The Implementation of Eco-Friendly Packaging Design for Cafeteria

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Abstract

An environmentally friendly life is a lifestyle where the things that are done or used do not harm the surrounding environment. Today, you can still find many kinds of garbage and waste that are not environmentally friendly, for example, plastic. The community environment is increasingly experiencing a decline in quality due to a lack of public understanding of education about environmental friendliness. This is the background of the author to find a solution to this problem. This study aims to determine the effect of eco-friendly packaging design on public education and interest in using it. This research design thinking method to describe design process of eco-friendly packaging. The solution offered by the researcher has an output in the form of a packaging design. From the results of the questionnaires that have been distributed, researchers can design according to the preferences of most people within the scope of the research survey. The solution target to be achieved is in the form of environmentally friendly product packaging designs that have an educational element. Elements of education can be in the form of instructions on where users should dispose of their waste, the type of packaging product that is used, and several other educations on environmentally friendly issues.

Keywords
Design Thinking, Eco-friendly Packaging, Food Packaging, Zero Waste

1. Introduction
Do people care about the environment around them? An environment is a place where many components of living things gather. In the process of life, the environment has stability that must be maintained. Recent studies have shown

that the impact of environmental pollution, especially household waste, can affect various aspects, starting from declining water quality which can affect people's health (Hasibuan 2016). Based on data taken from BPS Indonesia, Indonesia produces 66 million tons per year, this is very much and of course detrimental to the environment, and in 2018 it was estimated that 0.26 million-0.59 million tons of plastic flowed into the open ocean (Merdeka.com 2021). Environmentally friendly life can be started from the easiest thing, by using something that can be used over and over again or something that can be recycled. By using environmentally friendly products, we also help maintain the sustainability and health of the environment itself. Keep in mind that in addition to using environmentally friendly products, we still have to dispose of waste according to the type of waste itself to facilitate the process of sorting and recycling (Pitaloka 2021).

In general, the problem is the lack of public understanding of the application of environmentally friendly life. The problem faced today is that there are still many people who do not understand about an environmentally friendly life. Many people think that starting an eco-friendly life is hard to do. Worse yet, many are just following the eco-friendly trend without knowing what the goal is. There are still many people who do not know about the types of waste and still just throw away the garbage without sorting it by type.

A familiar study about public eco-friendly life education with the title "Study of Environmentally Friendly Education and Consumer Characteristics and Their Influence on Environmentally Friendly Attitudes and Behaviours ". This study contains an educational analysis conducted by a group of researchers (Kusumo 2017). What distinguishes this research from previous research is the way to be achieved to educate the public. In this study, education in the community is to be achieved by design. Designing environmentally friendly packaging and trash cans that have a design relationship based on the type of waste, so that they can educate the public in disposing of waste based on its type and at the same time encourage people to use environmentally friendly products.

This paper will discuss the design process of environmentally friendly packaging design. Researching and observing people's understanding of environmentally friendly living education, determining packaging and product designs that can educate the public. The purpose of this research is to produce design products in the form of environmentally friendly packaging designs and garbage can designs that can educate and encourage people to implement an environmentally friendly life. Assessing the influence and attitude of the community towards the designs that have been made to find out the results and impacts on people's lives.

2. Literature Review

In this section, the state of the art from several previous studies will be presented. State of the art will display and explain the most recent existing research. The purpose of doing state of the art is to make previous studies as references and differentiators to minimize duplication or plagiarism. In addition, this process can also pay attention to the development of previous research. The researcher will present several previous studies that have similarities to the topic raised, namely "Environmentally friendly packaging design". In the following, some previous studies and their differences will be presented in the state-of-the-art Table 1 as follows:

