Implementation of Acoustic Material Towards Grab Office Workstation Design to Optimize Productivity

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ABSTRACT
A comfortable environment crucially influents the performance of workers. A noisy working environment can interfere with the concentration and productivity of workers. Grab office uses an open layout plan because collaboration and discussion between individuals are needed. With this, the work area tends to be noisier. Even slight distractions and chattering greatly affect an individual's level of concentration. To respond to this, the designer attempts to create a workstation that can minimize noise to create a more productive working environment. The process of designing the workstation is carried out by using a design process method pioneered by Rosemary Kilmer and W. Ottie Kilmer which covers analysis and synthesis stage, starting from gathering information about materials that can absorb noise to implementing it towards the design of the workstation. The design of the workstation is based on the corporate identity of Grab such as by using Grab's corporate color, green, and also by making use of Grab's logo to develop the shape of the workstation. To reduce noise in the working area, acoustic materials are used. Fiberglass boards are then used as partitions and workstation dividers to absorb noise throughout the working area.

Keywords: *Acoustic, Office, Productive, Workstation*

1. INTRODUCTION

Employee productivity is one of the most important aspects of improving the performance of a company. By maximizing the performance of a company, it will be easier to achieve the goals that have been set. However, to make it happen, companies have to make sure the working environment is comfortable enough for the employees to work at their best capabilities.
Physical setting of offices has undergone transformation as well from having work privacy with cubicle workstations to open layout plans where space is no longer divided with walls. Open layout plans are prone to be noisier without proper acoustics [8].

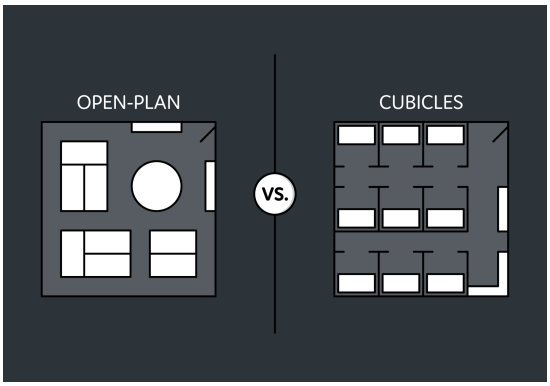

Figure 1. Open-plan vs cubicles
(By Phil Kendall, 2017)

A noisy office makes employees feel unmotivated and frustrated as there are lots of situations that can interfere with the employee's concentration. A noisy work environment can cause a disturbance towards the employees [1].
A study conducted by Poly found that 99% of employees are distracted from their duties at work every day. Respondents were also asked how these distractions affect their work, and 48% of respondents said that distractions in the office made it difficult for them to concentrate [2].
This proves that the conditions of the work environment that are noisy and full of interruptions affect the concentration and performance of employees. Being able to concentrate is very necessary for the employees to be able to finish their tasks well. A person requires a larger portion of thinking when completing a job with a high level of complexity. Even a slight distraction can greatly affect an employee's concentration.
A study conducted by Michigan State University in 2013 found out that even a brief interruption can double the risk of error during work. This happens because workers have to shift their focus from one task to another and then back again [3]. Certainly, this is a challenge for workers who works in an open plan office, owing the fact that other workers can freely talk to another worker resulting in a noisy working area. A study conducted by Evans & Johnson in 2000 found that employees who work in open spaces have increased stress in themselves [4]. The noise affects the concentration and work motivation of employees.

With the explanation of the data above, it can be concluded that a bad working environment can affect workers' productivity. Workers tend to be particularly distracted from their job when the office becomes too noisy and when lots of distractions are present. However, a calm office environment will increase the workers' concentration and productivity. With this, they will be able to finish their job better.

With that, the designer would like to create a workstation using acoustic materials that are able to absorb sound so that office workers can be more productive in doing their job.

