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USER INTERFACE DISPLAY DESIGN TO ASSIST FOOD WASTE MANAGEMENT USING THE USER CENTERED DESIGN METHOD

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Abstract

The designed user interface is mobile-based which aims to help manage food waste, especially for Bandung area students. The user interface display contains education about food waste, food waste banks and food donations. It is hoped that the user interface display created can help in managing food waste. Food waste in Indonesia is very concerning, for example in the city of Bandung there are 772.69 M3/day, which is 44.51% of the total of various types of food waste in 2021. Therefore a solution is needed that can help manage food waste. By utilizing technology, we can provide education about waste using a smartphone. Then a user interface display design is made using the user centered design method. The user centered design method is needed because it has an interface design process that focuses on usability goals. This method begins with collecting user information through questionnaires, then analyzing user information and obtaining user needs, then creating user flows, wireframes, mockups, and prototypes. After that, a usability test is carried out using the system usability scale method to see whether the user interface display that is made can meet user needs. The result of the system usability scale score is 87,5 and is in the excellent category, indicating that the user interface is good.

Keywords: *food waste, user centered design, user interface, system usability scale.*

1. INTRODUCTION

Food waste is leftover food that is still suitable for re-consumption but is simply thrown away [1]. Food waste is leftover food such as wilted vegetables, rotten fruit, and expired food that has not been eaten at all and has not even been opened from the package [2]. In 2011 the Food and Agriculture Organization's (FAO) comprehensive overview of food waste disappeared, which is generated on a global level. There are around 1.3 billion tons of food fit to eat wasted each year. At the European Union level in 2012, there were around 88 million tons of food that was fit and not fit to eat waste [3].

According to a study by The Economist Intelligence Index (EIU) in the "Food Sustainability Index" report, Indonesia is the second largest producer of food waste after Saudi Arabia. From data from the National Waste Management System (SIPSN) of the Ministry of Environment and Forestry, in 2017 - 2018 there was the largest composition of food waste in Indonesia at 93% [1]. In 2020, an emergency signal regarding food waste entered Indonesia [4]. There are 759 million people who are hungry, for in Indonesia food waste produces 13 million tons per year, which should be able to be given to save the stomachs of 27 million low-income people in Indonesia [2].

Data from the Housing and Settlements Service for 2021, there is an area that produces the highest amount of waste produced in the West Java region occupied by the City of Bandung, with the amount of waste reaching 1,529 tons per day [5].

The distribution of the types of waste generated in the city of Bandung in 2021. Based on data from PD. Cleanliness of the City of Bandung, 2021. Leftover food and leaves are the largest type of waste obtained from other types of waste. Types of food waste and leaves are in first place with 772.69 M3/day and 44.51% [6]. Community behavior is also often the driving force for the emergence of food scraps every day, which will impact the emergence of food waste if this behavior is not balanced with behavior to manage food waste properly [2].

The IPCC says that food waste that is not recycled and landfilled in landfills and is not treated, will be a source of methane which can cause global warming which is 21 times greater than C02 [1]. Food waste has quite a dangerous impact on the earth. One of the impacts of food waste is the occurrence of landslides due to the explosion of methane gas at the Leuwi Gajah TPA which is produced from organic waste such as food scraps or leaves [7]. Here are two step-by-step strategies to be implemented for future changes: 1) Providing self-education, with education can change behavior and the results can change for the better. Examples of behavior change such as making plans to eat, buying what is needed, recycling whatever is left, storing food that is not consumed, then starting to cook for yourself, and taking food

according to portions. 2) Take a role in reducing food waste, by starting from yourself, then inviting others with a passion to share [2].

Thus, efforts to reduce food waste that have been mentioned above can be developed or carried out innovations through and technological developments. Taking advantage of technology in managing food waste can be done by conducting education through smartphones [8]. Because now almost everyone uses it, smartphones are used for learning that can be done by someone who is shared through content or messages. Therefore, to help reduce and manage food waste, a user interface design was created using the user-centered design (UCD) method. The UCD method is needed because it has an interface design process that focuses on usability goals, user characteristics, environment, and flows in a design. The user interface display contains education about food waste, food waste banks, and food donations. It is hoped that the user interface display created can help in managing food waste [9].

In relevant research while Khasanah et. al (2019) write. This community partnership program is carried out to assist partners in marketing the production of liquid fertilizer from processed dried leaves. Before building a website-based fertilizer sales e-commerce application, the most important thing is to first design the user interface of the application to be produced. For this reason, the results of this program are in the form of a user interface design based on an e-commerce website using the user-centered design method. The stages that have been carried out from the user-centered design method consist of planning human-centered processes, determining the context of use, determining user and organizational needs, and producing design solutions. The interface design was created using the Balsamiq Mockups 3 application. By using the user-centered design method, a user interface design was produced which focused on user needs. The results of the user interface design that has been made include the main page, profile page, contact page, product page, and gallery page. However, the existence of this partnership program can contribute to partners in the form of a website-based e-commerce application interface design that can be used by partners in marketing production results online from the condition of previous partners who do not have online media used to market production results [10].

