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The Design and Development of iInvest Application

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Abstract: iINVEST application is proposed to provide support, mostly for youth or any other amateur investors, and equip them with proper knowledge and skills in investment endeavor regardless of their background where newcomers in this commercial and trading industry usually have major issues with high-risk investments and lose their capital. This application is an online mobile learning application for youth below 40 years, who are into investment in real estate, shariah compliance forex and shariah compliance coin mining. This application is proposed to be developed using evolutionary prototyping model as the phase will be iterated until the target user requirement has been achieve. One of the application's key advantages is that the user could attempt to make a mock investment on the chart module against other users who are using real money. Lastly, system prototype is developed to make sure that the application fulfills all the of requirements.

Keywords: Invest, Learning, Amateur

1. Introduction

As the pandemic Covid-19 hits the country, many people tend to find their new way of generating income from home. One of the best ways to earn money today as a layman, amateur or enthusiast is by starting to invest as your passive stream of income [1]. Investing can be done when people put a valuable resource into something that is beneficial (with respect to knowledge, experience, economic, finance, physical, mental, or spiritual). Today, many people shown interest in investment as they see it is one of the best ways for financial goals [2]. Newcomers in this commercial and trading industry usually have major issues with high-risk investments, which may end up lead to low-risk revenue or worst case, lose their capital. Some of the issues include account blow up [3], money management [4] and risk and reward [5].

iINVEST application is proposed to provide support, mostly for youth or any other amateur investors, and equip them with proper knowledge and skills in investment endeavor regardless of their background. This application also provides essential information about real estate investment, shariah compliance forex and shariah compliance crypto currency coin mining in one platform. On top of these

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information, users are provided with charts, figures, and statistics to assist them in making the best decision before any investment is made. The objectives of this application are as follow:

1. To design a mobile learning investment application based on Android operating system (OS).
2. To develop an online mobile investing application using Android Studio platform.
3. To evaluate the developed application with alpha and beta testing to target users (youth below 40 years).

This application is an online mobile learning application for youth below 40 years, who are into investment in real estate, shariah compliance forex and shariah compliance coin mining. The application will be developed in four main modules. First, introduction module, which would provide users about investment fundamentals. Another module is chart module where the users can get in hand to experience the real market where it contains buy and sell functional button with the given quiz. Next up is learning module, which provide in-depth information about real estate, shariah compliance forex and shariah compliance coin mining. The final module contains setting which the users may swap content between Bahasa Malaysia or English language. The subject matter expert for this project is a person who has investment experience for over 5 years. This application is proposed to be developed using evolutionary prototyping model as the phase will be iterated until the target user requirement has been achieve.

This application is an effort to help people who are longing for information about and keen into investment on the go (mobile device users). All modules should be well function and integrated to one another seamlessly. These include designs for user interface such as buttons, system navigation, object arrangements and color and text selections, which mostly will be designed using Adobe Photoshop. The application supposedly capable of running offline. It will be developed for Android-based mobile devices using Android Studio. The application will have a minimalist design theme to stimulate simplification and professionalism to the user. Results from both alpha and beta testing would expectedly improve the application further, and hypothetically, with respect to its functionality, efficiency, and reliability.

2. Related Work

2.1 Investment

Investment is a process of allocating resources, where the individual or group may receive a reward over a period. Investment may also simply means putting money to work for the investor [6]. Investing generally refers to the numerous instruments that people and institutions can purchase and sell to achieve a gain in profit, where it contains real and financial assets that can be classified [7]. Real assets are tangible assets that can be utilized to provide a service where land and houses are examples of actual assets. Financial assets are intangible claims on revenue created by the individual's actual assets, such as Bitcoin. To help the novice investor comprehend the financial market, a mentor with investing experience usually provides a trading guide [8].

2.2 API technology

At a very basic level, an application programming interface, or API is a method that enables two computer programs to communicate via a network using a common language that all parties could understand and agreed upon [9]. In the domain of financial markets and trading, an API may be used to link an application to the investor's preferred trading broker platform to acquire real-time quotations and price data, as well as to conduct electronic trades. Thus, the application is embedded with a real-time market chart to provide the user for a better understanding towards the real market.

