



## Designing ui/ux for "building house" application through users centered design method

Rayhan Alif Akbar<sup>1</sup>, Dadang Setiawan<sup>2</sup>, Dana S Kusumo<sup>3</sup>  
<sup>1,2,3</sup> Informatics Faculty, Universitas Telkom

### ARTICLE INFO

### ABSTRACT

#### Article history:

Accepted Jun 21, 2023  
Revised Jul 27, 2023  
Accepted Aug 29, 2023

#### Keywords:

Application;  
UI;  
UX.

House is the basic need for humans as a place to live or shelter, and it serves as a primary location for activities after being outside. As time passes and the population becomes more crowded, the need for housing also increases. Many people require housing, whether purchasing ready-made houses, building new ones, or renovating an old house. This research addresses these issues through application development that utilizes data from the surrounding environment.

*This is an open-access article under the [CC BY-NC](https://creativecommons.org/licenses/by-nc/4.0/) license.*



#### Corresponding Author:

Rayhan Alif Akbar,  
Informatics Faculty,  
Telkom University  
Building D, Telkom Education Area, Kec. Dayeuhkolot, Bandung Regency, West Java 40257  
Email: [rayhanalifakbar@student.telkomuniversity.ac.id](mailto:rayhanalifakbar@student.telkomuniversity.ac.id)

## 1. INTRODUCTION

At this time, Indonesia is one of the countries in the world with the largest population in Indonesia (Arifin et al., 2022; Tjiptoatmadja & Alfian, 2022; World Bank, 2021). As the population increases, the demand for housing will also increase and continue to increase yearly (Dale, 2020; Makarau, 2011; Wadesango et al., 2020). Based on this situation, many people in Indonesia who need to build a house according to their needs and are comfortable living in still require many improvements, especially in using the right technology and material selection according to development needs (Andiyan & Nurjaman, 2021; Asnudin, 2010).

The observations through searches on current website pages only provide applications for making application designs, and some only display information on building services (Chen et al., 2021; Stumpf et al., 2022; Tesone et al., 2008). They do not include the information the community needs, such as the price of construction materials, the cost of craftsmen, and a good house design. In order to deal with this problem, it is necessary to take on the role of people related to the house construction process, which aims to make the application can be running well (Adi & Firmansyah, 2013; Larsen et al., 2019; Lennartsson et al., 2023; Masood et al., 2022).

Through the user-centered design (UCD) method, the design of a house construction application aims to simplify and speed up the house construction process, as well as improve the quality and efficiency of resource use (Hartawan, 2022; Mukti, 2018; "UI/UX Design in E-Learning University of Harapan Medan Using User Centered Design (UCD)," 2022; Vani et al., 2021). The UCD method refers to a design method that

places the user at the center of every design phase by considering users' needs, desires, and problems (Ogbeifun & Pretorius, 2022; Travis Lowdermilk, 2013). The design of a house construction application using the UCD method is expected to produce better products and meet user needs. Therefore, the design of a house construction application using the UCD method is a relevant topic, given the need to improve the housing construction process in Indonesia (Aburamadan & Trillo, 2020; McGinn et al., 2020). This application is expected to help the users plan, monitor, and control the process of building houses more effectively and efficiently.

## 2. RESEARCH METHOD

This study used the UCD (User Centered Design) method to design the application's user interface. In the figure below, there are research stages, including understanding the user context, specifying user requirements, designing solutions, and evaluating requirements. These stages were analyzed in this research.

This process was used to understand the characteristics, tasks, and target users in the context of the product used. It is important to make initial design decisions and to provide a basis for evaluation. The characteristics in question include the user's knowledge, skills, experience, preferences, and ability to use the product. This process was used to determine the users who need the product by determining the user. It can be easier to determine the features and initial design of the product. At this stage, the author determined the users in the surrounding environment who are ready to own a home. At this stage, interviews were conducted with predetermined users. The author had determined the target users ranging from 25 – 40 years old because many already want to have their own homes and families. Thus, they can easily get information regarding the data that will later be the material for making the product. Besides, this observation stage was made for users who want to find architects or contractors for house construction .

