

Research Article

Implementation of a Biophilic Design Approach in Office Space Design as an Attempt to Increase Employee Well-being

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Abstract.

This study aims to explain recommendations for office space designs that seek to improve employee wellness during the post-pandemic period. This research is pragmatic research with a research and development (R&D) approach. The keywords used as the direction for the design concept were obtained from the initial research that had been carried out by the author. The results of the study explain that the biophilic design approach was chosen because it is considered capable of making liveable buildings that are suitable for meeting demands and respect, for both people and the environment. The implementation of a biophilic approach to interior design can be implemented in the selection of colors, materials, lighting, ventilation, room layout, and decoration aspects. The information collected is expected to be a recommendation for those who need it so that it can be used as a consideration or reference for design directions in the office space design process.

Keywords: spatial transformation, office space, post-pandemic, employee wellness, innovation

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1. Introduction

This research is a continuation of previous research that talks about studies related to the evaluation of interior design performance in office spaces. This research is expected to produce recommendations for related parties so that they can renovate the design of office space properly. This is especially important because there have been major changes since the Covid-19 pandemic hit the world and caused a change in the way of working over the last two years, namely the work-from-home system (WFH). Many people realize that without the need to be in a physical office space with colleagues to do work, the whole team can continue to run well and the division of work can still be distributed properly [1]. So policymakers and interior designers need a more organic, post-COVID approach, and must provide reasons for employees to want to come to the



office. Otherwise, it is likely that employees will often choose to work from home and avoid the hassle of travel [2].

In previous research, several keywords were produced which were projected to be the main thoughts in making office design concepts during the post-pandemic period. Namely collaboration, flexibility, sustainability, community with focus and engagement, and health. These keywords are then schematized into a design objective, namely a design to improve employee well-being. Recent developments in health technology have led to an increase in self-tracking devices for workplace health. Many companies have implemented workplace wellness programs which usually contain health promotion interventions, now this has developed in the direction intended to create a healthier working environment [3]. Well-being becomes an important issue in recent discussions. Especially since the pandemic has pushed us past a tipping point when it comes to health and well-being. The pandemic makes us feel that interior space is the only thing we have to keep us safe [4]. Interior space is the most important area that can protect humans, and in the end, must be able to fulfill the wellness of the users.

A built environment always consists of various levels or 'skins': architecture, interior architecture, and interior architecture objects. Together, these skins form a 'whole' that can be understood and controlled, but which must also be inspiring, meaningful, and empowering from the perspective of the people who inhabit the space [5]. An architect and interior designer usually work with development partners to bring big ideas to life and incorporate design elements focused on health and comfort. An interior designer must be able to catch the trend cycle for opportunities for new work systems, especially due to the pandemic as a catalyst that accelerates these changes. Therefore, this study aims to explain office space renovation design recommendations that seek to improve employee wellness during the post-pandemic period. The information collected is expected to be a recommendation for those who need it so that it can be used as a consideration or reference for design directions in the process of designing modern office spaces that aim to improve employee well-being.

2. Research methods

This research is pragmatic research or mixed methods with an R&D (Research and Development) approach. This type of research was chosen because in its process it is possible to collect and analyze data qualitatively and quantitatively in one study simultaneously [2]. The research phase will follow the R&D stage which consists of 1)

the analysis stage, which is the activity of reviewing the results of the questionnaire in previous research so that it can make a list of needs and formulate problems. 2) the synthesis stage, is the stage of conceptualizing the concept or design solution. This stage is the ideation and design prototype stage with the prototype output in the form of three-dimensional spatial visualization. 3) the evaluation stage is the stage of checking the prototype as a result of the analysis. At this stage, the distribution of questionnaires was carried out again in order to obtain feedback from respondents.

2.1. Methods of Data Collecting

The data collection methods used in this study were divided into two, namely library research (secondary sources/secondary data collection) and field research (primary sources/primary data collection). In this study, literature study data collected from scientific journals, articles, and theories originating from literature books were used to find a theoretical basis that could be used as a reference for formulating the results of the questionnaire as the background to reinforce the design concept brief and design prototype. For primary data collection, questionnaires were distributed to 38 respondents who also filled out questionnaires in previous studies. So that the sampling technique used is a type of non-random/probability sample on a judgmental basis. This sampling method was chosen because there was a desire and direction from the beginning of the research/purposive. Namely to reuse previous research respondents. The hope is to be able to evaluate the resulting design prototype more accurately.

2.2. Methods of Data Analysis

This study aims to design a prototype to obtain office design directions during the post-pandemic period to serve as an alternative reference through 3D visualization. The data analysis method used is mixed-methods analysis [2]. Mixed methods are a research approach that combines qualitative and quantitative research forms with pragmatism and advocacy/ participatory perspectives. In this analytical method, the most important thought is understanding the problem or knowing the solution to the problem, and what methods can be used according to the problem at hand. As well as prioritizing social justice, changes or benefits felt by participants to minority groups [6]. The R&D (Research and Development) approach consists of the stages of analysis, synthesis, and evaluation.