Table 1. State of the Art

No.	Title and Years of Research	Authors	Methodology	Result	Difference
1.	Study of Environmentally Friendly Education and Consumer Characteristics and Their Influence on Environmentally Friendly Attitudes and Behaviors	Rani Andriani, Budi Kusumo, Anne Charina, Yayat Sukayat, Gema Wibawa Mukti	Quantitative methods	The research group is an organic vegetable producer who markets their products through marketing activities that favor environmental issues. This study examines the effect of education and demographic characteristics on environmentally friendly attitudes and behavior. In carrying out the research, a survey technique was used which involved 60 respondents. The results of this study show positive results. e results show that in general, consumers know and are interested in environmentally friendly education, conducted by the "Tani Cipta Mandiri" group (Kusumo, et al 2017).	This research has many similarities in terms of objectives, to analyze and provide education to the public about environmentally friendly living. The method used is also the same, namely using a survey technique, quantitative. However, some things distinguish this research from previous research, namely the output of the results and the process undertaken. In this study, we will use the design process as an alternative to education for the community, using theories related to design. The resulting output is also in the form of a product design and a positive response to the education that has been given.
2.	Eco-Friendly Packaging Design Made from Teak Leaf as The Outer Packaging Layer for Brownies	A Munib, B Riyanto, A S Widodo, E Wulandari, M Suharto and L Gilang	Qualitative – Descriptive Methods, supported by Quantitative Methods	The utilization of teak leaves as the outer layer of brownie packaging will increase sales and product value. Another value is that the use of dry teak leaves as a cover for non-printed plain cardboard prevents the use of chemicals, namely kerosene, thinner, and printing ink. Further research	This research has similarities in designing environmentally friendly packaging. The thing that distinguishes this research from previous research is that previous research designed environmentally friendly packaging to find innovation, previous researchers

				is needed regarding the utilization of teak leaf waste to reduce waste and develop the concept of green packaging (Munib, et al 2021).	also focused on material selection and the process of making packaging from raw materials. While in this study, the purpose of designing environmentally friendly packaging is to distribute education and try to attract public interest in using environmentally friendly packaging.
3.	Potential for Making Environmentally Friendly Packaging Products Case Study of Bandung City	Pratiwi Kusumowardani	Quantitative Methods	In this study, the authors conclude that one solution to the waste problem in the city of Bandung is to reuse it as packaging for a product. With the process of finding out and analyzing the waste in the city that produces the most waste, namely Bandung by considering the types of materials and materials available, as well as looking at the potential of waste-producing areas and considering the potential of the people in the waste-producing areas. With this idea, the potential for empowering waste can lead to innovations, namely reusable packaging (Kusumowardani 2014).	Previous studies have similarities, namely in terms of the production of environmentally friendly packaging. the main differentiator in this research is the purpose and process of execution of this research. In this research, packaging is focused on the purpose of educating the public, and the process is carried out in the form of design.

Based on the comparisons presented above Table 1, the following conclusions can be drawn. The research to be carried out has similarities in terms of topics, namely discussing environmentally friendly issues. However, there are some differences from previous research. The most striking and recognizable difference is the purpose of the research, the output that will be produced is in the form of a packaging design prototype that will provide an element of education

to the community. Besides, that it is hoped that this research can be realized so that it can produce an environmentally friendly product.

2.2 Eco-Friendly Packaging

As the name implies, environmentally friendly packaging is the packaging of a product that does not harm the environment. Eco-friendly packaging certainly has advantages, for example, environmentally friendly packaging that has a biodegradable plastic base material will be more easily biodegradable, so it will be more friendly to the environment and minimize environmental pollution. This packaging also does not cause health problems in humans (Suherlan, et al 2018). Along with the times, many basic materials from environmental packaging have been developed, ranging from cassava bags, paper bags, bioplastics, and many others (Pimpan 2001). With the advancement of this technology, it is no longer a problem to be able to produce and use environmentally friendly packaging. The use of environmentally friendly packaging can have a big impact on environmental health, can reduce the percentage of waste that is increasing every year. However, it should also be noted that the excessive use of environmentally friendly packaging can also have a negative impact on the environment. Materials that are easy to be degraded by the earth will also take time to decompose, if the use of environmentally friendly packaging is too excessive, there will also be a built up that is bad for the surrounding environment. Therefore, the use of environmentally friendly packaging must also be used properly. On the other hand, environmentally friendly packaging still has a weakness, namely, the price is more expensive than plastic or Styrofoam products in general.

