

Design and Development of EcoSense: Android-Based Incentivized Environmental Campaign App

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Abstract

This research paper presents the design and development of EcoSense, an Android-based incentivized environmental campaign app, using the Design Science Research Methodology (DSRM). The DSRM approach involved six steps: problem identification, objective definition, design and development, demonstration, and evaluation. The problem of insufficient participation in environmental activities in Indonesia was identified using the Five Whys method, and user requirements were collected through an online survey. Various design artifacts were created to ensure the app is user-friendly, and the app was evaluated based on user engagement and participation. The results suggested that the app has the potential to effectively engage users in environmental campaigns, as evidenced by the relatively high retention and conversion rates. The study has some limitations, such as a small sample size and limited evaluation metrics, but future research can address these limitations and expand on the findings.

Keywords: *environment, campaign, incentivized, Android*

1. Introduction

The relationship between humans and the environment is two-way, interdependent, and mutually influencing. The community's activities have positive and negative effects on the environment, which in turn impacts human life, such as the 24% of deaths linked to an unhealthy environment [1]. Research also indicates that human activity has increased the Earth's temperature by more than 95% in the last 50 years [2]. To help raise awareness, EcoSense is designed as a platform to connect environmental activists and the public, to help people adopt a green lifestyle and drive green and environmentally friendly movements.

The environment is all the elements, which in complex interrelationships, form the framework,

arrangements and living conditions for humanity, either by their existence or by their effects [3]. Humans and the environment are inextricably linked. Human activities often have an effect on the environment, while the environment also affects how humans behave. Technology has enabled humans to make use of natural resources more efficiently, but this has had a detrimental impact on the environment's sustainability. To counteract this, humans must take action to protect their environment and resources in order to ensure their health now and in the future [4].

Campaigns are an effective way of communicating a targeted message to a particular population for a defined purpose and within a given period of time [5]. This type of communication seeks to achieve a certain goal or bring about a desired change, be it social, cultural,

political or economic. These campaigns are organized and have four main elements: they have a specific objective, target a large audience, have a predetermined time frame and involve a series of activities [5]. In order to reach campaign objectives, it is necessary to create a plan that will be executed over the course of the campaign. If the goals are met, this can be a positive sign to the audience that the change can be successfully implemented.

Social media is a new form of media that involves interactive participation [6]. It has become an increasingly powerful tool for organizations to reach out to individuals and spread their messages. The 2012 KONY short film was a great example of this, succeeding in reaching 100 million viewers in just six days [7]. This success is attributed to the nature of social media which allows for easy sharing of content [7]. This campaign served as an example for organizations to effectively harness the power of web communities to spur specific actions [8]. Social media helps break through conventional boundaries thereby enabling the public to participate in activities without them being physically present [9]. EcoSense is a mobile application that seeks to use this power of social media to support the environment and healthy living movement.

While it is true that incentivized environmental campaigns can be conducted without a mobile app, it is important to note that a mobile app can significantly enhance the impact and effectiveness of such campaigns. First, a mobile app provides unparalleled convenience and accessibility, enabling people to participate in environmental campaigns regardless of their location or time constraints. Second, a mobile app can provide real-time updates and feedback, creating opportunities for gamification and motivating users to continue their efforts. Last, a mobile app can facilitate collaboration and networking among individuals who share similar environmental concerns, leading to more effective and innovative campaigns.

Incentivized environmental campaigns can be an effective way to motivate people to engage in environmentally friendly behaviors because they provide people with tangible rewards for taking part in activities that help the environment. These rewards may include discounts, prizes, or other forms of recognition. Extrinsic rewards can influence the formation of pro-social behaviors that continue after the rewards have stopped if participants find intrinsic and social motivation in the action itself [10].

Incentives motivate people to take part in activities that might otherwise seem too tedious or

time consuming. They also help build a sense of community and collaboration, as people work together to achieve a common goal. Additionally, incentivized environmental campaigns can help raise awareness and understanding of environmental issues, which can lead to long-term behavioral change. Finally, incentivized campaigns can act as a way to bridge the gap between environmental activists and those less engaged with environmental issues, leading to greater environmental protection and advocacy.

The increasing importance of addressing environmental issues has led to the development of various technological solutions aimed at promoting sustainable behavior. Through this study, we hope to contribute to the development of effective tools and strategies that promote sustainable behavior and address environmental challenges in Indonesia. The research question guiding this study is: How can an incentivized environmental campaign application be designed to meet the information needs and motivations of individuals in Indonesia towards environmental issues and activities?

2. Related Works

A study with a similar approach was carried out by BetterPoints [10]. BetterPoints is a mobile application that focuses on changing the lifestyle of its users to become healthier by awarding points which can then be exchanged for shopping vouchers or donated. Based on the case studies that this paper has conducted in Birmingham City Council (BCC), it shows that renewed and continued participation in BCC programs can be encouraged through the incentives and rewards offered by this app. The finding that the average number of activities has increased over time suggests that incentives are working and can meet the needs of the Council's Public Health agenda.

Another study was conducted which aims to increase the use of public transportation by tourists in Madeira through a gamification feature on a mobile application called MARGe (MadeiRa Gamified experience) [11]. The application implements several different but related forms of gamification, such as creating narratives that give an adventurous atmosphere for the user, dividing each adventure into stages, displaying player progress, visual representation of user achievements, challenges with goals and rewards, points for tasks completion, awards page, leaderboard page and easter eggs. To evaluate this approach, the study conducted an evaluation in Funchal (capital city of Madeira) to measure user experience. In future works, to evaluate the persuasive effect, MARGe plans to collaborate

with local bus companies in Funchal to conduct real-world campaigns.

