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The 2<sup>nd</sup> International Conference  
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## **PUNTO: Designing for Pandemic Implementing Behavior Observation to Redesign Hand Sanitizer Bottle Cap**

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### **Abstract**

The spread of Covid-19 since March 2020 in Indonesia has brought a lot of changes, especially in people's daily behavior. Many people started to exercise and consume healthy food, also wearing a face mask in public places. In addition, people also start to bring hand sanitizers to sterilize their hands or any surfaces that they touch. Unfortunately, the designs of hand sanitizer bottles are not designed for the pandemic era. Most of the bottles in the market are still using pre-Covid designs that do not accommodate the needs of the user that would prefer to touch surfaces as minimum as possible. Existing bottle designs do not help users to minimize touch with small surfaces like ATM (Automatic Teller Machine) and EDC (Electronic Data Capture) machine buttons, while also enabling easy access to the sanitizer by encouraging pocket-placement of the hand sanitizer by design. This project aimed to design a new type of hand sanitizer bottle that accommodates people's behavior in the pandemic era. In order to do that, this project implement the Design Thinking method from Stanford D-School with emphasizing on behavior observation, with the addition of Problem Definition theory by Kees Dorst. The final result of this project is PUNTO, a hand sanitizer bottle with a ballpoint cap-inspired shape that could be used to press small buttons. Based on the testing and evaluation process, PUNTO succeeds to accommodate the user's behavior that has been overlooked by other hand sanitizer bottle's design. However, there is some potential for future development, especially in the activities that related with touch screen. PUNTO is currently in the process of registering for Intellectual Property Rights and afterward will be open for further commercialization.

### **Keywords**

*behavior design, design for pandemic, covid19, design thinking.*

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### **Introduction**

Design Thinking was initially used by Industrial Designer to identify and solve the problem during their design process, but in the last few decades it has been use to solve problem on outside of design related problem such as in business [1]. Even the most popular design thinking theory nowadays was created by a design firm IDEO to solve problem for business, as mentioned by Tim Brown that Design Thinking can be described as a discipline that uses the designer's sensibility and methods to match people's needs, with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity [1].



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The spread of Covid 19 since March 2020 in Indonesia has brought a lot of changes, especially in people's daily behavior. Since then, the awareness about hygiene and health has been increased exponentially. Many people start to exercise and consume healthy food, also wearing face mask in public places. In addition, people also start to bring hand sanitizers to sterilize their hand or any surfaces that they touch. Hand sanitizers that are available on the market came in various shape and sizes, but mostly in travel sizes.

According to Tim Brown, design thinking can be used to generate economic value by influencing human behavior in way of studying and empathizing with behaviors and identities of a society [2]. Unfortunately, the design of the hand sanitizer bottles that are available in the market are not designed for the pandemic era. Most of the bottles in the market are still using pre-Covid design, that do not accommodate the need of the user that would prefer to touch any surfaces as little as possible. The existing bottle design will make users still need to use their hand to touch small surfaces like ATM (Automatic Teller Machine) and EDC (Electronic Data Capture) machine button. This project aimed to design a new type of hand sanitizer's bottle that accommodate people's behavior in Pandemic era. In order to do that, this project will implement Design Thinking method from Stanford D School, with the addition of Problem Definition theory by Kees Dorst. The outcome of this project has been applied for Intellectual Property Right and afterwards will be open for further commercialization.

## Methodology

As mentioned above, this project will be using the Design Thinking approach from D-School Stanford University which emphasize on the empathic study in order to understand the need of the user. This methodology based on 5 steps: (1) Empathize, (2) Define, (3) Ideation (4) Prototyping and (5) Evaluate [3].