2.3 Comparison of reviewed application and proposed application

The features and characteristics of the three mobile applications, Finandemy [10], Investmate [11] and Learn To Invest, Trade and Earn [12] are compared with iINVEST. The comparison result is tabulated in Table 1.

Table 1: Comparative analysis between existing applications

Element	Finandemy	Investmate	Learn To Invest, Trade and Earn	iINVEST
Chart module	Chart layout does not specify and not presented properly to the user	Chart layout is presented with proper selection for the user	Does not contain chart layout.	Chart layout is presented with proper selection for the user
Learning module	Content provided offer 17 courses for the user	Content provided offer 20 courses for user	Content provided offer 20 courses for user	Content provided offer 3 courses that contain sub-courses for user
Subscription	Payment is required to gain full access in application	Free access to all the module	Free access to all the module	Free access to all the module
Advertisement	Displayed as an interface before a new course is taken	Displayed in the learning content	Does not displayed any advertisement	Does not displayed any
Constraints	Each course must be completed to be able to learn new courses	Each course must be completed to be able to learn new courses	Each course can be selected and in the sub-courses must be completed step by step.	Each course can be selected and in the sub-courses must be completed step by step
Compatibility	Android version 5.0 and higher	Android version 7.0 and higher	Android version 4.4 and higher	Android version 7.0 and higher

Table 1: (cont).

Element	Finandemy	Investmate	Learn To Invest, Trade and Earn	iINVEST
Learning module	Content provided offer 17 courses for the user	Content provided offer 20 courses for user	Content provided offer 20 courses for user	Content provided offer 3 courses with sub-courses

3. Methodology/Framework

This project is using evolutionary prototype methodology as shown in Figure 1 below to manage the work given according to the timeline which starts from planning, analysis, design, development and lastly maintenance phase. Evolutionary prototyping is a software development process in which a prototype is built initially to the target user. Thus, the customer's initial feedback is taken, more prototypes are created, each with new features or enhancements, until the final product emerges. The project will be looped if user requirement is not met. Thus, it will undergo planning analysis and design phase until the requirement set has been satisfied the user. In other word, using evolutionary is a better solution to deal with the complexity of the designing process [13].

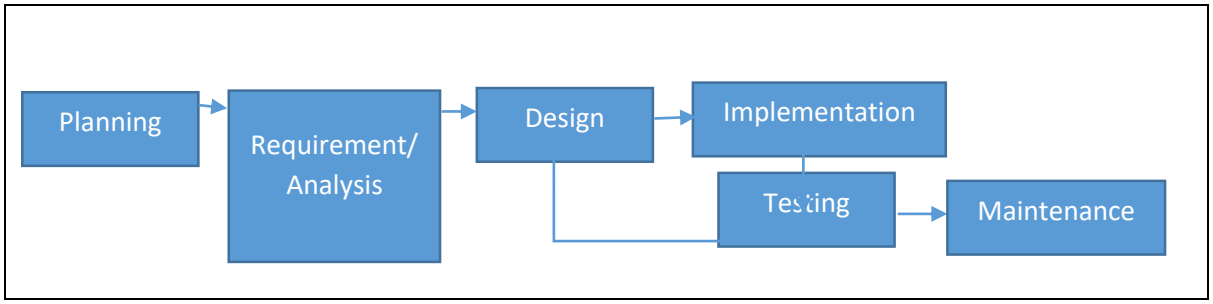


Figure 1: Adapted Evolutionary Prototype methodology

3.1 Planning

The explanation of research methodology phases is explained as follows. Table 2 summarize the main phase and activities carry out during each phase. The tasks will carry out based on the phase.

Table 2: Project Workflow

Phase	Activity	Deliverables
Planning	• Identification of the application for development • Feasibility assessment • Creation of project plan	• Project proposal • Gantt Chart

Table 2: (cont).

