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Preface

On behalf of the IC3INA 2022 organizing committee, I am honored and delighted to welcome you to the ninth of 2022 International Conference on Computer, Control, Informatics, and its Applications (IC3INA 2021) with the theme: "Digital Transformation Towards Sustainable Society For Post Covid-19 Recovery". The theme is perfectly in line with these two important reasons. First, the acceleration of digital transformation caused by change of lifestyle due to Covid-19 pandemic. This momentum is perfect to forge partnerships and cooperation, and to share research progress between research institutions, campuses, and small to large scale industries in order to optimize the management and the use of the available resources into multi-disciplinary science, to attain sustainable development. And second, with the world recession is around the corner, the theme never becomes more important than today for us to exchange ideas on how digital transformation could also tackle future challenges and ensure that everyone has the best (access) to participate and benefit from the digital transformation of our economy.

Our technical program is rich and varied with 5 keynote speakers and 76 technical papers split between 15 parallel oral sessions in two days' virtual conference. From 112 reviewed papers, we have accepted 76 papers, which means 67.9% of acceptance rate and 32.1% rejection rate. Both accepted paper number and rejection rate increase compared to IC3INA 2021 (45 accepted papers, 10% of rejection rate). IC3INA is committed to maintain and improve the quality of accepted papers. The accepted papers are separated into Computer and Networking (10 papers), Control (6 papers), Informatics and Data Processing (51 papers), and Information Communication Technologies (ICTs) Applications (9papers). The IC3INA 2022 has been approved and sponsored by the Association for Computing Machinery (ACM) as the global proceeding which is indexed by the Scopus.

Regarding the conference, this is the second year that we are holding the IC3INA annual event in a virtual format, with no audience physically in the

room. Following our previous success in 2021, this year we use a conference management system (Indico) to ensure that we all could optimally engage and present the latest innovations and developments, and to exchange ideas and various aspects of advances in computer technology, control, informatics and their applications.

As a conference chair of IC3INA 2022, I know that the success of the conference depends ultimately on the many people and the committees who have worked with us in planning and organizing both the technical program and the supporting team arrangements. We thank the steering committees for their wise advice and brilliant suggestions from the organizing committee. The technical program committee (TPC) for their thorough and timely reviewing of the papers, and our ad-hoc teams who have helped us to keep down the costs of IC3INA2021 for all participants. Recognition should go to the organizing committee members who have all worked extremely hard both individually and team efforts for the details of important aspects of this virtual conference program and the other related activities. Last but not least, thank you very much for your participation and support of our International Conference on Computer, Control, Informatics, and Its Applications (IC3INA 2022).

General Chair of IC3INA 2022,

Dr. Purnomo Husnul Khotimah M.T.

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Onthel: Online Delivery App to Induce Green Lifestyle Awareness

Authors: Andre Andre, Marcellinus Ferdinand Suciadi Authors Info & Claims

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ABSTRACT

Since the pandemic first appeared in 2020, there has been a growth in Indonesia's aggregators of delivery services. The convenience and promptness of this service are reasons why customers appreciate it. On the other hand, a large number of service vehicles contribute to the global warming and an increase in carbon emissions. These emerge as opportunities for us to design the Onthel. An environmentally friendly online delivery application using the bicycle fleet and also induce consumers to practice an eco-friendly lifestyle. We use an interaction design approach—a science that intersects with HCI—to help developers improve products and user interactions. The interaction design stage starts by establishing requirements, designing alternatives, prototyping, and evaluating. We tested the prototype that had been made through task scenario analysis, which is one of the stages of usability testing. The evaluation's findings indicate that this research can guide in developing a system to promote consumer behavioral change; in this example, induce customer behavior towards eco-friendly lifestyle.

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Index Terms

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Applied computing

Law, social and behavioral sciences

Anthropology

Ethnography

Human-centered computing

Interaction design

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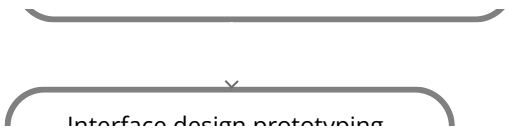

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Onthel: Online Delivery App to Induce Green Lifestyle Awareness

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ABSTRACT

Since the pandemic first appeared in 2020, there has been a growth in Indonesia's aggregators of delivery services. The convenience and promptness of this service are reasons why customers appreciate it. On the other hand, a large number of service vehicles contribute to the global warming and an increase in carbon emissions. These emerge as opportunities for us to design the Onthel. An environmentally friendly online delivery application using the bicycle fleet and also induce consumers to practice an eco-friendly lifestyle. We use an interaction design approach—a science that intersects with HCI—to help developers improve products and user interactions. The interaction design stage starts by establishing requirements, designing alternatives, prototyping, and evaluating. We tested the prototype that had been made through task scenario analysis, which is one of the stages of usability testing. The evaluation's findings indicate that this research can guide in developing a system to promote consumer behavioral change; in this example, induce customer behavior towards eco-friendly lifestyle.