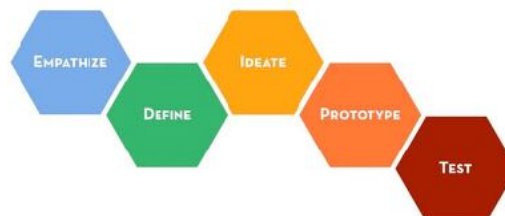


Figure 1. Design Thinking. (Source: D School, Stanford University)

The first step to Empathize was conducted through deep interview with the user to get better understanding on their daily routines and their needs, the second step Define was conducted based on problem formulation theory by Kees Dorst. The third step is Ideation where the team generate a lot of sketches and ideas in order to find the suitable solution. The fourth step is Prototyping, using rapid prototyping tools in order to gain effective and efficient results. The last step is Evaluate, where the prototype being tested and evaluate.

## Results

This research was started with Empathic Study that aimed to understand the potential users, through quantitative and qualitative approach to 50 people respondents. The demographic of the respondents lived in the city of South Jakarta and South Tangerang. The gender composition is 50% male and 50% female. The empathic study started with the goal to find out which type of hand sanitizer that they prefer to use it.



Figure 2. Existing type of Hand Sanitizer in Indonesian market. (Source: Author)

The existing type of hand sanitizers that are available in Indonesian market consists of 2 types, the Gel type (left) and the Spray type (right), see Fig. 2. We were started with asking questions about, which type of hand sanitizers that they use to: (1) cleaning their hand, (2) cleaning the surface that they are about to touch, and (3) cleaning both their hands and the surface. Most of the people use Gel type of hand sanitizer only to clean up their hands, while they use Spray type of hand sanitizer to clean up their hands and other surfaces, see Fig.3. This insight helped the project to focus on Spray type of hand sanitizer.

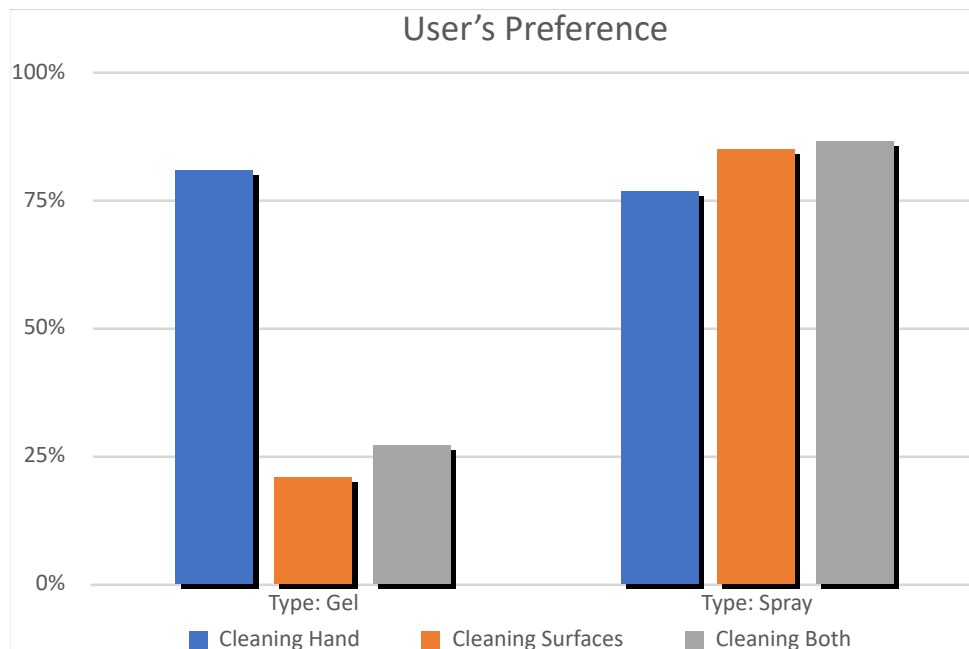


Figure 3. User's preference comparison between Gel type and Spray type of hand sanitizer, based on function. (Source: Author)

This project use Behavior Theory by John Watson that learned behaviors through physical interaction with the environment through a process called conditioning [4]. Thus, behavior happened to response environmental stimuli. The conditioning process for this project started from one particular scenario, which is when the user want to take a lift when they have their spray hand sanitizer bottle with them. This conditioning process conducted through a field observation in the building of Universitas Pembangunan Jaya and Bintaro Exchange Mall in South Tangerang, Indonesia, in December 2020, see Fig. 4.



