Application of Sentiment Analysis in the Reshot Method to Improve User Experience of the Hijra Bank Application

Ridwan Ahmad Ma'arif[1], Agung Triayudi[2]

Fakultas Teknologi Komunikasi dan Informatika, Universitas Nasional, DKI Jakarta, Indonesia

Email: 2022.ridwan.ahmad.maarif@student.unas.ac.id[1], agungtriayudi@civitas.unas.ac.id[2]

Orcid: https://orcid.org/0000-0002-1269-5888[2]

Abstract. The first stage in simplifying User Experience (UX) using the RESHOT method is Refine the Challenge. This stage is carried out so that design practitioners know the problems or needs of application users through product research. However, the product research methods that can be carried out at this stage are very diverse and require time. This research aims to explain a product research method that can be used by design practitioners easily and quickly, namely the sentiment analysis method with the Naïve Bayes algorithm. Naive Bayes is a classification method based on simple probability. The results of this analysis will be used as a reference for improving UX using the RESHOT method on the Hijra Bank application. The results of product research using sentiment analysis obtained 2711 opinions originating from tweets on Twitter and user reviews of the Hijra Bank application on Google Play. Of the 2711 opinions, 149 had negative sentiment, with the most frequently mentioned opinions being "Customer" and "Data" with an analysis accuracy of 92%. The results of this analysis are converted into a hypothesis, which will later become a reference in designing interfaces using the RESHOT method.

Keywords: Analysis Sentiment, Naïve Bayes, RESHOT, User Experience, User Research

1 Introduction

User Experience (UX) is an essential aspect in the success of a product [1] because UX tries to meet the needs of its users [2], pays attention to the emotions contained therein [3], and defines the purpose of the user using the product comprehensively [4]. UX also refers to a person's responses and perceptions resulting from the use or anticipation of a product or service provided [5]. This concept aligns with Human-Centered Interaction (HCI), which studies how a product can meet needs and provide solutions to its users [6]. To achieve this, Tulis and Albert's book [7] explained how to create or measure the success of UX by conducting product research to obtain user opinion and perception data based on the users themselves and improving or evaluating it based on this data. So, it is not a personal opinion that can judge the success of a UX [8], [9].

Research conducted by [10], a survey conducted on 4,384 respondents, showed that the most significant contribution to the causes of users canceling their purchases on e-commerce sites was due to things related to user flow, such as users being required to log in, information content that was less trustworthy to the user, and a complicated process of purchasing goods. These three things are the things that contribute the most to users canceling their shopping.

Marcus Fairs explains in his article [11] that a lack of design input in healthcare puts patients and doctors at risk. The article also explains that hospitals need a designer for all digital and environmental aspects. Sam Smith, a clinical doctor at Massachusetts General Hospital in Boston, said he urgently needs designers to help organize products and environments at the hospital to help keep the focus on patients and reduce distractions.

From this, we can conclude that a lack of design will harm both users and companies. So, when designing a design structure, both digital and non-digital, it must be combined by considering the needs of the user and the company. And a way to get this insight is with the product research

Product research or User Experience Research (UXR) is the initial stage in the design process because UXR aims to understand users and design the experience of a product from end to end [12]. However, from the variety of product research methods [13], application products are still created without carrying out the research stage. So, a product that is supposed to help and solve users' problems, however, creates new problems.

As explained by [14], the most current response is to conduct product research with the most frequently used method being user interviews. However, this method requires a lot of time and money, and reported on [15], the

cost required to conduct user interviews is 100$ per hour. In Indonesia alone, the costs required range from hundreds of thousands to millions.

In this research, research methods that can be carried out easily by design practitioners, which, of course, do not require research costs like research methods in general, will be explained. The research method used will be the sentiment analysis method using the Naïve Bayes algorithm.

The use of sentiment analysis methods to find problems faced by users of an application was carried out by [16]. In this research, sentiment analysis was carried out on customer satisfaction with the Tokopedia application. The results of this research are a grouping of feedback on the Tokopedia application on the Google Play publisher, which will later be used as a reference in developing the application.

Similar research was also carried out by [17]. This research analyzed sentiment to get user reviews on the KlikIndomaret application. The research results are in the form of sentiment analysis from 4,066 positive and negative label data, which KlikIndomaret design practitioners can use to improve UX.

In this research, researchers not only provide analysis results but implement the analysis results to improve the UX of the application using the RESHOT method [18]. The case study taken in this research is the Hijra Bank application, a digital sharia banking application operating in Indonesia.

RESHOT method is used because this method explains comprehensively how to simplify the UX of an application, in contrast to design methods such as Design Thinking, Double Diamond and the like where these methods focus more on how to get data related to the problems faced by users. On the other hand, in research [18] the RESHOT method has also succeeded in simplifying the UX of the blood donation application.