There's also a study that focuses on how different monetary incentive mechanisms affects the participants behavior in participatory sensing frameworks [12]. This study uses the Citizense framework with four different monetary incentive mechanisms used: fixed micro-payments (each valid submission will be paid a fixed amount of money), variable micro-payments (a specified amount of money is divided for each valid submission), lottery-style payments (each valid submission have a chance to win the prize), and also provides no incentives/payments as a comparison. The mechanism was tested in the form of a mobile application which had 44 different sensing campaigns, with a duration of more than 20 days and 230 participants. Incentive mechanisms are randomly distributed among campaign participants and subsets. From the results obtained, this study suggests: (1) monetary incentives are proven to increase campaign participation rate; (2) tangible and predictable rewards (fixed micro-payment) serve as the most effective incentive mechanism.

Apart from implementation in the form of an application as the platform, there is also study that compare the effectiveness of offering financial incentives and simply promoting campaigns in order to increase the number of smoking cessation rates [13]. The study was conducted in each of three cities in Denmark for each approach, the results of the non-randomized trial in this study showed that campaigns were better to recruit smokers to existing smoking cessation services whereas financial incentives increased six-month smoking cessation rates. Financial incentives outperformed campaigns to help smokers stay smoke-free for a year in an analysis of intention-to-treat. This supports the current evidence that providing financial incentives to smokers is a very effective strategy. More generally, this study shows that campaigns and incentives complement each other in the goal of changing habits.

Interesting findings were found in a study on the effectiveness of incentivized social media campaigns [14]. The purpose of this study was to test whether providing incentives for consumers to like, share, or comment on a brand's social media posts has an impact on sentiment and community engagement with that brand. To test it, a sentiment analysis was performed on Facebook insight data from a Fortune 500 companies using the Semantic Orientation CALculator (SO-CAL) software. The results show that the act of incentivizing does not have a strong impact on promoted post insights on overall sentiment. However, there is evidence to support that there's

a positive impact of the campaigns on overall engagement with the brand. Moreover, the study does believe that due to the limitations of the research that has been conducted (using only one data set from many brands of a company), it cannot be generalized that incentivized social media campaigns do not work. The insignificant performance of the incentive mechanism is rather due to the fact that the incentives offered may not be sufficiently valued by consumers or not sufficiently tied to the desired sharing and commenting actions.

This study adds to the literature by highlighting the potential of incentivized environmental campaigns and providing insights into the design and development of a mobile app to promote environmental awareness and actions. The survey conducted in this study provided insights into the attitudes and behaviors of people towards environmental issues and activities, as well as to understand their information needs and motivations when participating in such activities. This study also showcases the main user requirements for such an app, which have not been extensively explored in previous studies. The findings of this study may assist researchers and practitioners in the design and development of similar applications in other contexts.

3. Methodology

This study utilized the Design Science Research Methodology (DSRM) [15], which is a problem-solving research paradigm that focuses on creating artifacts that address specific problems. The DSRM involves six steps: problem identification, objective definition, design and development, demonstration, and evaluation.

3.1 Problem Identification

The first step of the DSRM is to identify the problem that the software solution will address. In this study, the Five Whys method developed by Sakichi Toyoda was used to identify the problem of insufficient participation in environmental activities in Indonesia. This method involves asking "why" five times in order to get to the root cause of the problem.

3.2 Objective Definition

The second step of the DSRM is to define the objectives of the software solution by gathering user requirements data. In this study, an online survey was conducted using Google Forms to collect user requirements data from individuals in Indonesia (see appendix). The survey consisted of

questions regarding demographics (age, gender, domicile, profession) and environmental issues and activities. We also included questions about their information needs and motivations when participating in environmental activities. This helped us gain insights into the attitudes and behaviors of people towards environmental issues and activities, which informed the objective of creating a software solution that would increase awareness and motivation for environmental activities.

The online survey was used to collect user requirements data from individuals in Indonesia. A convenience sampling approach was used to select participants. Descriptive statistics such as frequencies and percentages were used to analyze the data, which was presented in a narrative format. Participants were informed that their participation was voluntary and anonymous, and that their responses would be kept confidential. The survey also explained the purpose and expected duration of the research.

3.3 Design and Development Phase

The success of any software solution hinges on the quality of its design and development. In this research, various design artifacts were created to ensure the proposed solution is well-structured and user-friendly. Use case diagrams were used to identify user interactions and system functions. The architecture design diagram was used to show the components and relationships between them, while class diagrams helped to identify the classes and their attributes and methods. Lo-fi wireframes were created to represent the proposed user interface, and hi-fi designs were used to provide detailed visual representations of the app. These design artifacts were instrumental in ensuring that the app met the user requirements. In this study, the Android native framework is used to develop the software solution.

3.4 Demonstration Phase

The demonstration phase of the DSRM involves deploying the software solution and demonstrating its effectiveness. In this study, the software solution is deployed by releasing the app on the Google Play Store. We then evaluated its effectiveness by measuring user engagement and participation. We tracked the number of downloads and the number of users who participated in environmental activities through the app.