CCS CONCEPTS

• **Interaction design theory, concepts and paradigms**; • **Interface design prototyping**; • **Ethnography**; • **Mobile computing**;

KEYWORDS

eco-friendly lifestyle, green lifestyle, interaction design, delivery service, mobile application

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1 INTRODUCTION

The aggregator of online delivery services in Indonesia has increased since the pandemic began in 2020. They provide logistics delivery services with small loads from one address to another [13]. The impact of the COVID-19 pandemic in Indonesia has also changed people's habits to meet their daily needs. Consumers like this service because it is practical and fast. There is an increase in the use of delivery services in Indonesia, which is predicted to reach 5% in 2025 [3]. The following situation is in line with the growth of delivery service aggregators that operate in and reach big cities in Indonesia. Some popular ones are Gojek, Grab, Anterin, and Maxim [5]. These applications provide customers with various services and features that make it more convenient to transport items such as goods, documents, and food to their desired location [14]. However, these aggregators use carbon-based vehicles, contributing to global warming and increasing carbon emissions. It is recorded that until 2022, the number of delivery service drivers in Indonesia will reach more than 4 million and is predicted to continue to increase amid an economic recession.

Carbon emissions are, by definition, the waste products that result from burning compounds containing CO2-based principal constituents, such as gasoline, diesel, gas, and other similar fuels [4]. The long-term effect of carbon emissions is climate change, contributing to the acceleration of global warming. Some studies also indicate that the harmful impact of carbon emissions can disrupt economic growth [15–17]. As the world's 4th most crowded nation, Indonesia aims to lessen the country's reliance on fossil fuels, increase renewable energy sources friendlier to the environment, and target zero emissions before 2060 [19]. The government has implemented various policies to meet the challenge of reducing emissions to zero [20], such as the regulation of electric fuel stations, the principle of the development of battery factories, rules for the manufacturing of electric-based vehicles, and regulations for the raw materials used in electric vehicles.

In the current state of affairs, relatively few products offer app-based delivery services that are more considerate of the environment. Grab Bike and Gojek Ride are examples of transportation businesses that provide electric rides [12]. However, this service will be more practical and have a broad impact if it is accompanied by user awareness of an environmentally friendly lifestyle. Therefore, delivery services that induce users to endorse a green lifestyle still need to be expanded. Our main novelty and contributions are stated in how app developers could use an interaction design framework in engineering the UI/UX of the delivery service app that promotes a green lifestyle to facilitate Indonesia's progress toward achieving zero net emissions.

In this paper, we present the case for the Onthel application as a forerunner among delivery services that, in addition to minimizing their impact on the environment, encourage their customers to adopt eco-friendly lifestyle habits. We started by collecting data using the online questionnaires method to get an overview and view of the community about the concept of delivery services that induce a green lifestyle. We started by collecting data from Surabaya city, Indonesia, about society's habits toward an eco-friendly lifestyle. The subsequent step is to use the interaction design technique, an iterative process that produces personas, user journey maps, and

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application prototypes to fulfill user requirements. Finally, we conducted a task scenario usability testing to validate our prototypes.