2 Research methodology

The primary method of research is the RESHOT method. RESHOT stands for Refine the challenge, Remove, Shrink, Hide, Organize, Time, as explained in Figure 1. The RESHOT method is a method for simplifying UX based on the problems faced by application users. This method was created by Borrys Hassian, a design veteran, and was adapted from the book Law of Simplicity [19].
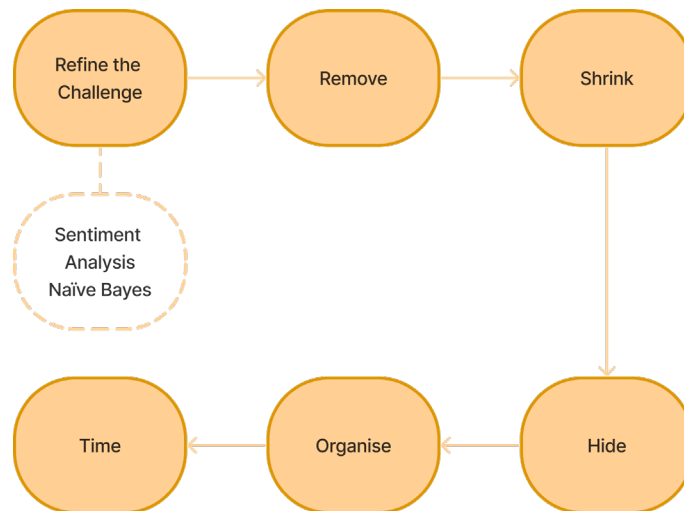

Figure 1. Flowchart of the RESHOT method

2.1 Refine the Challenge

The first stage in this method is Refine the Challenge. The researcher used the Naïve Bayes sentiment analysis research method at this stage, as discussed in the previous chapter. This stage starts from data crawling, dataset classifier, pre-processing, data collection, and model evaluation stage using Naïve Bayes. See Figure 2 for more details.
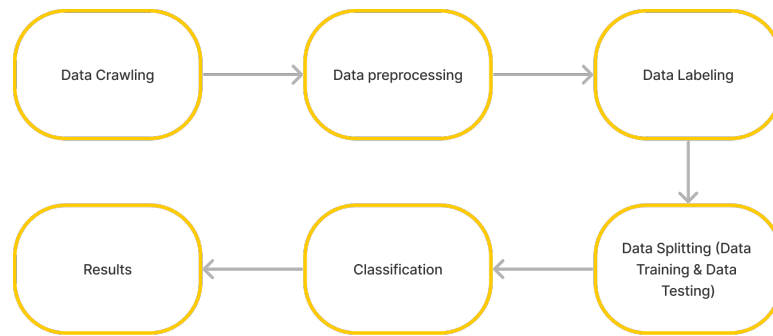
Figure 2. Flowchart of sentiment analysis

Crawling Data. Data collection in this case study used data crawling techniques. The data crawling technique uses Google Colab with the Python programming language at this stage. The data taken is tweet data on Twitter and suggestions for the Hijra Bank application on Google Playstore. The reason researchers take data through tweets on Twitter is because from this source it is very easy to collect opinions from the public en masse and many previous studies have taken data sources from tweets on Twitter. And the reason for taking feedback from Google Playstore is so that researchers have more specific data regarding the Hijra Bank application.

Data Pre-processing. At this stage, tweet data and reviews of the Hijra Bank application that contain irrelevant characters such as "RT", "@", emoji and the like are removed to become data that is ready to be used for analysis [20]. See Figure 3 to see the conversion of raw and cleaned data.

Figure 3. Convert raw data that has been cleaned

Data Labeling. The data that has been obtained will be labeled positive, negative, and neutral automatically using a Lexicon-based algorithm.

Data Splitting. Next, the data is divided into training and testing data, comprising 70% training data and 30% testing data. The composition of the division is as done in [21]. Data splitting aims to reduce overfitting and increase the accuracy of the evaluation model.

Classification. Next, the data is classified based on the labels that have been given.

Results. At this stage, the data processed in the previous five stages is used as a conclusion and hypothesis, which will later be used as a data reference to improve UX.

2.2 Remove

The next stage is Remove. At this stage, the researcher will analyze features or components that can be removed, but without hindering the user if these features or components are removed so that the features or components in the application are only what the user needs.

2.3 Shrink

Next, the researcher carried out the shrinkage stage by shrinking or adjusting the components on an application page. Components that will be adjusted include color, typography, and other visual components.

2.4 Hide

After getting the appropriate features or components, the researcher then adjusts the components by embedding components that are not suitable or not yet needed by the user. So that if the user uses a specific tool, all he has to do is remove the tool that the user wants to use [22].

