Received October 22, 2014; Accepted April 2, 2015

International Journal of Asia Digital Art&Design

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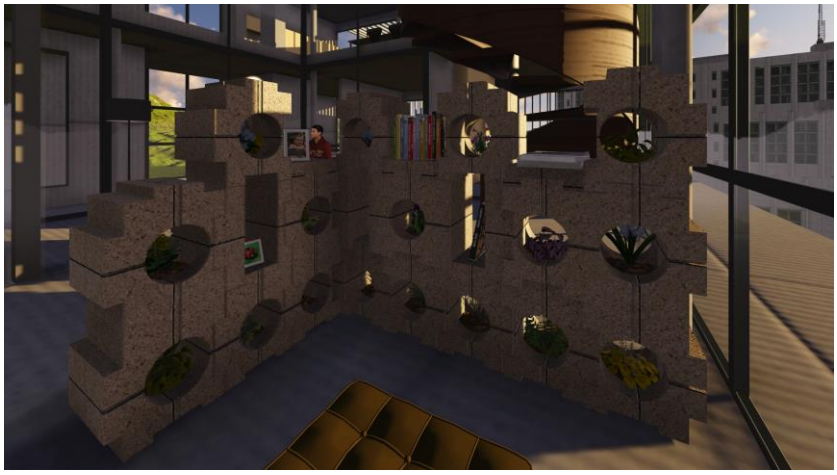
Space Design of City Home Indoor Plant Module for Relaxing Space of Home Environment in East Asia Region



Abstract
In Right now, population of the world is increasing rapidly day by day, and as it will in the future. Large numbers of people gathered in a city which makes the city grow into a megacity. Especially in East Asia, according to the survey of population in the world, we can see that most of cities in East Asia have extremely high density and population. Most of people come to city to find a job, and work is the biggest source of stress, also past studies have shown people who live in a megacity get stressed easily as crowded and polluted environment. We need to deal with the stress, or it may cause some serious health problem. The objective of this design project is to create a modular space which provides relaxing time for the people who live in a megacity of East Asia, an example of new lifestyle.

Keywords: indoor plant, module design, lifestyle

1 Introduction

1-1. Background of the study

Right now, population of the world is increasing rapidly day by day, and as it will in the future. Large numbers of people gathered in a city which makes the city grow into a megacity. Especially in East Asia, according to the survey of population in the world, we can see that most of cities in East Asia have extremely high density and population [1]. Most of people come to city to find a job, and work is the biggest source of stress, also past studies have shown people who live in a megacity get stressed easily as crowded and polluted environment. We need to deal with the stress, or it may cause some serious health problem.

1-2. Aim of the study

The purpose of this study is to create a space or a product which can provide relaxing effect in a healthy way for the people who lives in a big city of East Asia. There are three important factors that need to be included:

(a). If it's fit for the limited space in cities of East Asia.

(b). The effect of release stress and relax in healthy way.

(c). Easy to do, and not expensive.

In details of the module, there are many issues we want to look into. Material is one of important factors of the module, for making a decision; several types of material had tested on 3D simulation. Each module has being designed to join other module with organized water supply system, and was defined 3 standard sizes for fitting the size of houseplants. There are many kinds of houseplants and some of plants can only be

grown in appropriate condition. To create the condition, we need to consider several factors (such as moisture, light, temperature, humidity and fertilizers. Temperature and humidity) are hard to control if not in a greenhouse, but moisture, fertilizers and light issue could be solved by the function of modules. On this project, we also made a model to do some experiments for collecting and analyzing the results from the users, identify the relaxation effect of the module and compare difference between the module and traditional flowerpot.

2 Related Researches

2-1. Houseplants in East Asia

Since people live in such stressed environment, we need to learn how to relax and feel calm. There are many ways exist which can relief our stress and feel relaxed (such as gardening, Yoga and music), also there are some cultural spaces which have a great effect of relaxation. Researchers also found that

Figure 1. Relaxation space, houseplants, module design.

plants are very good for relief stress and pain even we just place it in our room. On the other hand, according to the survey, living spaces in megacity of East Asia are extremely small and limited. It means people can't afford something which is too big (such as a home theater or a pool). We want something is functional but not take too much space; modular design might be a very good answer for it (Figure 1).

Houseplant is a plant that grows in house, office or any building. People usually grow houseplants for decorative purposes, positive psychological effects, or health reasons such as indoor air purification [2].

There are many advantages of growing houseplants at home. Therefore, in the case of megacity, people were busy at work and have no time to take care of plants, sometimes even not at home for few days due to a business trip, and cause plants die (Figure 2-1) [3]. Moreover, since living spaces are limited in megacity, there is no enough space for houseplants at home, so some people choose not to grow a houseplant at home.

