Implementation of Reusable Plastic Waste and Electronic Cable Waste as Space Divider: Responding Sustainability Issue in New Normal Living- Study Case in a Small Coffee Shop

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Abstract.

Plastic waste and Electronic cable waste (E-waste) is two of the major issues in global environmental problem especially in the urban lifestyle, and it is increasing rapidly towards the time. The year 2020 is new normal condition in order to face covid-19 epidemic, which make the society have to be more aware of their personal hygiene and maintain physical distancing between one another. Feeling safe is an important aspect for the society to keep their social life in a public space such as a restaurant/cafe. A divider is introduced in the social environment such as restaurants to accommodate conversation while enjoying meal together with family or colleagues. And this such of dividers will add more waste into the environment. This study is to seek an alternative solution to utilize plastic waste and electronic cable waste into new goods that have new use of values related to new normal conditions. E-Waste dividers are made from cables and plastics waste offering a creative way to design a divider, and can simultaneously reducing amount of e-waste as well. The design has standards criteria such as easy to clean, and the function is to block droplets spreading. It has a storage technique uses a folding technique to facilitate storage arrangements, and it is designed aesthetically to accommodate the divider design of a restaurant/cafe. For further study, the divider can be made from other type of e-waste, and it can be designed as a divider in other public spaces.

Keywords: New Normal, E-Waste, Divider, Coffee Shop
1. Introduction
The amount of plastic waste and electronic cables in Jakarta are both waste that cannot be recycled, around 15 million tons of waste in Indonesia cannot be handled, and plastic is the largest amount of waste by 14% and 4.3% are metal waste. This problem also caused by the behavior of Indonesian people who like throwing their trash directly into the rivers or into their natural environment [1]. Meanwhile electronics in Indonesia increased as 1.274 million tons or an average of 4.49 kg per capita during 2016 with the trend to escalate in the future [2]. Plastic waste that cannot be managed properly will be buried in the ground or run into the ocean so that it can damage the ecosystem [3]. Electronic cable waste causes fatal things to Indonesia, namely the spread of toxins and other health problems [4].

In the early 2020 there was new type Corona Virus spread across the globe and has been declared as a global pandemic condition by the World Health Organization in 12th March 2020 [5]. Since then, the government of the Republic of Indonesia had implemented the large-scale social restrictions (Indonesian: Pembaratan Sosial Berskala Besar, abbreviated as PSBB) in several areas. The first regencies that applied the PSBB is Jakarta Region, that start on April 10th, 2020 until June 4th 2020. After that, the PSBB transition phase was announced with the new health protocol, that call New Habit Adaptation (Indonesian: Adaptasi Kebiasaan Baru) or called the “New Normal”. Health Protocol in New Normal is include keep physical distancing, 50% capacity for office and commercial, use a mask, conduct the healthy living, etc.

A divider came up for the solution of the new normal activity in a public space such as coffee shops. This design of dividers is to keep certain amount of dine in customers in the small area inside the coffee shops without changing much of the space layouts. Instead of rearrange the layout into a minimum capacity, it can be managed by reaching into an optimum capacity. Therefore these designs can be the solution for the new normal issues at the coffee shops, so that it can still continue running and maintaining the quota of their dine in customers without neglecting the covid-19 protocol [6].

A divider which is placed on top of the coffee shop dining table is made from plastic and electronic cable waste are able to manage some of the waste problem. Using plastic and electronic cable waste as part of the divider is to reduce the use of new materials by combining with recycled materials in order to avoid material pollution during the pandemic.

Small coffee shops in Jakarta are selected based on space issued that they have in order to follow covid-19 protocol with the result is very little space and reducing a lot of customers that can be dine in the coffee-shop. Based on the surveyed from Arah Kopi, Lain Hati, Fore coffee shops we can conclude that there is a reduction in chair furniture to meet the standarization and also a significant reduction in coffee tables.

The design process begins with the identification of the customers needs and in this study they are referred to the coffee shop customers. Based on surveys and layout studies of the interior coffee shop, it came up with 3 types of design variants which are chosen to be 3 alternatives divider design using plastic and electronic cable waste that can be implemented on top of the coffee shops table. Thus, the criteria and the design thinking process can be used for the next type of public space.

2. Methods
This research is conducting two steps in responding the “New Normal” condition. Firstly, the problems were identified by the spatial analysis throughout deep observation at the targeted coffee shops. This step will take the general brief of the problems where the customers need the dine-in activity while the physical distancing was required during the coffee shops operation hours. Secondly, the analysis guides the process of designing the products and facilities with the waste materials (plastic and electronic cable waste) to respond the needs and the requirements to obey the official health protocols.
The practical implications may lead the possible method to provide interactions among the customers throughout simulation by 3 dimensional modelling. This creation and creative process of making the separator facility could be achieved by using materials experience method consist of four experiential components; aesthetic experience (sensorial), meaning experience (interpretative), emotional experience(affective), and practise experience (performative) [7].