2.5 Organise

Next, the researcher carries out Organizing, namely the stage of grouping, naming, and combining existing features or content. For example, you can see in Figure 4 the components that have not been organized.
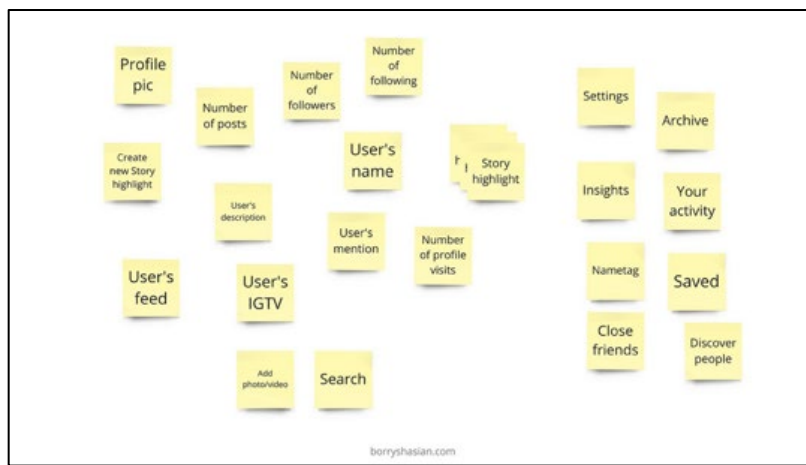

Figure 4. Components that have not been organized, Source [19]

After the features and content that are still unmapped have been grouped based on their function and relatedness, the next step is to name each group and combine features and content that are still related. For more details, see Figure 5.
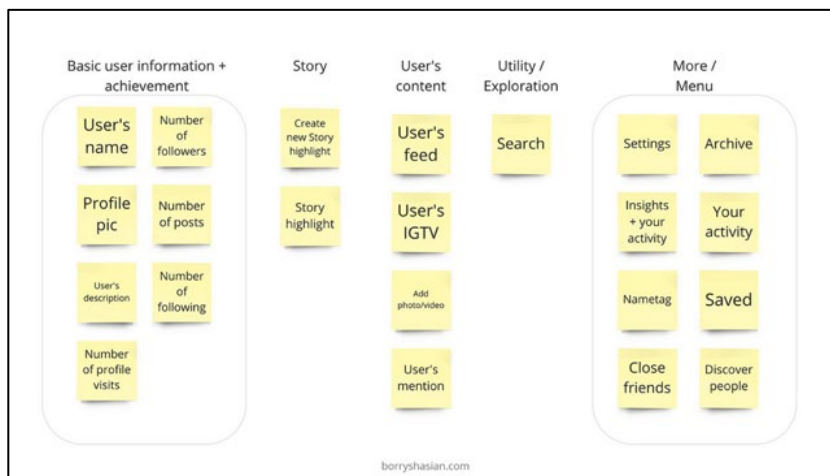

Figure 5. components that have been organized, Source [19]

2.6 Time

The final stage that the researcher carried out was Time, namely measuring the estimated time needed for a flow that the user will carry out, which the researcher will later adjust so that the time needed to complete a task can be faster or feel faster.

For example, the transfer feature takes around 12 seconds for a design practitioner. After knowing that the 12 seconds is due to technological limitations, the design practitioner can insert an animation of the transfer process so that the user only experiences the transfer time for around 2-3 seconds [19].

2.7 Implementation of Method RESHOT

In implementing the RESHOT method into a design, the Refine the Challenge stage is crucial to creating a design that suits user needs and solves the problems users face. So, at this stage, it must be based on valid data and the problems and needs of users.

The other stages, namely: Remove, Shrink, Hide, Organize, and Time, are flexible stages, namely stages that are applied only when needed. Because in a design, there may be an application flow that does not allow the Remove stage to be carried out, the Remove stage does not need to be carried out.

3 Results

In step Refine the Challenge, the data collection results obtained in this research were 2711 data, of which 2205 data came from tweets and 506 from user reviews of the Hijra Bank application on Google Playstore. The resulting data was classified by a lexicon-based algorithm into three labels, namely 213 positive labels, 149 negative labels, and 2349 neutral labels, with an accuracy level of 92%. The distribution of data that has been labeled can be seen in Figure 6.
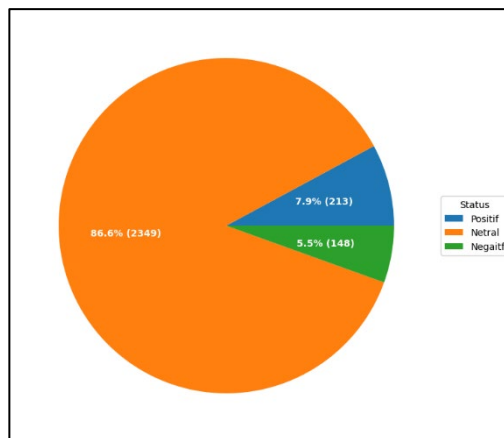
Figure 6. Distribution of labeled data

Even though the results of negative sentiment are smaller than neutral sentiment because, in this study, the researcher wants to improve the UX of the Bank Hijra application, the data distribution ratio has no effect because the sentiment that will be analyzed is sentiment related to user dissatisfaction or problems faced when using the application Hijra Bank. From the data obtained, 5 words on the negative label are most often mentioned by users, which can be seen in detail in Table 1.

