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UI/UX Design for Tourism Village Website Using the User Centered Design Method

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ABSTRACT

The importance of creative and innovative technology applies to any sector of industry. Technology offers a lot to improve performance in general. In the tourism sector, creative and innovative technology affects how the welfare of the community and businesses increase significantly. The use of technology can create exposure to enhance, and gain the interest of many people to the tourism itself. Developing a website or mobile based application is a way to be creative and innovative about the solution to increase the number of tourist visits. In addition to reaching the expected number of tourist visits, the application needs to be both effective and efficient in obtaining the up-to-date information regarding the destination. In this study, the User Centered Design method is used to obtain descriptive information to be used as a User Interface and User Experience design guidelines, also the User Experience Questionnaire method to assess the evaluated User Interface and User Experience outputs. One descriptive questionnaire is used as the implementation of User Centered Design, and the two User Experience Questionnaires afterward are used to assess User Interface and User Experience. The second design is appointed to be the final design of User Interface and User Experience based on the end comparison result of User Experience Questionnaire. These design methods produce a more effective output because the process involves direct evaluation from users in order to fulfill the needs and demands more precisely without overdoing the process.

Keywords: Website, User Interface; User Experience; UCD; UEQ

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1. INTRODUCTION

The disruption of information technology has caused many sectors in the industry to experience a series of changes on the market offer and demand. Integrated information technology is expected to facilitate and support associated role in availability and accessibility to enhance workflow in the area [1]. With the widespread use of information technology around the globe, social and economy activity rises which cause competition level within the industries increasing. To match the high level of competition in the market, building network and strategies for development and marketing is required [2]. Information technology takes the part to optimize networking and drives strategy building stronger which could positively effects on the economy to support the growth of business [3]. As result of information technology disruption, tourism has become one of many sectors that have the urgency to transform digitally which opens up new opportunities for tourism to excelled in the future [4].

The tourism sector takes a large part contributing in the economic growth in Indonesia. In order to boost the national economic growth, Indonesian tourism is expected to change strategy and follow changes that requires tourism to transform digitally. With implementing innovative and creative technology, the tourism

sector will experience significant changes in the products or services it offers so as to improve the welfare of the community and businesses [5]. Technology can be used to fill the gap to increase tourism potential, especially to achieve Sustainable Accessible Tourism (SAT) in today's competitive competition [6]. Utilizing technology such as applications which can be operated through smartphones or similar devices will increase tourist interest because they provide reachability, availability, and reliability [7].

In this study, the object used is Cikolelet Village, located in Cinangka District, Serang Regency, Banten Province, which is a tourist village that has several destinations as tourism options. Referred from an early interview with stakeholder, Cikolelet Village has so much to offer from its tourist destinations including a variety of cultural traditions, traditional arts, and SMEs that have the potential to compete in the tourism sector. Based from the interview, it is unfortunate for Cikolelet Village to have less extensive promotion which caused not as many tourists to know about their tourist attractions. In context to increase the number of tourists in tourism villages, building a website or mobile-based application is a solution. Apart from being able to reach tourists outside the region, the existence of applications for tourism related also increases the efficiency and effectiveness of potential tourists to obtain the accurate, and up-to-date information related to the tourist destinations which could spark interest of tourists [8].

Based on the description above, to support the making of tourism applications, a good design is needed to increase the tourist interest. Every website or mobile-based application must have a good User Interface (UI) and User Experience (UX). Where the User Interface (UI) is the interface of a system which means it can be seen, heard, touched, or interacted with an understanding process. An effective, and efficient UI design is important because UI is pictured to be the bridge between users and a programming language. The right UI design will help users so that their needs are met when using the application in the most effective wa y [9] [10]. Meanwhile, User Experience (UX) according to ISO 9241-210:2019 standard, is pictured to be a person's perception of the response of a product, system, or service. Good or bad UX can affect if the user is satisfied, and comfortable, or motivated to use the system. So UX is designed with a certain method so that users have the best experience when using the application [11] [10].

To be able to reach a variety of tourists, the UI/UX design of the website in this study uses the User-Centered Design method which is supported by the User Experience Questionnaire. The User Centered Design (UCD) is a method that focuses on user needs. By all means, the UI/UX designs created with this method are based on the expectations, goals, suggestions, experiences, and evaluations from potential users to make it more satisfying to use in the future [12] [13]. On the other hand, the User Experience Questionnaire (UEQ), is a tool to measure the overall user experience when using a product. The UEQ in this study helps to assess the compatibility of the UI/UX of the website which has been evaluated with UCD [14]. In comparison to other methods, the combination of UCD and UEQ enhance the process of providing users with services when using the products by emphasizing user's trigger for innovations [15].