Another related article wrote by Syukron et. al (2023). Based on the analysis of the design thinking carried out, it can be concluded that in accordance with Pergub regulation No. 97 of 2018 concerning restrictions on the generation of single-use plastic waste and Pergub No. 47 of 2019 regarding source-based waste management, traditional villages have the authority to direct their communities to sort waste, directly, they can use organic waste themselves and inorganic which will be taken to the TPS3R waste bank. For urban areas, it is not yet possible to see the realization of resource-based waste management due to private self-management and TPS which have always been temporary shelters. The prototype being developed at this time aims to solve a problem that exists in Bali related to waste management. This prototype is also an educational tool so that every community can carry out 3R independently which aims to reduce waste in TPS3R. Bapeling is an Innovation for Digitizing Garbage Transportation to TPS3R with appropriate features regarding 1) Garbage transportation routes and schedules, 2) Garbage banks that can be monitored mobile via the website of each resident, 3) TPS 3R Marketplace from the products they have, and 4) Education about TPS 3R. The target users of the application are the Community and TPS3R Waste Bank Managers and the types of waste sources that are the main points are Household Waste and Household-like Waste with the target location being residential areas. Through the trial process, input was received in improving the application because this website is easy to operate and use to help the community in waste management [11].

From the relevant research that the authors describe, the authors finally find scientific unrest in this study. Where the waste in Indonesia from the people themselves is now increasingly piling up and making the environment inconsistent as an ecosystem and making the environment so polluted. So this study has the finding that the creation of an application for waste management which the authors explain next will provide a solution to this research gap. Because this is also a novelty of research where previous research did not use the object under study which is the same as the following research. Apart from that, the novelty of this research is found in the innovation that the author has created, which is a new thing where this application is specifically aimed at food waste and not for plastic waste. Meanwhile, the waste in previous studies was indeed food waste, but the research scope and limitations were also different. As for this study, the design used is a user interface display, not a mockup or prototype, which is a means of education about food waste.

2. METHOD

The design of the user interface display uses the user centered design method. The user centered design method is needed because it has an interface design process that focuses on usability goals. This method begins with collecting user information through questionnaires, then analyzing user information and obtaining user needs, then creating user flows, wireframes, mockups, and prototypes. After that, a usability test is carried out using the system usability scale method to see whether the user interface display that is made can meet user needs.

The state of the art in this study is experimentation on a design in the form of a user interface display. The research was conducted by

means of observation and questionnaires to the people of Bandung. This research was conducted using data on food waste in the city in 2021. This data is known from the Leuwi Gajah TPA. The problem of this research is due to the accumulation of food waste which reaches 772.69 M3/day per day. therefore the design of the user interface display was made in order to provide an alternative solution to this case.

To design a user interface that helps manage food waste, the user centered design method will be used. The first is the stage of the UCD method, namely specifying the context of use, determining the user and obtaining user information, the second is specifying user and organizational requirements, analyzing information from users, then making solutions to these problems, then creating user flows and wireframes, the third is producing design solutions, designing user appearances interface in the form of a mockup and making a prototype, finally evaluate design against user require to perform usability tests using the usability scale system and analyze the results of the tests carried out [12]. The following in Figure 3 is the stages of the research flow process.

The user-centered design method will be used to design a user interface that helps manage food waste. The first is the stage of the UCD method, namely specifying the context of use, determining the user, and obtaining user information. The second specifies the user and organizational requirements, analyzes user information, and then solves this problem to create user flow and wireframes. The third is to produce design solutions, to design a user interface in the form of a mockup and create a prototype, and finally, to evaluate design against user requirements, to carry out usability tests using the usability scale system, and to analyze the results of the tests carried out. The following in Figure 3 are the stages of the research flow process.The user persona created is a representative of Bandung area student respondents who are made into one persona. The user persona created describes a student who is 21 years old and lives in the Bandung area, in the user persona providing information in the form of a biography, goals, needs, motivations, and frustrations experienced. The following in the image is the result of the user persona that has been created.

Then in the second stage identification of user needs will be carried out after conducting a questionnaire and obtaining information in the first stage. After knowing what the user's needs are, it will continue to create user flows, in the form of user stages in using the user interface display from the home page until the user can choose four available features starting from education about food waste, information on places to donate food, making food donations, information on the nearest food waste bank, and dispose of food waste . After the user flow is created, the next step is to create a wireframe according to the stages in the user flow.

A user interface will be designed to help manage food waste, based on user needs in the created user persona. To make the user interface look made mobile-based according to the limitations

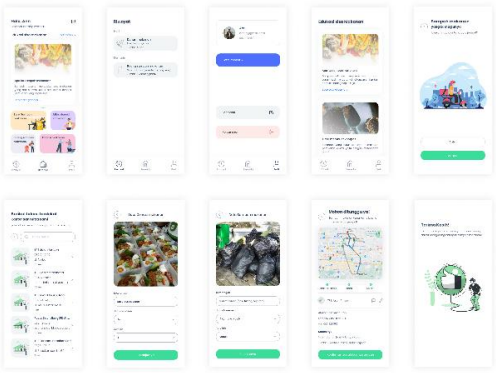
Then start the process of designing the user interface according to the user persona as a guide. Then the results of the user interface display design are made into a mockup. after that a prototype was made so that it could resemble the actual user interface display [13].

