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Web Based Application Development for Creating Collaborative Project Using NodeJs

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Abstract *– In an era marked by rapid technological advancements, the ease of accessing information has unlocked unprecedented opportunities for individuals to realize their aspirations. However, the mere acquisition of knowledge or technical skills does not always lead to success or recognition, particularly when striving to create something truly remarkable. The success story of The Beatles serves as a prime example of how collaboration can amplify individual talents and lead to extraordinary achievements. The band's collective effort demonstrates that co-creation among individuals can produce results far greater than the sum of its parts. With the rise of digital connectivity, collaborative efforts have become more accessible than ever before. Advances in technology have bridged physical distances, allowing for global teamwork that transcends geographic barriers. Despite these advancements, successful collaboration hinges on building trust, which is often nurtured through transparency. Transparent communication fosters a culture of honesty, openness, and mutual respect, which, in turn, strengthens trust among collaborators. To address the need for enhanced collaboration in creative and technical projects, this paper proposes the development of a web-based application platform. The goal of this platform is to streamline the collaborative process and facilitate the collaborative process and improve outcomes. The results indicate that the platform effectively supports users in initiating projects with multiple collaborators by connecting them with others who share similar goals. Additionally, the platform fosters trust between project creators and potential members through its transparent display of project details.*

Keywords: *Website; Project; Collaboration; Trust*

I. INTRODUCTION

Today, information is easy to access and technology is rapidly advancing, leading to many new discoveries and innovations each year. Everyone has the chance to pursue their dreams if they can access the needed information. Learning new skills has become easier, allowing people to improve their abilities and create works that are appreciated by many. However, individual skills alone are sometimes not enough to create widely recognized masterpieces.

For instance, John Lennon was a talented musician and songwriter, but he could not have formed the legendary band The Beatles without his partner Paul McCartney, who was the co-lead vocalist, co-songwriter, and bassist. This partnership exemplifies the importance of collaboration in creating impactful works. Many other examples also highlight how working with others can lead to significant achievements.

Technological advancements now make it easier to collaborate through digital connectivity via the internet. A survey of world innovators concluded that by 2025, the relationship between humans and technology will be even closer. Most people will rely on digital connectivity for work, learning, medical needs, transactions, and social interactions (Anderson et. al, 2021). This makes connecting with others, previously difficult due to distance, possible with just a smartphone. However, building connections with other professionals can be challenging without work experience or formal education in the field. Moreover, building trust with strangers online with different culture can be difficult, if not properly managed this can affect the project outcome negatively (Battistella et. al, 2024).

Starting a group project requires trust among its members. An important component for building trust is transparency. Transparency fosters a culture of honesty and openness among members, creating trust, improving communication, and increasing involvement and enthusiasm (Perruci, 2019). With transparency, productivity can increase, trust can be built, and members can provide honest feedback and feel a high sense of responsibility. Teamwork and collaboration are essential elements for achieving project goals. Trust and confidence between team members form the foundation of effective cooperation (Shastri et. al, 2021). It activates cooperation and collaborative processes within teams and essential for high-performing teams and increased efficiency (Fareed et. al, 2022). Modern information technology, including online collaborative platforms and project management software, enhances communication efficiency (Turner, 2022). This enhancement underscores the vital role digital platforms play in fostering transparent, efficient, and trustworthy interactions (Lin & Yaakop, 2024).

I order to address these issues, the author proposes a web-based application platform that allows users to share project ideas and collaborate. This application will include features like project discussion forums and group chats. It aims to make it easier to create projects that involve collaboration with others.

The following research journals that support the conducted study namely:

- **Attracting Visitors during Website Visits**

This research examines how retail websites can attract visitors when they first navigate the site. By providing visitors with an engaging browsing experience, encouraging them to explore the site, and making the information logical and accessible, websites can capture visitors' interest in their products (Demangeot & Broderick, 2016).

- **Transparency and Innovation: From Transparent Structure to Transparent Actions**

This journal focuses on information systems and how transparency influences innovation within an organization. Transparency also affects decision-making within a team. It was found that sharing information transparently in a team leads to increased awareness, better understanding of collaborators' needs and goals, and improved coordination (Jensen et. al, 2016).