In previous research, this User Centered Design method was done by Destiara Kirama Safitri and Andriansyah Andrianingsih in the journal, "UI/UX Analysis for Redesigning Smart-SITA Front-End Web with UCD and UEQ Methods" [16]. In their research, Safitri and Andrianingsih created a design to increase the usability value of the website for the better. According to both, a good system is a system that has aspects as needed after the evaluation process. Both researchers combine qualitative and quantitative methods where data is obtained qualitatively, then processed and calculated using formula to produce a value before finally being described in words.

From the previous research, the method applied in the process in order to obtain the expected value of design is still too complex. According to the research paper, designers would only iterate design based on the UEQ value obtained from the users. As result, the process became less effective and create a missing gap as this research takes time to meet the expected design. This is because the previous research does not involve direct evaluation from users so there could be another efficiency problem in the process in designing. This study is intended to fill those gaps and create the perfect UI/UX design by involving users to evaluate design descriptively, and giving out UEQ for them to rate the design. Implementing this method helps designers to have a strong process aiming the expected UI/UX design without overdoing design process. With this new process of designing, the website can produce more effective outputs because it is based on the needs and demands of users that have gone through UEQ testing.

As a reference, and as a complement to previous journal, this research collects a descriptive information from users after looking through the given prototypes as a reference for further designs. In addition, the UCD functions in the evaluation process in this research. The User Experience Questionnaire (UEQ) is used right after, to assess the UI/UX by comparing designs with a benchmark to get the most compatible design as the final result. This study involves one descriptive questionnaire, and one UEQ. With much hope, this research could be useful for further research and can be developed for further journals regarding UI/UX design.

2. RESEARCH METHOD

2.1. Research Respondents

In this study, the data was obtained by involving 12 respondents, namely; 3 respondents of 20 years, 3 respondents of 30 years, 3 respondents of 40 years, and 3 respondents of >40 years. Selected respondents with age groups will represent the wide target users of website applications which is the general public from across generations. These potential users also came from various backgrounds so that the data obtained will be highly related for the UI/UX design analysis.

Respondents evaluate the UI/UX website prototype descriptively through a questionnaire so that the results obtained are easy to apply when redesigning the UI/UX website at a later stage. This descriptive evaluation was carried out only once, and was carried out before the re-design process. All respondents were given a link to a prototype of the same tourist village website, and the same questionnaire. Respondents were directed to see the prototype website first in order to be able to answer questions completely. To support the UI/UX design, respondents are also given out an UEQ assessment after conducting the descriptive evaluation. After the prototype was re-designed, the respondents received a link to the new prototype, and conducted a UEQ assessment again so that the design results could obtain a comparative value.

2.2. Research Scenario

The UI/UX design in this study has a series of processes (Fig. 1).

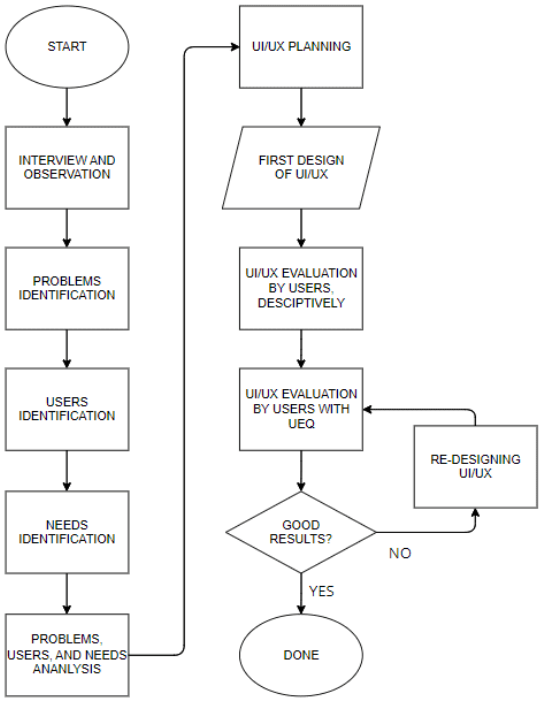

Figure 2. UCD Diagram

The interview, and direct observation process were done at the tourist village on Monday, May 23, 2022. The entire process of this design shows the implementation of UCD method where the stages from the interview to the final result of the UI/UX website include the Plan the Human Centered Process, Specify the context of use, Specify User and Organizational Requirements, Produce Design Solution, and Evaluate Design Against User Requirements are done.

The problems, potential users, and needs that have been identified are then analyzed to be the first UI/UX design material. After the first UI/UX is designed, the UI/UX evaluation is then carried out descriptively to facilitate the second design process. Besides providing a descriptive evaluation, the assessment is needed to improve the UI/UX condition before being determined as the final result. The dissatisfaction of potential users or respondents will be used as a trigger to redesign the UI/UX of the website. The process of designing will continue to repeat so that UEQ produces a good value.

2.3. User Centered Design

User Centered Design (UCD) has several principles, in which the design is created based on the results of the evaluation, previous experience, suggestions from potential users. There are several processes of the UCD to be used as a reference in the development of UI/UX designs (Fig.2) .