The prototype stage was carried out directly by users, and they could experience the features of the building house application. This stage was also used to get user feedback after using the application, as the prototyping process is included in usability testing. Therefore, it can help ensure that the products can run optimally based on the users' needs. This stage was done to evaluate the designs completed at the previous stages [1]. The usability testing of single ease questions concluded the results of the steps' evaluation by conducting this testing directly on the users so that the product that has been made is aligned with their expectations and needs. This research implies that this research can add references and knowledge about designing UI/UX for building houses and this application can be used by fund users as a solution to the problems faced, especially in problems when building a house.

## 3. RESULTS AND DISCUSSIONS

Application of the user-centered design method with a design approach focused on users' needs, preferences, and experiences in developing products or services. In the context of Building House applications, the UCD method implementation can help ensure that this application suits users' needs and preferences. The UCD approach in building house application design was carried out in several stages, namely understanding the user's context, specifying user requirements, designing solutions, and evaluating requirements.

Furthermore, conducting a survey and obtaining the necessary data to create a user persona to group users for the purpose the application made can be according to the needs and be useful for the user. The author grouped the data into four user personas, divided into two male and two female where the average users were office workers and

self-employed. Each user persona has similar goals, needs, and challenges, thus the goals of the application are expected to be clearly focused on the target user

In the login app, this process starts with opening the application. Then the application will appear as a splash screen to give a professional impression and provide brief information about the application or give a message to wait for a second when the application is loading, then enter the Welcome page to make the first interaction with the users. Then, move to the Log in process if they already have an account. If the users do not have an account, then there is an option of Register. Furthermore, if they forget the password, they can immediately create a new password by entering the New Password and logging back with the password that was created. Meanwhile, users who only want to see can choose Skip to go directly to the Homepage.

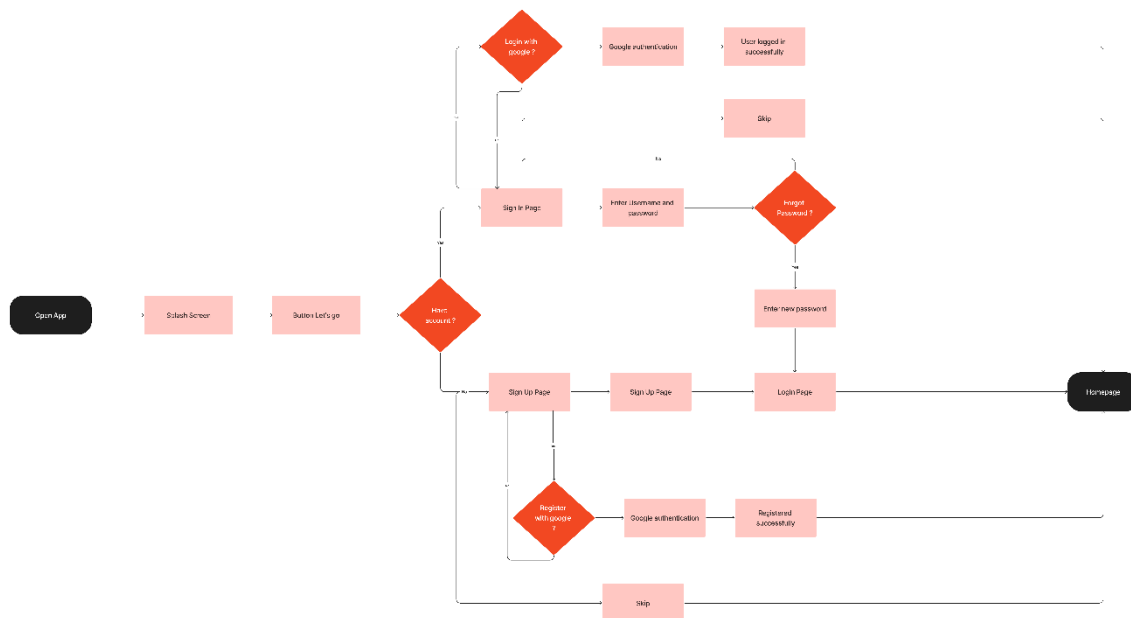


Figure 1. Login and register account

In the flow search, there are three first categories: House Design, Interior Design, and Architect. For the first flow, when the users want to search for a house design, they can click on the house design category, then a list of available home designs will appear. If they want to search for a house design, click the available search bar, then the house design they are looking for will appear, and enter the detail page for the house design. For interior design, the process is the same as flow house design. In flow architect, the user needs to set the location first, or it is automatically set based on the user's location. Next, a list of available architects will appear. The users can choose the architect according to their desires and then clicks on the Architect to enter the Architect Details.