Flowerpot is the most common item for growing houseplant; it has multiple standard sizes which depend on the size of plant. But in the situation of city, the flowerpot takes too much space

Figure 2-1

Figure 2-2 **Figure 2-3**

Figure 2-1. Dried-up houseplant. **Figure 2-2.** House plants on balcony. **Figure 2-3.** Flower pot placed next to the window.

from our home if we just line it up (Figure 2-2) [4]. Also, place flowerpot at inappropriate location such as window or door side may cause some inconvenient issue (Figure 2-3) [5].

2-1. Modular design

The basic idea underlying modular design is to organize a complex system (such as a large program, an electronic circuit, or a mechanical device) as a set of distinct components that can be developed independently and then plugged together. Although this may appear a simple idea, experience shows that the effectiveness of the technique depends critically on the manner in which systems are divided into components and the mechanisms used to plug components together.

Modularization, due to the functional independence it creates, has been called the goal of good design. Industry has made an effort to modularize products to be flexible to the needs of end users and marketing. This effort has led to the creation of product families. Occasionally, modules are created with some aspects of production in mind. However, this modularization is done without fully understanding the implications of the design. Although often yielding highly functional products, once the entire manufacturing process is accounted for, this

unstructured modularization often leads to costly redesigns or expensive products. In addition, the unstructured modularization makes the process difficult to repeat if it is successful and difficult to avoid if it is unsuccessful. Modularity requires maintaining independence between components and processes in different modules, encouraging similarity in all components and processes in a module, and maintaining interchangeability between modules. Modularity with respect to manufacturing necessitates understanding the various manufacturing processes undergone by each attribute of each component. We could use various combinations of modules to fit our needs and the space of the room, such as limited living space issues could be solved by the flexible properties of modularization.

3 Concepts

The concept of this idea is all about relaxation, growing houseplants in a modular space which provides relaxing effect for the people who live in megacity of East Asia. There are various kinds of modules which have different functions and purposes, and the numbers and types of modules depend on the users and environments.

In order to grow the plants, three sizes of module (Figure 3) were considered; a small module for a small size of plant, a medium module for a medium size of plant and a large module for a large size of plant. Medium and large modules are multiples of small modules, so that modules are able to create a modular partition and space.

Except growing plants in mainly function of module, additional functions are also very important to this idea. Think about what we need in growing plants, light and water are the essential elements for plants. For this reason, it would be convenient if we apply water supply and lighting modules into this idea. On the other hands, music is also a good way to relief stress, image if we can read a book and listen to some soothing music in a green space, it could be a very good experience of relaxation.

The next step is to think about how to water a plant, we can do it just simply by our own, but sometimes people are away

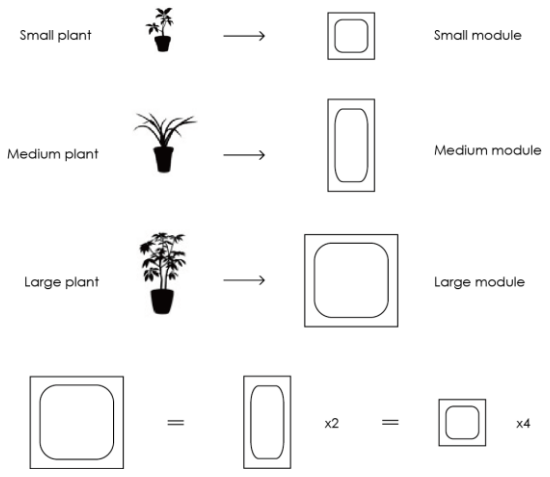


Figure 3. Plant's module

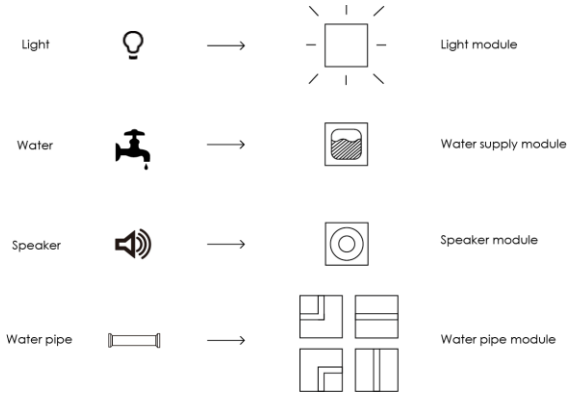


Figure 4. Ideas of additional modules

from home for a brief time by work or private reasons. This is also a good reason to explain why some people don't want to have plants in their house in megacity. To solve this problem, we can use some water pipes which are connected to water supply modules and convey water to the plants. Here are some ideas of additional modules (Figure 4).