3. Result and Discussion
The current crisis is driven by external factors (covid 19) causing the dynamics of the shifting habits in adapting the crisis and dealing with it in a new way called new normal. New normal is created from a crisis that threatens health when exposed to a deadly virus. This extreme situation suddenly changes the most fundamental behavior of humans, that is the way of socializing, and it is calculated to last for a long time in all parts of the earth. So the world began to change the patterns of human behavior to be very concerned about a certain distance, known as Social distancing.

While in the daily life of human activities must continue, covid-19 protocol is an absolute requirement for every individual, without exception. Everyone is responsible for the health of himself and others, including his family. This understanding must be embedded in society every time doing activities outside the home. Being away from others in a safe distance, trying to stay away from the crowd, never take off the mask and wash your hands frequently are significant forms of new normal behavior.

New normal has the meaning of giving distance between one human and another human in one zone. The distance that slowly dissolves into an awareness of how humans cannot live alone and the emergence of mutual suspicion that everyone has the potential to carry covid-19 virus, which since the last 4 months has been rampant, is an attitude that can turn into awareness of caring for others. So that new normal becomes easy to live through an independent pattern of behavior that is in an orderly protocol covid 19.

3.1. Object Study
The number of visitors in the coffee shop is limited to less than half the capacity as allowed by the authority. Interior relayout refers to the covid-19 protocol applied to small cafes and coffee shops that are widely spread in the commercial district of the capital.

This study was taking place in 3 coffee shops in Jakarta, which is Arah Kopi, Fore coffee shop, and Lain Hati coffee shops. The picture below are the condition after relayout furniture for new normal. This situation shows that many tables and chairs have been partially removed to face the new normal protocol, but without a well-planned layout arrangement so that there are empty spaces that cause an uncomfortable ambiance.

![Figure 1. From Left: Lain Hati, Coffee Shop Fore, Anah Coffee Shop](image)
According to observations in the field, the floor plan of a cafe and coffee shop that refers to the new normal is divided into 2 zones, namely the take away service zone and dine in zone, which each zone is regulated in such a way that visitors are not jostling and crowding.

The take away service zone includes a queue area in a booking area as well as a cashier area, waiting area, and take away area. The take away service zone directs visitors with a single line. This makes visitors feel safe enough to place orders, pay and wait for orders to be taken away following a one-way circulation as seen in the picture below.

![Figure 2. Arah Kopi Coffee Shop, Cashier and booking area (1), Waiting Area (2), Take Away Area (3). Source: Writer, 2020](image)

The dine-in zone includes the booking area, then payment, then selecting available tables and chairs. After completion, visitors return through the arrival lane to exit the cafe and coffee shop. Dine-in zones require extra protection that is not sufficiently installed just in the form of a prohibition sign (call for distance) in the eating-drinking area. Extra protection is fulfilled by giving a minimum distance of 1 meter between tables. Provide chairs with lying alternately to prevent visitors sitting directly next to each other. From the picture below is Lain Hati Coffee Shop, Fore Coffee Shop, and Arah Kopi Coffee Shop illustrates about sitting rearrangement by eliminating some of the table and chairs, as well as the distance between the tables in order to fulfil the New Normal of standardization. From these surveys, we can conclude that in a little coffee shops with 50m2 in average, the tables capacity have been reducted into half or 1/3 of capacity.

![Figure 3. Table arrangement before New Normal Source: Writer, 2020](image)
3.2. Divider As Solution for Covid-19 Protocol

Without a good arrangement of the furniture, it will result in a distance that is quite far apart. The safe distance for preventing droplet as WHO standard is 1.8 meters. This underlies the researchers stating that a sufficiently qualified barrier is needed to overcome the problem, and the existence of a barrier between the set of tables will optimize the distance between another so that it can lead to a good furniture setting in order to create a comfortable ambiance for visitors.

To fulfill the covid-19 protocol is also by separating the dining area on the table or between the table by installing a barrier that is solid, non-porous, and not hollow. This barrier serves to prevent droplets of visitors from contaminating other visitors' dining areas. Furthermore, limiting the area on the table and between the tables is called a divider. The pictures below are showing the arrangement of the tables before implementing the dividers and after the implementation of dividers which can have more seats and table arrangement.

![Figure 4](image1.png)

*Figure 4. Table arrangement layout before New Normal (left) and after the implementation of dividers (right) at Fore Coffee Shop*  
*Source: Writer, 2020*

![Figure 5](image2.png)

*Figure 5. Table arrangement layout before New Normal (left) and after the implementation of dividers (right) at Lain Hati Coffee Shop*  
*Source: Writer, 2020*

![Figure 6](image3.png)

*Figure 6. Table arrangement layout before New Normal (left) and after the implementation of dividers (right) at Arah Kopi Coffee Shop*  
*Source: Writer, 2020*
From these surveys, a divider design is the most suitable item as an answer to the challenges of the interior small cafes spatial planning problems and the challenges of reusing plastic waste and electronics cable waste. The design will be applied as a divider between tables, using plastic waste and electronics cable waste directly implemented as the following pictures.