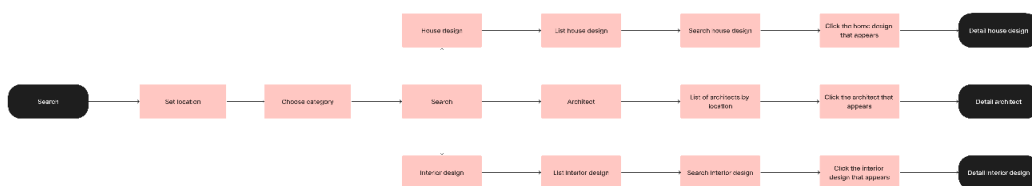


Figure 2. Search

In this flow location, the users set the location to find the first suitable architect. The user clicks the Location icon above the Search bar, then will be directed to the Location page. If the users want to set a location, they need to search for the location on the search bar available on the Location page. Then they can select the appropriate location. After that, select the location being searched. The architect will appear at the map point according to the selected location.

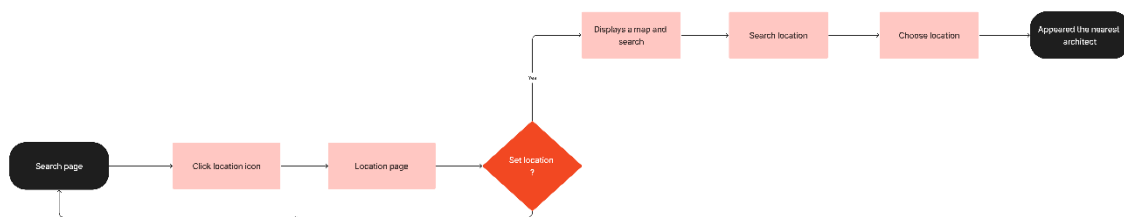


Figure 3. Find location architect

The flow is used to contact the architect when the users want to contact the architect. Then, the users enter the architect category on the search page, then can directly select an available architect. The users immediately click on the Architect to enter into the Details of the Architect and the users can click the Contact Me button. It will redirect to the Chat page to contact the architect.



Figure 4. Contact architect

The following is a wireframe or initial design used in the application design process to describe the structure, layout, and functions of the user interface (UI) to be built. There are 18 pages for the initial wireframe with mid-fidelity. The designs made could be more detailed and visually detailed. This is because Mid-fidelity is usually still in the iteration and updating stage, which allows changes to be made in the middle of a design before moving on to a more detailed design stage, such as a high-fidelity design.