To create a space that make people feel relaxed and calm, we set up the space between balcony and living room. It makes people feel they aren't inside of the building but outside, and also feel safety as inside of the house, a middle space between inside and outside of the house.

Light is an essential element in growing a plant. We need to consider the quality, quantity and duration of sunlight, and it depends on house facing direction and position. In this project, the space is set up between balcony and the living room so the sunlight can go through the window to the plants. However, some houses may not get enough sunlight due to the direction and position issues, in these cases, artificial light may be needed to keep our plants healthy, so the best way we can think about is using both sunlight and artificial light for adapting various conditions.

Before we think about what is going to change in our lifestyle with this space, first we need to imagine what people will do if this space is set in their house. For this reason, we will perform a simulation that by the husband as we set at first of this chapter as below (Figure 5):

(a). Come back home at 7:00 pm, and have a dinner with family

(b). After dinner, the husband walks through relaxation space to the balcony and then smokes a cigarette (point 1).

(c). Take care of houseplants (point 2).

(d). Sit on a chair at middle of relaxation space and read a book (point 3) for an hour.

(e). Leave relaxation room and have a chat with family, then go to bed.

From this simulation, we can see the husband spends about an hour to relax in relaxation space alone and do some houseplant care. These actions are actually helping him to relief stress from works and clearing his mind, in addition, he can communicate with family more smoothly without work stress. Also, this is just one of the examples, as the concept of idea; we may do any other activities (such as Yoga or listen to music) by our preference to relax in relaxation space.

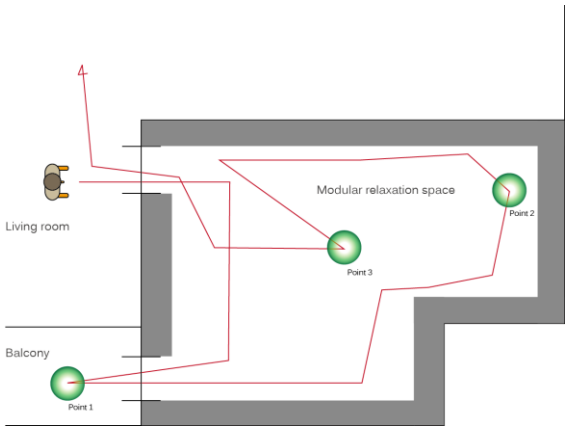


Figure 5. Modular space lifestyle

4 Detail of module

The module is designed in way which radiates relaxation and calmness, but with a simple structure which is easy to use for any user. Each module includes a light unit that provides lighting for plant and space, so even the sunlight is not enough for the house, the plant can still be fine by the grow light [7].

All of the modules are designed in organized way which is able to connect with each other (Figure 6-1), but the contents is different that depends on the function of modules. For example, a plant module is formed by the light, soil and plant unit, and a water module is formed by the light, water and container unit (Figure 6-2).

Besides the plant and water module, there are three additional modules designed to produce more functions and varieties for the space(Figure 6-3).

(a). Cap module: like a cap to put upon the module so user can utilize the space (such as a music player or some books) which top on it.

(b). Stand modules (left and right): both modules have to use together to create a space at the center of modules, similar to cap module, this module is also designed to utilize a space for additional function.