- **The Impact of Website Quality on E-Loyalty through the Mediating Role of E-Trust and E-Satisfaction: Evidence from Online Shopping Sites in Vietnam**

This study aims to examine the impact of website quality on user loyalty, focusing on the roles of trust, satisfaction, and enjoyment while navigating the site. E-loyalty related to online shopping activities can attract new customers and retain existing ones (Giao et. al, 2020).

- **Systematic literature review: Factors affecting project management success**

This research looks at how project management affects the success of projects in different industries. It studies factors like communication, leadership, planning, and teamwork, and how they impact project success. It also looks at how using information technology and specific project management methods, like Agile and Lean, can make projects more successful. The goal is to give practical advice to people who work on projects to enhance project success (Reni & Tukiran, 2024).

II. METHODS

The research method used in this study is depicted in the flowchart below (Barakbah et. al, 2013).

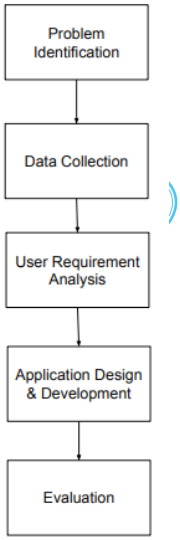

Figure 1. Research Method

2.1 Problem Identification

The research begins by gathering issues that need addressing into points which the researcher will attempt to solve.

2.2 Data Collection

The user needs analysis began with data collection through questionnaires with optional questions distributed to community groups on social media. Through the distributed questionnaires, the author received responses from 80 respondents.

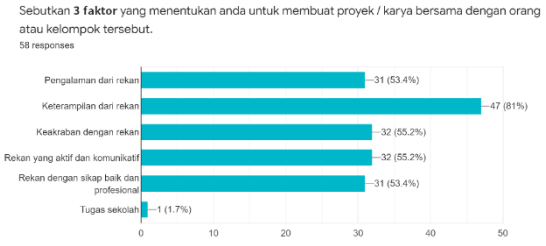

Figure 2. Histogram Factors for Creating Projects with the Group

From the three factors that determine creating a project with the group, the most responses received were 47 answers choosing skills from peers. The other responses were more evenly distributed, with 31 answers selecting experience from peers, 32 answers indicating familiarity with peers, 32 answers for peers who are active and communicative, and 31 answers for peers with a good and professional attitude.

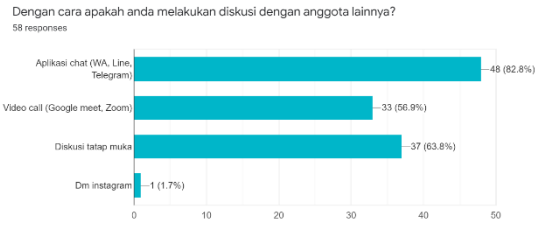

Figure 3. Histogram How to Conduct Discussions among Members

From the responses obtained from the question above, chat applications received the most answers, with 49 responses. This was followed by face-to-face discussions with 3 responses and video calls with 33 responses. From this data, it can be concluded that there is a need for a chat feature in the application to be developed, so that users creating projects can have direct discussions with other members.

Figure 4. Chart of Satisfaction with the Performance of Other Members

From the responses obtained from the question above, 46 people answered that they were satisfied with the performance of other members, while 9 people answered that it was average, and 4 people answered that they were not satisfied with the performance of other members. For this questionnaire, it will grouped the 9 people who rated the performance of others as average and the 4 people who were not satisfied into a group of individuals who are dissatisfied with the performance of other members.

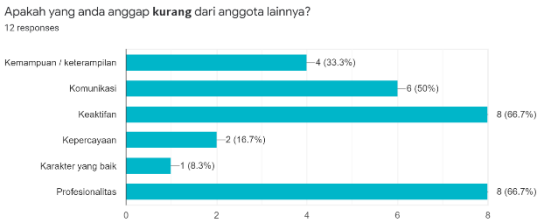

Figure 5. Histogram of Shortcomings of Other Members

From the 12 people who answered that they were not satisfied with the performance of other members in the previous question, the responses included 8 answers citing the lack of activity from other members, 8 answers due to the professionalism of other members, 6 answers indicating that communication from other members was poor, 4 answers citing the skills of others, 2 answers indicating a lack of trust from other members in a project, and 1 answer due to the poor character of others. Therefore, from these responses, it can be concluded that there is a need for a user profile page displaying professional experience, as well as allowing users to assess the activity of someone based on how often they respond to discussions on a project.