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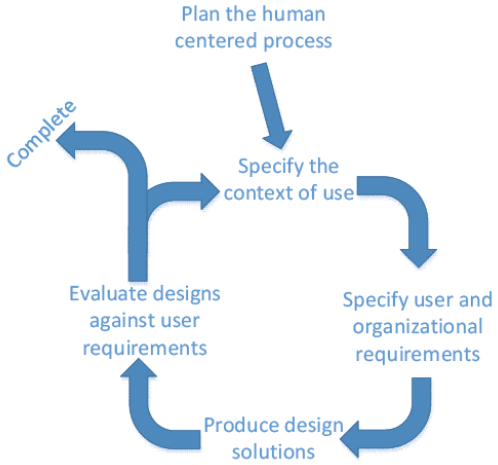


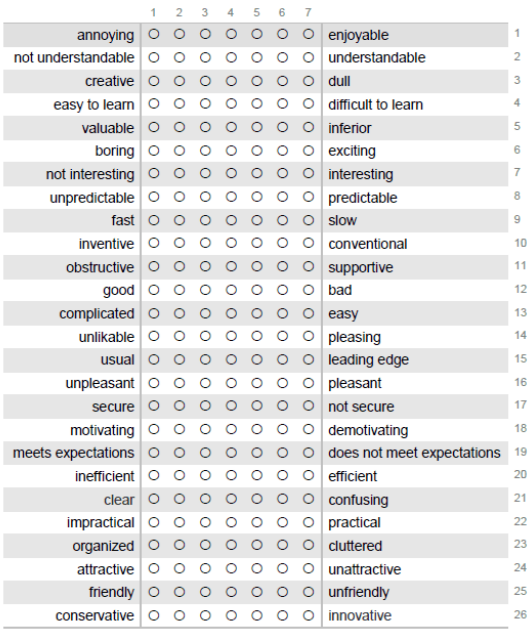
Figure 2. UCD Diagram

The 'Plan the Human Centered Process' stage which is a discussion process with stakeholders to collect data is carried out during interviews and direct observations with the administrators of Cikolelet Tourism Village. After collecting data directly from stakeholders, the next step is 'Specify the Context of Use', which is the stage of re-identifying problems, users, and needs. Furthermore, is to complete the 'Specify User and Organizational Requirements' stage, in which the process of analysing the relationship between user needs, and the users themselves in order to find out what the application can fulfil. After the UI/UX design idea from the analysis was being carried out, the design process begins to fulfil the next stage, which is the 'Produce Design Solution' stage [17] [18].

The 'Evaluate Designs Against User Requirements' stage is then carried out after the first UI/UX design is completed. The process of collecting evaluation data is carried out based on user needs by distributing questionnaires arranged in such a way to obtain descriptive responses from potential users. After that, still at the same stage, an assessment was carried out with UEQ to determine the compatibility of UI/UX [17] [18].

2.4. User Experience Questionnaire

The UEQ contains 26 questions with 6 aspects of assessment related to their experience while operating a prototype which has been evaluated in the form of questions (Fig. 3) [19]. The 6 aspects of research in 26 UEQ questions are Attractiveness, Perspicuity, Efficiency, Dependability, Stimulation, and Novelty. Attractiveness is to indicate the user's impression of a product as a whole, whether the user likes it or whether the user thinks the product is something interesting. Perspicuity is to indicate how easy it is for users to understand the product, whether the product is easy to understand as a whole, whereas Efficiency is about how the user experience is at ease when using the product, whether the product works better, or worse than it should. Dependability is to indicate how much control the user has when interacting with the product, whether the product's habits can be guessed or whether the user feels comfortable when using the product. Stimulation is to indicate how the product generates interest in users as well as motivates users to use the product again. Novelty or newness is to indicate how innovative and creative the product is to attract the attention of users [20] [21].



	1	2	3	4	5	6	7		
annoying	○	○	○	○	○	○	○	enjoyable	1
not understandable	○	○	○	○	○	○	○	understandable	2
creative	○	○	○	○	○	○	○	dull	3
easy to learn	○	○	○	○	○	○	○	difficult to learn	4
valuable	○	○	○	○	○	○	○	inferior	5
boring	○	○	○	○	○	○	○	exciting	6
not interesting	○	○	○	○	○	○	○	interesting	7
unpredictable	○	○	○	○	○	○	○	predictable	8
fast	○	○	○	○	○	○	○	slow	9
inventive	○	○	○	○	○	○	○	conventional	10
obstructive	○	○	○	○	○	○	○	supportive	11
good	○	○	○	○	○	○	○	bad	12
complicated	○	○	○	○	○	○	○	easy	13
unlikable	○	○	○	○	○	○	○	pleasing	14
usual	○	○	○	○	○	○	○	leading edge	15
unpleasant	○	○	○	○	○	○	○	pleasant	16
secure	○	○	○	○	○	○	○	not secure	17
motivating	○	○	○	○	○	○	○	demotivating	18
meets expectations	○	○	○	○	○	○	○	does not meet expectations	19
inefficient	○	○	○	○	○	○	○	efficient	20
clear	○	○	○	○	○	○	○	confusing	21
impractical	○	○	○	○	○	○	○	practical	22
organized	○	○	○	○	○	○	○	cluttered	23
attractive	○	○	○	○	○	○	○	unattractive	24
friendly	○	○	○	○	○	○	○	unfriendly	25
conservative	○	○	○	○	○	○	○	innovative	26