2.3 Types of Trash (Waste)

In every daily activity, humans will produce waste. Garbage is a material that is wasted or disposed of from the results of human and natural activities that have not or have no economic value. Garbage has various types, judging from its nature, waste can be divided into two types there are organic waste, and inorganic waste. Organic waste is waste that comes from living things, this waste can be easily decomposed, this type of waste is also commonly known as wet waste. Meanwhile, the type of inorganic waste commonly known as dry waste is non-biodegradable waste (Pimpan 2001). However, there are some wastes that if reprocessed can have a value, one way is to apply the 3Rs, namely Reduce, Reuse, Recycle. Where Reuse is the direct reuse of waste, reduce is the reduction of all activities that can produce waste, and recycle is the reuse of waste carried out in several processing stages (Puspita 2017). Excessive use of materials such as metals, plastics, or other inorganic materials can increase the risk of environmental pollution.

2.4 Research Road Map

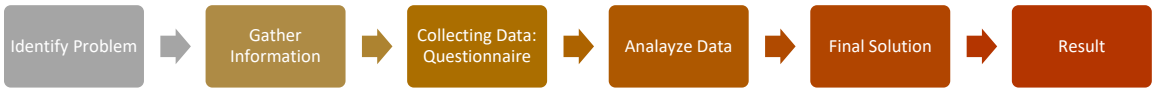

Figure 1. Research Road Map

Road Map is a step that will be carried out by researchers during the research. (Figure 1). At this stage, the researcher determines 6 stages in the research process. The first stage is to identify existing problems, researchers seek and identify problems related to environmentally friendly issues. At this stage the researcher will describe the existing and relevant problems in accordance with the initial objectives of the study, after the problem is found, the identification process of the problem is carried out. Problem identification is done so that before starting the research the researcher understands what problems will be solved. After finding the problem, the next step is to collect the information needed in a predetermined range of topics. Information collection is carried out to obtain information related to the issues raised. Information can be obtained through trusted news media, books, to previous journals. Collecting information can also be useful as a reference for researchers in solving the problem so that there is no duplication or repetition of existing research to avoid plagiarism. The third stage is the stage where researchers collect data through questionnaires that will be distributed to predetermined targets, and from the results obtained data analysis will be carried out to obtain which solutions are by the preferences of the respondents. This questionnaire data collection can help researchers to get suggestions and preferences of the community whose segmentation has been determined. The questionnaire carried out has closed questions where an answer is a definite number or scale so that the data obtained

for research can be accurate. After collecting the questionnaires, the data analysis process was carried out. Process Data analysis is carried out to analyse the results of the questionnaire, determine what output will be produced. And after the process, a final solution will be obtained which is used to solve the problems of this research topic. From the final solution obtained, it will be followed up with the design of the prototype design. The prototype is the result of the design of a research product. And after designing this prototype, the final design will be obtained which will be the result of this research.

3. Methods

The method used in this study is quantitative. Research using quantitative methods uses data in the form of numbers as a tool that helps the research process run. The survey scope of this research is people aged 40-60 years who have a job or household work, and in this research, a survey was conducted on 82 people to obtain data and information. The instrument used in this study is a questionnaire form in the form of a scale statement, in a total of 11 scale statements.