*Figure 4. Behavior Observation with the Case Scenario: Lift (Source: Author)*

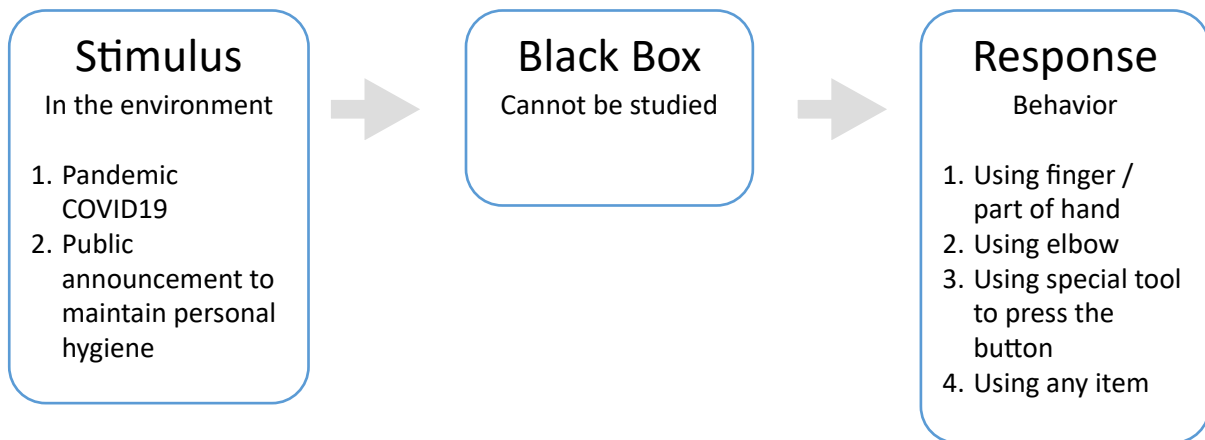


Figure 5. Behavior Theory with the Case Scenario: Lift. (Source: Author)

John Watson's Behavior Theory diagram above explain that external conditions provide stimulus to the human, then we processed it within what called black box (because cannot be scientifically studied) and then produce the results in the form of behavior or reaction. In this scenario, when observee want to use Lift during pandemic Covid 19, they were either using their finger or part of their hand; using elbow; using any items that they were carry or using special tools to press the button.

Based on the findings on the previous phase, we decided to analyze the data using traditional problem formulation approach by Kees Dorst [5].

## What +? = Outcome

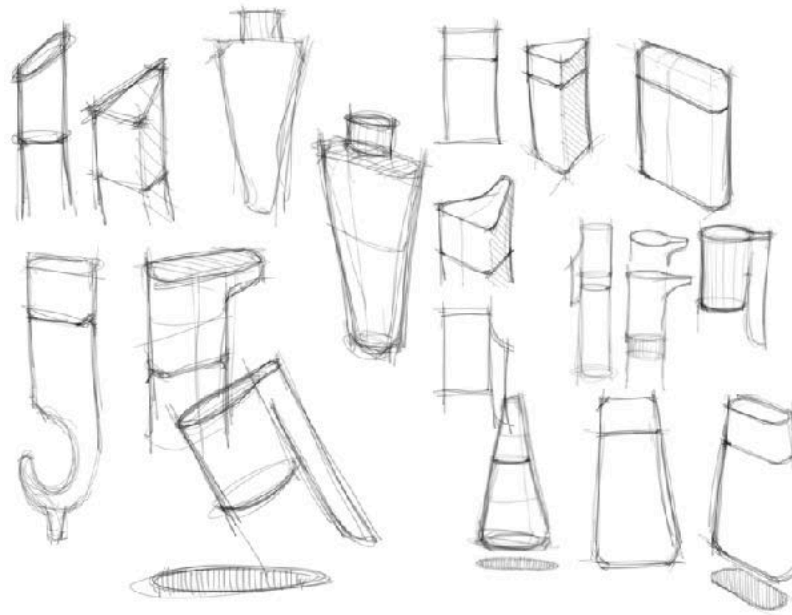


Spray Type Hand Sanitizers + ? = User does not need to touch small surface directly for certain activities like pressing button in EDC machine, ATM, or lift.

