

GCBSS paper esa

by Esa Dora

Submission date: 19-Oct-2021 10:17AM (UTC+0700)

Submission ID: 1677725432

File name: 12th_GCBSS-esa.pdf (783.61K)

Word count: 5830

Character count: 32327

Rethinking Interior Design Approach for Shop House Food and Beverage Retails to Embrace New Normal Protocol*

**Purnama Esa Dora Tedjokoesoemo^{1*}, Poppy Firtatwentyna Nilasari²,
Sriti Mayang Sari³**

^{1,2,3} Interior Design Department of Petra Christian University, Surabaya, Indonesia

ABSTRACT

The 2020 COVID-19 outbreak has deeply redefined our relationship to public spaces. The implementation of restrictions on community activities in Jakarta alone has resulted in 1030 restaurants permanently closed and 400 restaurants to temporary closed from early 2020 to 2021. Public preference has shifted to outdoor area with open air space to reduce the possibility of transmission. Therefore, shop house food and beverage retails that operated in big cities may find a challenge to keep the costumers' comfort. This paper is investigating on adaptation in interior design approach in shop houses design. The method used for this research was the systematic literature review and typology studies. Systematic literature review was used to define, study, analyse, and classify available design adaptation of indoor health and comfort to mitigate the transmission in the public spaces. Typology studies conducted by comparing literature reviews, existing pre COVID design, and proposed conceptual design made by students in Design Interior and Styling for Commercial and Retail Space studio. The result shows that the design approach that put further indoor health and comfort criterias consideration were very rare to be found. This was generally due to site limitations, requests from the owners, and limited awareness from interior designers to indoor health and comfort. In the final analysis, it is found that guide and reference to achieve better indoor health and comfort can be found in Greenship Interior Space. By applying this green building principles, better indoor health and environment will be possibly provided.

Type of Paper: Empiric

Keywords: shop house, new normal, food and beverage, retails, healthy building.

* Paper Info: **Revised: June, 2021**

Accepted: June, 2021

* Corresponding author:

E-mail: esa@petra.ac.id

Affiliation: Interior Design Department, Petra Christian University

1. Introduction

When we think about architecture, we often think about beauty and form, or what we may now popularly call as an instagram-worthy places. With the prevalence of social media, hanging out at an instagram-worthy cafe has become a part of self-actualization. People not only actualize themselves through photos of themselves in the most current places, but also compete to be the most actual through photos of the most current food. Therefore, it is not surprising to see the rapid development of cafes and restaurants with attractive interiors, focusing on beauty and form, since 2009 in Indonesia.

Most of public spaces tend to be designed in an enclosed and well controlled space to ensure occupants' comfort so that they can stay longer inside and spend more. The restaurant industry contributes greatly to business activity in Indonesia, as consumer spending is the backbone of the domestic economy (Major restaurants temporarily close, 2020). However, the 2020 Covid-19 outbreak has deeply redefined our relationship to public spaces. Fear of transmission (both direct and indirect) has stricken all sectors and put down public spaces including the food and beverages sectors. The implementation of restrictions on community activities force cafes and restaurants' consumer to switch from dine in to take away or even home cook meal only for hygiene reason. The restriction itself in Jakarta alone has resulted in 1.030 restaurants permanently closed and 400 restaurants to temporary closed from early 2020 to 2021 (Septyaningsih, 2021).

Over the past several months, since its occurrence, the Covid-19 pandemic has brought indoor environments quality into spotlight. In a very short period of time, the interest to incorporate health factor in building design has sparked and many start to understand that healthy building factors are not a luxury but a considerably normal approach to ensure building occupants, who spend 90% of their time indoor even in normal days, can work optimally (Kehrt, 2020). After more than a year of survival against Covid-19, now it has become a new reality when we think about staying healthy indoors, our minds will immediately go to social distancing, acrylic barriers, better ventilation, and improved indoor air quality. Public preference has shifted from fully indoor into outdoor area and from malls to detached spaces with open air space to reduce the possibility of transmission. This condition encourage more and more foods and beverages retailers to make use of shophouses.

The gradual easing of restrictions since third quarter of 2020, has brought a breath of fresh air not only to the food and beverage industry players, but also to the general public who can't wait to enjoy the dine-in experience. However, this must be accompanied by proper implementation of health protocols and also adaptation of interior design that supports a healthier space. The application of ecologically friendly building and green building design that has been highly encouraged over the past few years before the Covid-19 pandemic obviously shall be continued. The application of green building principles are known to provide better indoor environment quality performance (including lighting quality, ventilation, and O₂, and Volatile Organic Compound (VOC) concentrations in space) (Lim et al., 2012). Creating good indoor environmental quality, in a way is hoped to reduce the transmission of the Covid-19 virus.