Based on the questionnaires that have been distributed. The average respondent has understood the concept of an environmentally friendly life. This can be seen in the results of the questionnaire which shows that 90% or several 72 respondents have chosen to agree with their understanding of environmentally friendly life. Not only understanding the concept of environmentally friendly living but from the survey results, it was also found that as many as 68 people already know the types of waste and dispose of them according to their type. However, the obstacle that respondents have is implementing the concept of environmentally friendly packaging is that the packaging is known to be more expensive than ordinary packaging. This is supported by 58 respondents who agree that products with environmentally friendly packaging are much more expensive than products in general. Therefore, the design that will be produced must look at the selection of materials and designs that do not cost a lot of money to reach a more friendly price. From the results of the questionnaire, it was also found that respondents tend to choose environmentally friendly products that can be used repeatedly such as tote bags, stainless straws, Tumblr drinking containers rather than single-use products such as paper straws, paper cups, and others. The practicality of using environmentally friendly products that can be used repeatedly is more than 8% or as many as 6 respondents. Most of the respondents, totaling 75 respondents are also interested in environmental-friendly products designed to educate the public, and 65 respondents agree that providing education through product packaging design will be more easily conveyed to the public. The design that will be applied is done by giving color elements or special markings on the product packaging (type of packaging: recycled, plastic, etc.) adjusted to the color elements or special markings on the existing trash can designs so that people know where to throw their garbage. effective for the initial education step, this has been agreed by 75 respondents. Researchers will also bring innovations in the form of environmentally friendly packaging that is minimalist but still informative and acceptable to the public, supported by 70 respondents without any disagreements.

3.1 Design Thinking

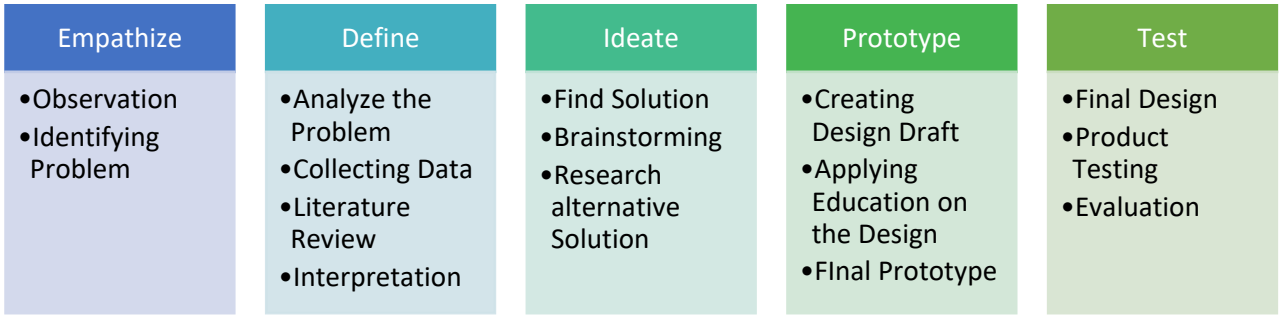

Figure 2. Design Thinking Table

The design thinking process has 5 main stages. (Figure 2) In the Empathize stage, researchers will observe problems and identify problems with issues of being environmentally friendly. In this section the researcher will understand and observe the problems that are around. After understanding and finding the problem, the problem identification stage will be carried out. After that proceed to the "Define" stage, in this process the problem analysis process, data collection, the literature review will be carried out to minimize plagiarism and look for previous research as reference

material that may be needed in this study. This stage is intended to emphasize the problems raised so that the main problem points are found. Analyse the problem to find out the problem and then proceed to collect data. After the data and problems are collected, the library review process is carried out. This library review process has the aim of seeking references from relevant previous research sources, so that the research conducted does not occur duplication or plagiarism. After that, they will enter the "Ideate" stage, at this stage, the researchers will brainstorm to find solutions from the questionnaires that have been distributed. This stage invites researchers to find various solutions that might be used in this research. In addition, this process is also intended for researchers to find various possible solutions as an alternative if the chosen solution is not successful. In the fourth stage, Prototype, researchers will carry out the design process of environmentally friendly packaging that also applies education, which will later the prototype design. At this stage the researcher will make a prototype from the results of the brainstorming that has been done. The prototype is also carried out based on the data that has been collected at the "Define" stage where the data collection process has been carried out through a questionnaire which is intended as complementary research data. In the process of designing the prototype, interview sessions are also conducted with experts or someone who is a master in their field, the aim is to receive suggestions and input on the prototype to be made. After obtaining the data, the researcher can proceed to the process of making a design draft and producing a final prototype. Then testing will be carried out to find out the advantages and disadvantages of the design that has been made.