Table 1. Five words most frequently mentioned by users

Word	Frequency
'data'	176
'nasabah'	152
'bsi	135
'tidak'	117
'pribadi	114

Researchers analyzed sentences that contained the 5 most frequently mentioned words especially sentences that contained 'data' and 'customers'. Because this word is a very sensitive word in the banking industry as explained in the introductory chapter. Examples of sentences containing frequently used words can be seen in Table 2.

**Table 2.** Some examples of user sentences containing negative words

No.	User Sentences
1	"Uang nasabah aman min?"
2	"gini aja. namanya juga bank ya harusnya menjamin data dan uang nasabah. sekecil apapun itu masalahnya pasti kepercayaan pasti ilang. ini bukannya nyelesain masalah malah nutipin masalahnya. takut kabut kali yak nasabahnya 🤣"
3	"Hati2 Aplikasi ini,takut nya Data kita dipergunakan tanpa persetujuan kita"

As a result of the analysis of sentences containing the words in Table 1, it was found that three hypotheses would be used as problem topics to continue to the next stage in the RESHOT method. The three hypotheses can be seen in Table 3.

Table 3. Hypothesis results based on sentence analysis results

No.	Hypothesis
1	Many customers do not know about the guarantee for the funds they deposit in the bank
2	There are still customers who feel unsafe registering as customers at Hijra Bank
3	Customers feel that they are guaranteed the security of their data and funds when a hack occurs

Based on the three hypotheses in Table 3, the researcher's focus is on how researchers can present information that can make customers or potential customers believe that the Hijra Bank application is a trusted bank because it is registered and supervised by the Financial Services Authority (OJK) and the Deposit Insurance Corporation (LPS).
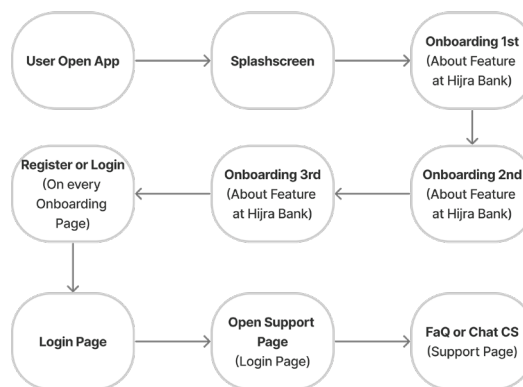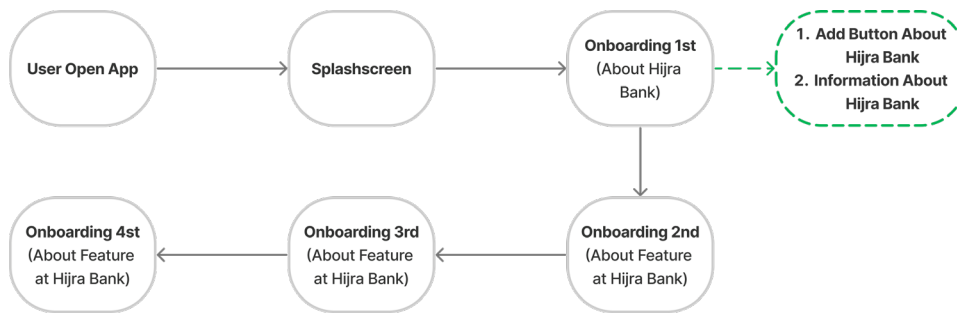

Figure 7. Initial user flow of the Hijra Bank application

Figure 7 begins the Hijra Bank application flow when it is just installed. The beginning of the Hijra Bank application flow starts with a splash screen or page that displays the Hijra Bank application logo for a few seconds, then goes to the Onboarding page. On this page, the Hijra Bank application does not introduce or present information related to Hijra Bank but only introduces the features of Hijra Bank. To find information about Hijra Bank, users must go to the Login Page and click the Support icon. Users can only find access to the Hijra Bank FAQ or contact CS to ask questions.
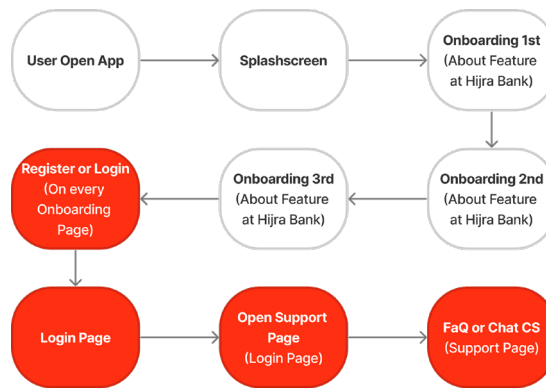
Figure 8. Four omitted diagrams

In the Remove step, from the narrative above, the researcher's first step was to make adjustments to the FAQ access entry point and remove four flow charts from the main user flow if they wanted to get information related to the Hijra Bank application. As depicted in Figure 8.