Figure 6. Histogram of Individual Projects that Require Help from Others

From the data obtained, professionalism of peers was the most common response with 10 answers, followed by skills from peers and active peers, each with 9 answers. Then there were 4 answers for the experience of peers and familiarity with other peers. From this data, it can be concluded that it is important to highlight the professionalism of an individual, along with their skills.

Figure 7. Chart of Project Ideas to be created

From the data obtained, 10 people expressed a desire to create an application, 6 people wanted to work on a music project, 10 people had ideas for creating video games, 6 people wanted to start a business, 4 people wanted to create a YouTube channel, 3 people wanted to make a film, 2 people wanted to create visual art, 3 people wanted to produce graphic design works, and the rest wanted to create works or projects in the creative industry. This data can serve as a consideration for filtering the categories that will be included in the application to be developed.

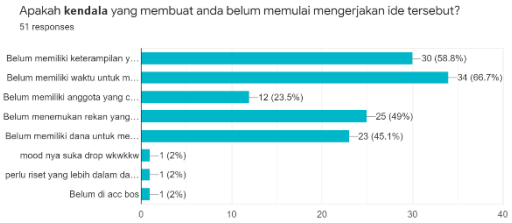

Figure 8. Histogram of Challenges in Project Ideas to be created

From the 54 respondents who had ideas for creating projects, it was found that 34 answers indicated they did not yet have time to work on it, 30 answers said they lacked sufficient skills, 25 answers stated they had not found skilled partners in their fields, 23 answers indicated they did not have funds to start a project or work, and 12 answers mentioned they did not have enough members. From these responses, it can be concluded that there is a need for a feature to provide resources for learning a field or a discussion forum. However, considering the 2-month project timeframe, this might not be feasible for the product backlog. Another feature that could be added is the ability to find people who want to join through user projects. For

the responses indicating a lack of funds, users who want to start a project or work can temporarily pool their resources manually among the members.

Alongside the questionnaire, analysis of similar applications is also conducted during user data collection.

Table I. Similar Application Analysis

Feature	Similar Application			
	Cofounderslab	Facebook	Starthawk	Findnlink
Finding and joining projects from individuals without any connections	√		√	√
Finding works created by others without friend connections or networks				
Creating discussion groups		√		√
Uploading works that can be viewed by all users on the website		√		
Uploading project ideas that you want to create and can be viewed by all users on the website	√		√	√
Posting job openings with specified limits				√

Based on the comparison of similar applications, one major limitation of previous applications was the difficulty in discovering works or projects created by others without being directly connected through friend networks or existing connections. This restricted users from finding relevant talents or collaborating with individuals outside their immediate circles. Bikinproyek addresses this gap by allowing users to easily discover and connect with others, regardless of personal networks.

2.3 User Requirement Analysis

Data from respondents is analyzed to connect their answers to the main features of the application to be developed.

2.4 Application Design and Development

During the implementation phase, the application developed using the React JS for the Frontend sized and Node.Js is utilized for the backend side.

2.5 Evaluation

After the application development is completed, evaluation is conducted through user questionnaires and assessment of user interface using the 8 basic principles.

III. RESULTS AND DISCUSSION

Below is an explanation and display of the pages on the Bikinproyek web application. In the development of this application, the author followed the eight golden rules written by Shneiderman and Plaisant (2010, p. 88) in designing the user interface.

3.1 Application Feature

3.1.1 Home Page

This page is used to welcome visitors when accessing the Bikinproyek web application. In the header section, there are login and register buttons where users can authenticate. There is also an action button labeled "start" that, when clicked, will redirect visitors to the project creation page. In the footer section, there is a button to switch the user interface to dark mode.

