

Terrariums approach in cafe design on people's eating behaviour

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ARTICLE INFO	ABSTRACT
<p><i>Article history:</i> Received July 06, 2023 Received in revised form Dec. 03, 2023 Accepted January 08, 2024 Available online April 01, 2024</p> <p><i>Keywords:</i> Café Eating behaviour Interior landscape Terrariums</p> <p>*Corresponding author: Aisya Nadra Binti Achmad Nizam Interior Architecture, School of Housing, Building and Planning, University Sains Malaysia Email: aisyanaadra@student.usm.my</p>	<p><i>Nature-inspired cafés have become a trend in modern interior design, promoting quality health and well-being for the customers. To encourage people to bring nature into the built environment, terrariums have taken up the interior space to improve the quality of life. Terrariums are one of the preferred indoor gardening options that only require an individual's creativity, with or without professional knowledge. However, the terrariums approach to interior spaces is still uncommon in Malaysia, and how the terrarium approach enhances people's eating behaviour remains unexplored. With the emerging trend of Mossarium KL, the concept of terrariums is used as part of the interior design as well as positive factors that enhance people's eating behaviour. This paper aims to study the terrariums approach in built environments and to review the enhancements of the terrarium on people's eating behaviour. A case study had been done on the Mossarium KL in Petaling Jaya, Selangor that adapted the concept of a terrarium in the interior space. This study's conceptual framework is based on the idea of employing terrariums as an interior landscape for exploring their potential impact on individual eating habits. This study highlights the importance of incorporating nature-based interventions, such as terrarium cafes within interior spaces and providing valuable insights into people's eating behaviours in the cafes.</i></p>

Introduction

Nowadays, coffee shops, commonly called cafes, have become a new lifestyle in the community, especially for young people (Daman Sudarman 2023), both in developed and developing countries such as Malaysia. It has become a trend for young people to socialize with friends and family. Excellent services provided by the cafe, such as tasteful foods and beverages, a cozy space with an air conditioner, and access to free WiFi, encourage people to stay longer on the premises. Customers constantly seek something new to satisfy their needs and desires (Lee, Chua, and Han 2020). In recent years, cafe owners and designers have started exploring innovative ways to create unique and captivating environments

that not only enhance the aesthetic appeal of the space but also enhance customer's behaviours, particularly when it comes to their eating behaviour.

Daily food intake and consumption are major factors influencing individual health. Inadequate eating habits and behaviours have led to a rise in overweight and obesity, particularly in young populations. According to the World Health Organization in 2016, more than 1.9 billion adults were overweight, and over 650 million were obese. Internal and external factors such as environmental factors, social interactions, and culture would affect individual eating habits (Kalnina et al. 2022). It is very important to understand how individuals make food choices, consume meals, and engage in dining experiences

to meet the needs of different customers. The impact of interior space on an individual's eating behaviour extends beyond physical functionality and aesthetics. Design elements such as colour, lighting, and comfort play a vital role in shaping the dining experience. The careful design and arrangement of design aspects within an interior space can significantly influence the overall eating experience.

In addition, nature can positively affect individuals' food choices. First, exposure to nature can contribute to a healthy diet by lowering stress and negative emotions (Michels et al. 2021). Emotional responses play a critical role in mediating the interaction between the environment and behaviour. Moreover, nature can encourage people to make healthier and more sustainable eating choices. For example, green packaging is associated with healthiness, while green lighting is found to discourage appetite (Huang 2015). Being in a green environment will enhance self-discipline, which helps resist emotional triggers that lead to excessive eating (Kakoschke, Kemps, and Tiggemann 2015).

The existing studies discussed above have established a relationship between nature and human behaviour, particularly in terms of stress reduction and its influence on food intake (Heidari et al. 2023; Hill et al. 2022). However, there is a lack of research specifically investigating the impact of incorporating terrariums in cafe environments on customers' eating behaviour. This research aims to address this gap by examining the effects of terrariums on customers eating behaviour. The study seeks to investigate the terrarium in the cafe design that enhance customers' eating behaviour. By exploring the potential effects of terrariums on customer behaviour in the context of a cafe, this research aims to contribute to a better understanding of how the incorporation of natural elements of terrarium can shape and improve the dining experience.

Literatur e review

The concept of terrarium and its benefits

An approach that has gained popularity in cafe design is incorporating terrariums in the interior space. A fun way to grow a plant indoors was introduced as a terrarium at least 2,500 years ago by Dr. N.B. Ward, a London physician (Srivastava et al. 2023). Terrariums can be made using clear glass or plastic containers, such as small fishbowls, canning jars, tanks, and bottles.

In other words, a terrarium is a mini garden with no drainage hole. It offers a new ecosystem to grow small plants that do not adapt well to normal environments. Two types of terrariums can be found are open-system terrariums and closed-system terrariums (Mississippi State University 2020). These living installations bring a touch of nature indoors, creating a serene and vibrant atmosphere within the cafe.