Few design adaptation considerations has been discussed and encouraged by interior design practitioners and communities as well as decree from Indonesia's Minister of Health has been launched. However, the implementation is still open for reviews. In the context of this research, the green building standard to be referenced is GreenShip Interior Space by Green Building Council Indonesia. This research was conducted to examine how green building standard and interior design adaptation in new normal were implemented or perceived on foods and beverages industry, specifically to those that make use of shop houses. This research will be conducted as a review for proposed conceptual design made by students in Design Interior and Styling for Commercial and Retail Space studio.

2. Literature Review

2.1 Covid-19 Mitigation Rules for Cafe and Restaurant in Indonesia

Covid-19 is mostly spread when people are physically near or have direct contact with one another. Transmission of the virus are droplet based that occurs when people cough, sneeze, sing, talk, or even breathe. Under certain conditions, people with covid-19 virus, especially those who are without symptoms, seem to have infected others who were more than 1.5 metres away. This is called airborne transmission which occurred within enclosed spaces that had inadequate ventilation. Respiratory droplets can also land on surfaces and objects. It is possible that a person could get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose, or eyes (Considerations for Restaurant and Bar Operators, 2020).

Indonesia's Minister of Health has launched a decree (Keputusan Menteri Kesehatan Republik Indonesia Nomor Hk.01.07/Menkes/382/2020) to set up community health protocol in public places and facilities for the prevention and control of covid-19. This regulation regulates health protocols to be implemented by business actors, workers, and visitors to food and beverage businesses. This regulation generally regulates the availability of facilities that support hygiene and indirect contact. To name a few, mandatory use of masks and personal protective equipment, mandatory of visitors limitation up to 50% of the area, improvement of online services, non-cash payments, availability of barriers between visitors, room cleaning, optimization of air circulation and sunlight, and air conditioning filtration.

2.2 Indoor Environment Adaptation for Cafe and Restaurant

2.2.1 Ventilation System, Indoor Air Quality, and Thermal Comfort

Among all indoor environment quality criterias, the performance of ventilation and natural daylighting are the most prominent being highlighted. As mentioned above, cafe and restaurant commonly found in Indonesia, tends to be designed in controlled enclosed space to ensure occupants comfort. However, this condition is not suitable during the pandemic situation. In a poorly ventilated indoor space, airborne transmission chance is higher and due to eating and drinking activity that require mask openings, airborne transmission is inevitable. In general, being outdoors and in spaces with good ventilation reduces the risk of exposure to the virus that causes covid-19.

To improve ventilation performance, proper operation of ventilation system, as well as increase in fresh air circulation is necessary. Cross ventilation to ensure purging of indoor air pollution is needed. Under ideal situation, opening windows and doors and prioritizing outdoor seating can be considered. Consider improving engineering controls using the building ventilation system. This may include increase in total airflow supply to occupied spaces, increase in outdoor air ventilation, and using caution in highly polluted areas. With a lower occupancy level in the building, this increases the effective dilution ventilation per person (Considerations for Restaurant and Bar Operators, 2020).

By using additional mechanical ventilation, proper routine maintenance are required. There may include inspection of filter housing and racks to ensure appropriate filter and periodic filter checking ensure they are within service life and appropriately installed. Additional operation to run the mechanical ventilation such as ACMV system at maximum for 2 hours before and after occupied times is also needed (Considerations for Restaurant and Bar Operators, 2020).

2.2.2 Lighting System

In relevance to point 2.2.1, lighting system is encourage to make use as much as natural daylighting as possible. Natural daylight benefits our health as it may boost vitamin D production (one of the most needed at the moment) and wards off seasonal depression.

Therefore, outdoor seating or even openings exposed to fresh air and natural daylight is high in demand. Moreover, natural daylight consists of a full colour spectrum and thus renders colour more 'true' than artificial light. In natural daylight we are able to see the real colour. This is beneficial for food and beverage presentation as well to look more appetizing.

2.2.3 Space Planning

Change of layouting is needed to ensure social distancing. Limitation on seating capacity up to 50% of total area occupancy is encouraged (Kementrian Kesehatan Republik Indonesia, 2020). Due to limitation and social distancing, food and beverage business owner shall prioritize option for take away service before the dine in. Even though, the dine in experience is irreplaceable, but communal health is a priority.