The last stage in the user centered design method is to evaluate the appearance of the user interface that has been made, whether it is in accordance with user needs or not, namely by conducting usability tests and using the system usability scale (SUS) method. The SUS method has several characteristics, which consist of 10 questions so that it makes it easier for respondents to answer them. With this the SUS method is the most widely used method for testing because it is easy to use and the results can be used for consideration [14]. The following in table 1 is a usability testing scenario that will be tested on users.

Table 1. Question of SUS

No	SUS Questions
R1	I easily use this app
R2	I think this app is complicated to understand
R3	I will use this app a lot
R4	It took me a long time to understand the features in this application
R5	In my opinion, the features provided are well prepared
R6	I think ordinary people find it difficult to understand using this application
R7	In my opinion, the features in this application can help manage food waste
R8	I have to learn before using this app
R9	I became aware of information while reading in this application
R10	I think it is necessary to need help to use this application

The following is how to calculate the SUS score, each odd item (R1, R3, R4, R7, R9) minus the respondent's answer scale, for even items (R2, R4, R6, R8, R10), five minus the respondent's answer, then multiply by 2 .5 to produce an overall SUS score, the SUS score has a range of 0 – 100 [15].

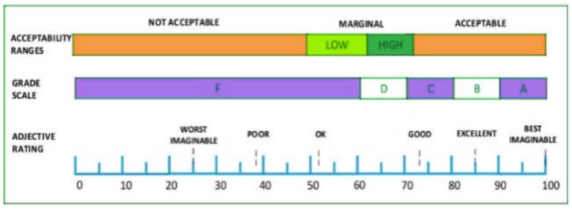


Picture 1. Containing Pages Homepage

The user interface display results to help manage food waste using the user centered design

method. The mockup is designed according to the user's needs in the user persona. On the contains mockup home page, education about food waste, information on places to donate food, make food donations, information on the nearest food waste bank, and dispose of food waste. Below is a mockup that has been made.

In the image above it is a mockup containing pages homepage, education about food waste, information on places to donate food, do food donations, information on the nearest food waste bank, and taking out the trash food. Below is a mockup that has been made. Then the results of the stages of the UCD method and usability testing using the SUS method, and the results of the SUS score are as follows:



Picture 2. Skor SUS

After carrying out several stages of the user centered design method, the last step is to evaluate the design against user requirements. At this stage the usability test is carried out using the system usability scale method. The tests were carried out using the previously mentioned test scenarios and provide questions from the SUS method. Usability testing involves five respondents for test scenarios, which aims to get effective and valid results [16].

Table 2. Result SUS Value

Responden	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	Rata - rata
1	5	1	5	1	5	1	5	1	5	1	100
2	5	1	4	1	5	2	4	3	5	3	82,5
3	5	3	5	2	5	3	5	1	5	3	82,5
4	5	2	4	1	5	2	5	2	4	3	82,5
5	5	1	4	2	5	1	4	2	5	1	90
Nilai Sus											87,5

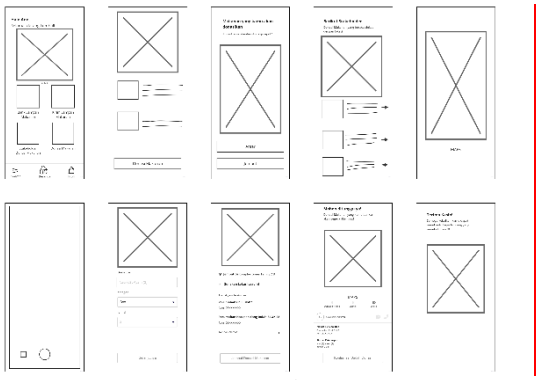
Interpret the SUS results, as follows: 1) Grade scales, the resulting SUS score is divided into five grades, namely A (90 - 100), B (80 - 90), C (70 - 80), D (60 - 70), and F (score < 60). 2) Adjective ratings, interpret the SUS score which was originally a numeric, to be an adjective. Adjective rating scale: Worst Imaginable, Awful, Poor, OK, Good, Excellence, and Best Imaginable [17].

After the usability testing stage gets a score of 82 (Figure 14) in the maze application and gets the results from calculating the SUS score and implementing the formula according to the method in (Formula 1), then the user interface display design to help food waste management gets results based on (Figure 13) for the acceptability ranges category, acceptable results were obtained , then for the grade scale category with a B result, while for the adjective rating category, an excellent result was obtained with a value of 87.5. Therefore the design of the user interface display to help manage food waste gets good usability results [18].

3. RESULTS AND DISCUSSION

Food waste is leftover food that is still suitable for re-consumption, but is simply thrown away [19]. Food waste is leftover food such as wilted vegetables, rotten fruit, and expired food that has not been eaten at all and has not even been opened from the package [2]. In 2011 the Food and Agriculture Organization (FAO) comprehensive overview of food waste has disappeared, which is generated on a global level. There are around 1.3 billion tons of food fit to eat wasted each year. At the European Union level in 2012, there were around 88 million tons of food that was fit and not fit to eat wasted [3].

The user interface is a creative process, to create attractive visuals and relies on a global design decision such as navigation, a visual feedback, color, design layout, and typography, as well as local design decisions such as a visual metaphor for a widget display, text for an icon, and a window for information. The User Interface describes several concepts, guidelines, then flows that can think critically of a design that is useful for interactive products [20].