Figure 3. UEQ Questions

The UEQ calculation is carried out using the Analysis Tools provided on the official website https://www.ueq-online.org. UEQ is used to test out user experience and provide an assessment of the product so that it can be improved in the future [22]. For compatibility reason, the UEQ assessment was carried out twice in this study so the output could show a value comparison. UEQ has a benchmark as an indicator for determining the best UI/UX design results for tourism village websites. There are values contained in each aspect of the UEQ method (Table 1) [14].

Table 1. Table UEQ Benchmark

	Attractiveness	Efficiency	Perspicuity	Dependability	Stimulation	Novelty
Excellent	≥ 1.75	≥ 1.78	≥ 1.9	≥ 1.65	≥ 1.55	≥ 1.4
Good	≥ 1.52 <1.75	≥ 1.47 <1.78	≥ 1.56 <1.9	≥ 1.48 <1.65	≥ 1.31 <1.55	≥ 1.05 <1.4
Above Average	≥ 1.17 <1.52	≥ 0.98 <1.47	≥ 1.08 <1.56	≥ 1.14 <1.48	≥ 0.99 <1.31	≥ 0.71 <1.05
Below Average	≥ 0.7 <1.17	≥ 0.54 <0.98	≥ 0.64 <1.08	≥ 0.78 <1.14	≥ 0.5 <0.99	≥ 0.3 <0.71
Bad	<0.7	<0.54	<0.64	<0.78	<0.5	<0.3

3. RESULTS AND DISCUSSION

The first design was carried out according to the results of problem identification, user identification, and identification of needs based on interviews and direct observation at Cikolelet Tourism Village and its administrators. Based on the results of interviews and direct observation, it can be concluded that Cikolelet Village needs support from in marketing to increase its tourism. After being analyzed, it was known that there were limitations on the part of the village to get exposure from outside, while the tourists also had limitations in accessing information related to tourist villages. These limitations gave rise to the idea of creating a website to attract more tourists who are out of reach. In addition to overcome the problem of accessibility to village-related information, the role of a website application for tourists will create a greater opportunity for Cikolelet Village compete in the market.

In order to reach the goal, the tourism village website needs to be designed so well that it can give the best presentation about the general information and the latest information regarding Cikolelet Village. Features such as map which overlook every single destination in the area, and an option to view 360° images regarding the tourist destinations were added to compliment the website to be the most providing information site about Cikolelet Village. Users can obtain information, adjust the time visit and make a series of activities before visiting the tourist village so that in the future it will provide a sense of security and comfort while traveling in the tourist village. With a variety of tourist targets, an effective and efficient website requires a UI/UX that is suitable for all walks of life. Furthermore, the results of the first design are evaluated by potential users as well as assessed through a questionnaire. The results of the evaluation and the value given by potential users after seeing the results of the first UI/UX design will be used for the second UI/UX design. The results of the first

and second UI/UX designs are then compared to prove that the UI/UX design using the UCD method is effective.

3.1. Results of the First UI/UX Design

As the result of collecting data is carried out during interviews and direct observation with the administrators of Cikolelet Tourism Village, a prototype which contains home page, about page, explore page, and contact us page was built. Home page or 'Home' (Fig. 4) is the main page of the website that shows several features such as the latest news about Cikolelet Tourism Village, a collection of village tourist destinations, and also a list of activities in the village that can be followed by tourists. When The Latest News feature is selected, it will navigate users to a page (Fig. 5). Both The Latest News feature and the Try Out New Experience feature can only be accessed through the main page, while the Let's Explore feature can be accessed directly on the main page and on the Explore menu. In the Let's Try Out New Experience section, there are two different interfaces, namely to show the Workshop content (Fig. 6), and Open Trip content (Fig. 7).

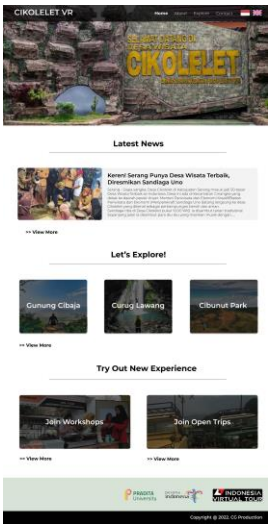


Figure 4. First Design Home Page,

Figure 5. First Design Latest News Page,

Figure 6. First Design Workshop Content Page,

Figure 7. First Design Open Trip Content Page

Beside the home page, there is the About page is a menu on the website that will show general information about Cikolelet Tourism Village (Fig. 8). There is also the Contact Us page (Fig. 9) that functions to provide contact information regading Cikolelet Tourism Village who can be contacted to ask about tourist destinations and related information. In addition to provide contact information for tourist villages, this page features maps of Cikolelet Tourism Village which have been given points according to various tourist destinations in the village. The Explore menu on the website will show various tourist destinations that can be visited while in a

tourist village (Fig. 10). After selecting a tourist destination, users are navigated to the location details page to view the complete information related to the selected location (Fig. 11). Furthermore, users can also find out more about the locations freely with the 360° camera feature (Fig. 12, Fig 13).

