

PRODUCT DESIGN OF MULTIFUNCTIONAL WORKTABLE FOR WORKERS IN LIMITED SPACE (CASE STUDY: PURI SURYA JAYA CLUSTER, SIDOARJO)

Arvin Ray Anggasta^{1,*}, Yosef Richo Adrianto², Darwin Yuwono³, Martinus Sony Erstiawan⁴

^{1,2,3,4} Universitas Dinamika, Indonesia

Email: yosef@dinamika.ac.id*

*Corresponding author

ABSTRACT

A work desk is an essential piece of furniture for employees, commonly used in offices or home workspaces. While large office buildings accommodate standard-sized desks, home offices often face spatial limitations, requiring compact, minimalist desks to optimize space. This study employs a qualitative approach rooted in real-world exploration and interpretation, focusing on the Puri Surya Jaya Cluster. Data were collected through direct observations of workspaces, semi-structured interviews with employees, supervisors, and design experts, and triangulation techniques to ensure comprehensive findings. To address the challenges of limited home office space, a multifunctional work desk was designed. This desk features a compact, space-saving design with smaller dimensions, making it easy to move while maintaining functionality. Insights from participants informed a flexible and ergonomic design tailored to support productivity in constrained home office environments.

Keywords: multifunctional work desk, home office, narrow space

Article history

Received:

30 Oktober 2024

Revised:

4 November 2024

Accepted:

5 November 2024

Published:

30 November 2024

Citation (IEEE Style): A.R. Anggasta, Y.R. Adrianto, D. Yuwono and M.S. Erstiawan, "Product Design Of Multifunctional Worktable For Workers In Limited Space (Case Study: Puri Surya Jaya Cluster, Sidoarjo)," *MERAKI: Journal of Creative Industries*, vol. 02, no. 01, pp. 30-36, November 2024.

INTRODUCTION

According to Kurniawan in his article on Arief-arsitek.com (2017), states that Rukan or Rumah Kantor is a house that not only functions as a residence/place of residence, but also functions as a place of business/work, and without being limited by the activities of the residents of the house and workers. [1]

Dekoruma, Kania in her article on Dekoruma.com (2019), added that workspaces in home offices can come in various shapes and sizes including placement in different locations, therefore the location and placement of the work desk must match the width of the workspace or personal space of the user, thus the room used will not feel cramped and uncomfortable. [2]

Putra, (2019) states that the need for functional furniture is increasingly needed to answer the increasingly limited work and living space of today's urban communities with an average space area of 3-5 m [3]. Olivia (2018) adds that multifunctional furniture can literally be separated and interpreted as meubel, which is a piece of furniture / furniture and multifunctional is something that has many functions or uses. [4]

Based on the background above, the researcher took a problem based on a multifunctional table, therefore the researcher formulated the problem, namely 'How to Develop a Multifunctional Worktable Product for Workers in Confined Spaces'. [5]

METHOD

In carrying out this research, researchers employed a Qualitative Approach, a research method rooted in the exploration of real-world phenomena through in-depth understanding and interpretation. This approach allowed for a nuanced examination of the specific context of the Puri Surya Jaya Cluster and the needs of its workers.

Researchers conducted direct observations of the workspace, focusing on the current work desk arrangements, employee interactions with the workspace, and any constraints or challenges faced. Semi-structured interviews were conducted with a diverse group of participants, including Employees to gain insights into their daily work routines, specific needs, and preferences for a multifunctional worktable. Supervisors, to understand the overall workspace requirements and any organizational constraints. Design Experts to obtain expert opinions on ergonomic design principles, material selection, and potential design solutions.

Participants were selected based on their relevance to the research objectives. Employees were chosen to represent a range of roles and experience levels within the organization. Supervisors were selected to provide a broader organizational perspective. Design experts were chosen based on their expertise in furniture design and ergonomics.