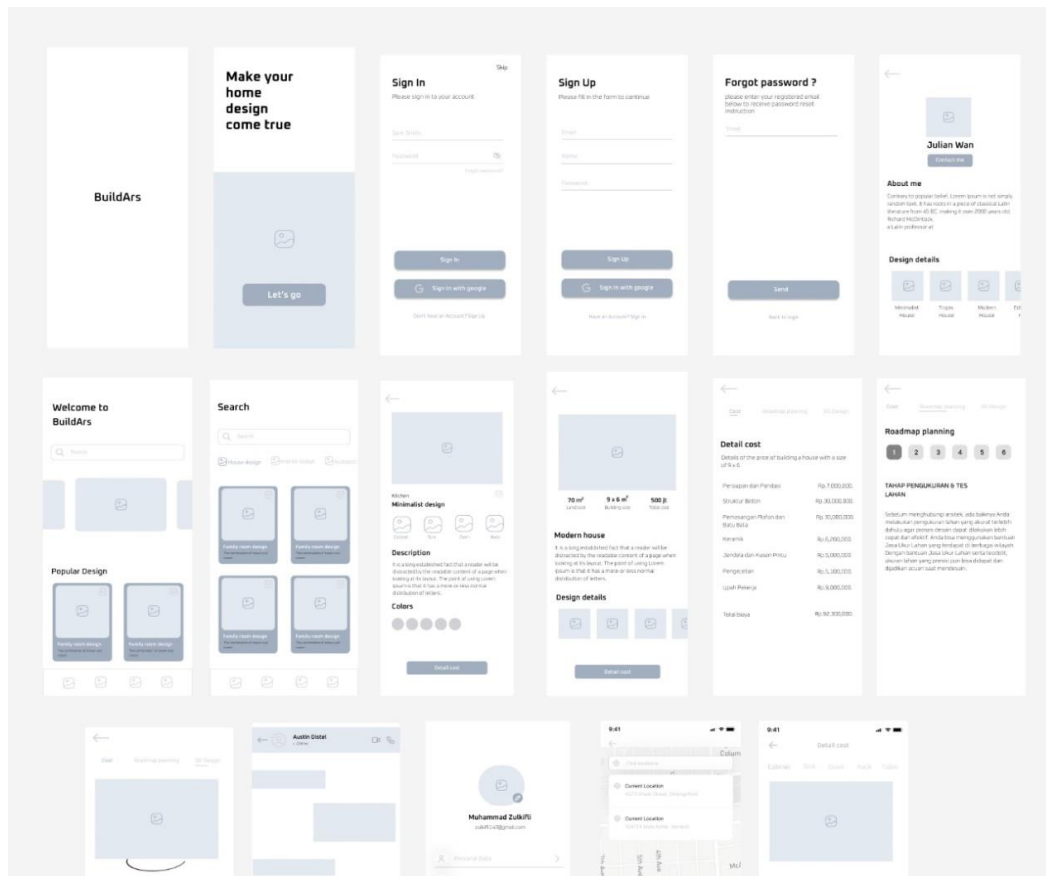


Figure 5. Wireframe

At this stage, the application design is more detailed and shows the application's final appearance. The mockup is designed after the wireframe stage and before the prototype stage. This stage is designed to provide a clearer picture of the appearance and functionality of the application. Mockups are used to display elements, such as buttons, icons, layouts, and text. The mockup that is created can also provide an overview of how the application interacts with the user.

