar as possible to the real application that will be built later. The Vokametri logo that was finally chosen is as in Figure 4a, embedded on the first page. Log in and create an account.

The color themes used are green with hex code #00a898 and cream with hex color code #fef6e9. The green color is used for the header, and cream for the background (4b). After clicking on a

course, the user can select the student (4c) or meeting (4d) menu. There is an Excel download on the top right. In the student menu, the data is sorted according to the parent number. As for the meeting, it is sorted from the first meeting onwards. Aspects whose students have all been assessed will change from white to green circles.

The add button on the bottom right will go to the page to fill in a new meeting and select the aspect items to be assessed on that day. The date is automatically set for the day the application was used at that time (4e). Meanwhile, if one of the students is clicked, it will go to the student's profile page, which contains the average value of the assessed aspects (4f).

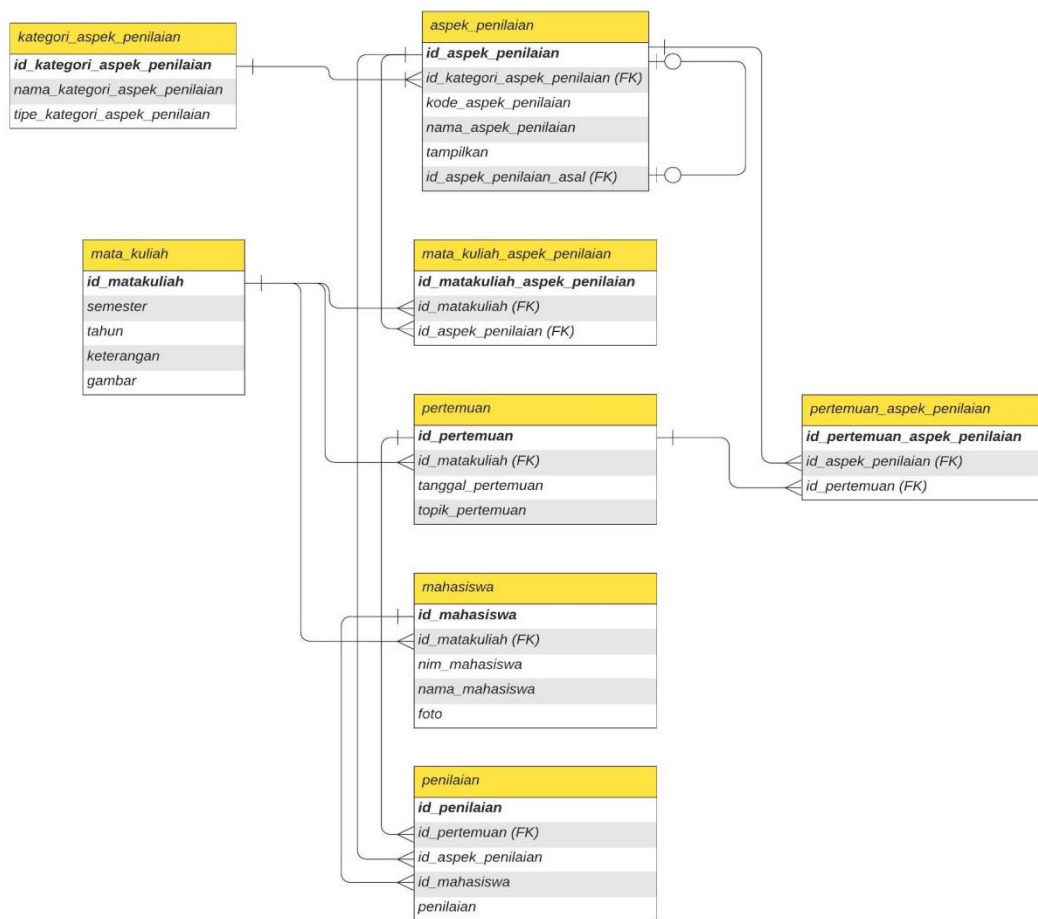


Figure 5 Database Relations

The database tables and their relationships used for this application are illustrated in Figure 5. There are eight tables required according to the user flow and interface design that has been made. Student grades for a meeting in a course are stored in the assessment

table. There are many relationships, namely between assessment aspects and meetings and between assessment aspects and courses. The rest of the relations between other tables are in the form of one-to-many.