By combining these data collection techniques, the researchers aimed to triangulate the findings and gain a comprehensive understanding of the needs and challenges faced by workers in the Puri Surya Jaya Cluster. This qualitative approach allowed for a flexible and iterative research process, enabling the researchers to adapt to emerging insights and refine their design solutions.

RESULTS AND DISCUSSION

Interviews and Observations analysis

In this chapter, the researcher discusses the application of the method to the creation of works and designs. The results of observations and interviews as well as the technology used to develop multifunctional workbench products for workers in limited spaces. [6]

The observation data from Puri Surya Jaya Cluster revealed several key insights. Firstly, the standard work desk size is limited, often accommodating only one or two people. Secondly, the absence of drawers or cupboards highlights a significant storage issue. This lack of storage space can lead to clutter and decreased productivity. Additionally, the observation suggests that a multifunctional design, incorporating features like adjustable height and integrated storage, would be highly beneficial for the employees. Finally, the data indicates a need for ergonomic solutions, especially for those using laptops without proper support.

The supervisors' insights provide further context to the workspace limitations at Puri Surya Jaya Cluster. The limited space, often shared by multiple employees, necessitates efficient use of the available area. The rectangular tables, while suitable for some tasks, may not be ideal for laptop users, as indicated by the presence of a round table for more flexible seating

arrangements. Additionally, the reliance on laptops highlights the need for workspaces that can accommodate various devices and work styles.

The employees' feedback emphasizes the need for more functional and flexible workspaces. Many employees, especially those using laptops, find the current desk size inadequate. The lack of built-in storage solutions contributes to clutter and disorganization. To improve the workspace, employees suggest a multifunctional table with ample storage space that can be easily adapted to various work activities and stored efficiently when not in use.

The expert input from the academic highlights several key design principles for the multifunctional worktable. The standard size of a worktable, while suitable for general office settings, may not be ideal for limited spaces. The importance of ergonomic considerations, such as sufficient legroom and comfortable seating height, is emphasized. Additionally, the expert suggests the use of multifunctional furniture, such as knockdown tables, to optimize space utilization. The choice of materials, such as plywood or multiplex, can influence both the weight and durability of the table. Finally, the aesthetic aspect of the table is considered, with the recommendation to choose colors that complement the overall workspace.

The data revealed that the workspaces in the Puri Surya Jaya Cluster are generally small and often shared by multiple employees. The existing work desks are often basic and lack essential features such as storage compartments. Additionally, many employees rely on laptops without proper ergonomic support, which can lead to discomfort and potential health issues.

There are key needs identified through Interviews and Observations:

1. **Space Optimization:** Employees require more efficient use of space, especially in smaller work areas.
2. **Storage Solutions:** Adequate storage for documents, stationery, and personal belongings is crucial.
3. **Ergonomic Design:** The work table should be designed to promote good posture and reduce strain.
4. **Multi-Functionality:** The table should be adaptable to various work tasks, accommodating both laptop and desktop setups.
5. **Aesthetic Appeal:** The design should be visually pleasing and complement the overall office environment.

Literature Study

The literature review indicates that optimal work desk dimensions should consider ergonomic principles and user needs [7]. While solid wood is popular, processed wood options like multiplex offer a balance of strength and affordability for furniture construction. Modular and multifunctional furniture designs are increasingly relevant for addressing limited space in urban areas and meeting the needs of modern consumers [8]. Adopting a knockdown or space-saving design allows for easy assembly and disassembly, making furniture adaptable to various spaces and storage requirements [9]. This approach is particularly suitable for small residential units and aligns with the preferences of millennial consumers who value customization and sustainability. Designers are encouraged to experiment with geometric design templates and consider both technological requirements and aesthetic considerations when creating furniture.

Color Implementation

The implementation of color in this research is a supporting element to determine the attractiveness of a design for consumers. From the color analysis carried out by researchers, the colors to be used are gold and black. With this color, the table will give a strong, comfortable, elegant and luxurious impression when used or looked at.