3.5 Evaluation Phase

The evaluation phase of the DSRM involves comparing the goals of the solution to the outcomes seen when the artifact is used. In this study, the goals of the software solution were compared to the outcomes seen when users interacted with the app. To analyze the performance of the EcoSense app, two important evaluation metrics were selected: conversion rate and retention rate. Conversion rate is the percentage of users who complete at least one campaign in the app after their initial downloads. While retention rate is the percentage of users who return to the app to complete more campaigns after their first participation. Both of these metrics were analyzed using data on the number of downloads, participants count of each campaign, and returning participants count. By examining these metrics, we were able to determine the effectiveness of the app in engaging and motivating users to act towards environmental campaigns.

4. Results and Analysis

4.1 Problem Identification

The five whys method, proposed by Sakichi Toyoda, is a technique used to identify the root cause of a problem. It involves asking "why" five times to get to the fundamental issue at hand.

Q: Why does environmental degradation persist?

A: Because there are multiple contributing factors, including population growth, industrialization, and consumerism. These factors can lead to increased resource consumption and waste production, which can put strain on the environment and natural resources [16].

Q: Why do these factors contribute to environmental degradation?

A: Because there is a lack of awareness and understanding about the consequences of our actions on the environment [17]. Additionally, there may be a lack of incentives or regulations to encourage environmentally friendly behavior [18].

Q: Why is there a lack of awareness and understanding about the consequences of our actions on the environment?

A: Because environmental education is not adequately emphasized in schools, and information about environmental issues may not be readily available or easily accessible to the general public [19], [20].

Q: Why is environmental education not adequately emphasized in society?

A: Because they may not be aware of the actions they can take to help protect the environment [21]. As a result, they may not feel empowered to make a difference.

Q: Why do individuals not feel empowered to take environmentally friendly actions?

A: Because they do not have sufficient knowledge or resources to take such actions. Additionally, the lack of awareness and understanding about the consequences of our actions on the environment may make individuals feel like their efforts would not make a significant impact [22].

4.2 Objectives Definition

Based on the results of the user requirements survey, it can be concluded that the three main user requirements are EcoWorld, EcoReward, and Campaigns. Campaigns feature tackles common difficulties users encounter when participating in environmental campaigns, EcoReward functions as an incentive program to promote campaign participation, and EcoWorld facilitates forums and discussions on environmental matters.

The Campaigns feature focused on raising awareness and taking action on environmental issues. Based on the results of user requirements survey, a lot of people have problems with joining environmental campaigns. For instance, campaigns not having clear missions, no existing platform or media that spread campaign information, and complicated registration flow.

Table 1. Requirements for Campaigns feature.

Feature name: Campaign
Description: a feature that allows user to browse, join, and complete campaigns
Acceptance criteria:
- Users can see the progress of each campaign they are participated in.
- Users can see the list of missions from the campaigns.
- Each campaign on the list shown includes poster image, title, timeframe, category, and number of participants.
- Users can upload a picture as a proof to complete a mission.
- Users can find out the status of their submitted campaigns (i.e. Unfinished, In Verification, Completed, Rejected, and Campaign Ended).
- Users can share the campaigns to the EcoWorld feed.
- Users get EcoPoints after completing a campaign.

EcoReward is an incentivized program that rewards users for their participation in environmental activities and campaigns. The user requirements survey results show that many people do not want to join environmental campaigns because the campaigns are not interesting. Therefore, we decided to bring gamification to the campaigns by using EcoReward, which is detailed in Table 2.

Table 2. Requirements for EcoReward feature

Feature name: EcoReward
Description: a feature that allows users to exchange their EcoPoints into various rewards
Acceptance criteria:
- Users can see the number of EcoPoints they have earned.
- There is a list of rewards that can be exchanged by users.
- There is a list of rewards that have been owned by the user.
- Each existing reward item displays an image, reward name, and the required number of EcoPoints.
- Users can view reward details by clicking one of the reward items on the reward list. Reward details include the last date of use of the reward, terms and conditions, how to use it, and description of the reward.
- There are two types of rewards that can be redeemed, namely E-Wallet credits and donation.
- Users can find out the status of their reward exchange (i.e. Not Redeemed, Redeemed, Requested, and Completed).

EcoWorld is a platform that provides users with information about environmental issues and activities, as well as access to events and campaigns related to the environment. The user requirements survey results show that many people wish to have a forum to discuss about environmental issues and a search feature to find friends in one area to carry out social activities together. Hence, we bring up a forum and social media feature called EcoWorld, which is detailed in Table 3.

Table 3. Requirements for EcoWorld feature

Feature name: EcoWorld
Description: A forum for users to interact and discuss with each other regarding environmental issues and campaigns on the platform.
Acceptance criteria:
- Users can view the home page containing public stories submitted by other users and themselves.
- Users can upload stories containing text captions, optional photo attachments, and optional campaign link.
- A story item displays the uploader's name, timestamp, caption, replies from other users, and the number of supporters.
- Users can support each other, reply on other users' stories and view others' replies.
- Users can click a button to share a story with other apps on their phone.

4.3 Design and Development

To help define the scope of the project and the functional requirements of the system, a use case diagram is drawn. The diagram provides a visual representation of the system and helps to identify potential problems and risks associated with the project. It also allows the project team to identify potential areas for improvement and to prioritize tasks. By providing an overview of the system and its components, the use case diagram helps to ensure that the design is comprehensive,

consistent, and complete.