Figure 9. Initial Hijra Bank user flow after the Remove stage

After the four charts were removed from the main user flow, the researchers then Organise, Shrink, and Hide the information content related to the Hijra Bank application on one page, which was called Onboarding 1st. Figure 9 is an illustration of the 1st Onboarding page, where the 1st Onboarding page is a page specifically for providing information that Hijra Bank is a bank that has been registered and supervised by the OJK, LPS, and other institutions. Apart from that, in Onboarding 1st, the green dotted line in Figure 9 is the entry point for viewing information about the Hijra Bank application. This information is embedded in a bottomsheet, which users can easily read.
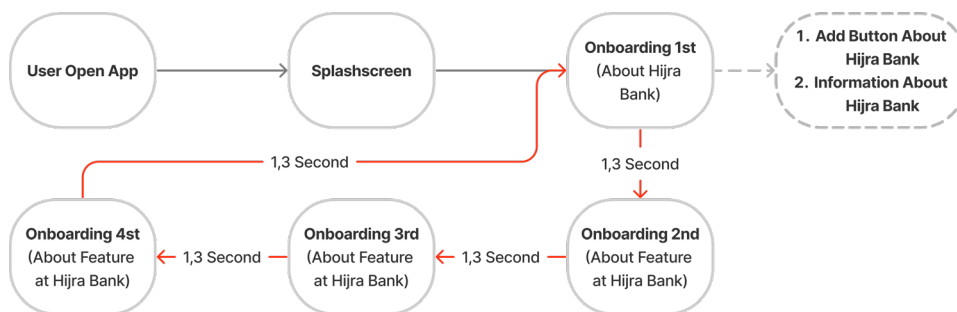
Figure 10. The transition time between diagrams or pages

In Figure 10, it can be seen that the Onboarding page change time is every 1.3 seconds. Researchers will delete this time, and if the User wants to move to the next page, the User must click the "Next" button on each Onboarding page. This is so that users can receive comprehensive information. An illustration of the Onboarding

page change time adjustment can be seen in Figure 11, and this is the result of the UX simplification process using the RESHOT method.
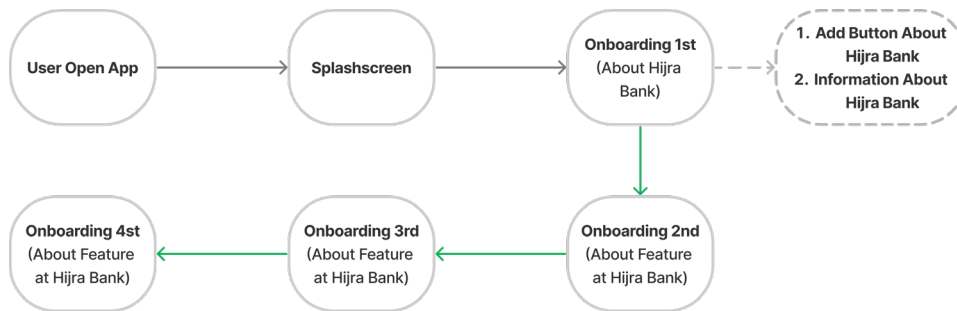

Figure 11. Adjustment of transition time between diagrams or pages

The result of the user flow to be able to get information related to the Bank Hijra application either at a glance or in detail is: (1) the User opens the application, (2) the User finds Splashscreen, (3) the User finds 1st Onboarding page, (4) If the User wants to know For more details regarding the Hijra Bank application, click the Hijra Bank button. More details can be seen in Figure 12.

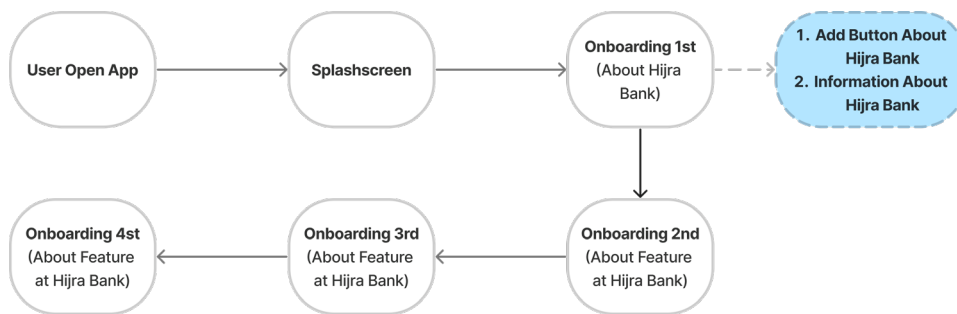### 3.1 Final Results & Implementation of Design