Figure 1. Color Implementation

Implementation of Workbench Materials

Researchers obtained several choices of solid wood and processed wood that were suitable for use. Based on the types of wood listed, researchers chose multiplex wood material as the main material for the product to be produced because of its flexibility and resistance to loads.

Table 1. Selection of workbench materials

No	Wood Type	Price	Strength	Easy Production	Easy Maintenance	Easy to Get	Load Resistance	Total
1	Solid Wood	1	5	2	3	2	5	18
2	MDF	3	3	3	2	3	3	17
3	Particle Board	5	1	1	1	5	1	14
4	Plastic Board	2	5	3	4	2	5	21
6	Multiplex	4	4	4	5	4	4	25
7	Triplex	5	1	5	4	3	2	20

Finishing Implementation

The finish that will be used in the final stage of making the table requires properties that can protect the wood from moisture, temperature, and water spills. The material used in this product is Duco paint because it is resistant to scratches and water.

Implementation of Workbench Connection System

This implementation will determine the connection system that will be applied to the workbench. Based on data obtained by researchers, the connection system used is a Half Lap connection, equipped with dowels and holes.

Shape Design Implementation

Tables generally have square and rectangular shapes. In this analysis it is stated that the tables used are laptop tables and writing desks. Suitable shapes for laptop tables and writing desks are square, rectangular, L, and U.

The conclusion reached by researchers is a rectangular shape with a knockdown system.

Alternative Design

1. Alternative Design 1

Alternative design 1 has a minimalist nature and can be easily disassembled, this table has a size that is not too large, so the table does not take up much space in the workspace, the table has 1 drawer that has a size wide enough to store various books, tissues, documents and staplers and special space for scanners.

2. Alternative Design 2

Alternative design 2 has a rectangular shape and can be disassembled, this table has 1 drawer that can store cleaning supplies and needs.

3. Alternative Design 3

Alternative design 3 is designed to be used for 2 employees with a sitting position facing each other, this design has a size that is wide enough to carry out work activities and other activities, this table in total has 4 drawers for each side, this table can be disassembled but requires space and concentration to install this table.



Figure 2. Alternative Design 1
(Source: Researcher Processed Data)



Figure 3. Alternative Design 2
(Source: Researcher Processed Data)



Figure 4. Alternative Design 3
(Source: Researcher Processed Data)

3D Drawing

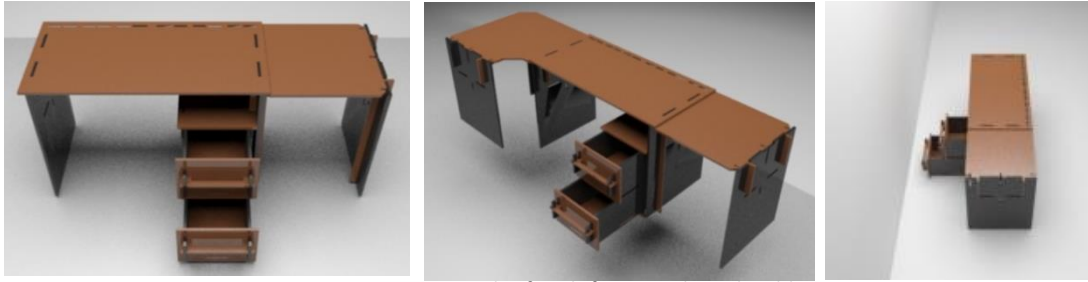


Figure 5. 3D Result of Multifunctional Work Table
(Source: Researcher Processed Data)

Final Design



Figure 6. Final Product

The final design was chosen by evaluating each alternative based on functionality, practicality, and suitability for the intended workspace. Alternative Design 1 was selected due to its minimalist and compact nature, which optimally utilizes limited space. The inclusion of a wide drawer for essential storage and a dedicated scanner space addressed user needs effectively. Additionally, its ease of disassembly ensured flexibility, making it the most practical and user-friendly option compared to the other alternatives.