Phase	Activity	Deliverables
Analysis	• Initial requirement for proposed application. • User analysis requirement • Review of similar existing application	• System requirement • Comparison table • Response of the questionnaire
Design	• Identify application requirements	• Storyboard with user interface
Implementation	• Test the developed system to find potential bugs or issues	• Learning module • User interface • Charts module are displayed
Testing	• Validates the user requirements. • Perform functional testing.	• Bug fixing • Improvement of the application • User requirement are met
Maintenance	• Project is documented and presented to the target user	• Feedback of the target user

3.2 Analysis

User Requirements Analysis is first step in the application development process because without a thorough study, the final product will not be used by the end user since the features that the target user requires are not meet. It will not be successful without the analysis. Quality and consistency are crucial for requirement analysis to be detailed at this step. In terms of user, functional and non-functional analysis are discussed in detail. A total of 35 respondent answering a set of questionnaires to develop an application of their preferred choices

Table 3: User Analysis

Category	Feedback	Action
Questionnaire	• Do you know what is Investing? 74.3% of the target user do not have exposure about investment. • What kind of navigation do you prefer in investing application? 97.1% of the user voted to have a plain and simple navigation. • How would you like to learn the topic? 82.9% agree on using graphical content. • Do you ever hear about dummy/ demo trading before? 74.3% agree that they never know about dummy trading. • Do you want the chart module to display buy and sell functional button? The user voted for the module to have buy and sell button where they can learn dummy trading.	• Provide a basic investing content at the target user • Provide interactive interface with simple navigation where the user can understand the application • Provide the user in graphical format where the interface must be interactive to attract them for learning. • Provide a chart layout for the target user to get in hand to look for market experience. • Provide buy and sell button for them to learn and know the risk where they can have proper knowledge in market.

3.3 Functional requirement and Non-functional requirement

Table 4: Functional Requirement

Phase	Activity
User interaction	• The system shall provide users with the ability to give input by touch screen on their Android mobile platform. • The system shall provide users with the ability to navigate through the application by using appropriate buttons.

Table 4: (cont).

Phase	Activity
User interaction	• The system shall provide users with the ability to display the building information based on the selected category. • The system shall provide user with the ability to initialize and generate a virtual plane. • The system shall provide the users with the ability to visualize and place order on the chart.
Autonomous system activities	• After launching the app for the first time, the system will display the Home Menu. • After the user chooses next, the application shall play the sound needed. • After the user completes the learning content, the system displays the completion of the topic. • Each time the user completes the close the position in chart module, the system shall update the new capital based on the Realtime database.

Table 5: Non-functional Requirement

Phase	Activity
Usability	• The application is brightness can be set. • The application should be easy to use application by using appropriate buttons.

Table 5: (cont).

Phase	Activity
Implementation	• The application shall be able to run using Android platform.
Performance	• The average response time between click and reaction is less than 0.1 seconds. • The application should be able to load the chart module within 1 seconds.

3.4 Design

The design of an application is the subject of this section. Flow charts, content structure and user interface design are just a few of the design methodologies that are used to present the prototype of the application.