Picture 3. Wireframe

In the picture is a wireframe as a reference in making a user interface display design, the wireframe illustrates a series of designs that will be made such as the home page, food donation page, food waste disposal page, food waste bank information page and information on the nearest food donation partner. User Experience is how the user feels the interaction that is being faced when using it. To create a good

user experience , there must be a match between product features and the desired user needs [21]. An easy-to-understand user interface will get a good user experience for users [22]. Conversely, if the user interface is bad and not easy to understand, you will get a bad user experience. To take measurements, you can use one of the elements in order to get the expected results. The user experience is divided into four elements, namely: 1) usabitily, it's easy for users to make the desired orders for products, such as when a user wants to make a call, simply pressing the Call button on a smartphone. 2) valuable, features in the product according to user needs. If a product is easy to use but does not meet user needs, then a product is not of value. 3) ease of access (adoptability), users can feel a pleasant experience when using a product. If the product fulfills the four elements mentioned above, it can be concluded that the product has a good user experience. 4) desirability, users can feel a pleasant experience when using a product. If the product fulfills the four elements mentioned above, it can be concluded that the product has a good user experience [23].

User Centered Design is an interface design process that focuses on usability goals, user characteristics, environment, tasks, and flows in a design [24]. User centered design is useful for evaluating usability. There are several process stages in the user centered design method, as follows: 1) specify the context of use, analyze the characteristics of product or system users who will explore what user conditions are like. 2) Specify the user and organizational requirements, analyze the needs of the organization and users. 3) Produce design solutions, create a design as a potential solution using user experience and knowledge. 4) Evaluate design against user requirements. Evaluate the design that has been made whether it is in accordance with the needs of users and organizations [25].

Usability is where a product can be used to achieve goals effectively, efficiently and to satisfaction by users [26]. Usability also means something that is easy to use properly, users can measure the quality of a product easily or not in learning to use a product. One method for measuring usability is the System Usability Scale (SUS), which is a method that is often used and is quite reliable, also users can easily carry out tests with the questions given [17].

The web plays an critical part in life, the web proceeds to involvement exceptionally critical advancements each time. Based on information from We Are Social and Hootsuite, it is known that web clients within the world have come to 4 billion from the previous 3.8 billion. Within the mid-1990s, the term UX was presented by Donald Norman. UX can be depicted as essentially as we select a put to eat. The reason we select that put, the primary impression when we to begin with enter, the gathering we get from the server, the menu is orchestrated, the time of serving the nourishment, the taste of the nourishment, the client benefit, are we comfortable, will we come back to that put, is the scope of the client encounter from the eating range. Straight to the point Guo tries to disentangle the UX concept. In his introduction, UX is partitioned into four crucial components. The four components are: esteem, convenience, allure, & adoptability. The UX of a stage is able to oblige the interface of all partners, specifically making websites simpler to utilize, valuable and viable for guests. The center is on fun and esteem instead of execution. The UX concept, in its development, was also adopted by social media. Social media platforms consist of mobile and desktop applications. This brought about a major change in social media design. In 1978, when it was still a bulletin board system, the design of social media was only to accommodate features for communicating using electronic mail. Social media then transformed not only to share news but also to become a business promotion tool. This is because anyone can easily access social media.

UX could be a person's discernment and reaction coming about from the utilize and or expectation of employing a product, system or benefit. More simply, User Encounter is how you are feeling about each interaction you're having with what is before you after you utilize it. To induce a great Client Involvement, a item must have compatibility between product highlights and client needs. This is often what at that point decides the item is important or valuable. Next, in the event that the item is simple to discover and simple to utilize the primary time, at that point the item can make clients feel great when utilizing it. The final thing, the item must be simple to utilize to urge things done or do what the client needs. As already clarified. In this regard, the research conducted by Fitriana and Yanto (2020) provides interesting findings. Based on the results of the validity test, the variables are valueable, liking/desirability, ease of access/adoptability, and usability variables are declared valid because the conditions are met, namely the value of the total item correlation coefficient (Corrected Item Total Correlation) is more than 0.3. Then based on the results of the reliability test of the five variables, namely, value/value of 0.541, liking/desirability of 0.697, ease of access/adoptability of 0.755, usability of 0.822, and variable user experience/UX of 0.784. Thus all variables have a Cronbach's alpha value that is more than the limit of the correlation coefficient value used by the researcher, which is equal to 0.400 so that the questionnaire is declared reliable.

The results of the analysis of the respondents' answers regarding the four variables used are: 1) Valued variables, the Facebook marketplace feature has menus that function well and meet user desires, and all of them are well integrated. In addition, the Facebook marketplace feature has fulfilled most of the user's needs in promoting and purchasing a product promoted through this feature. 2)

Desirability, the content and appearance of the Facebook marketplace feature are presented clearly, fit and comfortable to look at, making users feel comfortable using this feature.