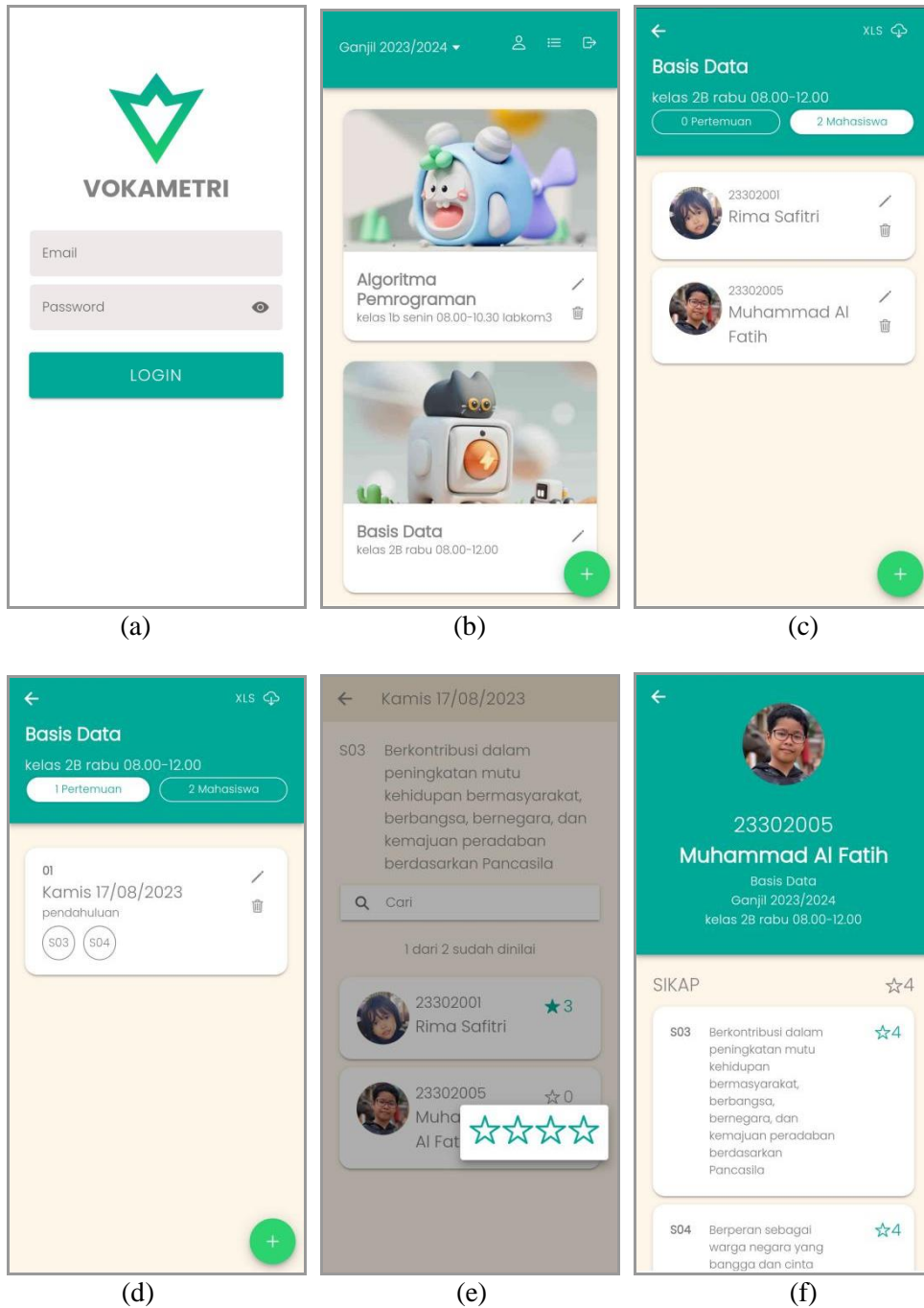


Figure 6 Result of Mobile Application



Semester Ganjil 2023/2024				
Basis Data				
Dr. Wahyu Ridhoni, S.Kom., M.Eng				
No	NIM	Nama	SIKAP	
			S03	S04
			Berkontribusi dalam peningkatan mutu kehidupan bermasyarakat, berbangsa, bernegara, dan kemajuan peradaban berdasarkan Pancasila	Berperan sebagai warga negara yang bangga dan cinta tanah air, memiliki nasionalisme serta rasa tanggungjawab pada negara dan bangsa
1	23302001	Rima Safitri	3	3
2	23302005	Muhammad Al Fatih	4	4