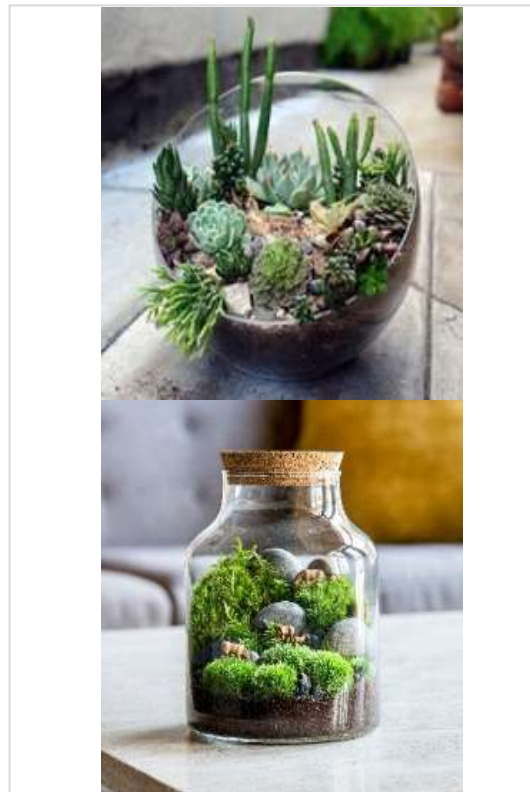


Figure 1. Shows the open and closed terrariums

There are two types of terrariums, open-system terrariums, and closed-system terrariums. Open terrariums require frequent watering and are suitable for plants that prefer less humidity, such as aloe vera or cacti, because there is no cover. Plants that suitable for open terrariums are aloe vera, cactus, and jade plant. In addition, closed terrariums are closed containers. It is intended to maintain heat and humidity to sustain a tropical atmosphere. Plants that can grow in the closed type are ferns, zebra plants, and nerve plants. The basic tools and materials used to create terrariums are a glass container, with or without lighting, potting soil, small stones, charcoal, optional plants, and decorative objects (Mississippi State University 2020).

Terrariums also mimic the glasshouse effect. Plants need basic things such as water, carbon dioxide, nutrients, and sunlight to grow. The layered plant and soil in the terrarium will produce transpiration, evaporation, condensation, and precipitation, which will self-nurture the plant ([Mississippi State University 2020](#)). It is also called “recycling water”. Water vapour is produced by the plants and soil and is collected on the container's walls before trickling down to the soil. Since they are self-nourishing, terrariums need the least maintenance care. First and foremost, watering needs to be taken into consideration when keeping terrariums. Closed terrariums require 4 to 6 months of watering, whereas open terrariums require frequent watering. Because there is no drainage hole, the volume of water is small. Overwatering will cause root disease and inactivate the whole system ([McKelvey 2022](#)).

Next, according to McKelvey, the amount of light should also be considered to maintain the terrarium's plants. Direct sunlight on the plants can slightly damage them because of the excess heat. Terrariums should be placed in bright light because most of the plants do not require direct light. Artificial lights can also be used to replace sunlight. Besides that, trimming also needs to be done for better growth of the plants in the terrariums. To keep the plants small and at a low rate of growth, fertiliser should not be added to terrariums ([McKelvey 2022](#)).

There is growing body of evidence that shows benefits of terrariums offer to interior spaces. According to [Chatakul and Janpathompong 2022](#), one significant advantage of nature is the improvement of air quality as plants act as natural air purifiers, eliminating harmful pollutants like carbon dioxide, nitrogen dioxide, and formaldehyde. Through the process of photosynthesis, terrarium release oxygen while absorbing carbon dioxide. This will help to regulate indoor air quality by reducing harmful pollutants, thereby promoting a healthier environment.

The author also mentioned that incorporating greenery to small areas will adding aesthetics value to the interior space. Terrariums add a unique and visually appealing element to indoor decor. The vibrant greenery, intricate plant arrangements, and miniature landscapes create a captivating focal point, contributing to an aesthetically pleasing environment. In addition, the author highlights that the ability of plants to

effects on psychological well-being by reducing stress levels and enhance mood. Small interaction with plant likes terrariums in indoor settings will create a calming and soothing ambience, providing individuals with a sense of relaxation.

Factors that enhance eating behaviour

A study conducted by [Vanhatalo, Liedes, and Pennanen in 2022](#) examined the impact of different ambiances in a lunch restaurant on customers' emotions, stress levels, food choices, and plate waste. The study explored nature ambience, fast-food ambience, and customary ambience. The results revealed that the nature ambience elicited more positive emotions compared to the fast-food ambience, while the fast-food ambience evoked more negative emotions than the customary ambience. In addition, the nature ambience week showed a slight reduction in objective stress levels after lunch, although subjective stress levels remained consistent throughout the research ([Vanhatalo, Liedes and Pennanen 2022](#)).