2 RELATED WORKS

Considerable research on applications that aim to change user behavior towards eco-friendly practices has been carried out. A study by German et al. concluded that pro-environmental attitude from a package delivery service provider highly contributes to consumer's behavior as the awareness of eco-friendly actions continues to rise, especially during the COVID-19 pandemic that significantly increased the demand for safe package delivery services [6]. Lin et al. studied that same-day delivery by crowdsourcing offers a promising solution for low-cost delivery service, however the fuel consumptions and emissions pose a problem when the demand increases, therefore a environmental-friendly solution is needed [9]. A serious gaming technique was utilized by Massaoud et al. to map player profiling in driving and provide reward for players whose driving patterns were environmentally friendly [10]. In addition, there have been efforts to encourage safe driving based on game theory, which has shown promising efficacy in changing drivers' behavior [8]. An overview of the environmentally friendly feedback system design in the campus environment has been compiled as part of an effort to provide a set of guidelines for the construction of environmentally friendly facilities on campus [2]. This research is intriguing because it encourages students to consider environmentally friendly alternatives that institutions may implement on campus. In addition, there has been an established study on mobile applications that can assist automobile owners in controlling the driving speed limit [1]. Zuraida and Aisyah work on the research of motorcycle taxis based on apps that have the potential to encourage safe driving practices in the community [18]. The number of motorcycle accidents that occur regularly in Jakarta is the focus of this investigation. The purpose of the researchers' creation of a hypothetical model is to investigate the nature of the connections between the myriad factors that may contribute to the incidence of accidents. Guimarães and Renzi used interaction design to develop an experimental breakfast delivery system with satisfactory result [7].

3 METHODOLOGY

We use an interaction design approach because it is relevant to the scope and objectives of this study. Interaction design is an iterative process of designing and developing interactive models between a product, system, or service to the user [21]. Interaction Design is a subset of UX Design under the HCI umbrella. The interaction design stages including establishing requirements, designing alternatives, prototyping, and evaluating. Fig 1 shows the Interaction Design workflow. Because each step might overlap with the next, it is feasible to evaluate the product and establish the requirements right at the beginning. When establishing requirements, the goal is to collect information from the target user by conducting data collection and requirements analysis. The designing alternatives stage is to build a usable conceptual design. Designers and developers usually collaborate through brainstorming to arrive at a common objective. Typical outputs at this stage are personas and user journey maps. The next step in the prototyping process is for the developer to create a low-fidelity prototype. Then they will move on to creating a high-fidelity prototype to transfer the outcomes of the design concept into an interactive visual form comparable to the actual product. The outcomes of this prototype are then put through several different usability testing methodologies to validate the applications that have been produced in terms of how easy they are to use and how effective they are.

4 RESULT & DISCUSSION

We apply interaction design, a framework for designing interactions between users and products. The first stage is establishing requirements to explore user needs by utilizing an online survey method to get sample data from the target user. The purpose of collecting this data is to get the experience and habits of respondents toward an environmentally friendly lifestyle. The second objective is to collect respondents' input regarding steps to introduce the green lifestyle through induction from external causes.

The next step is to determine the user requirements using questionnaires with 187 participants in Surabaya, Indonesia. A Likert scale is used in the survey to evaluate the respondent's behavior concerning three eco-friendly indicators: reducing, reusing, and recycling. For each indicator, we asked participants to likeness implement eco-friendly habits. These questions affect the UI design for inducing customer behavior toward a green lifestyle, i.e., rewarding the participant for using nonplastic compounds since most participants still use lots of plastic waste daily. The age demography of respondents is described as follows: 40.1% were between 18 and 24. About 31% of respondents were between 25 and 34, and 23% were between the ages of 35 and 44. The rest are respondents aged over 45 years. Furthermore, we conducted a descriptive statistical analysis to obtain respondents' habits, responses to external influences, and reactions to rewards/incentives given for environmentally friendly actions as input in the implementation of induction in this application. Respondents must indicate where they fall on a Likert scale regarding reducing, reusing, and recycling behaviors.

Of the three aspects of an environmentally friendly lifestyle, only the "reuse" aspect is what people with confidence have often practiced in their daily lives. In all three "reuses" acts, the mean value is more than 3.0. The standard deviation shows an even distribution, as do the variance and kurtosis values. The tendencies of "bringing our drinking bottle when leaving the house" and "using a shopping bag when shopping" show that the data spread is more inclined to a high Likert value. In comparison, the distribution of data with a low value frequently occurs in the tendency of "using the printer to print documents." This number is because the majority of respondents are teenagers, while we assume printer users are those who are office workers. We also analyze respondents' reactions to external variables influencing them to adopt eco-friendly habits to deepen our analysis of the respondents' data on their eco-friendly practices. In addition, as a validation of filling in the respondent's data, we also asked for self-evaluation to assess how confident the respondent is if they are considered practicing those habits. Based on statistical values, it shows that respondents believe that external