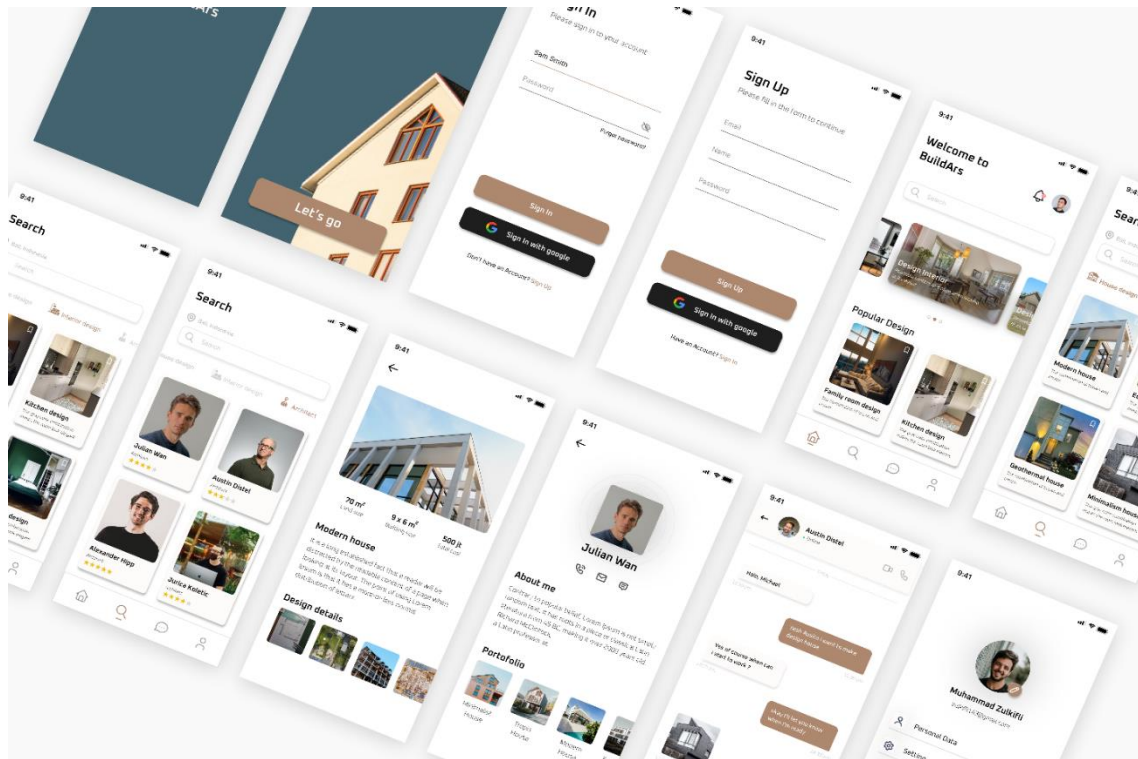


Figure 6. Mockup design

The splash screen itself is the initial appearance of the Building House application, where this view displays the application's logo or branding to give users a good first impression. For the Welcome page, the next page after the splash screen contains a brief introduction to the application and directs the user to the Next page.

The Login page is a page that appears when the user wants to access certain features of the Building House application that require access first. This page prompts the user to enter an account, such as an email and password. Meanwhile, the register page is a page that appears when a user wants to create a new account on the Building House application. This page reminds the users to enter their email, name, and password, then the information is verified.

For the Home pages that do not display the features only available on the not logged-in home pages, such as a Home Design Search feature, and can only browse. Meanwhile, for the logged-in home page, the users can access the Building House application's main features, such as contacting the architect, setting profiles, and viewing incoming notifications.

For this house design and interior design page, the users can search and select house designs and interior designs available in the application. Moreover, the users can view pictures and descriptions of each house design and interior design and filter based on the size, style, and type of house they want. As well as interior design, the users can choose furniture, accessories, and decorations provided in the application. Users can also save their favorite home designs and interior designs.

The Architect page allows users to search for and choose an architect that suits the user's needs. Users can also view architect profiles, their experiences, and portfolios, as well as ratings given by other users. Meanwhile, the detail page architect allows users to communicate directly with architects and share their design ideas.

For detailed house designs, users can view the selected house design details, starting from the land size, building, and estimated cost. The users can also see the

complete design, starting from the design with sketches to detailed depictions. Meanwhile, for interior design details, users can see the details of the selected interior, such as furniture users and color selection according to the selected design.

The message page allows the users to communicate directly with the chosen architect. Users can talk about the details of their projects, share ideas and drawings, and easily schedule meetings. Meanwhile, the location page allows users to set the location according to their wishes to find architects around the user. This feature can help them to find the nearest architect.

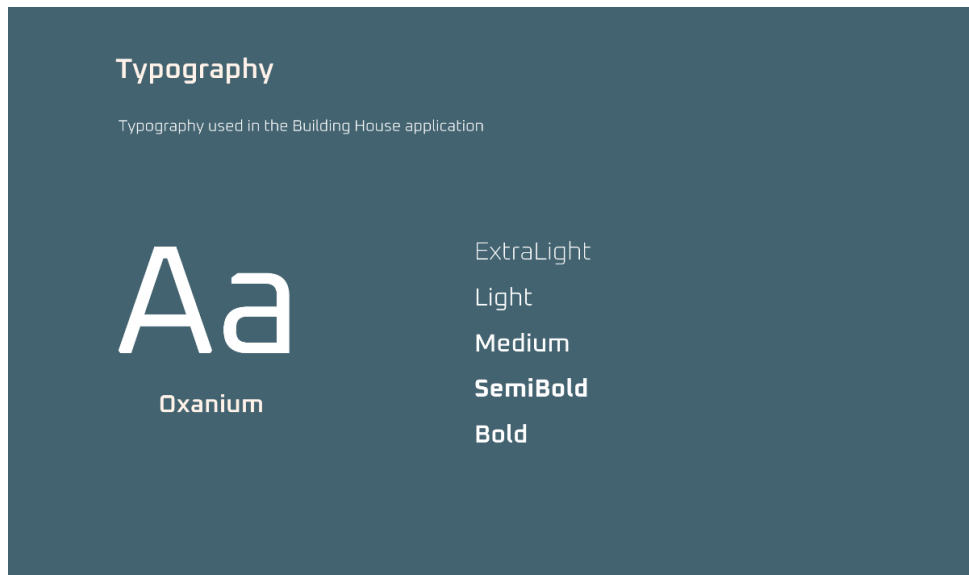
It provides detailed information to the user for detailed building, from detailed costs and roadmap planning to 3d design. Users can see the prices for building materials that must be prepared to start construction on this page. On this page, users can also be directed to the development process, from the measurement and land testing stages to the final stage. The users can also view house plans for 3d to 2d displays.