The interior designing for food and beverage during and even maybe post pandemic may consider options for dine-in customers to order ahead of time to limit the amount of time spent in the establishment. So that the signage system is now no longer secondary. The sign of food pick up and stations become important.

The installment of physical barrier is no longer an alien in the room. Individual eating booth may be seen as a good approach. If needed, provide physical guides, such as tape on floors or sidewalks and signage, to ensure that individuals remain at least 1 metre apart. Barriers can be useful in to maintaining physical distancing.

The design of the sitting area no longer accommodates large groups. Interior designers shall work hand in hand with UI/UX designer to discourage crowded waiting areas by using phone app, text technology, or signs to alert patrons when their table is ready. Avoid using "buzzers" or other shared objects. Limitation of crowd also affect the serving system to not provide buffet bars, salad bars, or drinking station that may open for shared utensils, handles, or buttons (Considerations for Restaurant and Bar Operators, 2020).

2.3 GreenShip Indoor Space

According to Green Building Council Indonesia official website, GreenShip Interior Space is a building certification system intended for interior that aims to provide proper comfort, health, and productivity for building occupant. The GreenShip Interior Space assessment system consists of Eligibility provisions and 6 (Six) assessment categories:

1. Appropriate Site Development (ASD)
2. Energy Efficiency and Conservation (EEC)
3. Water Conservation (WAC)
4. Material Resources and Cycle (MRC)
5. Indoor Health and Comfort (IHC)
6. Building and Environmental Management (BEM)

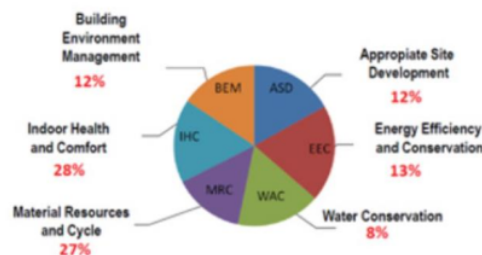


Figure 1. Credit Percentage in GreenShip Interior Space
(Source: Nasir in Wardhani, 2021)

Each category consists of several criteria containing Prerequisite, Credit Point, and Bonus Point. The GREENSHIP Interior Space certification system has a maximum of 93 points. To eligible to use this certification, the building must meet the requirements, among others the project has a fit out activity, management uses an area in one building with a minimum area of 25 m², and minimum one employee who works full time for 1 year (Green Building Council, n.d.).

However, this paper will not go deeper into the eligibility of the typology sites wheter they meet the certification criterias, but rather to look for the criterias that may suit the need of adaptation in pandemic situation. Among 6 assessment categories, IHC category has the highest percentage in the rating tools because indoor health and comfort play an important role in the occupant's health and comfort. IHC is an analysis instrument used to establish a high-quality indoor space for the health and comfort of its inhabitants with 11 criteria (Wardhani, 2021). In relevance to covid 19 adaptation, some adaptation of IHC 11 criterias can be seen in table 1 as suggested by Wardhani (2021).

Table 1. Indoor Health and Comfort Criteria and Adaptation (Source: Wardhani, 2021).

Code	Criteria	Credits	Adaptation
IHC P	No Smoking Campaign	P	No smoking campaign implementation to provide clean air for the indoor environment.
IHC 1	Outdoor Air Introduction	1	Proper ventilation can remove viral aerosols in a short time (Cook, 2020) including: well-designed natural ventilation, increasing outdoor air exchange rates & the inflow of outdoor air, stop air recirculation (Tang et al., 2020). Recirculation of central air conditioning which covers several zones should be avoided. In the case of split air conditioning units, potential contamination by air should be avoided where possible.
IHC 2	CO ₂ Monitoring	2	Avoid crowded and poorly ventilated spaces (Tang et al., 2020). Limit the number of people to 50% in closed spaces (Morawska et al., 2020). A space with high occupancy and activity traffic increases social interaction and the possibility of direct transmissions of Covid-19 from people to people and people with contaminated surfaces (Dietz et al., 2020).
IHC 3	Chemical Pollutant	9	Selective and close attention to choices of indoor material and Covid-19 virus survival period on them. Antimicrobial agents, such as copper alloys, help to eliminate or prevent pathogens growth that can be applied for frequent contact surfaces (Brittain, Wood, & Kumar, 2020)
IHC 4	Indoor Pollutant Source Control	2	The criteria still need to be implemented for a better indoor environmental quality with minimum indoor pollutant source.
IHC 5	Biological Pollutant	1	Usage of antimicrobial agents, UV light, ionization units, or HEPA filter can be used for air purification to efficiently minimize the