Figure 12. The final result of the initial flow of the Hijra Bank application

Based on the final results the researchers had created, the researchers designed the Onboarding 1st. As for the other designs, the researchers did not create them but took screenshots of the Hijra Bank application in the App Store in November 2023. These designs can be seen in Figure 13.
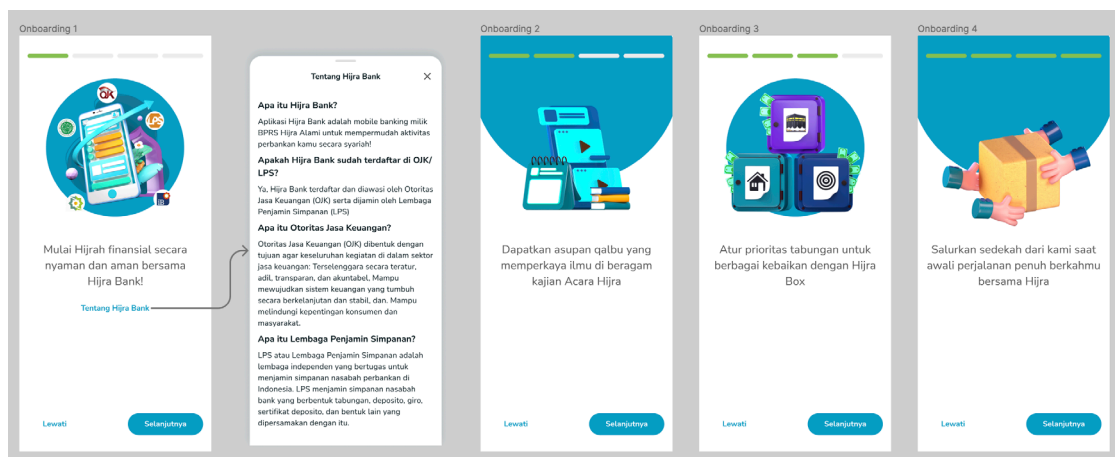

**Figure 13.** Visual design based on the final result

4 Discussion

4.1 Usability Testing

Next, the researcher will carry out Usability Testing on the design in Figure 13 to validate whether the results that have been created can provide answers to the researcher's focus, which has been explained in the fourth paragraph of this chapter. Usability testing involved ten respondents and used Maze as the testing medium. The reason why researchers determine that ten examiners/respondents are sufficient is when carrying out Usability Testing, if more than ten examiners/respondents are determined, then the results given will be similar, as explained in [14], [23].
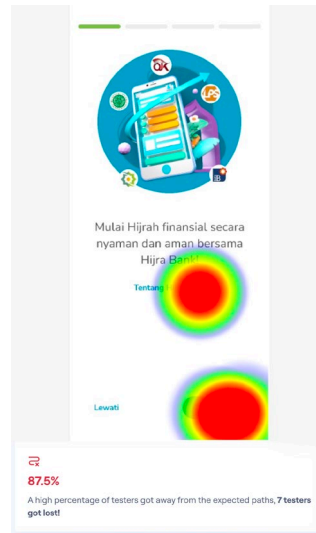

Figure 14. Usability Testing results based on final results - Onboarding 1

Figure 14 shows that seven respondents were lost, but actually, these respondents clicked the "About Hijra" button. Here, there was a researcher error in arranging the final page of the design flow, so seven respondents who should have been considered successful were unsuccessful. However, errors in setting the final page when the testing process is carried out do not affect the results of the Usability Testing that has been carried out. Because when seen, 7 out of 10 respondents clicked the "About Hijra" button directly when the Onboarding 1 page appeared. The other two clicked the "Next" button, and when they returned to the Onboarding 1 page, the respondent clicked "Neighbor Hijra." However, there was one respondent who did not complete this testing task. Researchers cannot be sure, but it is most likely because the respondent closed the testing page, so the testing process stopped. The researcher's opinion is based on historical data from respondents who came out when they were on the Splashscreen page, where the Splashscreen page is an introductory page for Usability Testing. See Figure 15 to see the respondents' historical data.
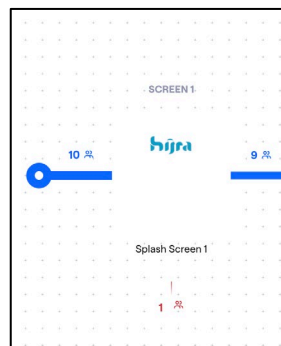
Figure 15. Users who did not complete Usability Testing

Of the nine respondents who completed the task given, 100% read the information related to Hijra Bank in the design that the examiners created. Look at figure 16.
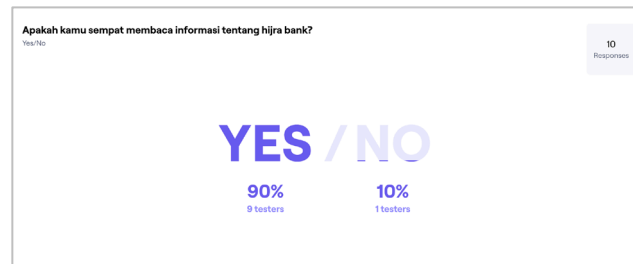
Figure 15. Users who did not complete Usability Testing

4.2 Analysis Accuracy Improvement

The initial accuracy results in this study were 74%, which is a figure that does not meet the minimum accuracy limit of 80%. This low accuracy result is caused by the data source being mixed between Indonesian and English, so in this case the researcher carried out language alignment, namely Indonesian. Another factor is that the researchers did not use the NLTK library, the use of NLTK as used in research [17], succeeded in increasing the accuracy value in this study to 92%.