![Figure 7. Implementation divider between tables into the layout](image)

Source: writer, 2020

The arrangement with divider using plastic waste and cable waste material resulting a much comfortable atmosphere. And the following is the divider design that uses electronic waste materials and plastic waste derived from Design Study Material that we can see the following pictures.

### 3.3. Construction of the Divider

The First step of making divider from plastic waste is to make a prototype of divider module. The divider is constructed by combining small modules of plastic waste as screen, and attach it into a frame for a support. The design module of plastic waste should be compact, easy to produce, and aesthetically designed. Below is some alternatives prototype module for the divider study.

![Figure 8. The Divider Module Designs](image)

Source: writer, 2020

This module can be attached to a wooden frame, similar as a frame that usually used for the back of the painting frame. The plastic module sheet that made from flatten plastic and cable waste
woven to each other with the order: front sheet-frame-back sheet. The sheet can be fasten by screw to the frame, then The edge of sheet is fastened to the iron bracket on the wall.

Picture below is the illustration installation of plastic divider to the coffee shop interior room. Other than to follow Covid-19 protocol, it makes a feature for the room itself. And the benefit is it can maximize the room capacity and still follow the protocol.

![Figure 9. The illustration of implementing divider into the cafee](image1.jpg)
Source : writer, 2020

The application of this divider will separate the table without giving a significant distance and also make the customers feel comfortable in the room. The next condition that arises is a beautiful atmosphere with a divider arrangement that also functions as a work of art that gives value to the decoration in the room.

The alternative installation for this divider is can be mounted on the ceiling, or free standing on the table. This alternative gives the coffee shop option and flexibility according their needs. This flexibility is crucial because the size and design theme of the coffee shop is different from one and another.

![Figure 10. The illustration of ceiling mounted divider](image2.jpg)
Source : writer, 2020

![Figure 11. The illustration of free standing divider](image3.jpg)
Source : writer, 2020
4. Conclusion
A small coffee shop is one of the businesses affected by the covid-19 pandemic problem, which must follow the Health protocol. Problems arise in small spaces and there is a lot of mobilization needed to accommodate high take-away activities as well as customers who are dine in. Furniture layout is arranged in such a way as to be very distant causing cold and uncomfortable atmosphere, not in accordance with the atmosphere of the cafe should be. This affects the comfort level of visitors who come in either as a take away customers or as dine in.

When comfort is influenced by social atmosphere and covid-19 social distancing protocols, we need a barrier that limits between tables without having to significantly reduce table capacity. So that visitors do not need to feel anxious about other visitors who are at the next table, which eventually creates a warmer atmosphere.

Plastic waste and electronic cable waste are one of the biggest waste problems in Indonesia. To recycle the waste is an effort to extend the life by giving it a new use value. The application of plastic waste and electronic cable waste as the main material of dividers is an effort to minimizing new waste that will be generated from the divider itself.

Various divider designs with plastic waste and electronic cables waste and some alternative dividers installation systems such as on the table, on the floor, and on the ceiling, is able to overcome the problem of the distance between the tables, and finally not only giving the waste a new use value, but to give the waste new aesthetic value into a work of art, by providing decoration in the interior that makes the atmosphere of the cafe become warmer and more attractive.

References
[1] http://litbang.kemendagri.go.id/website/riset-24-persen-sampah-di-indonesia-masih-tak-terkelola/
[2] Sahan, Yusnimar & Jayanti, Dewi & Anggriana, Nurul. (2019). Utilization of electronic scraps on making a concrete brick. MATEC Web of Conferences. 276. 01024. 10.1051/matecconf/201927601024
[3] https://www.cnnindonesia.com/gaya-hidup/20180425101643-282-293362/riset-24-persen-sampah-di-indonesia-masih-tak-terkelola.
[4] Wilyani, J. K. Nugraha, M. A. Aryadi, Nida Mariam. E-WASTE: AN UNDERRATED HAZARDOUS WASTE IN INDONESIA I. T. http://e-journal.president.ac.id/presunivojs/index.php/JENV/article/view/483
[5] Andrews, Jack & Foulkes, Lucy & Blakemore, Sarah-Jayne. (2020). Peer Influence in Adolescence: Public-Health Implications for COVID-19. Trends in Cognitive Sciences. 24. 10.1016/j.tics.2020.05.001
[6] https://www.businessinsider.com/photos-show-world-adapting-to-social-distancing-guidelines-in-pandemic-2020-5?r=US&IR=T#in-some-places-a-plastic-divider-is-not-enough-diners-in-this-bangkok-restaurant-for-example-have-been-asked-to-sit-diagonally-from-each-other-to-maximize-their-distance-3
[7] Karana, E., Barati, B., Rognoli, V., & Zeeuw van der Laan, A. (2015). Material Driven Design (MDD) A Method to Design for Material Experiences. International Journal of design