			accumulation of infectious viral aerosols (Tang et al., 2020).
IHC 6	Visual Comfort	3	Visual comfort still needs to be implemented for a better indoor environmental quality.
IHC 7	Outside View and Daylight	2	Daylight is a strategy to control the viability of infectious disease viruses in the room. Daylight is an important element in architecture and related with the presence of bacteria and pathogens, especially their growth in dark spaces. The number of microbes is related to the dust in the room in an interior space (Fahimipour et al., 2018).
IHC 8	Thermal Comfort	2(+2B)	Recommended RH between 40% and 60% indoors to reduce the spread of the Covid-19 virus and minimize the risk of mold growth (Noti et al., 2013; Rousseau et al., 2017). USEPA suggests to keep the RH to 30%-50% RH, a range that not only appropriate for thermal comfort but also reduces the mold growth (EPA, 2009).
IHC 9	Acoustic Level	1	Acoustic level still needs to be implemented regarding noise level in the workplace and reduce the noise that creates viral aerosol.
IHC 10	Interior Plants	2	Further research is required to decide indoor landscaping affects indoor air quality. The use of potted plants start to affect on indoor air quality when one plant is used per m ² (Cummins & Waring, 2020).
IHC 11	Pest Management	1	Pest management still needs to be implemented to reduce the biological pollutants that come from pest.

3. Research Methodology

This research was conducted in qualitative approach. The methodology used for this research was systematic literature review (SLR) and typology studies. Systematic literature review was used to define, study, analyze, and classify available design adaptation of indoor health and comfort to mitigate the transmission in the public spaces. Typology studies conducted by comparing literature reviews, existing pre COVID design, and proposed conceptual design made by students in Design Interior and Styling for Commercial and Retail Space studio.

To start the SLR method, researcher start by defining the research question, how did the adaptation to Covid-19 pandemic situation affect the food and beverage interior design approach in shop houses design, while shop houses often times are designed with single ventilation system only. After defining the research question, researcher continue the process by getting relevant sources to answer research question with related keywords: shop house, new normal, food and beverage, healthy building, and indoor environment quality. Then the data collected through literature study are selected through inclusion and exclusion criteria and classified for further used for comarison with typology. The source for literature review will be from journals, online articles such as online newspaper, online corporate or goverment articles, and standards in range of 2019-2021. The period of time range is short due to the Covid-19 theme that was happened from 2019.

The typology studies were conducted to gain the insight on how the on site application of the research question. Apart from all design alternatives and topics in Design Interior and Styling

for Commercial and Retail Space studio, researcher narrowed them into the selected of 2 groups that were focusing on food and beverage and using shophouse. The occupancy of living area in the shophouse was not necessarily considered in this research.

To breakdown the design process, the students will make use of 5 steps design thinking method. Design Thinking is a design methodology that provides a solution-based approach to solving problems. It is useful to understand the human needs involved by re-framing the problem, creating many ideas in brainstorming sessions, and by adopting a hands-on approach in prototyping and testing (Dam & Siang, 2021).

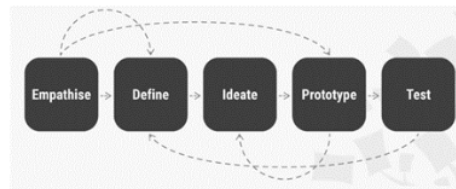


Figure 3. Design Thinking Diagram
(Source: Dam & Siang, 2021)

This paper will discuss the result obtain in each stages of design thinking that will indicate what considered important from the student designers point of view and how the supervisor may see them important. Comparison then made over literature and design proposal in respect of existing condition to analyse and understand the stakeholders' (retail owner and student designers) understanding of interior adaptation during the covid period, referring to existing regulations and references, and what considered important for them.

4. Results

The research object was using shop house that is used for food and beverage industry of Design Interior and Styling for Commercial and Retail Space studio. The object was located in Bali and is used as a cake and bakery cafe named The Hun's Man Cafe. It specialized in food and beverage with the basic ingredients of white bread. The Huns's Man Cafe will utilize first floor only of the total 2 floors building. By the time the design studio was held, the Hun's Man was still under renovation for it will switch from semi online to full offline store. So that, the existing comparison may not be able to be presented.