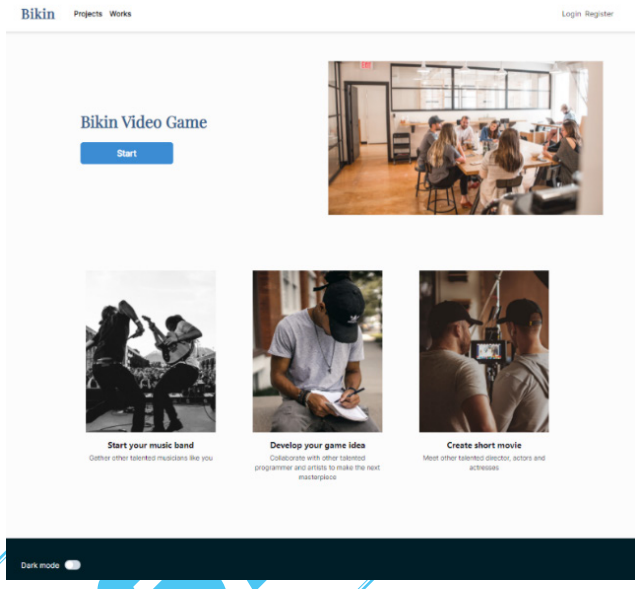

Figure 9. Home Page

3.1.2 Login Page

The login page is used to enter the credentials required to authenticate the user's account. The provided form accommodates the user's username or email, as well as their account password. Additionally, there is a button provided that directs users to the registration page if they do not yet have an account.

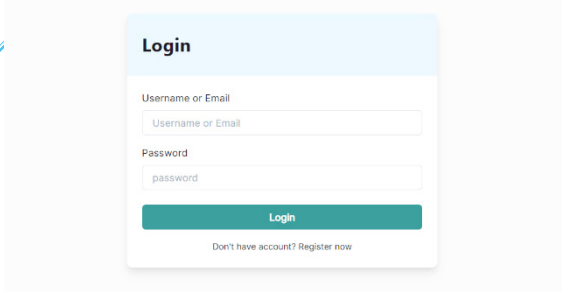

Figure 10. Login Page

3.1.3 Profile Page

This page features the user's photo, account description, and city of residence. Additionally, there are three main sections on this profile page. The first section is the experience summary, which displays the user's work experience, including awards, career history, or education. The "Works" section showcases the user's creations in various media formats such as images, videos, and audio. In the "Images" section, users can upload their artwork by clicking the plus button. For the "Videos" section, users need to upload their work to YouTube first and then provide the URL when uploading their work. Similarly, in the "Audio" section, users need to upload their work to Soundcloud first. At the bottom, there is a list of projects followed by the user.

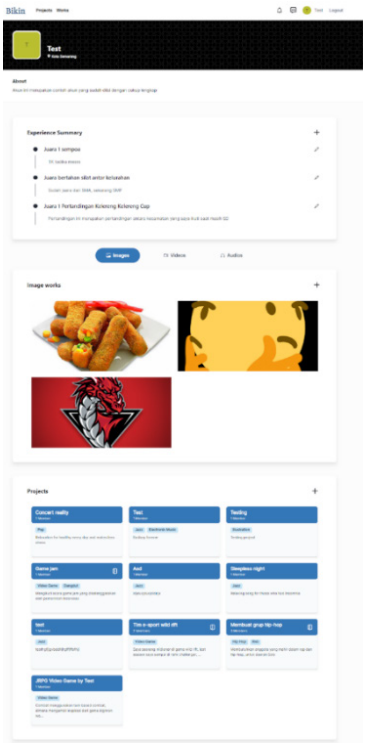

Figure 11. Profile Page

3.1.4 Projects Page

This page can be accessed through a link in the header component. On this page, users can view a list of projects created by Bikinproyek application users. The page provides several features, including a search feature that allows users to search for projects by name, a filter feature to filter projects by category, and a pagination feature accessed through buttons at the bottom of the project list. When users click on a project they want to view, they will be directed to the project detail page. Additionally, there is a "create project" button that directs users to the page for creating a new project.