Apart from that, with positive responses from respondents, which reached 77 people out of 100 respondents, users were happy with the content presentation and appearance of the Facebook marketplace feature. 3) The variable of ease of access (adoptability), the ease of using and finding the Facebook marketplace dominates the value of the positive response from respondents. In addition, the speed of connecting between sellers and buyers is also important. 4) The usability variable, which dominates the most positive answers from respondents, namely statement number 1 (I learned to use the Facebook marketplace feature quickly) because the use of the Facebook marketplace is relatively easy to use and easy to find information related to content, makes users feel the function and use of this feature. Overall the most dominant user experience variable that gets a positive response from respondents is the usability and desirability variables, this is because all statements contained in these two variables obtain positive scores above 50% with an average of 60 respondents choosing agree and strongly agree answers. And based on the highest score from the positive response of the respondents, it can be concluded that the main reason for users to use the Facebook marketplace feature is because the functions of the Facebook marketplace features are well integrated and the designs, symbols, icons and labels on the Facebook marketplace are quite relevant [21].

Just as previously explained, technology is currently capable of mastering anything, including in education, which now uses user flow. It is known that the study program website has finally been completed and can be online in 2016. This website contains various information about the DKV Study Program, including history, curriculum, facilities, and so on. For 5 years, there have been no significant website design changes made by the Study Program and Campus. During that time, there has never been an evaluation at the study program or university level regarding the design of this website. The potential of a website as a promotional medium for a study program cannot be underestimated. Such a broad media reach is the advantage of website media compared to other conventional promotional media, such as: newspaper ads, radio ads, and/or billboards; making the website the right alternative choice during a pandemic in the all-digital era. User Interface (UI) is a visual display of a product that bridges between the system and the user (user). A UI can be color, text, buttons, or icons. Some people understand the User Interface as a visual composition or layout in a system. In simple terms, the user interface is how the appearance of a product is seen by users. In general, a UI, can be seen on websites and Android/iOS applications. However, it does not rule out the possibility of being applied to kiosks or ATM displays. The role of a UI design cannot be underestimated, especially in the digital era. Currently mobile applications are always used by users around the world. User flow is the flow that is passed by users, from the first time they use the system (or website) to the last step carried out in the system. User flow is generally displayed in the form of a flow chart to facilitate every process experienced by users when using the system. Same as described earlier. A study that is relevant to this research has been found again in Sutanto's research (2022). In designing the user flow of a website, it should not be done with the assumption that users will only access the website from one starting point (entry point). The discussion above shows that there are 3 different starting points accessed by users of the UK Petra DKV Study Program website. In the future design process, it is necessary to add various possibilities to determine user flow by the design team to accommodate different starting points by users. The search feature that was provided and which was expected to help users search for content, was not used. No data is recorded in the behavior flow that the user visited the search results page. Even so, the search feature is still useful in a larger user experience scheme. With regards to content, educational website users consider information about the curriculum to be important. This is evidenced by the presence of quite a lot of user entry points on the curriculum page and the high average session duration. Also supported by the highest access duration data, making curriculum pages have important value in designing an educational website. Based on this user flow research, educational website content mainly for tertiary institutions can focus on information about the curriculum, special information for prospective students, profile information from study programs, and teaching staff information. These four things are pages that are accessed most often by users. The results of this research are expected to be valuable input for the study program website manager and can be used for future improvements [19].

The advancement of data innovation has developed quickly and influenced nearly all perspectives of life, one of the data media is the web. The web is an data medium that's exceptionally simple to get to through different communication media, computers, portable phones and smartphones. The number of media to get to the web goes hand in hand with the number of web clients. In this way opening up openings for companies to create administrations, commerce, connections and as a implies to present the company to the common open or clients through web media. The figure of competition in coming to clients, particularly in transportation service provider companies, is additionally getting harder, a few transportation benefit supplier companies have utilized the web as a

medium to present and make strides administrations to clients. Open transportation is right now beginning to involvement exceptionally fast improvement. Innovation like this is in the form of a prototype. This prototype is useful if it is applied to one of Indonesia's big problems in the natural context, namely waste. However, this research is also one of the backbones for the research that the author is currently writing. This research was written by Putri et al (2020). Based on the research that has been done, it can be concluded that the system created can make it easier for users (prospective ticket buyers) to order tickets, besides that this application can also help prospective buyers in searching for schedule information departure and also find out ticket prices directly without having to come to the bus agent first. In the future, this software can be redeveloped for other operating systems such as iOS or Windows Mobile [12].