CONCLUSION

In conclusion, the multifunctional workbench product offers a novel approach with its disassembly and modularity features, allowing users to customize shapes such as regular, L-shaped, or U-shaped tables easily without bolts. The use of appropriate materials like multiplex ensures affordability, strength, and production efficiency. Ultimately, the design prioritizes adaptability, enabling the furniture to accommodate contents and adjust to various room conditions while maintaining functionality and flexibility.

ACKNOWLEDGMENT

Thank you to all parties who supported the creation of this research until it was completed and also to Universitas Dinamika who guided the content and concept of this research.

REFERENCES

- [1] Arief-arsitek, "Konsep Membangun Rumah Kantor," Arief-arsitek.com, 2017. [Online]. Available: <https://arief-arsitek.com/blog/berita-konsep-membangun-rumah-kantor.html#:~:text=Rumah%20Kantor%20adalah%20sebuah%20rumah,penghuni%20rumah%20dan%20pekerja%20tersebut.> [Accessed: Aug. 24, 2022].
- [2] Dekoruma, "Cara Mendesain Ruang Kerja di Rumah," Dekoruma.com, 2019. [Online]. Available: <https://www.dekoruma.com/artikel/85074/cara-mendesain-ruang-kerja-di-rumah#:~:text=Ukuran%20ideal%20minimum%20untuk%20meja,kesehatan%20tulang%20leher%20dan%20punggung.> [Accessed: Apr. 20, 2021].
- [3] S. B. A. R. Putra, "TA: Pengembangan Desain Furnitur Tempat Tidur untuk Mempertahankan Luas Ruang Gerak pada Ruangan (Studi Kasus: Rumah Tipe 36 Perumahan Mirah Delima Regency Gresik)," Undergraduate Thesis, Institut Bisnis dan Informatika Stikom Surabaya, 2019. [Online]. Available: [https://repository.dinamika.ac.id/id/eprint/3565/.](https://repository.dinamika.ac.id/id/eprint/3565/) [Accessed: Feb. 21, 2022].
- [4] O. Sidharta, S. P. Honggowidjaja, and G. Setiati, "Perancangan Meja Multifungsi Pada Interior Small Living Space," JURNAL INTRA, vol. 6, no. 2, pp. 716–721, 2018. [Online]. Available: [https://publication.petra.ac.id/index.php/desain-interior/article/download/7550/6855.](https://publication.petra.ac.id/index.php/desain-interior/article/download/7550/6855) [Accessed: Aug. 24, 2022].
- [5] I. Islam and S. Saphiranti, "Hubungan Ruang dan Aktivitas Interpersonal pada Penerapan Pembatasan Jarak Fisik di Makam Bung Karno," MERAKI: Journal of Creative Industries, vol. 1, no. 1, pp. 37–48, Nov. 2023.
- [6] H. Hariyanto and E. Jaya, "TA: Kriteria Desain Furniture Untuk Shared Workspace Pada Hunian Small Open Space Ruang Tengah," MERAKI: Journal of Creative Industries, vol. 1, no. 2, pp. 37–43, Jun. 2024. [Online]. Available: <https://journal.ubaya.ac.id/index.php/meraki/index>.
- [7] A. Jasińska, M. Sydor, and M. Hitka, "Optimizing dimensions in furniture design: A literature review," BioResources, vol. 19, no. 3, pp. 4727–4748, May 2024. doi: <https://doi.org/10.15376/biores.19.3.4727-4748>.
- [8] H. Goutama, M. Grace, and P. F. Nilasari, "Perancangan Produk Interior Modular Multifungsi Berbasis Material Kayu Olahan," Jun. 2018.
- [9] T. Johnson, "Customizable and adaptable furniture: Designing for millennial lifestyles and environmental concerns." [Online]. Available: <https://doi.org/10.31274/etd-20200624-220>.