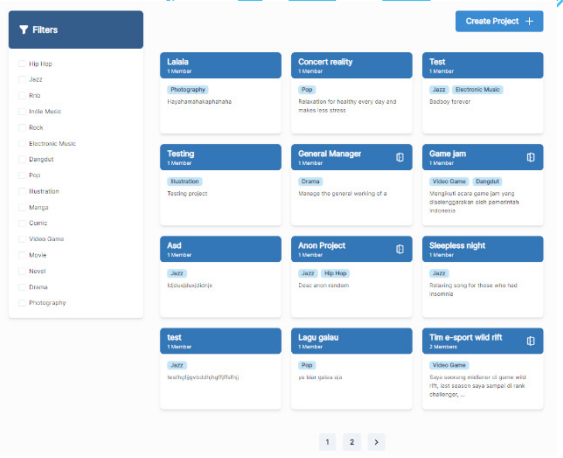

Figure 12. Projects Page

3.1.5 Create Project Page

This page provides a form for authenticated or logged-in users to fill out. The data from this form will be used to create a new project. The form consists of two stages. In the first stage, users fill in the title, description, category, and city of the project they want to create, as well as the name of the job to be done by the project creator.

In the second stage, users need to provide a job description, which was previously filled out in the first stage. After users submit the filled data and the project is successfully created, they will be directed to the project detail page.

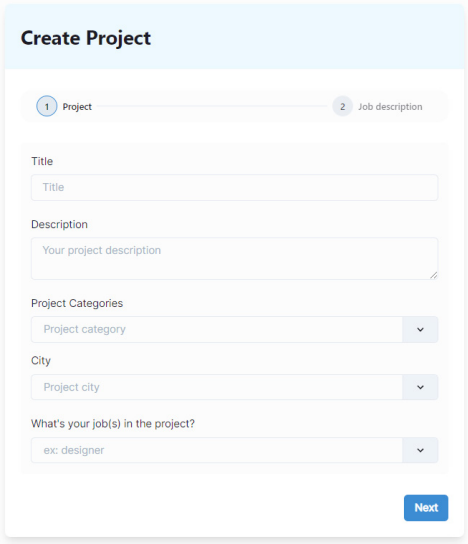

Figure 13. Create Projects Page

3.1.6 Project Detail Page

This page displays the details of a project that will be created. For the project initiator, there are several buttons available to edit the project or post job openings for the project.

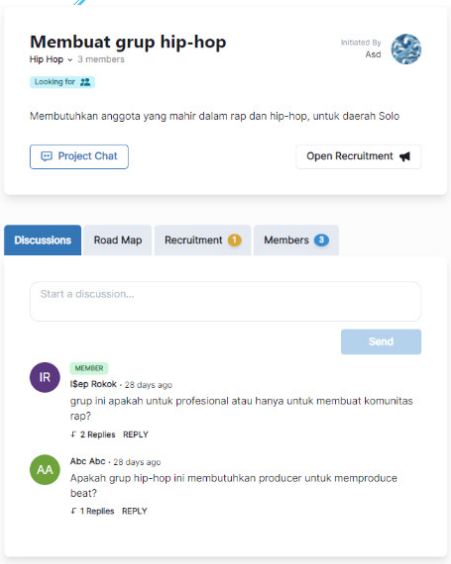

Figure 14. Detail Projects Page

3.1.7 Works Page

This page showcases publicly uploaded works by other users. Features provided on this page include filtering, searching for works, and sorting based on media type and pages. When users select one of the works, a modal will appear containing details about the work created by someone.

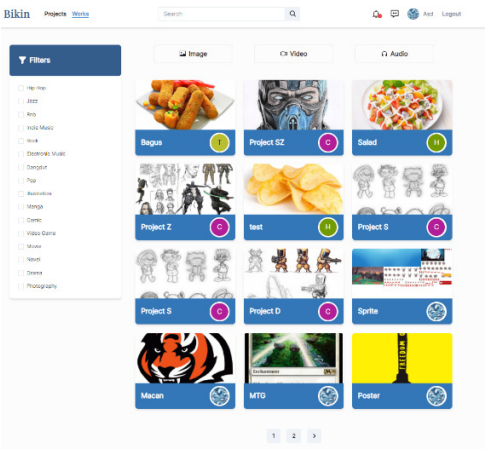

Figure 15. Works Page

As for Similar application analysis in Table 1. Bikinproyek has covered Finding works created by others without friend connections or networks features, which not available in other platforms.

3.2 User Evaluation

The survey results were obtained through questionnaires distributed to the public after they used the application. Received responses from 80 participants, which were subsequently compiled into a single table, as illustrated below.