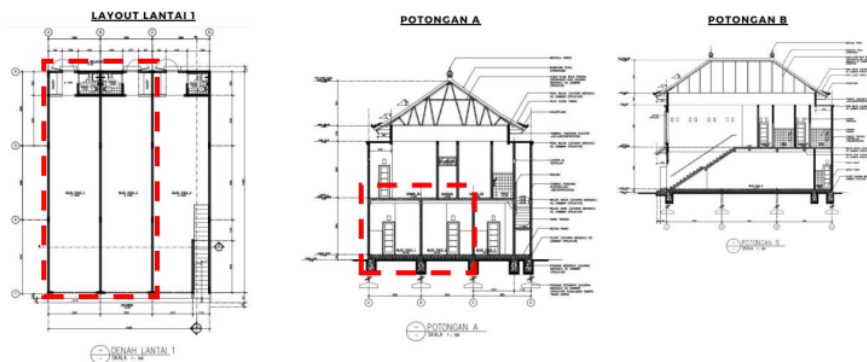


Figure 3. Existing Layout and Section

The object will then be scrutinized to understand the needs and possibilities of improvement. In each stages of design thinking, these are some findings and emphasis of findings that the student designers considered important:

4.1 Emphatize

2

The first stage of the design thinking process is to gain an empathic understanding of the problem we are trying to solve (Dam & Siang, 2021). At this stage the students conduct literature reviews, typology studies, and field site data. The literature reviews emphasis on definition of retail and commercial space, types of food and beverage industry, restaurants based on the type of service, retail aspects and characteristics, space size, new normal for workplace post covid, and style definition.



Figure 4. Emphatize Stage

At the typology studies, the students compared 3 food and beverage industry at shop house in the considerably equal industry scale. The comparison highlighted environment, space, enclosure, support, and ground plane aspects. Later on, for field site data they collect physical data such as on site shop drawings, site analysis via google maps due to stay at home study mode, and non physical data such as organizational structure, owner needs, and future development plans.

4.2 Define

Define stage is when we put together the information gathered during the empathize stage. In this stage, analysis and synthesis were made to define the core problems that will be presented as a problem statement in a human-centred manner (Dam & Siang, 2021). At this stage students did the design programming that comprises of space requirements, space characteristics, the amount of space, the pattern of relationships between spaces, zoning and grouping, affinity diagram to framework, and design statement. The site analysis were not found eventhough they are already collected at the previous stage. The space characteristic define types of lighting and availability of windows opening, mechanical ventilation used, sound system availability, and fire protection.



Figure 5. Define Stage

4.3 Ideate

2

At this stage, ideas are generated as much as possible. It is important to get as many ideas or problem solutions as possible at the beginning of the Ideation phase (Dam & Siang, 2021). To begin with, students set the programatic concept and design concept gained from define stage. To generate the ideas, students make use of moodboard from online sources, space planning making, conceptual sketches, and mock up. At this point students tend to play with masses to get the most fit in room circulation. The circulation was emphasis on human and things. There was no explanation on what gained from mock up making at this stage to be implemented in

the design. In the design development, students focus to develop on shape, colours, texture, and form rather than interior systems. Development of design style was prominent.



Figure 6. Ideate Stage

3 4.4 Prototype

This is an experimental phase, and the aim is to identify the best possible solution for each of the problems identified during the first three stages. The solutions are implemented within the prototypes to be further investigated and examined. By the end of this stage, the designer will have a better idea of the constraints inherent to the product and the problems that are present, and have a clearer view of how real users would behave, think, and feel when interacting with the end product (Dam & Siang, 2021). At this stage, students proceeded with making of technical drawing, presentation drawing, rendering, material board, and design board. Student transposed their approved ideation to digitalisation. The drawing produced were conceptual and stopped at 3D making. No further explanation on how the site will probably respond to the design proposed.



Figure 7. Prototype Stage

3 4.5 Test

This is the final stage of the 5 stage-model. At this phase, alterations and refinements are made in order to rule out problem solutions and derive as deep an understanding of the product and its users as possible (Dam & Siang, 2021). In the design studio, students conducted this stage in 2 phases. Ther first one by having a peer blind reviews and the second one by having an evaluation with the clients and supervisor. The evaluation was done by google meet due to travel restriction. The manuscript of this stage was not provided for further invetigation.

5. Discussion

From the design methodology described, we will breakdown the application of interior design comfort criteria that were addressed by the students in their design.