For this interior detail page, users can see detailed prices for interior items, from cabinets, tables, and chairs to other furniture according to the existing design.

The Building House profile page allows users to view and manage their profile information, including personal information, change account settings, and view saved designs.

Choosing the right typography can affect how the user reads and understands the information presented in the design. In this situation, the author chose the oxanium type font because this font has a text style that matches the selected color theme and matches with the existing content. In addition, this text is easy to read so that users can easily understand the information presented (Kelly & Gregory, 2011).

Furthermore, in selecting colors, the author used a combination of blue, brown, black, and white because it is based on the purpose of this application, namely regarding the construction of a house, and the color brown usually can represent this application. Because color selection influences user perception and experience, choosing the right color helps attract the user's attention. A good color combination can facilitate user navigation using the (Shen et al., 2015). As a result, the consistency and suitability between typography and color can improve the design's quality and help users feel comfortable and easy to use the application.



## Color

The color used in the Building House application



Figure 7. Moodboard

The following is a prototype of the building house application, where this prototype is used to find out how easy this application is when used by users. In addition, this prototype can measure the extent to which this application can be developed, starting from the features contained in the building house application. This prototype consists of logging in, registering accounts, and searching for information about house designs, interior designs, and architects.

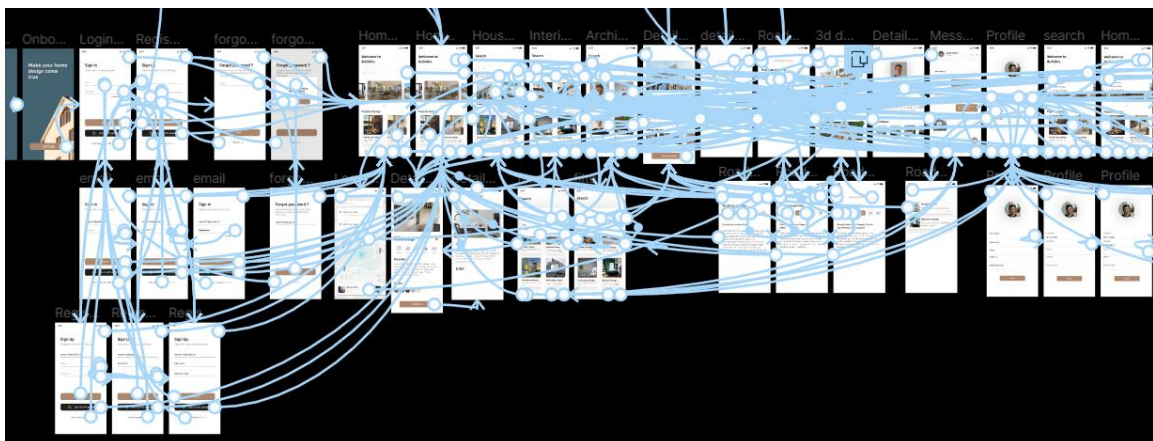


Figure 8. Prototype

The following is a list of questions given to the user, which aim to provide feedback for the users regarding the prototype testing that has been carried out before. The user can assess the features in the application that are easy or difficult to use so that the designer can re-evaluate these features. The author selected five samples for user testing because it would save time to get the same results repeatedly, so the author could not find the usability problem (Neilsen & Landauer, 1993). There were several miss-clicks with a percentage of 29,7%. The average users thought that the features in the building house application were easy to use because it had a user-friendly user flow. Thus, the users can easily use the application without watching the tutorial.

Table 1. User Opinion

No	Question	Very Difficult					Very Easy	
		1	2	3	4	5	6	7
1.	How easy can you to register and log in to your account?							✓
2.	How easy can you search for house designs and detailed development information?						✓	
3.	How easy can you search interior design and detailed interior information?							
4.	How easy is it for you to search for architects based on location?							✓
5.	How easy is it for you to contact the architect?							✓

For the first question, participants easily register and login accounts. Secondly, one participant still needs to understand how to look for detailed development information, maybe because the flow is too far, so many buttons must be clicked. However, the participant can do it until the task is complete. Adaptation is required to be easily operated in the future. For the third question, the participants completed the task, easily to search interior design and detailed interior information. Furthermore, for the fourth participant's question, searching for architects based on their location was easy. The fifth participant's question, they were successful in carrying out the task of contacting the architect because the author created a CTA button that is easy for users to reach and not too complicated to operate.