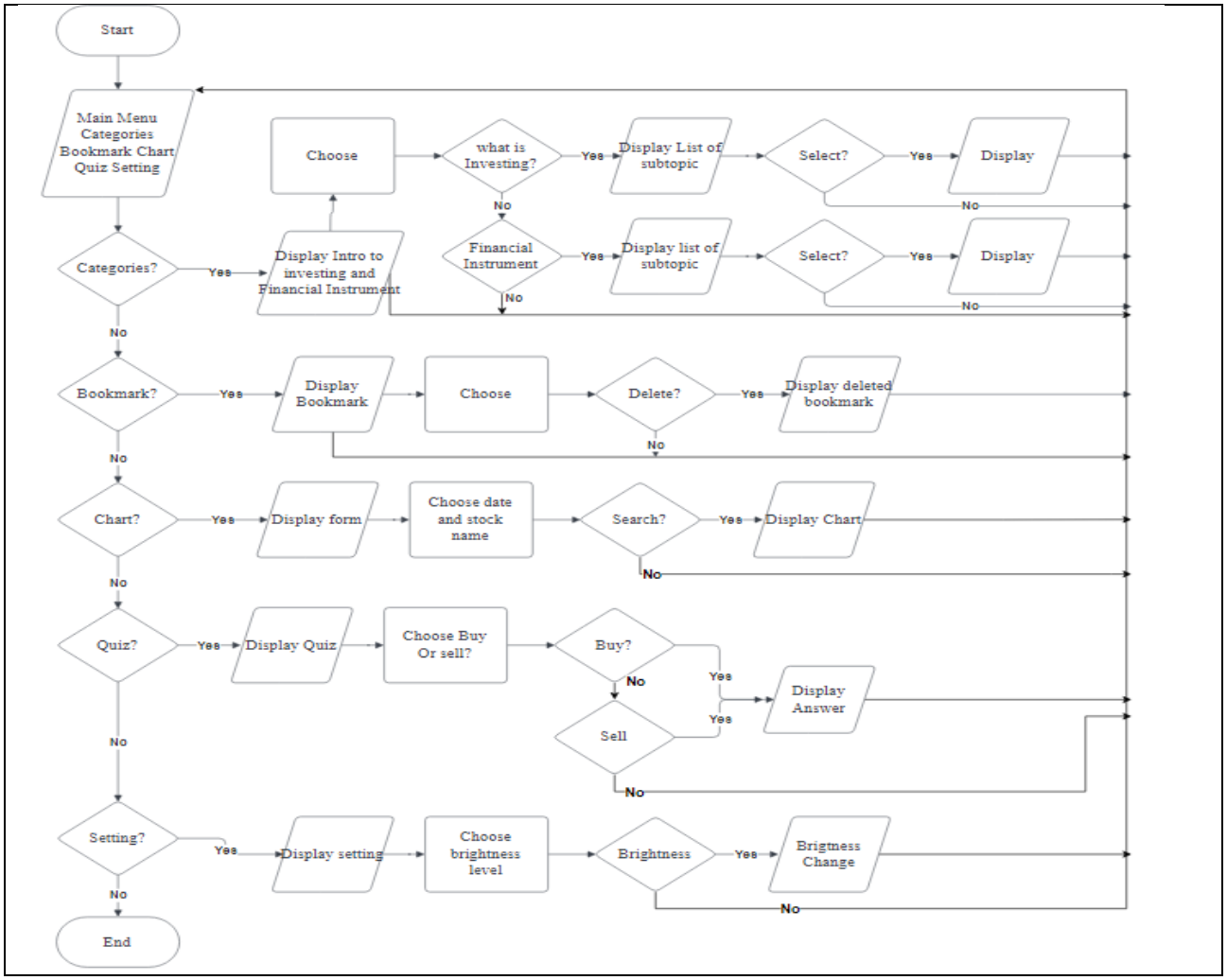


Figure 2: Application Flowchart

Table 6: Interface Design

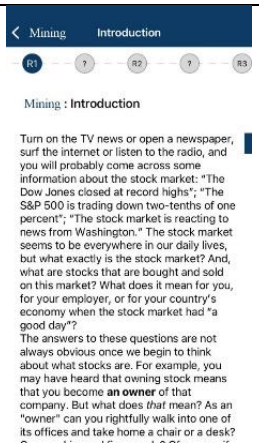
User Interface	Activity
	Main Menu shows how the interface looks like. The first page is the main menu, where users need to choose the investing courses. If the user chooses mining, the user is brought to the next interface.
	The users need to choose the submodule available if they have finish all of the learning content. If not, user need to start from the introduction. Then the learning content is showed, in submodule, user will have 5 chosen button
	The User interface will be presented with graphical content to make the learning process more interactive. If the user has finish learning the content, they need to press the button where it will bring them to the next learning module.

Table 6: (cont).

User Interface	Activity
	Chart shows how the user can get in hand to experience the market using dummy money with the real time data. The users need to choose whether to buy or sell. If the user chooses buy, the current capital with automatically calculate the total profit and loss until they have closed the position
	The Option is the language, where users need to choose whether to in Malay or English. If the user chooses feedback, they will have the comment option to give feedback for the developer. Then, the developer's info is shown where the current version of the application is presented in the interface

4. Results and Discussion

This chapter reviews the implementation and testing that has been conducted for this project. The project is developed in flutter by using Android Studio Emulator and using Dart programming language with some java language in the API implementation.