4.2 Design Framework

Today's design frameworks are very diverse, one of the most famous design frameworks is Design Thinking. The design thinking method or framework only focuses on how to find the problem that occurs to create a solution to the problem [24], [25], while the implementation of the solution created into an application flow so that it is simple is not explained. In the RESHOT method, the Refine the Challenge stage is the stage for searching for application users' problems until they get the right solution, and the next stage, namely Remove, Shrink, Hide, Organize, and Time, is the stage for simplifying the UX of an application. However, the drawback of the RESHOT method is that it does not have standard rules regarding the method used at the problem-finding stage, such as the design thinking method which uses the Affinity Diagram method to collect problem points.

5 Conclusion

The RESHOT method is a method for improving or simplifying the UX of an application based on user needs or problems. This method has a research product stage, namely the Refine the Challenge stage. Of the various research product methods carried out, researchers used the Naïve Bayes Sentiment Analysis method. As a result of sentiment analysis, researchers obtained 2711 data, of which 2205 data came from tweets and 506 from user reviews of the Hijra Bank application on Google Playstore. The resulting data was classified into three labels, namely 213 positive labels, 149 negative labels, and 2349 neutral labels, with an accuracy rate of 92%. Alignment of sentiment data using Indonesian and the NLTK library in the Naïve Bayes algorithm can increase the resulting accuracy value. This was discovered when the researcher had not done these two things, which resulted in an accuracy value of only 74%.

From these results, three hypotheses were then used as reference data for the design process using the RESHOT method. Usability Testing will then carry out the design that the researcher creates. As a result, 9 out of 10 respondents completed the tasks given, and 100% of the nine respondents read the information contained in the design. The nine respondents also thought Hijra Bank was safe because it was supervised by authorized institutions such as the OJK.

In this research, using Naïve Bayes is the algorithm that researchers consider most suitable for analyzing application review data based on previous research that researchers have read. Meanwhile, if it is for marketing strategy or product research for purposes other than improving UX based on application review opinions, using the Naïve Bayes algorithm may result in low accuracy. The limitation of this research is that it does not compare various algorithms for various product research objectives.

One of the important things that can be done in further research is to determine a method that can be used as a standard method in the Refine the Challenge stage of the RESHOT method. So, by aligning the methods used, developing the RESHOT method will be easier to carry out.

References

[1]   D. Norman, "The Definition of User Experience (UX)," Nelsen Norman Group. Accessed: Jan. 20, 2023. [Online]. Available: https://www.nngroup.com/articles/definition-user-experience/

[2]   A. Upadhyay, M. Shekhawat, and R. Manhas, "Data Driven UX/UI design for reproductive health tracker," in *2023 IEEE International Students' Conference on Electrical, Electronics and Computer Science (SCEECS)*, IEEE, Feb. 2023, pp. 1–5. doi: 10.1109/SCEECS57921.2023.10063134.

[3]   W. N. Wan Ahmad and N. Mohamad Ali, "THE IMPACT OF PERSUASIVE TECHNOLOGY ON USER EMOTIONAL EXPERIENCE AND USER EXPERIENCE OVER TIME," *Journal of Information and Communication Technology*, Oct. 2018, doi: 10.32890/jict2018.17.4.8273.

[4]   J. Rodda, C. Ranscombe, and B. Kuys, "A method to explore strategies to communicate user experience through storyboards: an automotive design case study," *Artificial Intelligence for Engineering Design, Analysis and Manufacturing: AIEDAM*, vol. 36, Mar. 2022, doi: 10.1017/S0890060421000287.

[5]   ISO DIS 2019, "ISO 9241-210:2019 Ergonomics of human-system interaction Part 210: Human-centred design for interactive systems," *International Standardization Organization (ISO)*, 2019.

[6]   D. A. Norman, "Human-Centered Design Considered Harmful," *Interactions*, vol. 12, no. 4, pp. 14–19, Jul. 2005, doi: 10.1145/1070960.1070976.

[7]   Tullis and Albert, *Measuring the user experience: collecting, analyzing, and presenting usability metrics*, vol. 2. Elsevier, 2013. doi: 10.1016/C2011-0-00016-9.

[8]   O. Vl. Bitkina, H. K. Kim, and J. Park, "Usability and user experience of medical devices: An overview of the current state, analysis methodologies, and future challenges," *Int J Ind Ergon*, vol. 76, p. 102932, Mar. 2020, doi: 10.1016/j.ergon.2020.102932.