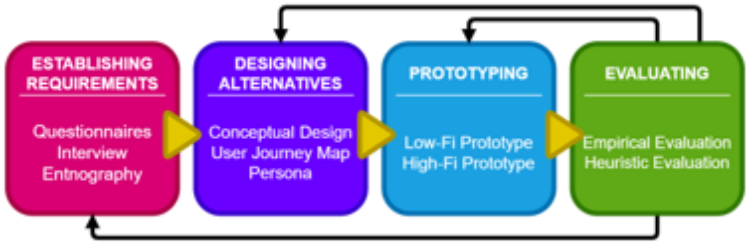

Figure 1: Interaction Design Workflow

Table 1: Descriptive Statistics For User Research

	Mean ($\bar{x}$)	SD (σ)	Variance ($\sigma 2$)	Kurtosis ($\beta 2$)	Skp	Conf. Level
Reduce						
Purchasing water bottle	2.59	1.21	1.46	-0.82	0.22	0.175
Turn off lamp and AC	4.65	0.72	0.51	6.41	-2.43	0.104
Reuse						
Bring own drink bottle	3.70	1.24	1.55	-0.35	-0.76	0.181
Use shopping bag	3.07	1.53	2.33	-1.45	-0.14	0.221
Print documents	3	1.43	2.03	-1.25	0.06	0.207
Recycle						
Sorting trash	2.86	1.29	1.68	-1.05	0.07	0.188
Donating stuff	2.84	1.23	1.52	-0.89	0.05	0.179
Self evaluation	3.30	1.23	1.52	-0.21	0.02	0.128
External influences	4.43	0.73	0.53	1.79	-1.29	0.074
Reward factor	4.10	1.00	0.99	0.88	-1.09	0.144

factors and incentives in the form of rewards can change their behavior to participate in implementing an environmentally friendly lifestyle.

The next step of interaction design is designing alternatives. We develop personas, and user journey maps to help with the conceptual basis of application design. We create personas based on the results of user requirements analysis and divide them into persona groups. In contrast, the user journey map is utilized to get a visual representation of the user flow or process from beginning to end, which is connected to the issues currently occurring with the delivery service. As a result, the persona and journey map are transformed into the prototyping concept's base.

We develop low- and high-fidelity prototypes based on personas, journey maps, and targets to be achieved in this research. Fig 2 shows the appearance of the high-fidelity prototype. There are two Onthel applications: Onthel for consumers and Onthel for cyclists. The Onthel for consumers is our main application to initiate delivery orders. On the other hand, Onthel for the cyclist is a must-use app for the cyclist to fulfill their customer order and earn payouts. The delivery service ordering process adopts other similar delivery services and adheres to the usability principle of Jakob Nielsen on consistency and standard points. The order process starts with the consumer entering the pick-up address, delivery address, and recipient contact information and determining the geolocation on the map. The system allows for multiple address. Fig 2a shows an example of a delivery route display. Next, consumers enter additional data such as pick-up date and time, a description of the goods sent, and make payments. From the cyclist's side, order details can be seen clearly and comprehensively, as shown in Fig 2b.

Earlier, we collaborated with the team to provide ideas for a reward and incentive model that would be appropriate for the requirements of this application. We concluded that the best approach would be to apply the tiered program method, a reward system derived from the loyalty program. This method provides rewards to consumers, which are seen from the application's intensity and quality of consumer activity. This method rewards loyal consumers for their orders and also provides rewards for consumers who want to practice an environmentally friendly lifestyle. Fig 2c shows a screenshot of the consumer's commitment to protecting the environment, which appeared at the final stage of the order process. Consumers are rewarded with Onthel Points for their commitment to green lifestyle behavior. Currently, we are designing three main activities: donating used plastic bottles, planting tree seedlings, and using non-plastic packaging for this delivery service. Cyclists will help accommodate consumer commitments. For example, a cyclist will provide seeds to plant if consumers choose to commit to planting seeds. Fig 2d shows the implementation of the tiered program in the form of progression milestones. Customers acquire Onthel