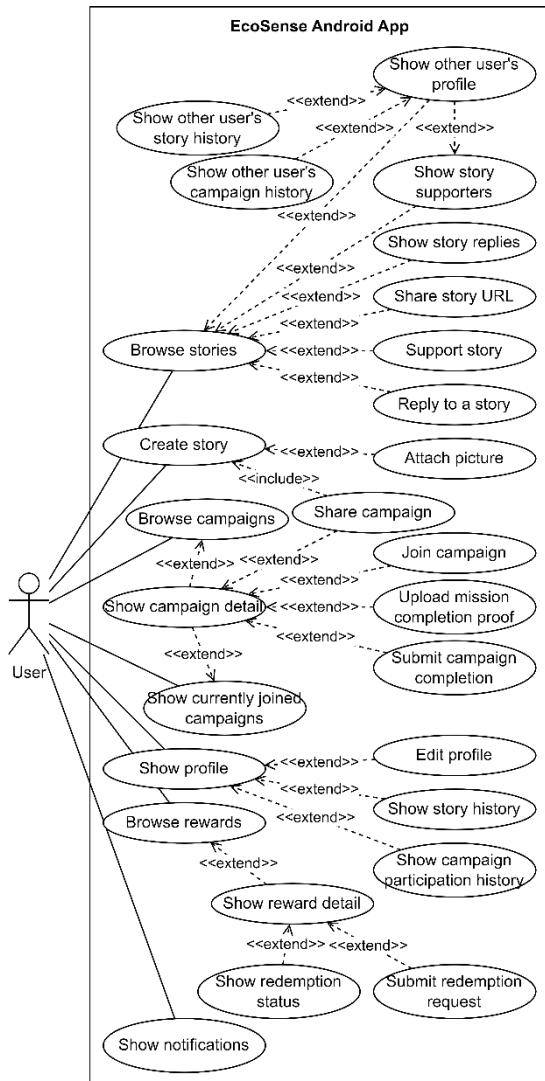


Fig 1. Use case diagram for EcoSense app

This research adopted Clean Architecture for app development due to its highly modular and scalable structure. Clean Architecture allows for the separation of the business logic from the UI, making it easier to understand and maintain the code. In Android app development, Clean Architecture is implemented by separating out the code into three different layers: the data layer, domain layer, and presentation layer. The data layer is responsible for managing and persisting data, while the domain layer is responsible for handling the business logic of the application. The presentation layer is responsible for creating the user interface and handling user interactions.

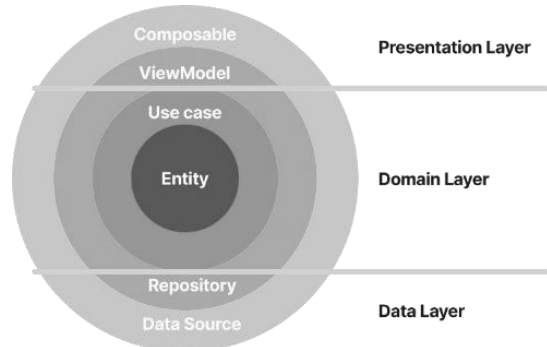


Fig 2. Clean Architecture

To help providing a visual representation of the relationships between different classes within the app, UML's class diagram is used. This helps designers to analyze and modify the program's structure and design. Class diagrams also allow designers to identify potential problems with the architecture of the system and to make changes to improve the overall design. By understanding the structure of the software, designers can create more efficient and reliable software architectures.

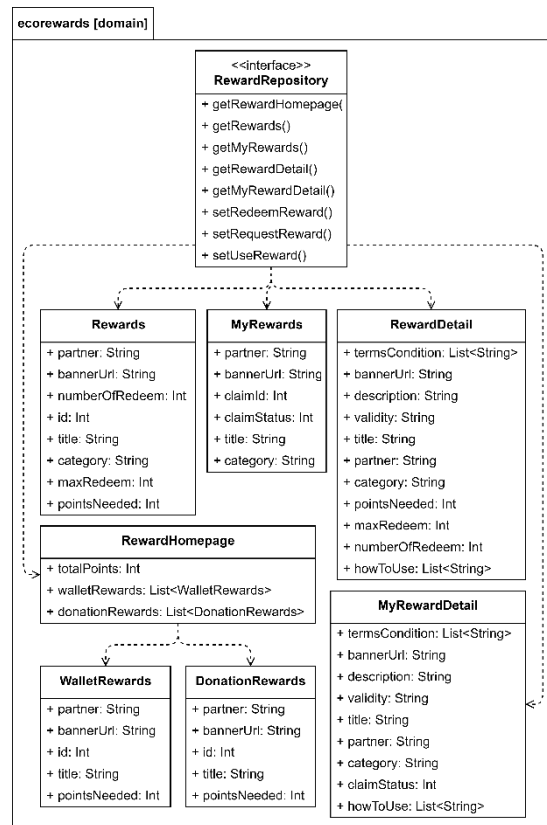


Fig 3. Class diagram for EcoRewards feature

The class diagram above shows the relationships between several classes/interfaces related to rewards. The *RewardRepository* interface provides methods to retrieve rewards data, including the reward homepage, rewards by

category, and details for specific rewards. The *Rewards* and *MyRewards* classes contain data about different types of rewards, including their titles, categories, and partners. The *RewardDetail* class provides more detailed information about a specific reward, such as its description and terms and conditions. Finally, the *RewardHomepage* class includes data about the user's total points, wallet rewards, and donation rewards. The various methods and properties of these classes and interfaces work together to provide a complete picture of the rewards system, from retrieving information about available rewards to redeeming and using them.