Figure 8. First Design About Page,

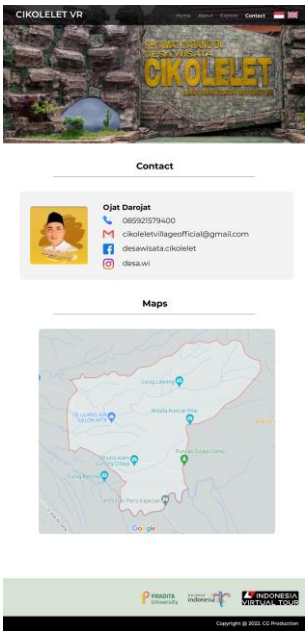


Figure 9. First Design Contact Us Page

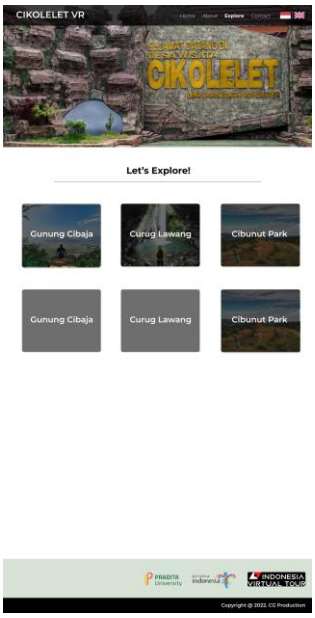


Figure 10. First Design Explore Page,

Figure 11. First Design Location Details Page

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Figure 12. First Design of the 360° Feature Page (1),

Figure 13. First Design of the 360° Feature Page (2)

3.2. UI/UX Evaluation Results

According to several respondents who have seen the first website prototype, the overall UI/UX of the website already has a decent appearance and provides a good experience, in line with user expectations. The designed UI/UX can convey the purpose of creating the website, not long-winded, and using concepts that can be understood well so that it is easy to obtain information related to Cikolelet Tourism Village.

However, according to several other respondents, the first UI design of the website still needs to be developed to make it more attractive, and as for the UX of the website needs to be more effectively used for all groups and ages of potential users. Many respondents said that the size, color of elements and chosen typography contained in the first UI are not exciting enough due to the lack of variety in color choices, or the size and distance between elements and typography that were still too small and inconsistent with the overall UI appearance. Furthermore, many respondents also expect the language on the website to be consistent.

As for the impression of the first UX of the website, many respondents still experience difficulties while using the prototype. Users still need time to adjust to the website because the existing features are not directly offered on the main page. According to some respondents at the beginning of using the prototype, they still find difficulties in understanding the function of the website. Some added, the website should add more navigation such as the option to return to the previous page in certain pages, and also add some other features such as shortcuts to contact the tourist village, and the link sharing feature to make it easier for users when they want to share content on the website with other people.

3.3. Results of the Second UI/UX Design

The second design was carried out according to the results of the evaluation from respondents which are obtained descriptively. As results, there are several features added to the prototype in order to produce an interface that suits the user. The website prototype is also designed in such a way to be more interactive to attract more tourists. By means, several processes are also changed according to user evaluations to be more effective and efficient at the time of use.

After the prototype was re-designed, now the second website prototype has a new arrangement in where there are three pages, namely Home, Explore, and About as well as several new features such as navigation to return to the previous page, then the link sharing feature, and several direct shortcuts, one of which is to contact the tourist village. The previous Contact Us page has been removed because it is not very effective. Now users can get the contact information of the tourist village which is shown in the footer of the website.

As an effort to make it easier for users to meet their needs on website applications, the home page to the second UI/UX design offers several options that can maximize the function of the website to make it more useful for users (Fig. 14). There are new features such as Cultural Traditions to explore through the traditional culture of the village, then through the Small Business feature which refers to MSMEs existing in the village, and also other activities that can be found when selecting the Other Activities feature. Furthermore, there is a 360° camera feature, and a news column on the home page. With what is offered on the home page, users will find it easier to use and maximize the features on the website because what the website offers is visible on the main page. A more clearer interface like this allows users to capture the intent of creating a website better than before.