Figure 7 Excel File Containing All Students' Grades

Screenshots of the results of the Vokametri application that has been installed on a mobile device are shown in Figure 6. Not many changes occurred, most of which followed the prototype design that had been made; only revisions occurred because the program results did not follow the design. Programming at the development stage is adjusted to the design stage's design.

The Excel file containing the attitude scores of all students in a course is shown in Figure 7. The header section contains the semester, course name, and lecturer name. Dynamic data rows according to the number of students entered in the course in the application. Columns consist of sequence number,

parent number, student name, attitude score of the average result of the aspect, and the respective score, which is the average score of the aspect item from all meetings. The file name will adjust the semester and the name of the course, for example, vokametri\_semester\_ganjil\_2023\_2024\_basis\_data.xlsx

Tests are carried out repeatedly until all features run as expected. Black box testing is done with various scenarios to see which functions have not been successful. Table 1 is an adaptation of the Boundary Value Analysis Technique (Yulistina et al., 2020). The results of testing by the research team with black box testing that has been carried out. All functions have run successfully.

Tabel 1 Blackbox Testing

Scenario	Expected Output	Result
Registering a new account	The account page shows your name and email	Success
Change password	Login with a new password	Success
Login with incorrect username and password	Cannot login and shows info on the wrong username or password	Success
Add aspect items	The number of new aspects increases	Success
Edit aspect item code and description	Aspects are updated with new codes and descriptions	Success
Adding a course	In a certain semester, according to the content, the course appears.	Success
Change the semester filter	The contents of the course list change according to the selected semester filter.	Success
Edit a course	Semester, name, description, or cover image changes	Success
Deleting a course	A confirmation pop-up appears if canceled. If yes, I will delete	Success

Scenario	Expected Output	Result
Click on one of the courses	Display the meetings and students menu for the course, along with a description of the number of meetings and students	Success
Click the student menu	Move to the student list	Success
Click the meeting menu	Move to the list of meetings	Success
Add student	The number of student data increases	Success
Edit a student	Nim, name, or photo of the student is changed	Success
Delete a student	A confirmation pop-up appears if canceled back; if yes, it will delete	Success
Add a meeting	The number of meeting data increases	Success
Edit a meeting	The date, topic, or assessed aspect changes	Success
Delete a meeting	A confirmation pop-up appears if the canceled return is yes. I will delete	Success
Assess a student	the number 0 on the assessed student changes; if all students have been assessed, the aspect will turn green	Success
Click on one of the students	display profile with average score calculation	Success
Click the download icon	download an Excel file containing all students' score data with the correct calculation.	Success

In the black box testing above, the tester does not need to know the code structure of the program but only needs to match whether the output generated from the input is as expected. The main focus is to determine whether the overall functionality is working according to the needs of the system specification. (Verma et al., 2017).

The Ionic Framework used in this development is not written with native Android source code but is a hybrid application written with web-based and converted into native code. This consideration is taken because, with the Ionic Framework, the resulting application can be compiled cross-platform for Android and iOS (Zefanya & Sihotang, 2019) so that the next development to the iOS operating system becomes easier without the need to write different program codes. In addition, it can minimize the time and cost of development (Suhaidi et al., 2020).

The performance in terms of graphics that is feared in hybrid applications

(Chandra et al., 2019) does not occur in this developed Vokametri application. The application switches pages seamlessly, and all the required functionality can also be handled well by the Ionic framework.

## CONCLUSION

The Vokametri application has been built with the Ionic framework and runs on the Android platform. All functions have run successfully. Therefore, it can be used by lecturers at Hasnur Polytechnic and other vocational colleges to conduct attitude observations based on KKNi. This application runs offline so that the assessment can be done without being connected to the internet. Lecturers can see the value profile of the attitude aspect of a student and can download an Excel file, which is a list of attitude scores from all students in a course.

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