3. Result and discussion

3.1. Result

Workplace design is significantly correlated with employee job performance [7]. Due to the Covid-19 pandemic and the development of health protocol requirements in each sector, new workspace area requirements are needed. The evaluation of this study was obtained from design engineering criteria and an environmental health perspective [8]. Biophilic design, as one of the newest reconnection theories, incorporates organic life into the built environment in an essential way. Extending this logic, building shapes, articulations, and textures themselves can follow the same geometries found in all life forms. Empirical evidence confirms that designs that connect humans to life experiences enhance our overall sense of well-being, with positive and therapeutic consequences on physiology [9]. These statements are consistent with the results of the questionnaire which shows that respondents think that after experiencing work during a pandemic, the topic that must be considered in office space design is office design that can maintain or care for health. (Figure 1)

Topics that must be considered the most in designing an office space in the post-pandemic period

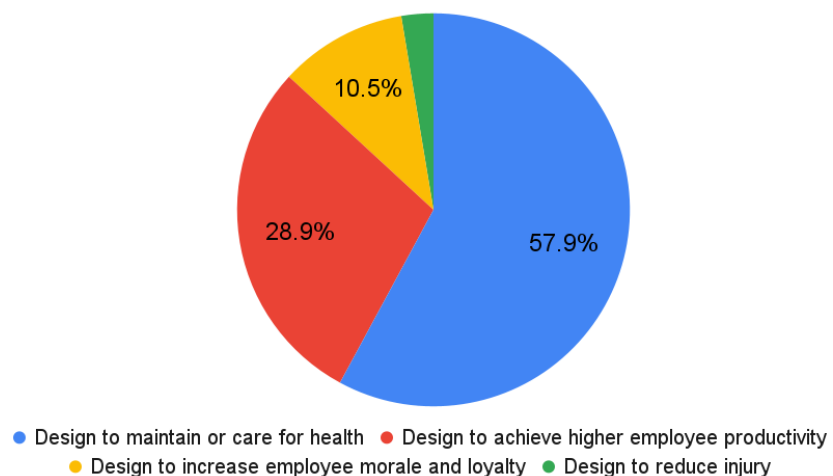


Figure 1: Selection of topics that must be considered in office design in the post-pandemic period.

This is also in accordance with the analysis of previous research that the concept of biophilic design is the most suitable design concept to be applied to the interior design of physical office space in the post-pandemic period. Respondents' reasons for choosing the biophilic design concept were explained by respondent number 1 who considered

that incorporating natural elements or nature into office spaces, aims to make users healthier. In addition, respondent number 5 considered that the greener areas that could be accessed, the better it would be for air circulation in the room. Respondent number 9 also gave his insight, he said that connectivity between residents and nature, sufficient lighting, and air circulation would be good for health. Several other reasons include the respondent feels that he really needs a green element in the room and hopes that the biophilic design concept can reduce stress and it is better if there is an exit opening so that he is not worried about the spread of the Covid-19 virus which is still spreading in the environment [10]. Due to the correlation between theory and the results of the questionnaire, for this reason, the biophilic design was chosen as an approach which was then implemented in the visualization of the prototype design space in this study.

3.2. Discussion

This prototype design uses an open plan-group office system with linear circulation. This system was chosen because as many as 61% of respondents (23 people) answered that they currently use the system in the office. The implementation of the design can be seen in the image below

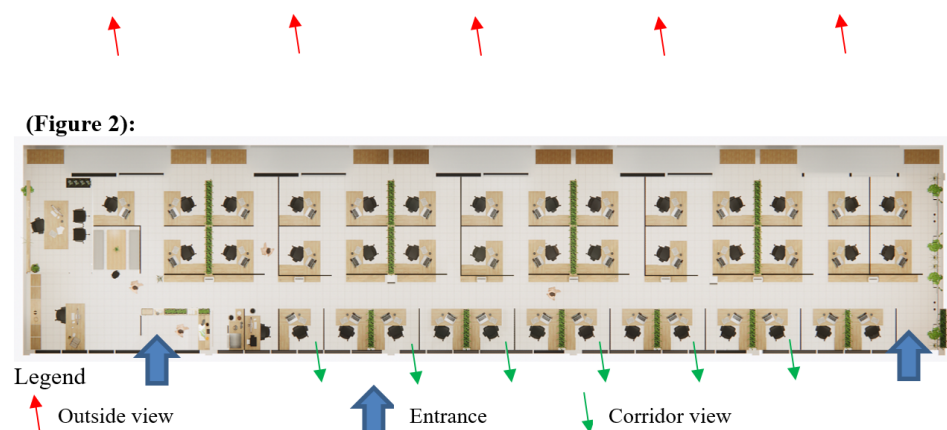


Figure 2: Office space recommendation plan.