2. BACKGROUND

2.1. Method

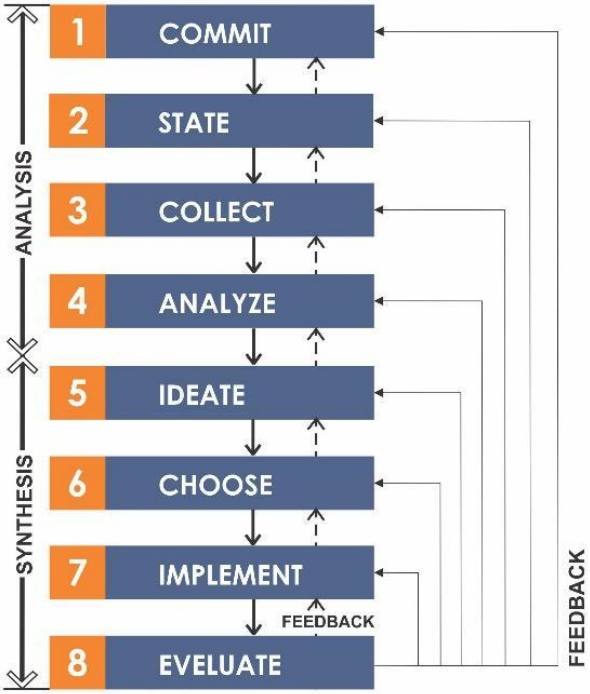

Figure 2. Design Process by Rosemary Kilmer dan Otie Kilmer, 2014
(illustrated by Hanna Taslima, 2018)

In designing this workbench, the method pioneered by Rosemary Kilmer was used. According to Rosemary Kilmer, the design process can be divided into two stages, namely analysis and synthesis [5]. In the analysis process, the first stage is commit. Commit is the stage of accepting and committing to this design project.

The next stage is state, which is the stage of defining the problem. At this stage, the designer conducts research and formulates problems regarding the problems experienced by workers in the office, especially those regarding acoustics.

Collect is the stage where the designer collects facts and existing field data. At this stage, data collection is carried out through: (a) collecting data regarding Grab's corporate identity, (b) studying literature materials related to the issues raised.

Next is analyze, which is the stage of analyzing the problems discovered from the data and facts that have been collected. At this stage, the designer analyzes the information that has been obtained in order to produce solutions to these problems.

While in the synthesis process, the first stage is ideate, which is the stage of pouring ideas in schematic and conceptual form. In this process, the designer makes: (a) design concepts, (b) alternative designs, (c) material and color concepts, (d) shape concepts.

While at the choose stage, the designer chooses the most suitable and optimal alternative from the existing ideas.

At the implement stage, the designer channels the ideas through 3D modelling and rendering of the workstation and also prepares a PowerPoint presentation.

The last stage is evaluate, which is the stage of reviewing the designs that have been produced and making revisions to create the final design of the workstation.

These are the parameters used in the process of designing the workstation:

Table 1. Parameter of designing a workstation which can reduce the noise level

NO	PARAMETER
1	Utilizing acoustic materials that can absorb sound on furniture to muffle noise. [6]
2	NRC of acoustic materials to absorb noise in an office ≥ 0.7. [7]

(By Canisha Chrystella, 2021)