Table 7: User Interface Implementation

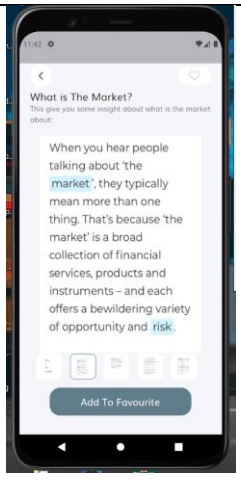
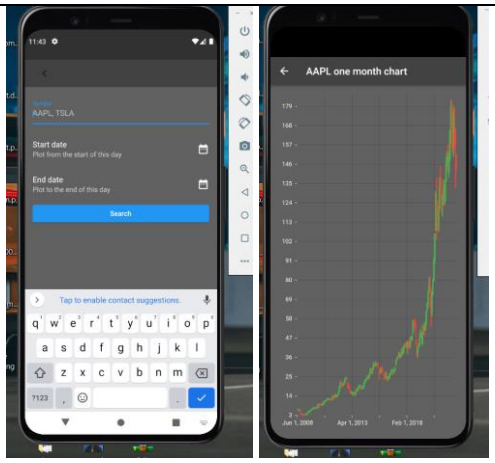
User Interface	Activity
	Learning module in the item card contain specific database that is needed which is product where product contain image, name that are extract from the database to be displayed as a card. The gesture detector is set to push the user to another screen in where the user can select the multiple option subtopic.

Table 7: (cont).

User Interface	Activity
 (a) (b)	The interface of the chart module will be displayed where it contains search form(a) that must be filled with stock name that the user knows by using symbol entry class that contain the text style and the form must be filled before the user press the search. Besides, in the image show that date must be pick for the user to view the chart(b) where start date and end date are needed to be filled before submitted.
	The interface of the bookmark module will be displayed in the learning content where the user can add to bookmark when they have not done yet the reading of the subchapter. Thus, they can add to bookmark and reopen the application after if they want to know the last lesson they learn.
	The quiz module will be in the homepage where after the user clicks, it will be routed to the chart screen where the user has 2 sets of quiz that contain 10 question each which is buying and selling.

4.1 Functional Testing

The testing phase is critical for ensuring the application functional quality. Testing evaluates whether the programmed is properly executed and function in accordance with the project requirements.

Table 8: Test Plan for Learning Module

No.	Test Cases	Expected Output	Actual Output
1.	Display of the content	The text and image must be displayed correctly	Showing clearly and correctly
2.	Indicator showing current state	Showing every image page state	Showing as expected
3.	Back Button	Pop back to the last screen	Able to pop back without loading

Table 9: Test Plan for Chart Module

No.	Test Cases	Expected Output	Actual Output
1.	Fill all the information required	Successful added and automatic go to chart page	Successfully go to the chart page
2.	Not fill all the information required.	Pop up message “Please fill the required field”	Please fill the required field
3.	Chart display	Show all the chart information	Chart are shown with the information

Table 10: Test Plan for Bookmark Module

No.	Test Cases	Expected Output	Actual Output
1.	Add to bookmark	Successful added and update on the bookmark screen	Successfully updated
2.	Delete the selected item	Slide to the left and item are deleted	Items are deleted

Table 11: Test Plan for Quiz Module

No.	Test Activity	Expected Output	Actual Output
1.	Image and information	Image is shown clearly with the instruction	Instruction is given clearly with the image
2.	Buy and sell	Pop effect	Able to pop correctly
3.	Result	Shown a clear result	Able to show the score clearly

4.2 User Acceptance Testing

User acceptance testing is the final stage of the software testing process. This means that users will have the option to test the app to check if it works as intended. This is an important step in the development process since it allows the developer to verify the software for any errors that may have gone overlooked.

Table 12: Result of user interface evaluation

No.	Features	Rank					Total
		1 (Poor)	2 (Fair)	3 (Good)	4 (Very Good)	5 (Excellent)	
1.	Easy to understand	0	0	1	10	10	21
2.	Layout of the content	0	0	1	13	7	21
3.	Text style (font size, color, type)	0	0	0	10	11	21
4.	Interface design (background color, image and design)	0	0	2	8	9	21

Table 13: Result of application feature evaluation

No.	Features	Rank					Total
		1 (Poor)	2 (Fair)	3 (Good)	4 (Very Good)	5 (Excellent)	
1.	Learning Content	0	0	1	6	14	21
2.	Chart Module	0	0	1	12	8	21
3.	Bookmark Module	0	0	0	10	11	21

5. Conclusion

iINVEST Application's overall findings in terms of project success, benefits, application limits, and future upgrade suggestions. The proposed application's issue description, objectives, and scope were all utilized to assess the project's success. Even though the proposed application fulfilled the project's objectives, various faults were uncovered throughout its development. Consequently, a variety of future possible tasks can be implemented into the existing application to improve its performance.