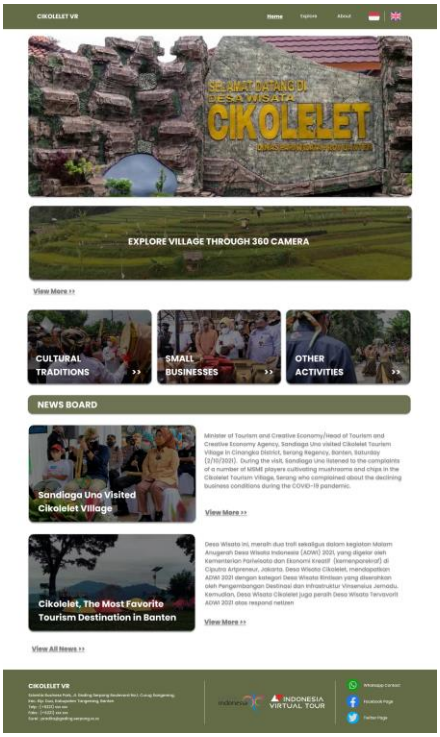

Figure 14. Second Design of Home Page

The Explore Village Through 360° Camera feature will take users to the Explore website page where users can see several choices of destinations to be seen virtually (Fig. 15). The other features such as Cultural Traditions, Small Businesses, Other Activities, and News Boards will also lead users to the Explore page which gives users many choices according to their category.

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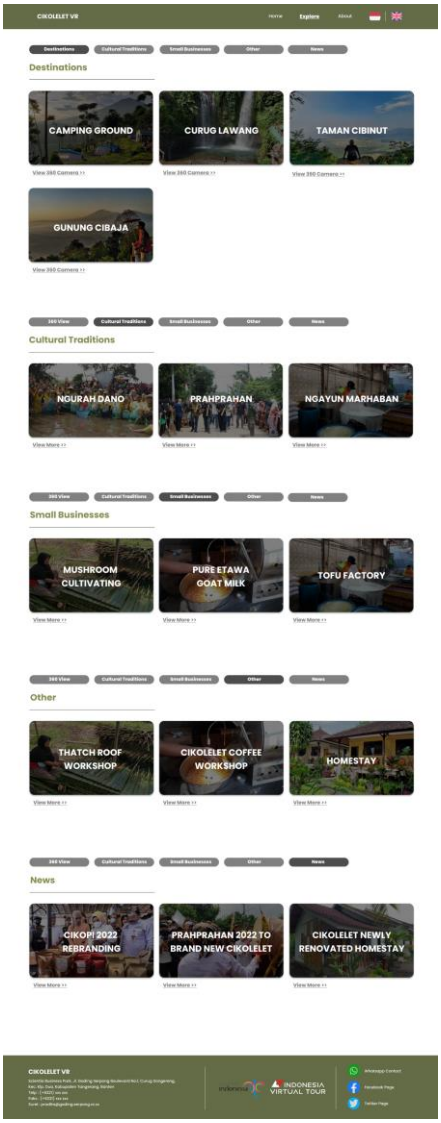

Figure 15. Second Design of Explore Page

Every content that is opened through this Explore page has a similar appearance and features such as the link sharing feature, and view other news or other articles feature (Fig. 16). There is a slight difference in the Destination content page which has additional features (Fig. 17), thus allowing users to be directly directed to the destination route via Google Maps, and to see various tourist village destinations virtually with the 360° camera feature (Fig. 18, Fig. 19).