On the off chance that so, there's a require for community instruction around squander, particularly nourishment squander. Nourishment squander is nourishment that can be devoured by humans but isn't expended and arranged of for certain reasons. Nourishment squander as nourishment that's consumable and for people but is disposed of, misplaced, harmed or expended by creatures and incorporates parts that are not eaten. Nourishment squander is beginning to ended up an issue in different nations since of the different impacts it causes. Nourishment squander has an affect on nourishment security, the environment and the economy. As much as 1.3 billion tons of nourishment fit for utilization (a third of world nourishment generation) is squandered along the nourishment supply chain from generation to utilization. The sum of nourishment squandered can meet the nourishment needs of one-eighth of the worldwide populace who involvement nourishment and sustenance insufficiencies. In expansion, this sum can also reduce the challenge of assembly worldwide nourishment needs which is able increment by 50% to 70% in 2050. Nourishment squander that's basically tossed into landfills or TPA, without appropriate treatment can gotten to be a source of methane which causes worldwide warming. worldwide. Nourishment squander that's heaped up in landfills will be changed over to methane which is a nursery gas and features a potential for worldwide warming 21 times more prominent than CO2. Food squander tends to corrupt more rapidly and the methane it produces is higher than other natural materials that are dumped in landfills. Tossing absent nourishment squander is the same as squandering assets. Financially, nourishment squander causes financial misfortunes that are utilized to create nourishment, such as the acquirement of nourishment crude materials, water, vitality and so on. The comes about of a ponder conducted by The Financial analyst Shrewdly Unit (EIU) in its report "Nourishment Supportability List" in 2017 expressed that Indonesia is the moment biggest maker of nourishment squander after Saudi Arabia. These comes about are upheld by information from the Service of Environment and Forestry's National Squander Administration Data Framework (SIPSN), the biggest composition of squander in Indonesia in 2017-2018 was nourishment squander, which reached 93%. In more detail, SIPSN added that within the 2017-2018 period, the composition of squander in Bogor Rule was ruled by nourishment squander, up to 70%. So the research conducted by Wulansari et al (2019) stated that in his research it was surprising. The generation of food waste from food stalls is 29,413 kg/day or 6,383 tons/year. The largest composition of food waste is rice, which is about 70% of the total food waste. Serving rice in a buffet style results in the smallest average amount of leftover rice per day compared to other serving methods. Efforts to reduce food waste leftover by consumers that can be done from the side of food stalls include implementing a buffet serving of rice, conducting campaigns about food waste and applying different portions of rice to food stalls [1].

In terms of problems in Indonesia, besides discussing the solution in the form of technology, waste in Indonesia is quite ironic. The capacity to handle waste by the community and local government is currently not optimal. Garbage in Bali in particular cannot be managed properly. Garbage is one of the complex problems faced by society. In Indonesia, there is Law of the Republic of Indonesia Number 18 of 2008 and Presidential Regulation Number 81 of 2012 which states that waste is the residue of human daily activities and/or solid natural processes. The waste problem is no longer just a matter of cleanliness and the environment, but has become a cultural problem that has the potential to cause conflict and loss. Garbage is still a special concern for the Provincial Government of Bali to create a safe and clean Bali. Apart from that, the problem discussed was Bandung, but in the ins and outs of an island like Bali, similar data was also found. Especially on the island of Bali, the latest exploration data results from the latest research that Bali produces 4,281 tons of waste per day or 1,562,565 tons of waste generation per year. The main waste composition is organic waste, reaching 60 percent. Apart from that, according to the lack of a garbage transport fleet, the process of transporting garbage is hampered, which also results in a lot of garbage piling up due to delays in the process of transporting garbage. This information shows that there are still many people who do not pay attention to the importance of waste management. People actually believe that as long as the garbage in front of the house is still in the hands of the cleaners, it won't be a problem. In the research written by Syukron et al (2023), a design like this research has been shown to overcome waste problems in Bali. This research has previously been written by

the author in the introduction, but there are things in this research that also need to be considered again. Digital recording in this study shows a significant positive for doing site design [11].

Garbage is residual material that is wasted or disposed of from human activities and natural processes that do not yet have economic value. Based on its nature, waste is divided into two types, namely organic waste and inorganic waste. Organic waste is a type of waste that decomposes easily, such as food scraps, dry leaves, vegetable scraps and others. When organic waste is processed, it can later be used as compost and can later have a sale value. Inorganic waste is a type of waste that does not decompose easily, such as plastic, glass, wood and so on. Inorganic waste when processed can later be turned into other products that have a sale value. One of the waste generators is in residential areas. Seventy-five percent of the types of waste found around residential areas are organic waste from food scraps and dry leaves, while the rest is inorganic waste. Garbage that has piled up around residents' settlements is currently only being thrown away and allowed to pile up just like that. Whereas for this type of organic waste if it can be processed properly it can provide a selling point, one of which is if the type of organic waste that has accumulated around residential areas can be processed which can later become compost so that it can provide a selling value. Fertilizers are materials that are added to the soil which can later affect plant growth derived from the essential elements produced by fertilizers. Based on the form of organic fertilizer is divided into two, namely liquid fertilizer and solid fertilizer. Currently the role of information technology is influential in the world economy, especially in terms of marketing. The buying and selling process that is carried out via the internet is known as e-commerce or electronic commerce. E-commerce is usually website-based which provides get and deliver services. The benefits of e-commerce can be felt both from the side of the seller and the buyer. The benefits felt from the seller's side include cheaper operational costs and the shops they own are better known by the wider community because the goods sold can be accessed by anyone via the internet. While the perceived benefits from the consumer side are buyers can view product information, place an order and process payment transactions by utilizing the internet which can be done anywhere and anytime. The failure of a software product when used is one of the reasons the user cannot interact with the interface display of the software. Based on these problems, it is necessary to take an approach to the user in designing the interface of a software product. The user centered design method is an approach for user interface development and system development. In line with the research of Khasanah et al (2019), this community partnership program is carried out to assist partners in marketing the production of liquid fertilizer from processed dry leaves. Some time recently building a website-based fertilizer deals e-commerce application, the foremost vital thing is to to begin with plan the client interface of the application to be delivered. For this reason, the comes about of this program are within the frame of a website-based e-commerce client interface plan utilizing the client centered plan strategy. The steps that have been carried out from the client centered plan strategy comprise of arranging the human centered handle, indicating the setting of utilize, indicating client and organizational prerequisites and creating plan arrangements. The interface plan was made utilizing the balsamiq mockups 3 application. By utilizing the client centered plan strategy, the coming about client interface plan comes about center on client needs. The comes about of the user interface plan that has been made incorporate the most page, profile page, contact page, item page and exhibition page. Thus the existence of this partnership program can contribute to partners in the form of a website-based e-commerce application interface design that can be used by partners in marketing production results online from the condition of previous partners who do not have online media used to market production results [10].