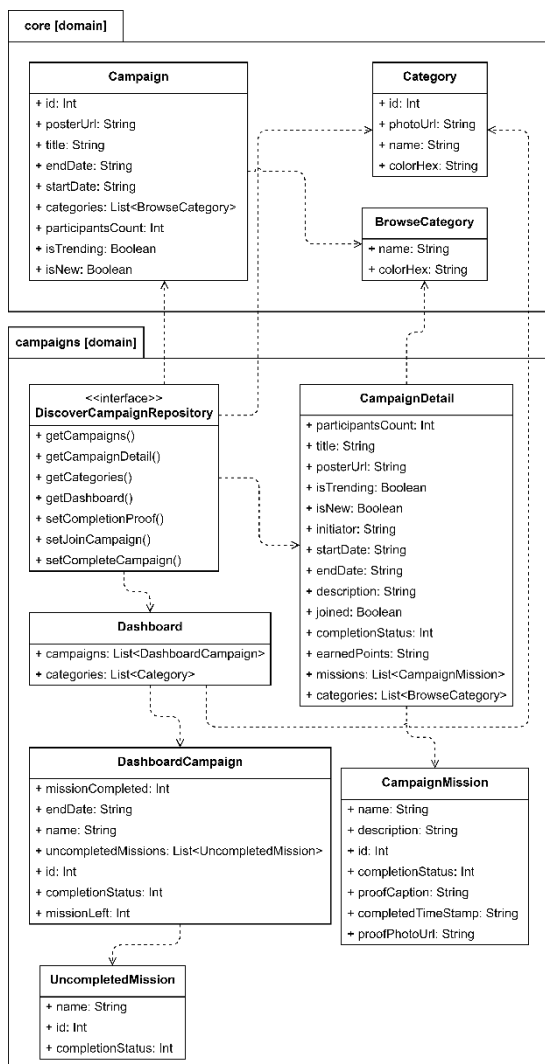


Fig 4. Class diagram for Campaigns feature

The class diagram above illustrates the relationships between several classes and interfaces that relate to the campaigns feature. The *DiscoverCampaignRepository* interface defines the operations necessary to discover campaigns, retrieve campaign details, get categories, and interact with campaigns, including setting

completion proof and joining or completing a campaign. The *Campaign* and *Category* classes represent the entities themselves, with the *CampaignDetail* class containing detailed information about a specific campaign, including its missions and completion status. The *Dashboard* and *DashboardCampaign* classes provide summary information about the user's campaigns and uncompleted missions. The *BrowseCategory* class is a simplified version of the *Category* class, used specifically for browsing campaigns.

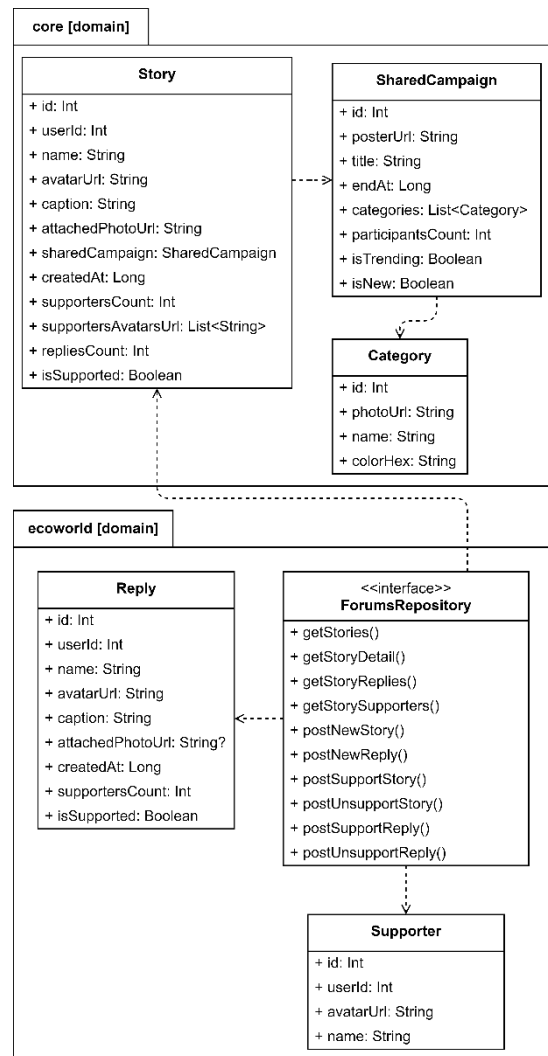


Fig 5. Class diagram for EcoWorld feature

The class diagram above depicts relationships between several classes that work together to provide *EcoWorld* feature. The *ForumsRepository* interface is the central point of access to functionalities related to stories, replies, and supporters. The *Story* class represents a story object with various properties, including a unique identifier. The *SharedCampaign* class represents a shared campaign that can be attached to a story.

The *Category* class represents categories that a campaign can belong to. The *Reply* class represents a reply to a story. Finally, the *Supporter* class represents a user who supports a story or reply.

Designing Lo-Fi wireframes helps to quickly visualize the structure and layout of the application before investing time and effort into designing the Hi-Fi UI. It also helps to identify any usability issues or potential problems early on. This can help to avoid costly mistakes or user experience issues that may arise during the Hi-Fi design phase.