Figure 6-1

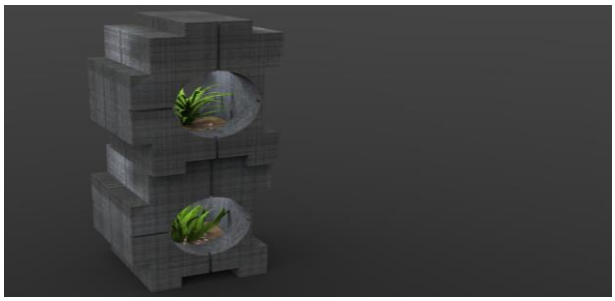


Figure 6-2

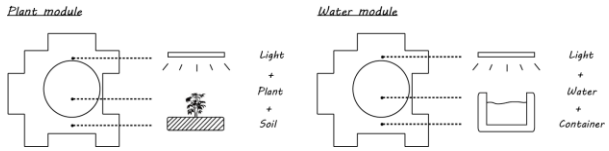


Figure 6-3

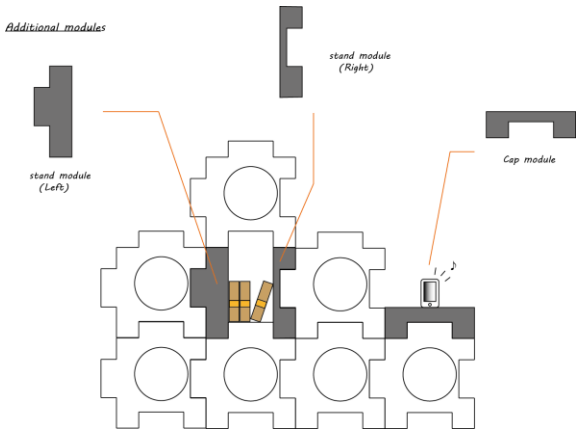


Figure 6-1 and 6-2. modules and contents. **Figure 6-3.** Additional modules.

5 Size of module

Before we set up the size of module, first we need to know height of houseplants and size of standard flowerpots. Here are the sizes of houseplants (Figure 7-1):

(a). Small size houseplants 30~40cm height (examples: Peperomia, Spiderplants and Green Dracaena)

(b). Medium size houseplants 60~80cm height (examples: ZeeZee plant, Arrowhead Vine and Chinese Evergreen)

(c). Large size houseplants 90~120cm height (examples: Snake plant, Croton and Dieffenbachia)

There are many kinds of houseplants and some of them even grow over 200cm height, but in this case, we will pick up

Figure 7-1

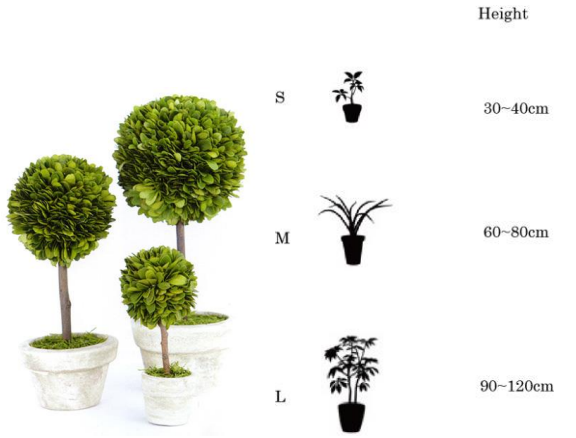


Figure 7-2

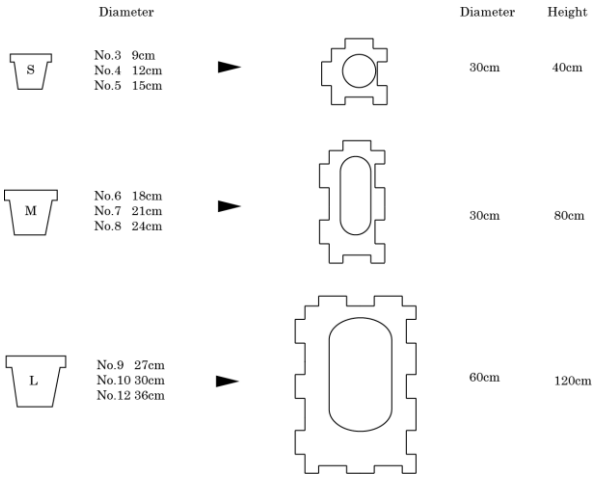


Figure 7-1. Size of houseplants. **Figure 7-2.** Size of flowerpots and modules.

small to medium size of houseplants only, because of large size houseplants are not suitable for the living space in East Asia, and if the houseplant is too big, the module won't be needed either.

By the size of houseplants and flowerpots, we had set up 3 sizes of modules to fit various houseplants (Figure 7-2).

6 Results and Conclusion

The result of this project is as images of below (Figure 8). The modular space could provide a great relaxation effect, and release the stress from work and the cities. Even for the people who are busy or having some living space issues in East Asia, this idea is able to handle these problems. However, it is an unexpected answer from the survey that people are not interesting in houseplants, we may need to think about how to make people feel interested in houseplants and show people that plant is good for health and mind by the modular space in the future.

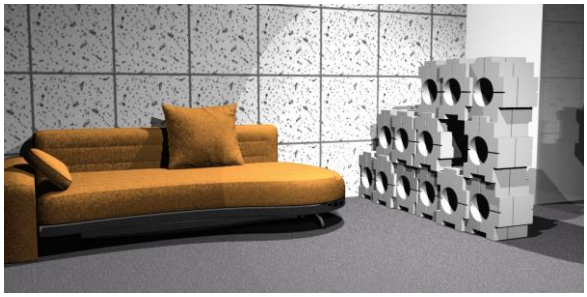


Figure 8. The modular space.

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