4. Result and Discussion

The result of this research is all based on the design thinking method that is used in this research. At the prototype stage, the researcher performs the draft design stage, applicating education to the design, and finally finished the final prototype. This process is carried out in stages by researchers to get the best results, from material design to colour selection, typeface, to layouts that will be used in the design and based on theory. The first step is going to create the design draft which is going to determine the type of the packaging, choose the materials, and finally sketch the design draft. The material that is going to be used is made from cassava starch. This modified cassava starch is made from the reaction between starch and maleic anhydride using sodium hydroxide as a catalyst and water as a solvent, and after the process of the reaction is complete, the product is neutralized with a hydrochloric acid solution (Pimpan 2001). The basic material of cassava starch is a material that later when it becomes waste can be classified into biodegradable waste. Biodegradable waste itself is all waste that can be destroyed and decomposed by other living organisms and comes from plants or animals. It is not only processed cassava starch that can become biodegradable waste, but other wastes such as food waste, human and animal waste, and sewer waste are also included in the same category (Puspita 2017).

This packaging was made specifically to solve the main problem discussed above, namely, the number of people who are not educated about an environmentally friendly life. This lack of public education has led to an increase in the amount of waste that has increased. Based on data taken from BPS Indonesia, Indonesia produces 66 million tons per year, this is very much and of course detrimental to the environment, and in 2018 it was estimated that 0.26 million-0.59 million tons of plastic flowed into the open ocean (Merdeka.com 2021). The Figures 3 – 7 shown from the data from the survey are very high. The packaging that is designed brings educational features through single-use food container packaging. This package will have a design that conveys information regarding the packaging materials used and an invitation to dispose of waste in its place. This food container is planned so that it can be used by takeaway food sellers. With an affordable price plan, it is hoped that many people can use this environmental-friendly packaging so that this environmentally friendly packaging education campaign can be spread to the wider community. However, this packaging still has drawbacks, namely, because this packaging has environmentally friendly materials, its use is also limited, its use can only be used for dry and non-gravy food containers because if it is used for gravy or wet food, this packaging can be damaged.

Figure 3. Design Draft

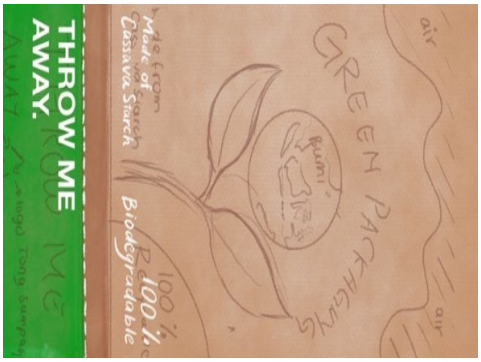

Figure 4. Design Draft

Figure 5. Primary Packaging - Final Prototype

Figure 6. Primary Packaging - Design Layout

Figure 7. Secondary Packaging - Final Prototype

The design process begins with the stages of making drafts and layout. Drafts are made to determine the sketch and colour selection that will later be used in the prototype. Sketching is done to determine the layout that will be used in the prototype. After doing the sketching stage, the original icon is made, namely a hand drawn picture of the earth and leaves. After all the elements are ready, then proceed to the stage of merging design elements into the final prototype. The prototype design compile and the colouring process is carried out and it is finished as a final prototype design, which can be seen in Figure 6. To be able to see the shadow of the prototype when it is printed, a final mock-up process is carried out on food packaging products so that it becomes a 3-dimensional prototype which will be very helpful in providing an overview during the process of printing the packaging. While designing food packaging, the researchers also added a secondary packaging prototype, using the original design that was made in the design draft