Table 2. Indoor Health and Comfort Criteria Appliation in Design

Code	Criteria	Availability (Y/N)	Note
IHC P	No Smoking Campaign	N	No smoking campaign or signage implementation in any students design works.
IHC 1	Outdoor Air Introduction	Y	Providing outdoor dining area with simple plant selection. Aethetic purpose only, based on owner's request. Operable windows were present in few students work, but in a very minimum amount.
IHC 2	CO ₂ Monitoring	N	No counting of occupants limitation provided in the programing, as well as no proper new normal rules for food and beverage industry found in emphasize stage to show their sufficient knowlegde. Instead workspace new normal found. Seating arrangement applied social distancing with bigger circulation alleys, but the seating arrangement were still designed as usual without partition or hinder the face to face seating arrangement.
IHC 3	Chemical Pollutant	N	Material and finishing found to be the same as bussiness as usual.
IHC 4	Indoor Pollutant Source Control	Y	The students aware of dust so that they chose smooth surfaces. They also aware of the kitchen can produce smoke and food odors, so that massive full wall separation given.
IHC 5	Biological Pollutant	N	No sign of antimicrobial agents, UV light, ionization units, or HEPA filter found in any drawings or programming. Seating arangement as pre covid-19 situation.
IHC 6	Visual Comfort	Y	The students provided artificial lamp to give a general ambiance. No emphasis, play of contrast, and consideration of color rendition made in particular.
IHC 7	Outside View and Daylight	Y	The students provided openings for access to views and harnessing the natural daylight with consideration to building orientation.
IHC 8	Thermal Comfort	N	Not enough study given to justify their thermal comfort design approach. Students directly prompt to apply mechanical ventilation, shown in define (programming) stage. The outdoor dining area was not provided with additional mechanical ventilation in respect to Bali high in humidity.

IHC 9	Acoustic Level	N	The acoustic consideration only to application of sound system as background noise. Due to floor to ceiling height, cocktail effect may emerge.
IHC 10	Interior Plants	Y	Most of the students applied artificial plants for indoor plants, for relaxing atmosphere only and considering owner's request.
IHC 11	Pest Management	N	No pest management documented in the design document.

From table 2, we can see that only 5 out of 11 indoor health and comfort criterias were addressed by the students. The highest and the most influential in pandemic indoor adaptation design, from the 5 addressed criteria, were indoor pollutant source control and outside view and daylight. These 2 however, were possible due to site position and architectural design that enables hovering on the side. The students still lacks in site analysis strength to apply passive approach before directly went into active design approach. The inability to do site visitation played a big role for design students to learn of the environment.

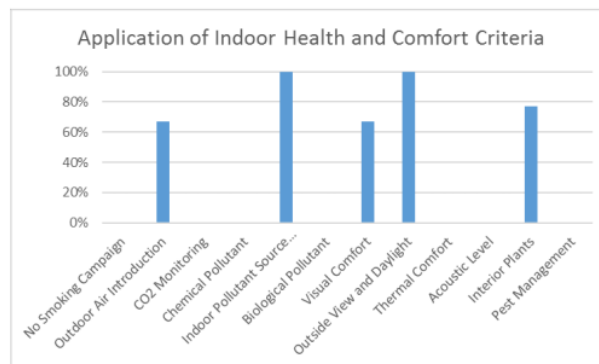


Figure 8. Indoor Health and Comfort Criteria Applied by the Students

6. Conclusion

Since its occurrence, the Covid-19 pandemic has brought indoor environments quality into spotlight. In a very short period of time, the interest to incorporate health factor in building design has sparked and many start to understand that healthy building factors are not a luxury but a considerably normal approach to ensure building occupants can work optimally. Few design adaptation considerations has been discussed and encouraged by interior design practitioners and communities as well as decree from Indonesia's Minister of Health has been launched.

The application of green building principles are known to provide better indoor environment quality. Creating good indoor environmental quality, in a way is hoped to reduce the transmission of the Covid-19 virus. Greenship Interior Space, provide listing of indoor health and comfort aspects that can be used as a checklist for designers to start their healthier interior design. Some adaptation may be needed by the standard, that was long launched before the covid-19 pandemic, to be relevant to the current condition. Despite of that, explanation of each indoor health criterias were still very clear to follow.

However, the design approach that put further indoor health and comfort criterias consideration were very rare to be found. In the design studios, students showed minimum awareness to indoor comfort and health practice, even to those empirical, easy to find on daily basis covid-19 adaptation such as providence of water basin at entrance, hand sanitizer station, and acrylic barriers. Nevertheless, some indoor health and comfort criterias that still had the attention were

outdoor air introduction, indoor pollutant source control, outside view and daylight introduction, and interior plants. This was generally due to site limitations, requests from the owners, and limited awareness from interior designers to indoor health and comfort.

Acknowledgements

10

The authors would like to thank the Ministry of Research, Technology and Higher Education the Republic of Indonesia for the PTUPT research scheme 2021. We would also thank LPPM of Petra Christian University for providing guidance throughout the process, as well as tutors and students of group 1 and 7 of Design Interior and Styling for Commercial and Retail Space studio.