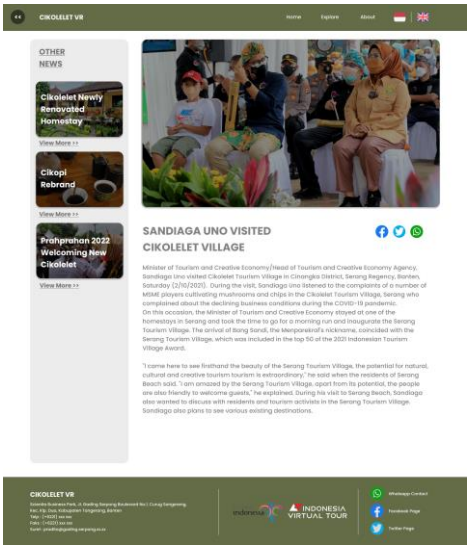

Figure 16. Second Design od News Content Page,

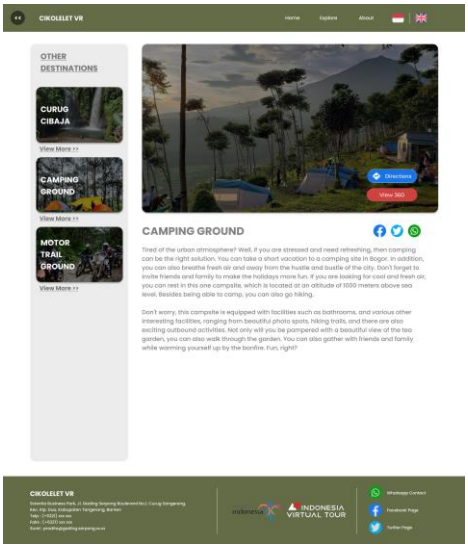

Figure 17. Second Design of the Location Details

Figure 18. Second Design of the 360° Feature Page (1),

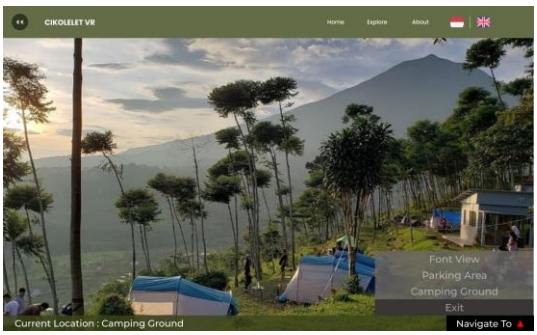

Figure 19. Second Design of the 360° Feature Page (2)

The About page on the second design shows a series of basic tourist village information including the Cikolelet Tourism Village zoning map (Fig. 20). This page also adds features so that users can immediately see the route to the destination instantly. The Contact Us page that was seen in the previous UI/UX design was removed because it was not very effective. For this reason, the contact, address, and social media of the tourist village are allocated to the website footer which is located at the bottom of each page.

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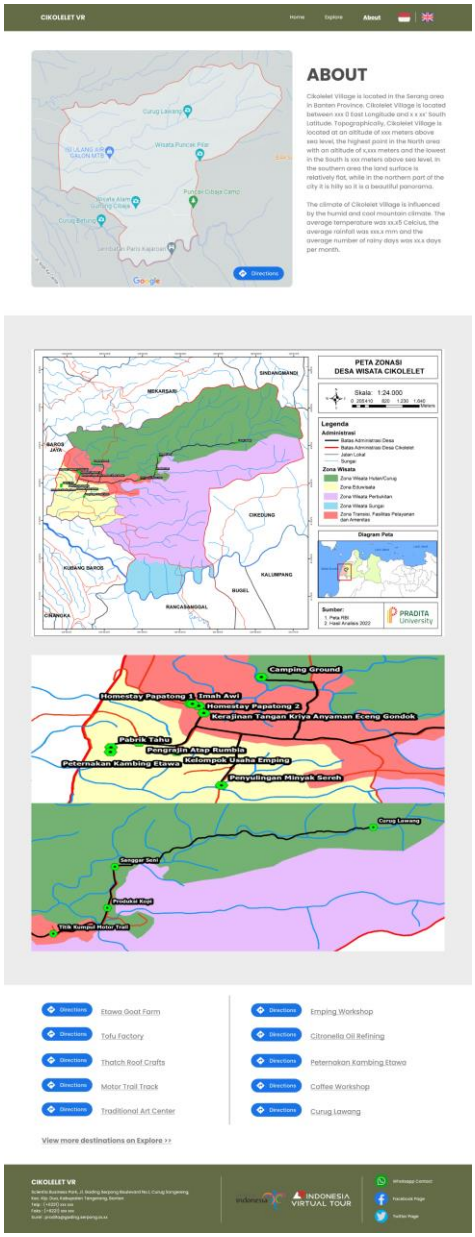

Figure 20. Second Design of About Page

3.5. UEQ Comparison Results

In this study, a comparison was made between the results of the first, and the second UI/UX designs. The comparison was carried out using Data Set 1 with the blue-coloured bar which was obtained from the UEQ result of the first UI/UX website design, and Data Set 2 with the red-coloured bar which was obtained from the UEQ result of the second UI/UX design (Fig. 21). From the results comparison of the two data sets, the second UI/UX design produces better values than the previous design. This shows that the second design which has gone through UCD process is the most compatible to use.

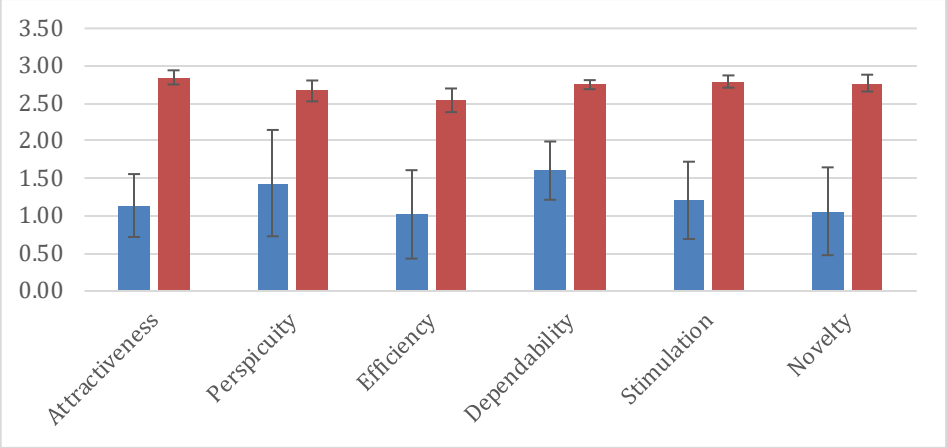

Figure 21. Comparison Result of the First and Second UI/X

Furthermore, to ensure that the second UI/UX design is more compatible than the first one, the UEQ results of the two data sets which are represented by the graphic lines are compared with the UEQ benchmark that has been set. Firstly, Data Set 1 is compared with the UEQ benchmark (Fig. 22), and then the UEQ Data Set 2 is compared with the UEQ benchmark (Fig. 23).