The increasing number of films circulating in the market, of course, will make it difficult for potential viewers to decide which film to watch. To solve this problem, there are several ways you can do it, for example searching on film service provider websites, reading film descriptions, or asking friends, and so on. To get comfort in accessing fast and updated information is one of the demands of an enterprise application that relies on delivering information to customers and the public at this time. Android applications have now developed very quickly to become one of the reliable alternative information media in conveying information. Besides that, the Android application media also allows its users to get updated information data, so that information can be accessed quickly anytime and anywhere. But in android applications there are still problems in the user interface design needed by android application users. Interface or interface serves to bridge the user with the application. Because one application with another application has a different interface design, it must be readjusted to the functions and needs of the application itself. In this film synopsis application requires an interface design that can meet the information needs of users in specifications. In an effort to provide a good initial appearance to users of the film synopsis application, a user-friendly User Interface (UI) and User Experience (UX) design is required. At an individual level, user interface design can change the lives of many people, so it is important that the design meets the needs of the user. From this explanation, user interface design has an important role in the effectiveness of an Android application. User Interface (UI) is when the system and users can

interact with each other through commands such as using content and entering data. While User Experience (UX) is mentioned as user experience related to reactions, perceptions, behavior, emotions and thoughts of users when using the system. There are several choices of approaches in designing UI/UX, but the ones that are well known are only Human Centered Design (HCD) and User Centered Design (UCD). HCD is an approach that focuses on all users, whether potential or not, will be the object of testing in the data collection process and the evaluation process of the design being designed. Meanwhile, the UCD approach focuses on specific potential users, for example, gender and age range. The design process of both the HCD and UCD approaches is carried out by interviewing and designing the user design process. Wireframe is the initial framework before a website page or an application interface is designed. Wireframe is an important stage in a product design that must be well understood. Wireframe is an important stage before stakeholders agree on the layout of the information for the application before the user interface design is made. Therefore, we also support this research regarding technology that distributes information related to waste, which can be seen in Hartawan's research (2022). The results of the UI/UX wireframe design concluded that the use of the UCD method in making this wireframe design is able to provide a good layout from the location of the navigation to the film synopsis android application, in addition to the neatly arranged layout, there is also design information for user needs when looking for information during the initial design process simulation of the latest version of the UI/UX design can also be done well [9].

Waste management for the government cannot be separated from the principles contained in article 2 of Law no. 32 of 2009 concerning the Protection and Management of the Environment (PPLH) which regulates the principles of state responsibility, participative principles, good governance principles, and regional autonomy principles. Law No. 18 of 2008 concerning Waste Management is also enacted which is based on Indonesia's large population with a high growth rate resulting in a large increase in waste volume. Besides that, people's consumption patterns contribute to the emergence of increasingly diverse types of waste. Based on research data from the EIU (Economist Intelligence Unit), that the number of food waste phenomena from year to year tends to increase. Indonesia is ranked as the second largest producer of food waste in the world after Saudi Arabia, with an estimated 300 kg of food waste per capita every year (RI Ministry of Agriculture, 2019). This food waste phenomenon is exacerbated by the condition of Indonesia's population who suffer from hunger by 13.5% of the total population of 269 million people. So, from the above data it is clear that Indonesia is a developing country with a hunger index that is still at a serious level. However, ironically, the amount of food waste in Indonesia reaches 300 kg of food waste per person every year, thus placing Indonesia in second place in the world in terms of large category of food waste. Hermanu's research (2022), which shows this is happening, provides his findings. This research is limited to the level of policy analysis in the field of waste management, where in material terms the laws and regulations have not yet touched on the behavioral aspect, both from the side of producers who sell food products and from the side of consumers who consume food products, especially household consumers who generate the most waste. food in the household environment. From the empirical facts it was found that a number of regulatory instruments related to waste are more in the nature of regulating aspects of management, control, environmental preservation and recycling, in order to create comfortable, balanced, sustainable and sustainable environmental conditions, but people's behavior in disposing of waste (food) in the consumption stage it has not been touched in a regulatory manner which can build awareness to be wise in consuming food that does not leave food waste [2].

Methods in program improvement are progressively creating beside the times, one of which is broadly utilized, specifically the Human Computer Interaction (HCI) approach. Creating a usable and secure framework within the sense that the framework can work legitimately is the point of HCI whereas moreover setting more accentuation on viewpoints of assessment, plan and usage. In a few past thinks about on HCI, the HCI demonstrate can offer assistance analyze how clients can associated with computers, so that they can describe behavior models from different focuses of see. The computer program advancement prepare could be a stage that's regularly investigated, counting the investigation and needs investigation stages. The reason of these stages is to get particular necessities both useful and non-functional. A few approaches have been carried out by a few past analysts. Necessities investigation is the method of getting clear and exact client prerequisites and imperatives, program necessities will be required through seriously communication to obtain user necessities, in arrange to dispose of equivocalness that frequently happens due to the failure to investigate these needs or moreover since of partners. partners) cannot legitimately express the specified needs. Research by Kusuma et al (2020) provides its findings that the academic system on the InfoKHS website has many potential features to be developed according to user needs. Several new features from the results of research conducted through several stages of needs analysis, users will find it easier to carry out activities to interact with the system. By exploring user needs, there are new scenarios that can be applied to the KHS Info site. The scenario that can be applied is to display a list of classes and supporting

lecturers in each class as well as KRS consultation, that the KRS program design must be approved in advance through consultation with the guardian lecturer before finally entering the KHS Info site repository [26].

