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Multifunctional Decorative Plant Shelf Design Concept For Room

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Abstract. Plants are living things that are nurtured and cared for in a medium. Plants have several benefits and the main one is providing oxygen through the process of photosynthesis. Ornamental plants in this room are generally used to beautify the interior of the house. In addition, seeing some of the benefits of plants that provide oxygen is certainly very influential for health and comfort in the room. However, plants also need sunlight which is the most important aspect of their life. Another problem with plants is that they need clear air to launch the photosynthesis process. Therefore, the researcher has a solution by designing a multifunctional ornamental plant rack for the room by adding a diffuser as an air purifier on the plant rack and a sunlight replacement technology that can be used automatically. This study uses mixed methods which is a research method that combines two methods, namely qualitative methods and quantitative methods which are used simultaneously. Qualitative methods include interviews with plant rack users and sellers of decorative plants. In quantitative methods, researchers deploy questionnaires to plant rack users. Case studies were conducted in 2 places in Gresik area and interviews with ornamental plant sellers and using needs analysist . This research produces a multifunctional ornamental plant shelf for a room with a minimalist design concept. The minimalist concept is the use of simple and close elements in technological progress.

Keywords: design, shelf, decoratif plant, multifunction, room

1. Introduction

Plants are living things that are kept and cared for in a medium. Plants have several benefits, the most important of which is providing oxygen through photosynthesis. Plants also have various types, one of which is ornamental plants. Ornamental plants have two types: outdoor ornamental plants and indoor ornamental plants. Ornamental plants in the room are generally used to beautify the house's interior. In addition, seeing some of the benefits of plants that provide oxygen dramatically impacts health and comfort indoors. However, plants also need sunlight, the most important aspect of their lives.

According to data from Esteban et al., quoted in the journal(Fauziah et al., 2019)suggested that differences in sunlight intensity and nutrients cause differences in morphology and photosynthetic pigment content in plants.

Another problem with plant data is that plants need clear air for photosynthesis. Clean air also has an important role for both plants and humans. It affects the health of human lungs, and plants also need clean air for smooth metabolism processes.

Based on Zakaria's data, quoted in the journal (Hasna Salsabila et al., 2020), photosynthesis in plants can be disrupted, such as a decrease in chlorophyll caused by heavy air pollution. The effects of air pollution on plants impact morphological and physiological damage. Air pollution can also cause physical and chemical changes.

Air pollution often occurs in open spaces, but it can also occur indoors and is even more dangerous. The solution to air pollution and photosynthesis in closed spaces is the need for technology that can purify the air, which can be done by providing a diffuser in the room.

Looking at the problems above, indoor plants also need sunlight and clean air for photosynthesis, the most important aspect of their lives. They need to carry out their metabolic process, namely photosynthesis, so the garden can produce oxygen.

According to Better Homes and Garden, citing Kompas.com, one plant in a room makes the air 25 percent cleaner, and five plants make the air 75 percent cleaner in an average room measuring four by five meters. Therefore, researchers have a solution: create a multifunctional ornamental plant rack design using sunlight replacement technology and automatic watering. They add a diffuser as an air purifier to the plant rack and sunlight replacement technology that can be used automatically. In addition, this plant rack can also water automatically.

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2. METHOD

The method used in this study is mixed methods or a mixed method. According to Sugiyono, citing the journal(Hayati, 2021), mixed methods are a research method that combines two methods, namely qualitative methods with quantitative methods that are used simultaneously in one study to obtain more complete, valid, objective, and reliable data. The research flow is as follows:

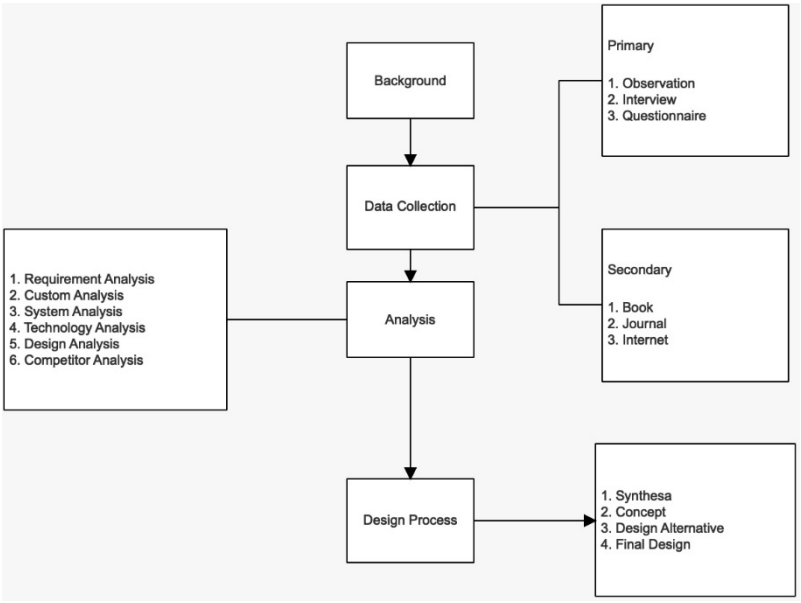

Figure 1. Research Flow
Source: Personal Document

3. RESULTS

Based on the results of the needs analysis for the plant racks contained in the case study, it is then compared with various competitors of similar products by measuring the dimensions and finally, the average measurement is taken, In the results and discussion of this study, the results obtained were multifunctional ornamental plant shelves for rooms using the following dimensions:

Table 1. Dimensions (source: personal document)

no	Shelf Parts And Dimensions
1	The plant shelf frame uses dimensions of 50 x 50 x 150 cm (plot)
2	Plant shelf base 20 x 20 cm (px)
3	Using four pot holders and this number of coasters, the pots can be filled with four plants, which can make the air clean and look neat, and the room still looks clean.