Table II. User Evaluation

Question	80 Respondent	
	Yes	No
The application is easy to use and understand	69 (86%)	11 (14%)
Easy to find a project or work and talent that I want to see	61 (76%)	19 (24%)
The apps makes me more confident and assured about joining a project	55 (69%)	25 (31%)
Satisfied when using this application	59 (74%)	21 (26%)

The results of survey shows that 86% of the respondents stated that the application was easy to use, 76% stated that the application eased the to find the project, 69% stated the applications makes trustable when joining project and 74% satisfied when using the applications.

Figure 15. Histogram of Features That Need to Be Added

The features that need to be added to improve the application are as follows: 50 people suggested project recommendations for users, 52 people requested more detailed filters, 56 people indicated that video and audio uploads should not rely on third parties, 53 people proposed a feature for scheduling third-party video calls, and 35 people suggested integrating a video call feature within the web application.

In addition to the questionnaire, an evaluation based on the eight golden rules was conducted, yielding the following results.

1. Strive for consistency

In The principle of striving for consistency has been applied in the development of this application. The font type used is the same across most pages, and a blue color theme serves as the primary design element of the application. Additionally, the navigation bar at the top displays a consistent menu according to the user's status. Another example is the layout of the projects and works pages, which share a similar structure and components.

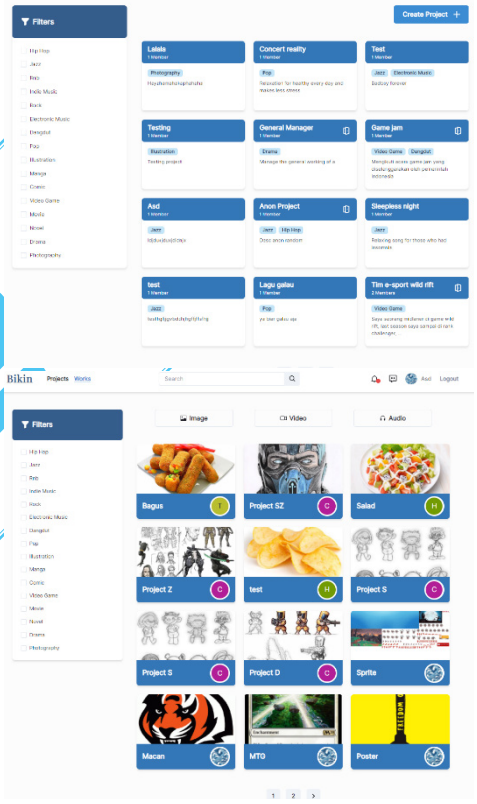

Figure 16. Strive for consistency Evaluation

2. Seek universal usability

In this application, users can filter categories. When a user selects multiple categories to filter, a display is provided to remove the chosen categories. The option to remove a category is indicated by a trash can icon, which serves as a button to discard the selected category.

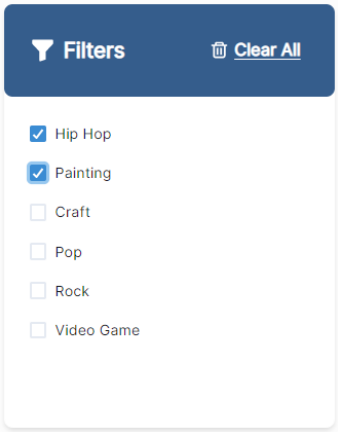

Figure 17. Seek Universal Usability Evaluation

3. Offer informative feedback

Certain user actions within the application provide feedback when specific conditions are met. For example, an error message is displayed when a user or the server encounters a mistake and the color of the tab button changes to indicate which tab the user is currently on.

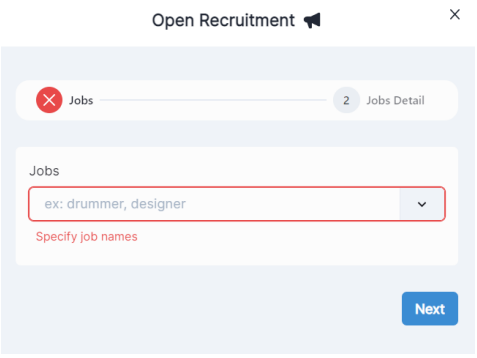

Figure 18. Offer Informative Feedback Evaluation

4. Design dialogs to yield closure

Sequential or interconnected actions are presented to help users understand their current stage in the process. One example of this is when a project owner opens a job vacancy; once the form is successfully submitted and processed by the server, a toast message appears indicating that the vacancy is now open.