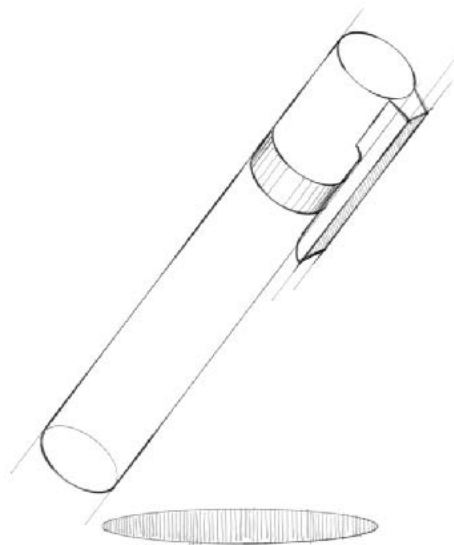
Figure 6. Problem Formulation. (Source: Author)

The variable of (What) will be replaced with the object of the research which is Spray type hand sanitizer product, while the (Outcome) will be replaced with the new behavior that user does not need to touch small surface directly for certain activities like pressing button in EDC machine, ATM, or lift, see Fig 6.

The ideation process developed based on the limitation that generated from the problem formulation. For instance, in order to touch small surface, it requires a pointing shape. In addition, the new design should consider the feasibility of manufacturing process. The ideation process was proceeds with sketching method, see Fig. 7, 8.



*Figure 7. Sketches. (Source: Author)*



*Figure 8. Final sketch. (Source: Author)*



During sketching process, there was new idea that the design should have the possibility to be implemented on as many bottle shapes as possible. Therefore, the authors came up with the idea that the development should focus on the bottle cap. The inspiration of the shape was from the ballpoint cap, it has sticking part that could be used to press small surface like ATM machine or EDC machine button. The final sketch then recreated with 3D digital modelling software Rhinoceros in order to get better understanding on the shape and construction of the design, see Fig. 9. After the final 3D modelling is done, the next step is to process the design with rapid prototyping technology 3D printing.