Acknowledgment

The authors would like to thank the Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia for its support.

Appendix A

Table 12: Result of user interface evaluation

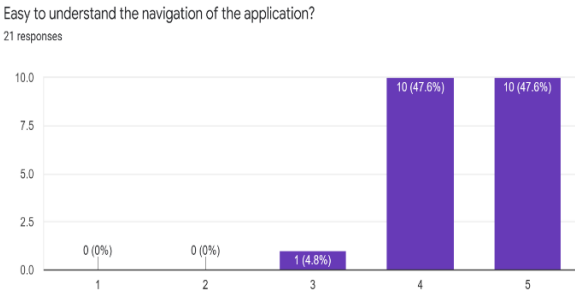
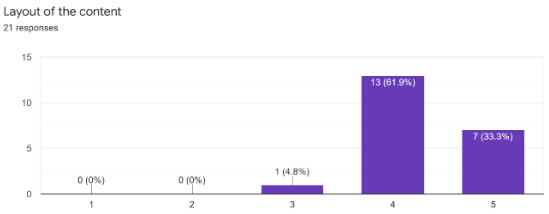
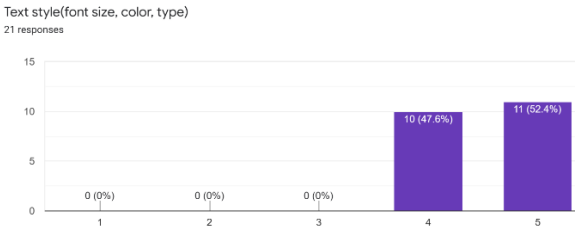
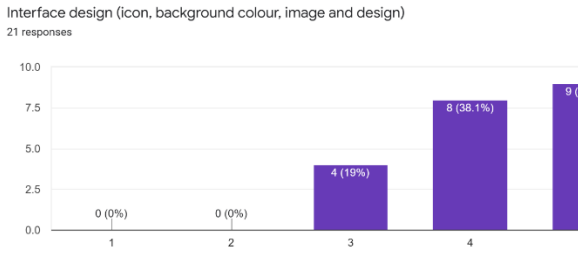
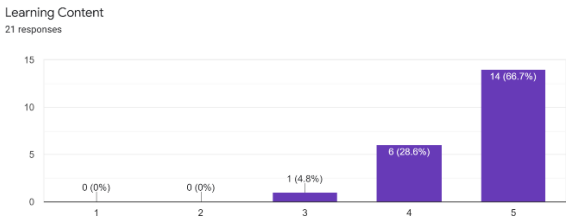
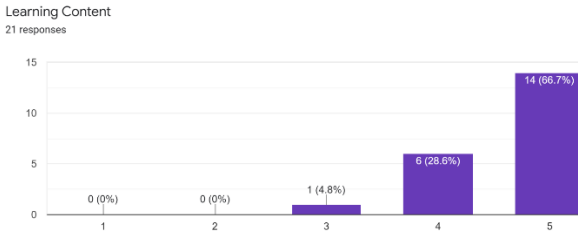
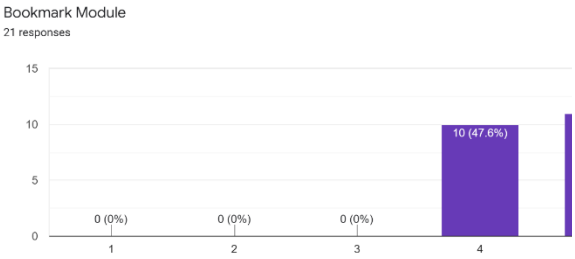
Feedback receives	Feedback receives
	
	

Table 13: Result of application feature evaluation

Feedback receive	Feedback receive
	
	

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