The user interface, the user interface that is more than the screen, is a series of graphical displays that the user can understand when using the system, conceptually and physically. The user interface provides (means) of input, which allows the user to control the system and output, which allows the system to inform the user (feedback). An interface is a set of tools or elements used to manipulate digital objects. User Interface is a collection of several graphic elements that are used as a means to interact and control a system. User Experience is the experience created by the product for people who use the product in the real world. User interaction with the system interface display will bring up an assessment based on user experience. User Experience is not a graphic display of an interface display, but the whole process that is passed by the user when interacting with the system. UX design with a user approach will provide comfort and convenience as long as users interact with the system. UX with the first requirement for an exemplary user experience is meeting customer needs precisely, without fuss or fuss. Next comes simplicity and elegance which results in a product that is a joy to own, a pleasure to use. UX will be a link between business goals and goals desired by users. Of course, UX design that involves users will have a high level of success in delivering business goals and user goals. Design Thinking is a human-centered design approach to solving problems and bringing about new innovations. This method has several stages starting from gathering information about the user, based on that information is made about what the user needs, making creative solutions, building representations of the solutions offered, and testing the results of the representations that have been built so as to get feedback. Usability is the level of usefulness of a product that can be used by users to achieve the specified goals effectively, efficiently and provide satisfaction. Usability is related to every human interaction with the system, whether it is easy to use and experience when using it. The 5 ideal usability requirements are: Learnability, Efficiency, Memorability, Errors, and Satisfaction. To determine the level of usability (usability) of a product can be done with usability testing. Parameters are needed to determine the level of usability during testing. There are several parameters to measure usability including: 1) Success Rate, measuring the level of success of users in completing all "tasks" on a website. 2) The Time a Task Requires, measures the time needed by a user to complete a "task" on the website. 3) Error Rate, the level of errors made by users when completing "tasks" on the website. 4) User's Subjective Satisfaction, the level of user satisfaction in completing the entire "task" when interacting on the website. Moodboard is a collection of inspiration in the form of images, visuals and other objects. A moodboard is a collection of images, fonts or other objects that are used as a guide in making designs. Moodboards can be used for designer needs or team needs in creating a design concept. The purpose of preparing a moodboard is to produce key visuals, which then develop into visual elements and visual styles in the design. Moodboard preparation helps in the creative process to determine the main elements in designing designs. A style guideline is a document composed of a number of design rules. Style guidelines contain specific implementation guidelines, visual references, and design principles for creating interfaces or other design results. Making style guidelines aims to maintain the consistency of each element made in the design. The most common style guidelines tend to focus on branding (colors, typography, trademarks, logos, and print media), but style guides also offer guidance on content and visual and interaction design. User flow is a sequence of steps performed by a user when using a product to complete user tasks. User flow is directly related to the user experience when interacting with the product. Users will understand and use the product well if the user flow is well designed. The better at facilitating user flow from start to finish in a given process, the easier the product is to work with and the more likely it is to deliver a great UX. Wireframe is a design framework for a product, its manufacture is carried out at the beginning of product design. At the wireframe stage, a detailed discussion of features, content, interfaces and other important elements is carried out. Wireframes are divided into two types, namely low-fidelity wireframes and high-fidelity wireframes. The two types of wireframes will be used as the basis for making prototype designs. a. Low-fidelity wireframe Wireframe, is the most basic design in the wireframing process. In low-fidelity wireframes there are no colors, text sizes and other elements. The purpose of its manufacture is to determine the structure and layout of each element to be made in the design plan. High-fidelity wireframe is the development of low-fidelity wireframe. The difference lies in the colors and scales that have been included in the design plan. The actual structure and layout of the design can be seen in the high-fidelity wireframe design. In the Big Indonesian Dictionary, prototype or prototype is the original model that becomes an example. Prototype provides an overview to the user regarding the system to be developed. High-fidelity and low-fidelity wireframes are the basis for making prototype designs. Prototypes are made to be tested on users to find out their responses regarding the design concepts created.

4. CONCLUSION

From the problems mentioned in the background, namely about food waste and making

solutions to these problems, with the stages of the user centered design method, a user interface display design can be made to help manage food waste successfully designed . A good user interface is the main thing so that it can be used easily and comfortably, and will also result in good usability . With the UCD method, you can create a user interface display that suits the user's needs. to test usability using the system usability scale method by getting results based on several categories, for the acceptability ranges category with acceptable results, then for the grade scale category with B results while for the adjective rating category getting excellent results with a value of 87.5 indicating that the design of the user interface display created already has a good user interface and meets user needs. Future research can improve the appearance of the user interface based on feedback from users.

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