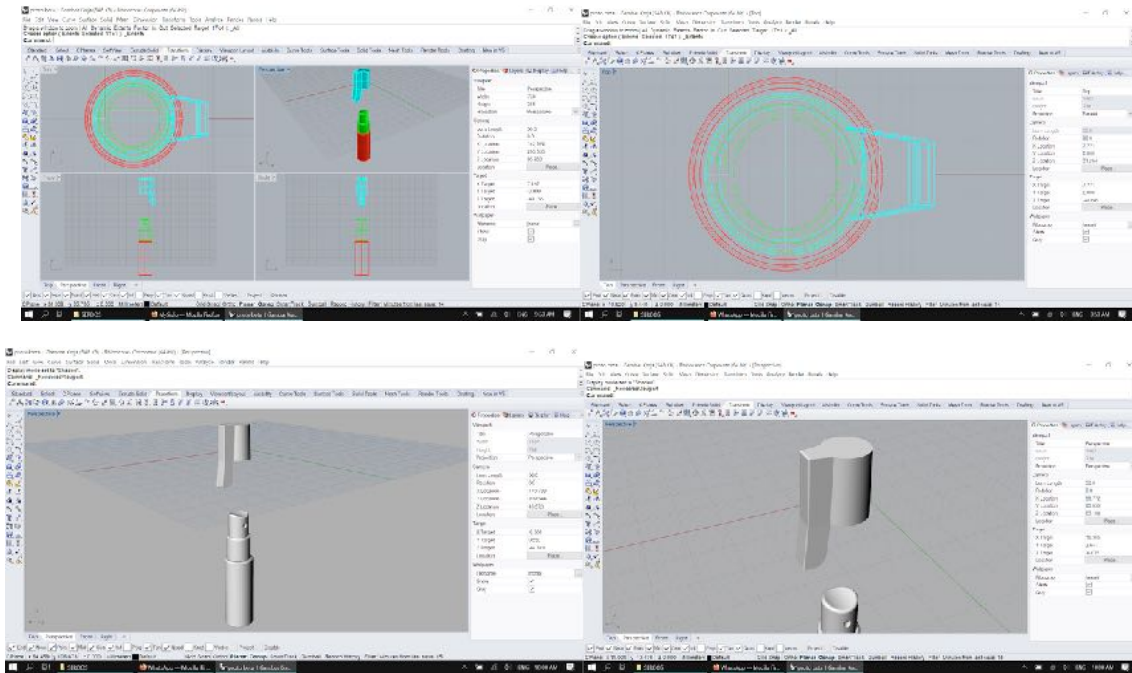


Figure 9. Final design created in 3D modelling software Rhinoceros. (Source: Author)





*Figure 10. Final design rendered in 3D rendering software Keyshots. (Source: Author)*

The testing and evaluate process was conducted with the prototype that generated from 3D printing method, see Fig. 11. In order to validate the design, the prototype printed in 1:1 scale from material PLA, so we were testing it directly on ATM, EDC machine and lift, see Fig. 12, 13.

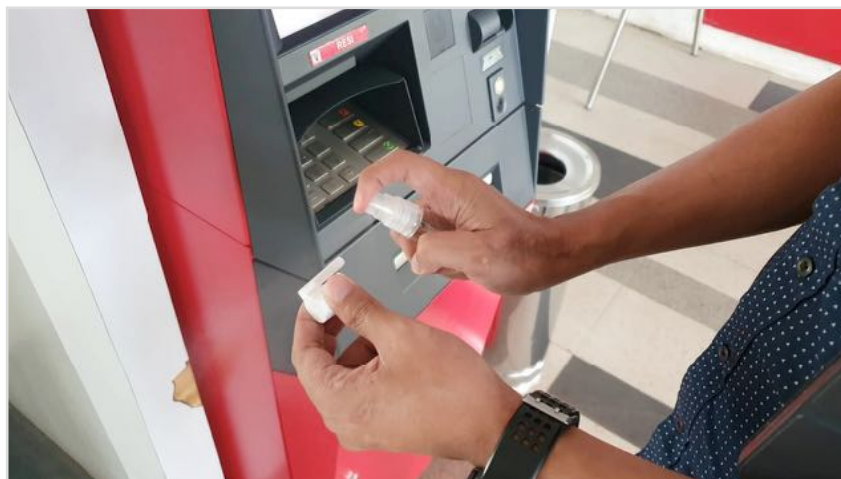


*Figure 11. Prototype made from PLA with 3D printing technology. (Source: Author)*





*Figure 12. Prototype made from PLA with 3D printing technology that being tested in ATM, EDC machine and lift. (Source: Author)*



*Figure 13. Clean up the cap after being used. (Source: Author)*



*Figure 14. The prototype is easy to carry. (Source: Author)*

## **Conclusion**

Based on the test and the evaluation phase, the design of the new cap solves the problem formulation. PUNTO helped user to do their daily activities with touching less surface. In addition, PUNTO's cap resembles a pen cap, to remind users of a pen and will encourage users by behavior to store it in their pockets to have easy access at all times. However, it cannot work with the ATM machine that using touch screen display. This feature and the possibility should be researched and developed for further development. PUNTO is under going process of registration for intellectual property rights in Directorate General of Intellectual Property Rights Republic of Indonesia.

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