[9]   D. Quiñones, C. Rusu, and V. Rusu, "A methodology to develop usability/user experience heuristics," *Comput Stand Interfaces*, vol. 59, pp. 109–129, Aug. 2018, doi: 10.1016/j.csi.2018.03.002.

[10]   Baymard, "48 Cart Abandonment Rate Statistics 2023 – Cart & Checkout – Baymard Institute," Baymard Institute . Accessed: Jan. 21, 2023. [Online]. Available: https://baymard.com/lists/cart-abandonment-rate

[11]   M. Fairs, "Lack of design input is putting patients and doctors at risk, says physician," dezeen. Accessed: May 20, 2023. [Online]. Available: https://www.dezeen.com/2020/04/21/design-input-healthcare-risk/

[12]   I. Pettersson, F. Lachner, A.-K. Frison, A. Riener, and A. Butz, "A Bermuda Triangle?," in *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, New York, NY, USA: ACM, Apr. 2018, pp. 1–16. doi: 10.1145/3173574.3174035.

[13]   Binus, "Macam-macam Metode pada UX Research," Binus University. Accessed: Oct. 28, 2023. [Online]. Available: https://sis.binus.ac.id/2022/01/05/macam-macam-metode-pada-ux-research/

[14]   U. Ibekwe, "Usability Studies: How Many Participants Are Enough?," UXtweak. Accessed: Jan. 15, 2024. [Online]. Available: https://blog.uxtweak.com/usability-studies-how-many-participants-are-enough/#:~:text=doesn't%20exist-,The%205%2Duser%20rule%3A%20Cost%2Deffective%20and%20optimal%20usability,'

[15]   N. Loper, "User Interviews Review (2024): $100 an Hour for Your Opinion?," sidehustlenation. Accessed: Mar. 04, 2024. [Online]. Available: https://www.sidehustlenation.com/user-interviews-review/

[16]   D. Ananda, T. A. Taqiyyuddin, Ii. Nugraha Faqih, R. Badrahadipura, and A. A. Pravitasari, "Application of Bidirectional Gated Recurrent Unit (BiGRU) in Sentiment Analysis of Tokopedia Application Users," in *2021 International Conference on Artificial Intelligence and Big Data Analytics*, IEEE, Oct. 2021, pp. 1–4. doi: 10.1109/ICAIBDA53487.2021.9689758.

[17]   A. G. Budianto, B. Wirjodirdjo, I. Maflahah, and D. Kurnianingtyas, "Sentiment Analysis Model for KlikIndomaret Android App During Pandemic Using Vader and Transformers NLTK Library," in *2022 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM)*, IEEE, Dec. 2022, pp. 0423–0427. doi: 10.1109/IEEM55944.2022.9989577.

[18]   R. A. Ma'arif and F. Fauziah, "Implementation of RESHOT Method to Create a Good User Experience in an Application," *JUITA : Jurnal Informatika*, vol. 11, no. 2, p. 281, Nov. 2023, doi: 10.30595/juita.v11i2.17643.

[19]   B. Hasian, "Menyederhanakan UI (User Interface) dengan metode RESHOT," Medium. Accessed: Jan. 22, 2023. [Online]. Available: https://medium.com/designchitchat/menyederhanakan-ui-user-interface-dengan-metode-reshot-69545384b0ee

[20]   Kusrini and M. Mashuri, "Sentiment Analysis In Twitter Using Lexicon Based and Polarity Multiplication," in *2019 International Conference of Artificial Intelligence and Information Technology (ICAIIT)*, IEEE, Mar. 2019, pp. 365–368. doi: 10.1109/ICAIIT.2019.8834477.

[21]   S. AISYAH, S. WAHYUNINGSIH, and F. AMIJAYA, "PERAMALAN JUMLAH TITIK PANAS PROVINSI KALIMANTAN TIMUR MENGGUNAKAN METODE RADIAL BASIS FUNCTION

NEURAL NETWORK," *Jambura Journal of Probability and Statistics*, vol. 2, no. 2, pp. 64–74, Nov. 2021, doi: 10.34312/jjps.v2i2.10292.

[22] K. Marchese, "Swiss Army Knife: a sharp tool and design icon." Accessed: Jan. 23, 2023. [Online]. Available: https://designwanted.com/swiss-army-knife-design-icon/

[23] J. Nielsen, "Why You Only Need to Test with 5 Users," Nielsen Norman Group. Accessed: Jan. 15, 2024. [Online]. Available: https://www.nngroup.com/articles/why-you-only-need-to-test-with-5-users/

[24] N. Veflen and A. Gonera, "Perceived usefulness of design thinking activities for transforming research to impact," *Food Control*, vol. 143, p. 109264, Jan. 2023, doi: 10.1016/j.foodcont.2022.109264.

[25] A. Lahiri, K. Cormican, and S. Sampaio, "Design thinking: From products to projects," *Procedia Comput Sci*, vol. 181, pp. 141–148, 2021, doi: 10.1016/j.procs.2021.01.114.