3. RESULT AND DISCUSSION

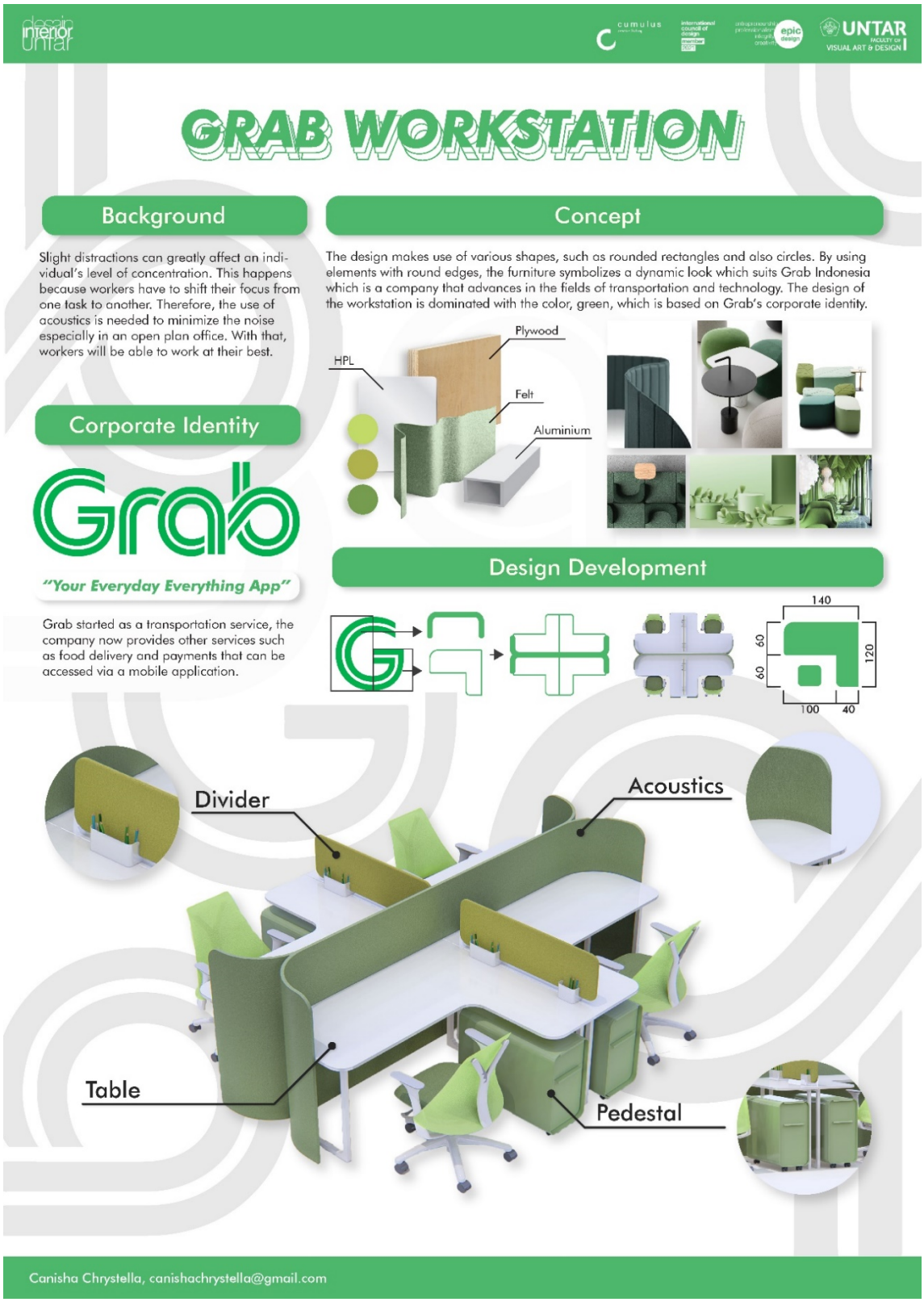

Figure 3. Design concept of Grab office workstation
(by Canisha Chrystella, 2021)

3.1. Shape Concept

The table top of the workstation is inspired by Grab's logo shape. The design makes use of various shapes, such as rounded rectangles and also circles. The L-shaped table top is completed with with rounded corners.

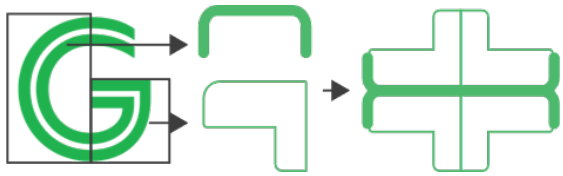

Figure 4. Shape development of Grab Office workstation (by Canisha Chrystella, 2021)

The L-shaped table provides a wide space for the workers. By using elements with round edges, the furniture symbolizes a dynamic look which suits Grab Indonesia which is a company that advances in the fields of transportation and technology.

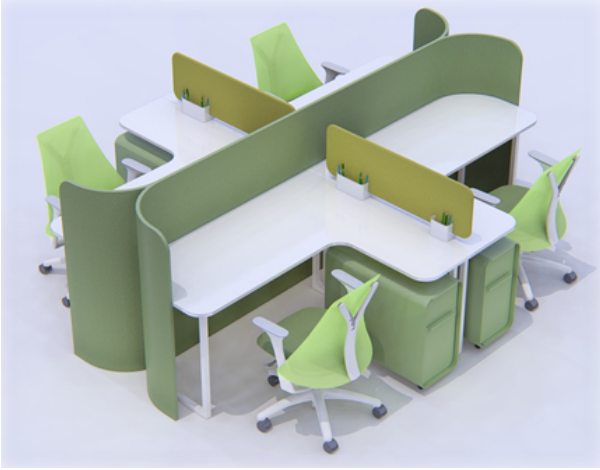

Figure 5. Perspective of the workstation (by Canisha Chrystella, 2021)

The workstation is completed with pedestal below the table surface to provide more storage. The pedestal has wheels and is not attached to the table so it is moveable.

Figure 6. Perspective 2 of the workstation (by Canisha Chrystella, 2021)

Acoustic partition is fixed on the front side of the table and reaches the floor providing more privacy and acts as a sound absorbing panel. An acoustic panel is also provided to separate space between two users. This panel is detachable. Therefore, it can be put aside when not needed. The panel is settled onto two stationary holders.