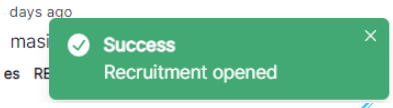

Figure 19. Design Dialogs to Yield Closure Evaluation

5. Prevent errors

Efforts to minimize user errors in this application can be observed with most buttons; they are disabled while a request is being sent to the server.

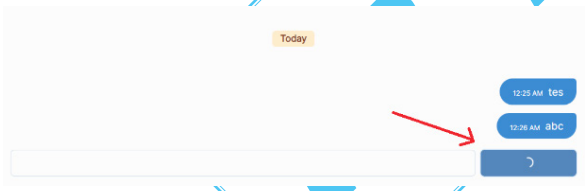

Figure 20. Prevent Errors Evaluation

6. Permit easy reversal of actions

Several features in this application allow users to edit previously entered data, ensuring that users do not need to worry about entering incorrect information. One such feature that can be modified is the experience summary on the user's profile page.

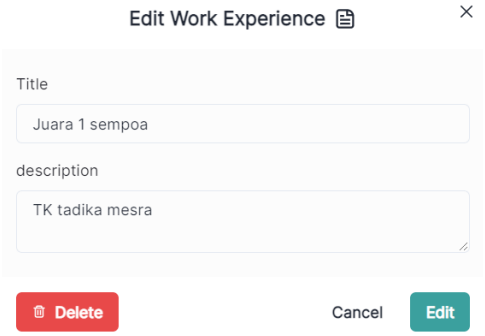

Figure 21. Permit easy reversal of actions Evaluation

7. Keep users in control

It is crucial for users to have control over the features of this application. One way this is achieved is by providing a confirmation prompt when users attempt to delete a plan from a project's roadmap. This approach ensures that users feel empowered and in control of their actions.

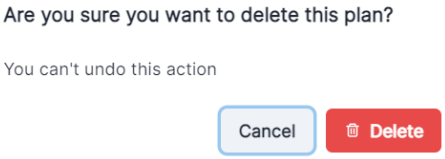

Figure 22. Keep Users in Control Evaluation

8. Reduce short-term memory load

Humans often rely on short-term memory during direct interactions. Therefore, in this application, when a project creator wants to accept or reject applications from other users, only the jobs applied for by that individual are displayed. This design simplifies the process for users, eliminating the need to review each job individually selected by the applicant.

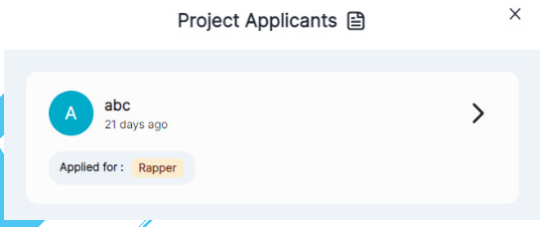

Figure 23. Apply for the listed positions

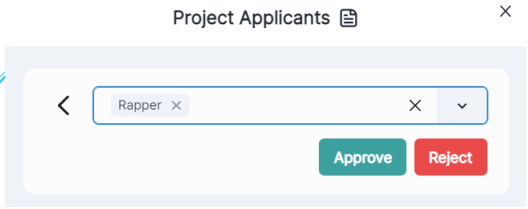

Figure 24. Positions selected by the applicant.

IV. CONCLUSION

Based on the research and development of the Bikinproyek web application, which began with problem identification and analysis during the design phase, we discovered that Bikinproyek serves several important purposes. Firstly, it helps users initiate projects involving two or more people by connecting them with others who share similar goals. Secondly, it simplifies the process of finding individuals with specific talents. Thirdly, it fosters trust between project creators and potential members through transparent project details. Additionally, the app allows users to create portfolios for various purposes, enabling them to showcase their work and connect professionally. Lastly, Bikinproyek features a simple and attractive interface, making it easy for users to navigate and understand.

For further researches, several suggestions have emerged that may benefit future researchers. First, create an internal feature for uploading video and audio without relying on third-party services. Additionally adding video

scheduler also demanded. Lastly, developing more detailed filters for projects and works would streamline the search process, making it easier for users to find relevant content.

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