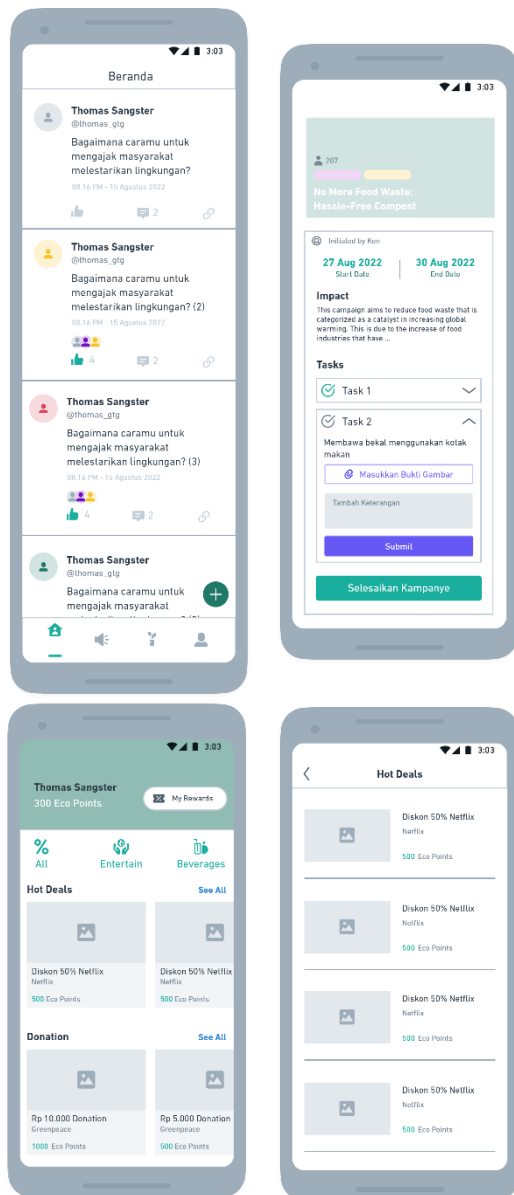


Fig 6. Lo-Fi wireframe designs for EcoSense

Designing user interface (UI) is important in app development because it is the first point of contact between the user and the app. UI design is

done before coding because it allows developers to plan out the app in its entirety before any code is written. UI design allows developers to create a visual representation of the app and ensure that it meets the user's needs and expectations. It also allows developers to identify any potential issues that could arise during coding and make necessary adjustments before coding begins. UI design also allows developers to create a better user experience by ensuring that the app's design is aesthetically pleasing and easy to use. By designing the UI before coding, developers can save time and money by avoiding costly rewrites and fixes due to user issues.

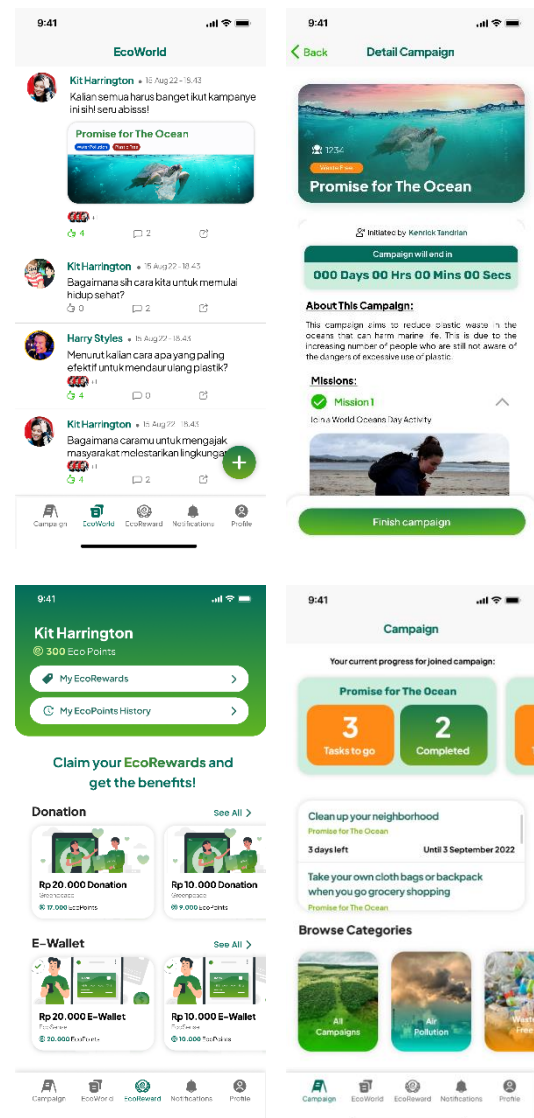


Fig 7. Hi-Fi user interface designs for EcoSense

There were several challenges while developing the app. For example, as Jetpack Compose was a relatively new toolkit, the developers had to spend extra time learning and understanding the framework. Additionally, the

developers had to ensure that all the components of the Clean Architecture were implemented correctly. Moreover, the developers had to ensure that all the user requirements were met and that the app was fully functional. In the end, the team was able to develop an Android app with all the desired features and requirements. This shows that the development of an Android app with the aforementioned requirements is achievable.

4.4 Demonstration

The app was made publicly available on November 23, 2022, and was downloaded 119 times during the first two weeks until December 11, 2022. The majority of user acquisition was through Google Play Search.