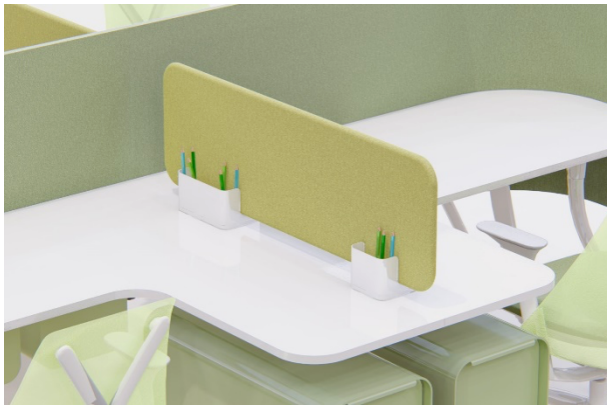

Figure 7. Partition detail of the workstation (by Canisha Chrystella, 2021)

3.2. Material and Colour Concept

Grab's corporate color is green which can be seen as most of Grabs features and products are dominated with green. Therefore, the workstation is designed with the color, green, which is based on Grab's corporate identity.

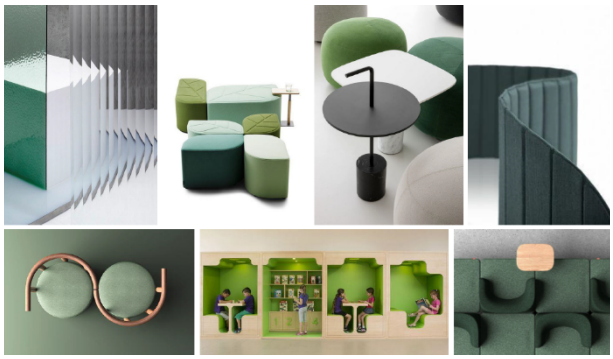

Figure 8. Moodboard (by Canisha Chrystella, 2021)

The top table is made of plywood finished with white wood texture HPL. The table legs and are made of white powder coated aluminum. Pedestal below the top table surface is also made of plywood finished with a green HPL.

Figure 9. Material board
(by Canisha Chrystella, 2021)

Table 2. Material and parameter adjustments.

NO	PARAMETER	*Fiberglass Board*
1	Utilizing acoustic materials that can absorb sound on furniture to muffle noise. [6]	✓
2	NRC of acoustic materials to absorb noise in an office ≥ 0.7. [7]	✓

(By Canisha Chrystella, 2021)

3.3. Application

The workstation can be configured into various arrangements. So, this modular workstation can be placed so that the users are solely individual, face-to-face, or lined facing one direction.

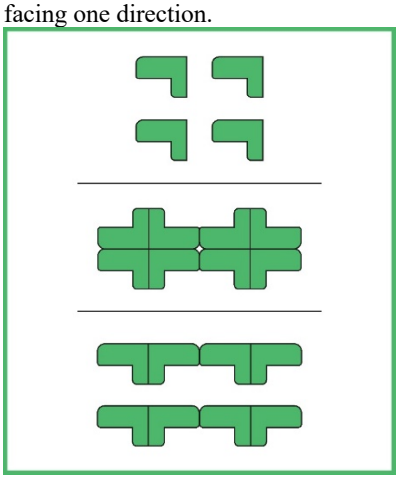

Figure 10. Workstation configurations
(by Canisha Chrystella, 2021)

The office desk is also equipped with sound-absorbing panels. The minimal NRC required for a sound absorbing material in an office is 0.7 [7]. The sound-absorbing panel in this design uses a fiberglass board material that has an NRC (Noise reduction coefficient) level of around 0.75-1.00 [9]. With that, the material is suitable to be used as a sound absorber of this workstation. The fiberglass board is also wrapped with green felt. Both the fixed partition and detachable panels are made of fiberglass board with felt finishing.

Figure 11. Office scene
(by Canisha Chrystella, 2021)

4. CONCLUSIONS

Grab's workstation is designed using sound-absorbing materials so that the work area is not too noisy as it can affect the productivity of the workers. Acoustic material in the form of fiberglass board is used in dividers and workstation partitions to absorb noise. Even though Grab's office implements an open layout plan, with the present of noise absorbing workstation, there will be less noise and the workers will be more productive.

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