#### 4. CONCLUSION

Based on the analysis result of the implementation and testing that has been carried out, the community requires the building house application to find information about development details and architects. Because these service providers are still few and it is still difficult to find information related to it, the SEQ test also shows that the building house application is easy for users to use as it has a user flow that makes it easier for users to access all the features provided by the building house application with a success rate. There is 100% for each task given to the users, which shows that the building house application can easily help people when they want to find information about construction. It can be a solution that has yet to exist so far. From the results of the implementation carried out in the testing stage, as follows login and register features, the users can create an account and sign in with that account. This feature contains a name, email, password form, and sign-in and sign-up buttons. The home design search feature and construction information aims to make the users can search for the desired home

design and get anything that needs to be prepared when they want to build a house like the chosen design. This feature contains a search field, available home design views, building detail buttons, cost details, roadmap planning, and 3d design. Home interior design search feature allows users to search for information about prices and types of goods needed according to the chosen interior design. This feature contains a search column, interior design, cost detail buttons, and item details. Architect search feature based on the user's location makes the users can search for architects based on the user's closest location. This feature contains set locations, search forms, available architects, and a map display of the user's location. Architect contact feature makes the users can contact the architect. This feature contains details from the architect, a CTA button to contact the architect, and a message page. Through the features that have been considered and adapted to existing problems, as well as an application design that has been adapted to the target user, it is expected that this application can be used by fund users as a solution to the problems faced, especially in problems when building a house. This research implies it can add references and knowledge about designing UI/UX for building houses. Future research should improve design with other methods.

#### REFERENCES

- Aburamadan, R., & Trillo, C. (2020). Applying design science approach to architectural design development. *Frontiers of Architectural Research*, 9(1). <https://doi.org/10.1016/j.foar.2019.07.008>
- Adi, A. Y., & Firmansyah. (2013). Rancang Bangun Aplikasi Rencana Anggaran Biaya Dalam Pembangunan Rumah. *Undergraduate Thesis STIKOM Surabaya*, 1–8.
- Andiyan, A., & Nurjaman, A. (2021). PENDEKATAN URBAN GREEN BUILDING PADA BANGUNAN APARTEMEN. *RADIAL: Jurnal Peradaban Sains, Rekayasa Dan Teknologi*, 9(1). <https://doi.org/10.37971/radial.v9i1.218>
- Arifin, B., Rokhman, M. R., Zulkarnain, Z., Perwitasari, D. A., Manggau, M., Rauf, S., Noor, R., Padmawati, R. S., Postma, M. J., Massi, M. N., & van der Schans, J. (2022). Adaptation and validation of the HIV Knowledge Questionnaire-18 for the general population of Indonesia. *Health and Quality of Life Outcomes*, 20(1). <https://doi.org/10.1186/s12955-022-01963-5>
- Asnudin, A. (2010). Pengendalian Sisa Material Konstruksi Pada Pembangunan Rumah Tinggal. *Jurnal Mekanika Teknik*, 12(3), 162–164.
- Chen, J., Saunders, K., & Whan, K. (2021). Quality control and bias adjustment of crowdsourced wind speed observations. *Quarterly Journal of the Royal Meteorological Society*, 147(740). <https://doi.org/10.1002/qj.4146>
- Dale, S. (2020). Breeding population increase and range expansion of the Great Crested Grebe *Podiceps cristatus* in southeastern Norway. In *Ornis Norvegica* (Vol. 43). <https://doi.org/10.15845/ON.V43IO.2982>
- Hartawan, M. S. (2022). PENERAPAN USER CENTERED DESIGN (UCD) PADA WIREFRAME DESAIN USER INTERFACE DAN USER EXPERIENCE APLIKASI SINOPSIS FILM. *JEIS: JURNAL ELEKTRO DAN INFORMATIKA SWADHARMA*, 2(1). <https://doi.org/10.56486/jeis.vol2no1.161>
- Kelly, S., & Gregory, T. (2011). Typography in Human-Computer Interaction. *Iowa State University*.
- Larsen, M. S. S., Lindhard, S. M., Brunoe, T. D., Nielsen, K., & Larsen, J. K. (2019). Mass Customization in the House Building Industry: Literature Review and Research Directions. *Frontiers in Built Environment*, 5. <https://doi.org/10.3389/fbuil.2019.00115>
- Lennartsson, M., André, S., & Elgh, F. (2023). PLM support for design platforms in industrialized house-building. *Construction Innovation*, 23(2). <https://doi.org/10.1108/CI-09-2019-0092>
- Makarau, V. H. (2011). *Penduduk, Perumahan, Pemukiman, Perkotaan dan Pendekatan Kebijakan*.
- Masood, R., Lim, J. B. P., González, V. A., Roy, K., & Khan, K. I. A. (2022). A Systematic Review on Supply Chain Management in Prefabricated House-Building Research. In *Buildings* (Vol. 12, Issue 1). <https://doi.org/10.3390/buildings12010040>
- McGinn, C., Bourke, E., Murtagh, A., Donovan, C., Lynch, P., Cullinan, M. F., & Kelly, K. (2020). Meet Stevie: a Socially Assistive Robot Developed Through Application of a 'Design-Thinking' Approach. *Journal of Intelligent and Robotic Systems: Theory and Applications*, 98(1). <https://doi.org/10.1007/s10846-019-01051-9>