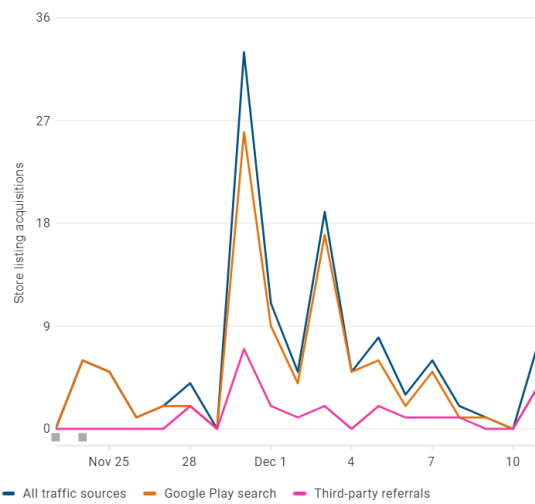


Fig 8. Store listing acquisitions by traffic source from Nov 23, 2022, until Dec 11, 2022

To promote the adoption of the app, four environmental campaigns were launched between November 30, 2022, and December 6, 2022, each lasting seven days. The decision to launch four environmental campaigns in the demonstration phase of this study was made after consideration of the project goals and available resources. Four campaigns were deemed sufficient to showcase the versatility and adaptability of the software solution while keeping the campaigns focused and achievable within a reasonable timeframe. Adding more campaigns could have led to a dilution of resources and made it difficult to accurately measure the impact of each campaign. On the other hand, launching fewer campaigns may not have provided a comprehensive representation of the software solution's capabilities. Additionally, four campaigns provided enough variety to appeal to different user demographics and interests while keeping the environmental message consistent throughout. Therefore, the decision to launch four

campaigns was a strategic choice that helped maximize the impact of the demonstration phase of this study.

The first campaign, titled "Yuk, Pakai Transportasi Umum," aimed to encourage the use of public transportation as a means to reduce carbon emissions and attracted 65 participants. The second campaign, "Naik Transportasi Alternatif," incentivized the use of electric vehicles, attracting 25 participants. The third campaign, "Yuk, Bawa Wadah Makanan Sendiri!," aimed to reduce single-use plastic usage by encouraging the use of reusable food containers and attracted 45 participants. The fourth campaign, "Kantong Plastik Ga Asik!," incentivized the use of non-plastic reusable bags while shopping and attracted 34 participants.

4.5 Evaluation

Based on the data collected from November 30th to December 6th, the EcoSense app had a total of 119 total downloads. Out of these downloads, 68 unique participants engaged in at least one campaign during this period. The app also had 35 returning participants who participated in multiple campaigns, indicating a retention rate of approximately 51.47%. The high retention rate suggests that users are satisfied with the app and their requirements are being met. Furthermore, the conversion rate for this period was around 57.14% as 68 participants engaged in at least one campaign out of a total of 119 downloads. These results suggest that the EcoSense app has the potential to effectively engage users in environmental campaigns, as evidenced by the relatively high retention and conversion rates.

5. Conclusion

This research demonstrated the design and development of EcoSense as an Android-Based incentivized environmental campaign app. The study identified the problem using the Five Whys method, collected user requirements data through an online survey, and created various design artifacts. The app was released on the Google Play Store, and its effectiveness was evaluated by measuring user engagement and participation. The results suggested that the app has the potential to effectively engage users in environmental campaigns, as evidenced by the relatively high retention and conversion rates.

Despite the rigor of the research design, this study has some limitations that need to be acknowledged. First, the sample size of the online survey was relatively small and may not be

representative of the larger population. Additionally, the convenience sampling approach used to select participants may have introduced selection bias. Second, the evaluation phase of the study was limited to measuring the effectiveness of the software solution based solely on the two selected metrics. Other metrics, such as user satisfaction, could provide a more comprehensive understanding of the app's effectiveness. Finally, the study only focused on one country, Indonesia, and may not be generalizable to other contexts.

Further research is needed to address the limitations of this study and expand on the findings. First, future research could increase the sample size and use a more representative sampling technique to ensure the generalizability of the findings. Second, additional metrics such as user satisfaction could be included in the evaluation phase to provide a more comprehensive understanding of the software solution's effectiveness. Furthermore, future studies could explore the possibility of expanding the software solution to other countries and cultures to evaluate its cross-cultural effectiveness. Finally, incorporating additional features such as social media sharing and gamification elements could be explored to enhance user engagement and motivation towards environmental activities. These further works could help to enhance the effectiveness and usability of the EcoSense app and provide a better understanding of how technology can be used to address environmental problems.

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Appendix User Requirements Survey