The plan above was made based on the standardization of a one-division room scheme in an office with a capacity of 42 employees without meeting rooms. The room is on the right wing of the 2nd floor of the building with a total height of 5 floors. The standard space for each person has a work area larger than 1.8 m x 2 m. In this room, there are two exit and entry points at the end of the room, as well as a window with an

outside view to the north with a total of more than 75% active space so that it meets indoor health comfort standards. There is also a window that leads to the corridor. The blocking spaces in the work area above include: 1) foyer, 2) pantry, 3) reception area, 4) head division room, 5) printing area, 6) communal desk, 7) group office, and 8) archive shelf. The details of the visualization can be seen in the image below (Figure 3):

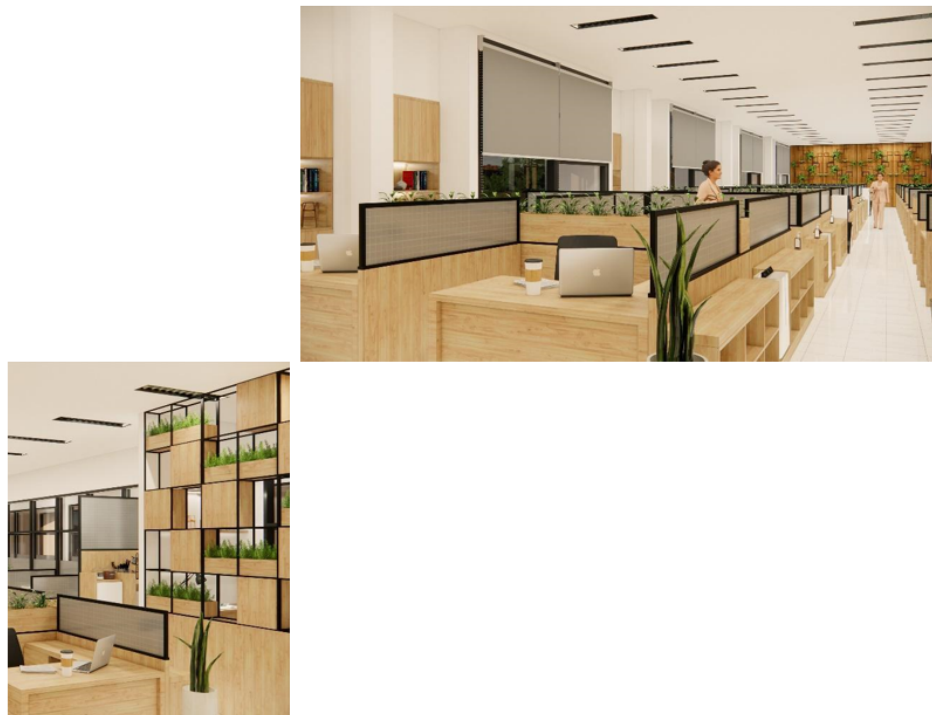


Figure 3: Office space design visualization.

The application of biophilic approach is implemented by bringing natural elements into the room through the procurement of plants that are used as aesthetic elements. The selected plants are types of plants that according to experts can absorb toxins including sansevieria, nephrolepis exaltata, and maidenhair fern. In addition, all the selected materials apply natural colors and natural fibers, and the materials used are material products that have been labeled as environmental save, including wall paint finishing products, HPL, and sealers. These two things are implemented in order to reduce the number of chemical pollutants in indoor air. For the ventilation concept, even though there is artificial ventilation from central air conditioning, every window that leads to the outside view is made with a design that can be opened. So that in the morning before working hours start, natural ventilation can be maximized by exchanging air through a cross-ventilation system.

The room temperature is maintained so that it is always between 23 - 27°C and in each group cubicle an air purifier is installed so that dirty air can be filtered. As for the lighting concept, the lights are chosen in daylight (white) and must measure ≥ 350 lux using energy-saving lamps (LEDs) so that thermal comfort can be achieved and does not stress employees. As well as maintaining acoustic comfort, every partition and building construction must be made using noise absorber materials, such as fiberboards. In addition, a stimulus is added in the form of natural sounds from speakers during breaks to create a feeling of relaxation. Then for added convenience, two CO₂ monitors have been implemented in the group office area in the hope of preventing sick building syndrome in building users.

4. Conclusion

All of the design recommendations above are guided by green ship point 4 from the Green Building Council Indonesia (GBCI) regarding indoor health comfort. The evaluation results of the design recommendations show that 82% of respondents (31 people) feel that the recommendations given are good enough. This is because respondents argue that the reference standards used have clarity, and the implementation of the designs made makes sense to be applied to redesign projects and new office design designs. The design that was made was also felt to have answered the needs of the evaluation results in previous research. For the next design development process, the authors hope to be able to use some software for measurement as well as increase the number of respondents to a larger sampling population. The hope is that the design development process can run better.

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