References

- Brittain, O. S., Wood, H., & Kumar, P. (2020). Prioritising Indoor Air Quality in Building Design Can Mitigate Future Airborne Viral Outbreaks. *Cities & Health*, 0(0), 1-4. <https://doi.org/10.1080/23748834.2020.1786652>
- Considerations for Restaurant and Bar Operators. (2020, February 11). Centers for Disease Control and Prevention. Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/community/organizations/business-employers/bars-restaurants.html>
- Cook, T. M. (2020). Personal protective equipment during the COVID-19 pandemic: A reply. *Anaesthesia*, 75(8), 1121-1122. <https://doi.org/10.1111/anae.15158>
- Cummings, B. E., & Waring, M. S. (2020). Potted Plants Do Not Improve Indoor Air Quality: A Review and Analysis of Reported VOC Removal Efficiencies. *Journal of Exposure Science & Environmental Epidemiology*, 30(2), 253-261. <https://doi.org/10.1038/s41370-019-0175-9>
- D'Alessandro, D., Gola, M., Appolloni, L., Dettori, M., Fara, G. M., Rebecchi, A., Settimo, G., & Capolongo, S. (2020). COVID-19 and Living space challenge. Well-being and Public Health recommendations for a healthy, safe, and sustainable housing. *Acta Bio Medica Atenei Parmensis*, 91(9-S), 61-75.
- Dam, R.F., & Siang, T.Y. (2021, January). 5 Stages in the Design Thinking Process. Interaction Design Foundation. <https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process>
- Dietz, L., Horve, P. F., Coil, D. A., Fretz, M., Eisen, J. A., & Van Den Wymelenberg, K. (2020). 2019 novel coronavirus (COVID-19) pandemic: Built environment considerations to reduce transmission. *MSystems*, 5(2), 1-41. <https://doi.org/10.1128/msystems.00245-20>
- EPA (United States Environmental Protection Agency). (2009). *A Brief Guide To Mold, Moisture, And Your Home*. Retrieved from <https://www.epa.gov/sites/production/files/2016-10/documents/moldguide12.pdf>.
- Fahimipour, A. K., Hartmann, E. M., Siemens, A., Kline, J., Levin, D. A., Wilson, H., Betancourt-Román, C. M., Brown, G., Fretz, M., Northcutt, D., Siemens, K. N., Huttenhower, C., Green, J. L., & Van Den Wymelenberg, K. (2018). Daylight Exposure Modulates Bacterial Communities Associated With Household Dust 06 Biological Sciences 0605 Microbiology. *Microbiome*, 6(1), 1-13. <https://doi.org/10.1186/s40168-018-0559-4>.
- Green Building Council Indonesia. (n.d.). GREENSHIP rating Tools interior space. Retrieved June 10, 2021, from <https://www.gbcindonesia.org/greens/interior>
- Honey-Roses, J., Anguelovski, I., Bohigas, J., Chireh, V., Daher, C., Konijnendijk, C., ... Nieuwenhuijsen, M. (2020). *The Impact of COVID-19 on Public Space: A Review of the Emerging Questions*. <https://doi.org/10.31219/osf.io/rf7xa>
- Karin, A., & Srinaga, F. (2021). Relocating and Resizing Strategy for Shop House Area to Build Resiliency in Dealing with New Normal. *Conference Series*, 3 (1), 223-234. Retrieved from <https://adi-journal.org/index.php/conferenceseries/article/view/362>