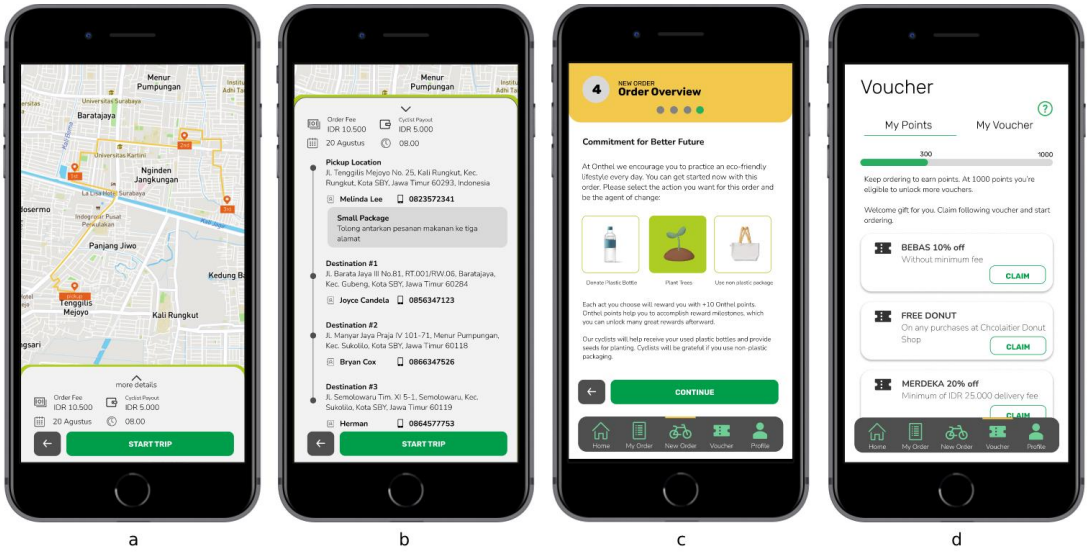

Figure 2: High Fidelity Prototype

points to redeem them for appealing vouchers at each milestone point. The customer can use this voucher to receive a discount on their orders, purchases of goods made in stores that collaborate with Onthel, and other one-of-a-kind prizes such as prestigious medals or plaques in recognition of the customer's participation in the implementation of environmentally friendly habits.

Afterward, we evaluate the results of the Onthel application prototype development. We employ a method called task scenario analysis, and our goal is to have ten people participate, including consumers and cyclists. The participants finished the prepared task scenarios as shown in Table 2 and we record the completion time and the number of errors raised. However, there is an error in the task order. In more detail, this task instructs the customer to place an order from location A to location B. This error occurs due to a payment system error involving the payment gateway. Another error occurs on the cyclist side, namely in the task delivery sequence. We investigated that the error was related to uploading proof of delivery photos to the server. When viewed at the completion time, the participants quickly completed their tasks. However, the study recorded the longest time in the task delivery sequence because the distance between locations A and B took approximately 17 minutes to reach by bicycle. Therefore, we found that the completion time doesn't reflect the performance of the real app. Consequently, we conduct an additional heuristic evaluation that involves a team of experts. First, two experts were involved and were briefed on general user personas and scenario tasks. Then, each expert began the evaluation process based on Jacob Nielsen's heuristic guidelines and positioned themselves regarding the user persona on each scenario task. Finally, experts categorize their results based on their problem findings. As a result, our design has been evaluated, and found low-to-medium problems that may hinder user experiences. For example, our design shows a need for error prevention on a few parts, and it could be a significant problem if no further action is taken. Nevertheless, the application is generally considered usable, and the UI/UX design for promoting a green lifestyle has met the participants' expectations.

5 CONCLUSIONS

Application-based delivery services have been increasing in Indonesia since the pandemic that began in 2020. This fact has an environmental impact due to the increasing number of drivers of carbon-fueled vehicles in the delivery service fleet. We developed the Onthel application as a pioneer in environmentally friendly delivery services. We use an Interaction Design approach to design and construct applications that promote a green lifestyle for everyday life. The findings we highlight in this paper show that many respondents still do not fully implement environmentally friendly habits. Secondly, respondents like rewards and agree if external factors encourage them to carry out environmentally friendly habits in their daily lives. Third, implementing a reward system with a tiered program model can be one of the solutions for the delivery service application design, which is not only environmentally friendly but also successfully encourages users to practice environmentally friendly habits. Henceforth, we can continue this research on the final implementation of the product being tested in actual conditions. Tests on customer retention and response to changes in behavior toward eco-friendly habits still need to be aggravated with appropriate measurement metrics.

ACKNOWLEDGMENTS

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Table 2: Task Scenario Result

App	Task Description	Completion Time (Avg)	Error number
Onthel	Customer boostrap (sign up - login)	00:51	0/5
	Order steps	02:05	1/5
	Inspecting milestones	00:30	0/5
	Inspecting green lifestyle commitment	00:21	0/5
	Order tracking	00:11	0/5
Onthel Cyclist	Cyclist login	00:13	0/5
	Order checking	00:15	0/5
	Delivery sequence	17:48	1/5
	Cyclist earning report	00:23	0/5

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