The plant rack model uses a single-pole model using Arduino Uno technology because it does not require a programmer chip, and the available modules can be easily used; a water pump with 5 watts of electricity with a flow rate of 210 liters/hour because the use of a multifunctional indoor plant rack requires relatively small electricity, the diffuser weighs 300 grams with a water holding capacity of 400 ml. and LED grow light low power variant and has a voltage of 220 volts which is suitable for use in plant rack technology.

Multifunctional indoor because it has a relatively small electrical power. The material used is hollow iron, which can make the house look luxurious. In addition, this material is not easily corroded, has a relatively low price, has good heat insulation, and is not easily attacked by pests. Dutch teak wood because it has a relatively low price; this

material also has a lighter weight, fine fibers, and is resistant to humidity and temperature, so this material experiences very minimal shrinkage; the system used is a sliding system applied to the water storage drawer. Using square and rectangular shapes generally gives the impression of conformity, peace, solidarity, security, and equality. Squares and rectangles often do not attract consumers' attention, but squares and rectangles can be twisted into more dynamic shapes and assume strong technology.

This multifunctional decorative plant rack for the room also uses a gray color palette that can make the house's interior elegant and minimalist. This color can create stability and user potential, and this color is a neutral color that can be used all the time by using a paint finish because it can provide an elegant feel to the interior; this finish is also very effective to use, and paint can be corrosion protection. Moreover, varnish because it is easy to apply and able to display wood grain on furniture so that it can provide beautiful results.

Meanwhile, ornamental plants that are suitable for use in rooms are sansevieria hahnii, monstera adansonii, and marble golden pothos because the plants have beautiful and graceful shapes. These plants have colors that make them unique. These plants can make a room look beautiful and elegant. In addition, the care of these plants is also very easy.

DESIGN CONCEPT

The design concept used in the multifunctional ornamental plant rack for the room is a minimalist concept.
The minimalist concept was chosen because it suits the needs of a room that does not require much decoration and can be placed in various room styles.
The minimalist concept is the use of simple elements used to create neatness to get the best impression and effect and closely related to technological progress. The minimalist concept is applied to the design style of ornamental plant shelves for the room.

SKETCH 1

This plant rack takes the form of a frame with an alternating model using square and rectangular shapes with a watering and lighting system above the plants. This plant rack has a water storage drawer below.

Figure 2. Sketch 1 With View And Detail
Source: Personal Document

SKETCH 2

This plant rack takes the form of a frame with an alternating model. Each arrangement of plant racks is a long rectangular shape that can be slid to the right and left. Above the plants, there is a watering and lighting system. Below, there is a water storage drawer.

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Figure 4. Sketch 2 With View and Detail
Source: Personal Document

FINAL DESIGN

Sketch 2 is the final design of the multifunctional decorative plant shelf concept for the room, based on the suggestion of the craftsman. This plant shelf takes the form of a frame with an alternating model using a long rectangular shape. Each arrangement of plant shelves can be slid to the right and left. It has a watering and lighting system above the plant and a water storage drawer below.

Figure 5. Final Design
Source: Personal Document

PRODUCT RESULTS

The product results are finished products that have been selected as the final design. They produce plant shelves with a frame shape that alternates using a long rectangular shape with each arrangement of plant shelves that can be slid to the right and left. The shelves have a watering and lighting system above them and a drawer for storing water at the bottom.

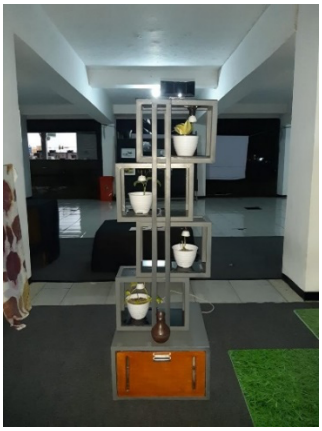

Figure 6. Product Concept Results
Source: Personal Document

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4. CONCLUSION

Plants are living things that are kept and cared for in a medium. Plants have several benefits, the most important of which is to provide oxygen through photosynthesis. Plants also have various types, one of which is ornamental plants. Ornamental plants themselves have two types, namely outdoor ornamental plants and indoor ornamental plants; where examples of outdoor ornamental plants include canna, caladium, and Persian shield, while indoor ornamental plants are usually located in the house or workspaces such as cactus, monstera, philodendron, bromeliad, sansevieria, and sirih-Sirhan.

These indoor ornamental plants are generally used to beautify the house's interior. In addition, seeing some of the benefits of plants that provide oxygen greatly impacts health and comfort indoors. However, plants also need sunlight, which is the most important aspect of their life.

The multifunctional ornamental plant rack design proposed by the researcher is a product design for a multifunctional plant arrangement place where the place is made with the aim of making the plants look neat and is designed for indoor ornamental plants.using sunlight replacement technology that can be used automatically and a diffuser as an air purifier to help smooth the plant's metabolic process as well as an automatic plant watering tool

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