- Kehrt, S. (2020, December 15). The 'Healthy Building' Surge Will Outlast the Pandemic. Retrieved June 08, 2021, from <https://www.wired.com/story/healthy-building-outlast-pandemic/>
- Kementrian Kesehatan Republik Indonesia, Gerakan Masyarakat Hidup Sehat. (2020). Adaptasi Kebiasaan Baru Rumah Makan/ Restoran Bagi Pelaku Usaha. Jakarta; Kementrian Kesehatan Republik Indonesia.
- Lim, Y. W., Kandar, M. Z., Ahmad, M. H., Ossen, D. R., & Abdullah, A. M. (2012). Building façade design for daylighting quality in typical government office building. *Building and Environment*, 57, 194-204. <https://doi.org/10.1016/j.buildenv.2012.04.015>.
- Major restaurants temporarily close as COVID-19 outbreak worsens. (2020, March 26). *The Jakarta Post*. Retrieved from <https://www.thejakartapost.com/news/2020/03/26/major-restaurants-temporarily-close-as-covid-19-outbreak-worsens.html>
- Megahed, Naglaa A., Ehab M. Ghoneim. (2020). *Indoor Air Quality: Rethinking rules of building design strategies in post-pandemic architecture*. <https://doi.org/10.1016/j.envres.2020.110471>
- Menteri Kesehatan Republik Indonesia. (2020). Protokol Kesehatan Bagi Masyarakat Di Tempat Dan Fasilitas Umum Dalam Rangka Pencegahan Dan Pengendalian Corona Virus Disease 2019 (Covid-19). Indonesia. Retrieved from http://hukor.kemkes.go.id/uploads/produk_hukum/KMK_No_HK_01_07-MENKES-382-2020_ttg_Protokol_Kesehatan_Bagi_Masyarakat_di_Tempat_dan_Fasilitas_Umum_Dalam_Rangka_Pencegahan_COVID-19.pdf
- Morawska, L., Tang, J. W., Bahnfleth, W., Bluyssen, P. M., Boerstra, A., Buonanno, G., Cao, J., Dancer, S., Floto, A., Franchimon, F., Haworth, C., Hogeling, J., Isaxon, C., Jimenez, J. L., Kumitski, J., Li, Y., Loomans, M., Marks, G., Marr, L. C. Yao, M. (2020). How can airborne transmission of COVID-19 indoors be minimised? *Environment International*, 142, 1-7. <https://doi.org/10.1016/j.envint.2020.105832>
- Noti, J. D., Blachere, F. M., McMillen, C. M., Lindsley, W. G., Kashon, M. L., Slaughter, D. R., & Beezhold, D. H. (2013). High Humidity Leads to Loss of Infectious Influenza Virus from Simulated Coughs. *PLoS ONE*, 8(2), 2-9. <https://doi.org/10.1371/journal.pone.0057485>
- Septyaningsih, Iit. (2021, January 18). PSBB Diterapkan, 1.030 Restoran Tutup Permanen. *Republika.co.id*. Retrieved from <https://www.republika.co.id/berita/qn4qjk380/psbb-diterapkan-1030-restoran-tutup-permanen>
- Tang, S., Mao, Y., Jones, R. M., Tan, Q., Ji, J. S., Li, N., Shen, J., Lv, Y., Pan, L., Ding, P., Wang, X., Wang, Y., MacIntyre, C. R., & Shi, X. (2020). Aerosol transmission of SARS-CoV-2? Evidence, prevention, and control. *Environment International*, 144, 1-10. <https://doi.org/10.1016/j.envint.2020.106039>
- Wardhani, Dyah Kusuma, Susan. (2021). The Adaptation of Indoor Health and Comfort Criteria to Mitigate Covid- 19 Transmission in The Workplace. *Humaniora*, 12 (1), 29-38.

GCBSS paper esa

ORIGINALITY REPORT

10%

SIMILARITY INDEX

8%

INTERNET SOURCES

6%

PUBLICATIONS

8%

STUDENT PAPERS

PRIMARY SOURCES

1	www.montcopa.org Internet Source	1 %
2	Submitted to Southern New Hampshire University - Continuing Education Student Paper	1 %
3	kishoreyasarapu.com Internet Source	1 %
4	Russell N. Olmsted. "Reimagining Construction and Renovation of Health Care Facilities During Emergence from a Pandemic", Infectious Disease Clinics of North America, 2021 Publication	1 %
5	cchcs.ca.gov Internet Source	1 %
6	Submitted to The Independent Institute of Education (IIE) Student Paper	1 %
7	coek.info Internet Source	1 %

8	Submitted to University of Westminster Student Paper	1 %
9	Submitted to Southampton Solent University Student Paper	<1 %
10	www.asianjab.com Internet Source	<1 %
11	Submitted to Harriton High School Student Paper	<1 %
12	Submitted to Sunway Education Group Student Paper	<1 %
13	www.thejakartapost.com Internet Source	<1 %
14	Submitted to University of Cape Town Student Paper	<1 %
15	Alireza Afshari, Göran Hultmark, Peter V. Nielsen, Alessandro Maccarini. "Ventilation System Design and the Coronavirus (COVID-19)", Frontiers in Built Environment, 2021 Publication	<1 %
16	Submitted to La Sierra University Student Paper	<1 %
17	www.federalregister.gov Internet Source	<1 %
18	aiamichigan.wildapricot.org Internet Source	<1 %

19

www.tandfonline.com

Internet Source

<1 %

20

health.westchestergov.com

Internet Source

<1 %

Exclude quotes On

Exclude matches < 5 words

Exclude bibliography On