at the beginning of the manufacturing process. The output of this design process produces secondary packaging and primary packaging. Primary packaging is packaging that is in direct contact with the product. This packaging will later be addressed to food restaurant owners who serve takeaway food, which will later function as a dry and light food container, disposable because the material used is not able to hold water in the long term. While the second output to be produced is secondary packaging. Secondary packaging is packaging that is not in direct contact with the product but is in contact with the primary packaging. The purpose is to protect the primary packaging. This secondary packaging does not affect the quality of the product because it does not come into direct contact (Utami 2021). The important point of the design made is to be conveyed through the illustration of a leaf and the earth. Leaves are described as the environment and the earth as a life where both have a relationship to complement each other. The educational element is conveyed using instructions on where to dispose of the garbage because it is equipped with a recyclable logo, or it can also be considered biodegradable. (Figure 7) In addition, information about packaging such as the basic ingredient of the material is also provided, so that it is expected to provide insight into the views of the public.

Figure 8. Color Palette

Colours selection is carried out in the drafting process. (Figure 8) The colours used in this design are colours taken from earth tone colours. Earth tone is a colour that has elements of the beauty of the earth (Nydia 2021). This earth tone colours comes from natural elements on earth, from the sun, green plants, soil, sand, sky, water to storms. Most of these colour tones have a pigment that tends to brown where these colours can create a feeling of calm, comfort, and warmth (Buehler 2021). The choice of this colours was chosen because it was in accordance with the theme that had been determined at the beginning, which was environmentally friendly. The choice of this colours is said to be appropriate because these colours represent the colours of the earth. The colours that have been chosen are believed to represent the elements of this earth itself. The use of typeface uses 3 types, namely sans serif, decorative, and script. Overall, the design does not use serif fonts because it wants to convey the information contained in the packaging in a light and relaxed way to look at. The choice of decorative font for the words "Green Packaging" was chosen because of its shape which resembles clipping writing, supporting the theme of the design, namely recycling. Then in the “Throw Me Away” section, the Helvetica font is used. Helvetica is a typeface with a neutral design so that it can be used in various designs (CNN Indonesia 2017). This typeface also has good legibility so it will be very suitable to be used as a marker or instruction.

5. Conclusion

In this paper, research has been carried out on environmentally friendly packaging. An environmentally friendly life is something that we must start living for the health of the environment around us. We have seen from what has been discussed that the data shows that the waste produced is increasing every year, and without us realizing it this will have a bad impact on all aspects of human life and the earth. The main problem raised in this study is the lack of public understanding and education on environmentally friendly living, more specifically in using food product packaging and plastic bags. From these problems, a brainstorming process was carried out to find solutions to these problems and it was found to design an environmentally friendly food container packaging. The packaging material is planned to use cassava starch. The design process is carried out in several stages, namely making a design draft, sketch, final prototype, and final mock-up of the prototype. The original icon is made for this project a hand-drawn picture of the earth and leaves. After all the elements are ready, then proceed to the stage of merging design elements into the final prototype. In this paper, the prototype of the packaging that has been designed aims to become a campaign and provide education to the public. Another goal is to spread and invite more people and communities to use environmentally

friendly products. The prototype design consists of 2, primary packaging and secondary packaging of food packaging. This primary packaging prototype has a function as a food container with specifications, for snacks and not wet. As for the secondary packaging, it is a crackle bag that is used as a container for the primary packaging. From all the research that has been done, the product design that has been discussed in the conclusions above has been produced. It is hoped that this research can be useful for society and the environment. The product design that has been made is also expected to be an alternative solution so that research can be continued in the future.

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