Table 4. User requirements survey

No.	Question		Required
	English (translated)	Bahasa Indonesia (original)	
1	What is your name or initials?	Siapa nama atau inisial Anda?	Yes
2	What's your WhatsApp number?	Berapa nomor WhatsApp Anda?	No
3	What is your gender? <i>Choose an option:</i> a. Male b. Female	Apa jenis kelamin Anda? <i>Pilih satu opsi:</i> a. Laki-laki b. Perempuan	Yes
4	Where are you domiciled? <i>Choose an option:</i> a. Jabodetabek b. Outside Jabodetabek (Java Island) c. Outside of Java Island	Di mana Anda berdomisili? <i>Pilih satu opsi:</i> a. Jabodetabek b. Luar Jabodetabek (Pulau Jawa) c. Luar Pulau Jawa	Yes
5	What do you do? <i>Choose an option:</i> a. Student b. Employee c. Businessman d. Doesn't work e. Other (type your option)	Apa pekerjaan Anda? <i>Pilih satu opsi:</i> a. Pelajar/Mahasiswa b. Karyawan c. Wirausaha d. Tidak Bekerja e. Lainnya (ketikkan opsi Anda)	Yes
6	Do you have a smartphone? <i>Choose an option:</i> a. Yes b. No.	Apakah Anda memiliki smartphone? <i>Pilih satu opsi:</i> a. Ya b. Tidak	Yes
7	How old are you? <i>Choose an option:</i> a. < 17 years b. 17-22 years c. 23-35 years d. 36-50 years e. > 50 years	Berapakah umur Anda? <i>Pilih satu opsi:</i> a. < 17 tahun b. 17-22 tahun c. 23-35 tahun d. 36-50 tahun e. > 50 tahun	Yes
8	How often do you participate in social activities? (example: donations, social services, environmental campaigns, etc.) <i>Choose an option:</i> a. > 5 times b. 3 – 4 times c. 1 – 2 times d. Never	Seberapa seringkah Anda mengikuti kegiatan sosial? (contoh: donasi, bakti sosial, kampanye lingkungan, dll.) <i>Pilih satu opsi:</i> a. > 5 kali b. 3 – 4 kali c. 1 – 2 kali d. Belum pernah	Yes
9	If so, what social activities have you participated in?	Jika pernah, kegiatan sosial apa yang pernah Anda ikuti?	No
10	What motivates you to take part in these social activities?	Apa yang mendorong Anda untuk mengikuti kegiatan sosial tersebut?	No
11	Are you sufficiently aware of environmental issues/problems? <i>Choose an option:</i> a. Yes b. No c. Maybe	Apakah Anda cukup mengikuti isu/permasalahan lingkungan? <i>Pilih satu opsi:</i> a. Ya b. Tidak c. Mungkin	Yes
12	Do you want to make a positive contribution to environmental issues? <i>Choose an option:</i> a. Yes b. No.	Apakah Anda ingin memberikan kontribusi positif terhadap isu lingkungan? <i>Pilih satu opsi:</i> a. Ya b. Tidak	Yes
13	Have you ever participated in an environmental campaign? (example: planting trees, cleaning the beach, etc.) <i>Choose an option:</i> a. > 5 times b. 3 – 4 times c. 1 – 2 times d. Never	Apakah Anda pernah mengikuti kampanye lingkungan? (contoh: menanam pohon, membersihkan pantai, dll.) <i>Pilih satu opsi:</i> a. > 5 kali b. 3 – 4 kali c. 1 – 2 kali d. Belum pernah	Yes
14	If so, what environmental campaigns have you participated in?	Jika pernah, kampanye lingkungan apa yang pernah Anda ikuti?	No
15	What sources do you usually use to obtain information about environmental activities?	Sumber apa yang biasanya Anda gunakan untuk memperoleh informasi mengenai kegiatan	Yes

	<p><i>Choose at least one option:</i></p> <ul style="list-style-type: none"> a. YouTube b. Article c. News Portal d. Other (type your option) 	<p>lingkungan?</p> <p><i>Pilih minimal satu opsi:</i></p> <ul style="list-style-type: none"> a. YouTube b. Artikel c. Portal Berita d. Lainnya (ketikkan opsi Anda) 	
16	<p>What problems did you encounter when seeking information or contributing to environmental issues?</p>	<p>Apakah masalah yang Anda temui ketika mencari informasi atau berkontribusi terhadap isu lingkungan?</p>	No
17	<p>Do you often have difficulty finding sources of information focused on environmental issues and activities?</p> <p><i>Choose an option:</i></p> <ul style="list-style-type: none"> a. Yes b. No. 	<p>Apakah Anda sering kali mengalami kesulitan dalam menemukan sumber informasi yang terfokus pada isu dan kegiatan lingkungan?</p> <p><i>Pilih satu opsi:</i></p> <ul style="list-style-type: none"> a. Ya b. Tidak 	Yes
18	<p>Are you interested in downloading and using EcoSense?</p> <p><i>Choose an option:</i></p> <ul style="list-style-type: none"> a. Yes b. No. 	<p>Apakah Anda tertarik untuk mengunduh dan menggunakan EcoSense?</p> <p><i>Pilih satu opsi:</i></p> <ul style="list-style-type: none"> a. Ya b. Tidak 	Yes
19	<p>If not, why are you not interested in using our application?</p>	<p>Jika tidak, kenapa Anda tidak tertarik untuk menggunakan aplikasi kami?</p>	No
20	<p>Have you ever encountered or used an application like EcoSense? If yes, state the name of the application.</p>	<p>Apakah Anda pernah menemui atau menggunakan aplikasi sejenis EcoSense? Jika ya, sebutkan nama aplikasi tersebut.</p>	No
21	<p>In your opinion, what features do you expect in this application to make it easier for you to get information and contribute to environmental issues? (example: social forum)</p>	<p>Menurut Anda, fitur apa sajakah yang Anda harapkan dalam aplikasi ini untuk memudahkan Anda mendapatkan informasi serta berkontribusi terhadap isu lingkungan? (contoh: forum sosial)</p>	Yes
22	<p>What made you interested in using this application?</p> <p><i>Choose at least one option:</i></p> <ul style="list-style-type: none"> a. Want to start contributing small to the environment b. Want to discuss environmental issues c. Want to get attractive rewards d. Other (type you option) 	<p>Apa yang membuat Anda tertarik untuk menggunakan aplikasi ini?</p> <p><i>Pilih minimal satu opsi:</i></p> <ul style="list-style-type: none"> a. Ingin mulai berkontribusi kecil terhadap lingkungan b. Ingin berdiskusi mengenai isu lingkungan c. Ingin mendapatkan reward menarik d. Lainnya (ketikkan opsi Anda) 	Yes
23	<p>Would you be willing to be contacted further?</p> <p><i>Choose an option:</i></p> <ul style="list-style-type: none"> a. Yes b. No. 	<p>Apakah Anda bersedia untuk dihubungi lebih lanjut?</p> <p><i>Pilih satu opsi:</i></p> <ul style="list-style-type: none"> a. Ya b. Tidak 	Yes