- Mukti, Y. (2018). Rancang Bangun Website Sekolah Dengan Metode User Centered Design (UCD). *Jurnal Ilmiah Betrik*, 9(02). <https://doi.org/10.36050/betrik.v9i02.34>
- Neilsen, J., & Landauer, T. (1993). A Mathematical Model of the findings of Usability Problems. *ACM Proceedings*, 1–36.
- Ogbeifun, E., & Pretorius, J. H. C. (2022). INVESTIGATION OF FACTORS RESPONSIBLE FOR DELAYS IN THE EXECUTION OF ADEQUATELY FUNDED CONSTRUCTION PROJECTS. *Engineering Management in Production and Services*, 14(1). <https://doi.org/10.2478/emj-2022-0008>
- Shen, Z., Xue, C., Li, J., & Zhou, X. (2015). Effect of icon density and color contrast on users' visual perception in human computer interaction. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 9174, 66–76. [https://doi.org/10.1007/978-3-319-20373-7\\_7](https://doi.org/10.1007/978-3-319-20373-7_7)
- Stumpf, E., Ambati, R. T., Shekhar, R., Staffa, S. J., Zurakowski, D., & Sinha, P. (2022). A Smartphone application to provide real-time cardiopulmonary resuscitation quality feedback. *American Journal of Emergency Medicine*, 60. <https://doi.org/10.1016/j.ajem.2022.06.045>
- Tesone, D. V., Severt, D., & Carpenter, M. L. (2008). Modern Learning Theories Provide Applications For Distance Learning Practice. *Journal of College Teaching & Learning (TLC)*, 5(5). <https://doi.org/10.19030/tlc.v5i5.1257>
- Tjiptoatmadja, N. N., & Alfian, S. D. (2022). Knowledge, Perception, and Willingness to Use Telepharmacy Among the General Population in Indonesia. *Frontiers in Public Health*, 10. <https://doi.org/10.3389/fpubh.2022.825554>
- Travis Lowdermilk. (2013). *A developer's Guide to Building User-Friendly Applications*. 135.
- UI/UX Design in E-Learning University of Harapan Medan using User Centered Design (UCD). (2022). *Journal of Computer Science, Information Technologi and Telecommunication Engineering*. <https://doi.org/10.30596/jcositte.v3i1.9843>
- Vani, T., Hidayat, R., & Yudhistira, A. Y. F. D. (2021). Rancang Bangun Mobile Commerce di Lamandau Store Berbasis Android berdasarkan User Centered Design (UCD). *JURNAL MEDIA INFORMATIKA BUDIDARMA*, 5(1). <https://doi.org/10.30865/mib.v5i1.2544>
- Wadesango, N., Bizah, S., & Nyamwanza, L. (2020). The Impact Of Tax Amnesty On Tax Compliance And Tax Evasion Behavior Among Smes. *Academy of Entrepreneurship Journal*, 26(3).
- World Bank. (2021). GDP growth (annual %)- Indonesia | Data. *THE WORLD BANK Web Page*, 1–19.