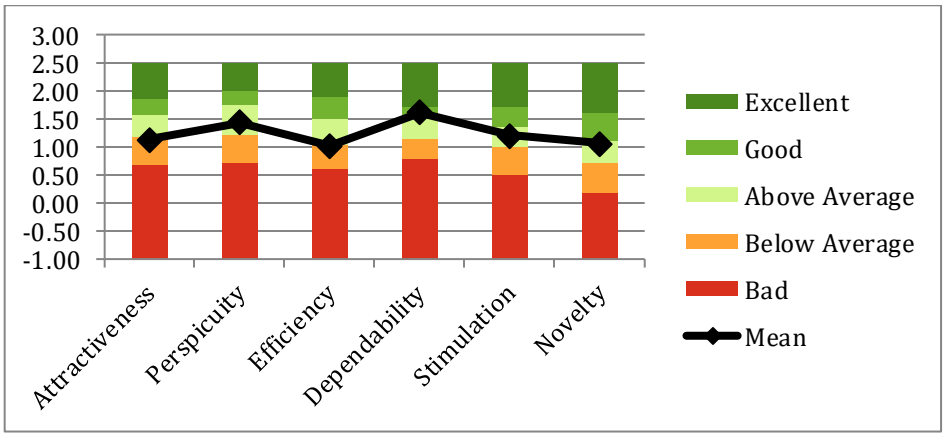

Figure 22. Comparison Result of the First UI/X and UEQ Benchmark

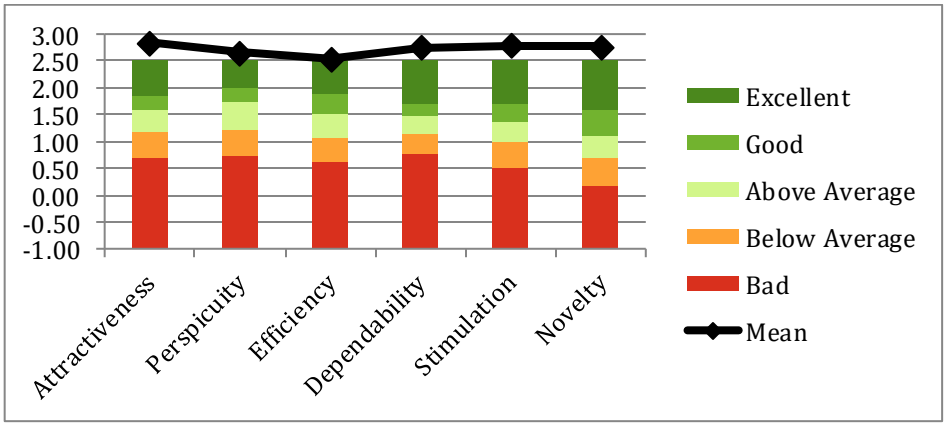

Figure 22. Comparison Result of the Second UI/X and UEQ Benchmark

The three graphics shows how the second design has much greater value than the first design, indicated by the UEQ benchmark. The graphics show that Data Set 2 or the result of the second design with score 2,85 on attractiveness, 2,67 on perspicuity, 2,54 on efficiency, 2,75 on dependability, 2,79 on stimulation, and 2,77 on novelty (Figure 21) is superior to Data Set 1 with score 1,14 on attractiveness, 1,44 on perspicuity, 1,02 on efficiency, 1,60 dependability, 1,21 on stimulation, and 1,06 on novelty (Figure 22).

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4. CONCLUSION

This study shows an alternative UI/UX designing process which produces more effective output through UCD and UEQ methods. Collecting descriptive questionnaire to carry out better design material and comparing UEQ proved to draw significant improvement within designs. To meet the expected UI/UX, users have the important role in this process as they contribute in evaluating the UI/UX design. Any dissatisfactions that came in from users became the good benchmarks and triggers to improve design. Analyzing problems, potential, needs, and UEQ values from users' feedback on the design will provide so much clearer, and determined design material which later supports the designing process. Implementing this method brought efficiency to the design process as it spares much time on design iterations to reach the expected design. By this process of designing, the final result of the UI/UX design has meet the expected design which scores above the average UEQ score. That way, it can be said that UI/UX design using the UCD method by distributing descriptive questionnaire and UEQ is effective to be applied in UI/UX design future activities.

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