This study found that improving the ambience in real-life settings can have a moderate impact on promoting healthier and more environmentally friendly eating habits. The researchers observed a higher number of vegetarian menu selections and fewer meat dishes in these settings. The study highlighted the influence of environmental cues, such as incorporating greenery and nature-themed elements, on food choices and portion sizes. This has significant implications for designing lunch restaurants, as integrating natural elements like plants, flowers, or water features can foster healthier and more environmentally conscious eating decisions. By creating a natural atmosphere in these settings, it is possible to encourage healthier and more sustainable food choices. Overall, this study underscores the importance for restaurants and food service establishments to consider enhancing the ambience to promote healthier and more environmentally friendly eating habits ([Vanhatalo, Liedes, and Pennanen 2022](#)).

The study supports that exposure to nature like terrarium can reduce stress levels, which positively affect eating behaviour. A well-designed terrarium in interior space can bring a touch of nature indoors, which may contribute to a more relaxed state while eating. This can enhance customers' mindset and leading to a more positive dining experience.

In summary, the presence of terrarium in interior spaces provides a range of advantages. They purify the air, reduce stress, boost productivity, elevate mood, and enhance creativity. The future of terrarium is anticipated to witness increased popularity and an amplified focus on the health and well-being aspects. Therefore, embracing the inclusion of plants in interior design is a valuable choice that promotes both physical and mental well-being (Chatakul and Janpathompong 2022). Therefore, the objectives of this paper are to investigate the terrarium approach in cafe setting and to study the effects of terrarium in enhancing customers' eating behaviour. Further exploration of the terrarium on dining experience would contribute to a more comprehensive understanding of how the environment can be optimized to promote healthier and more sustainable eating behaviour.

Methods

The method used in this study is a qualitative method. This study aims to study the effect of terrariums on customer eating behaviour and identify terrariums in a cafe setting that positively enhance eating behaviour. To address this research, a case study will be conducted at Mossarium KL, a terrarium cafe located in Kuala Lumpur. The methodology consists of the following steps, firstly a comprehensive literature review. Literature review was conducted to understand better the relationship between terrariums and eating behaviour. This review will provide a foundation for the study and inform the research objectives. Next, Mossarium KL was chosen as the case study due to its popularity as a terrarium cafe and its accessibility for data collection. Mossarium KL combines the concept of a cafe with a botanical and greenery-focused environment. The unique environment of the cafe allows for the observation and analysis of customer behaviour in relation to terrariums and eating behaviours. Studying such a unique business model allows researchers to explore the integration of nature and dining experiences, as well as the challenges and opportunities associated with running a specialised cafe. Finally, the findings from the data analysis will provide a detailed understanding of the terrarium in a cafe design and how the terrarium positively enhance eating behaviour in a cafe setting. The

results will be linked to the existing literature to validate and expand upon previous research.

Case Study

Mossarium KL background



Figure 2. shows the location of Mossarium KL in Petaling Jaya Selangor



Figures 3 and 4. The facade view and owner of Mossarium KL, Mr Kenn Lim
Source: Mossarium_kl in Instagram

SS2, known as Sungai Way- Subang, is an inner suburb in Petaling Jaya, which is one of the biggest cities in the state of Selangor. SS2 is a large housing area, including bungalow houses, condominium complexes, and semi-detached houses. It has six commercial zones in SS2, consisting of 20 blocks of shophouses, and Mossarium KL is located in the busiest business district. There has a wide selection of foods in SS2, including fast foods, cafes, and restaurants, suitable for people of all ages. Business owners need to have a strategic location to ensure business growth. Therefore, the location of Mossarium KL has the advantage of attracting more customers, particularly younger people.

Mossarium KL is located at Jalan SS 2/55, Petaling Jaya, 47300, Selangor. The estimated floor area of Mossarium KL is 2000 to 3000 sqft. The cafe consists of gallery, cafe and use as a workshop. The owner of Mossarium KL, Mr. Kenn Lim, and the terrarium artist were inspired by the natural green scenery that reflects 'the way of Zen' in a living space. The purpose of this gallery and cafe is to design and simulate terrariums, incorporating forest elements into the living space. The philosophy of being in touch with nature created a feeling of calm in a green environment and encouraged people to take a break from the hustle and bustle of life. Furthermore, according to the philosophy of Mossarium KL, terrariums are the ideal method of having live plants for a busy lifestyle. They are simply beautiful, low maintenance, and require small spaces. Together with the sound of the forest, the beautiful creation is life's pleasure. Moreover, Mossarium KL emphasises the value of respect, humble and simplicity in life to ensure the quality of good services.



Figures 5 and 6. show the workshop session and food and beverage in Mossarium KL

Source: Mossarium concept design website

Referring to [figures 5](#) and [6](#), Mossarium KL offers a terrarium workshop and academy, preserved moss wall customization and installation, a terrarium gallery and gift shop, and a coffee cafe. One of the biggest projects handled by Mr Kenn Lim was the moss art piece for Gamuda Cove. It is one of the largest moss walls in Malaysia. Mossarium KL offers terrarium workshops every weekend that are available for booking through their social media. Moreover, the cafe offers the best selection of coffee beans for a range of beverages such as espresso and latte. Other than coffee, they also serve tasty desserts and pastries. This cafe's surroundings have a natural and green sense to them. The unique concept of a forest with terrarium landscaping creates an eye-catching and peaceful impression for the customer.

Terrarium in Mossarium KL

The building is divided into four main areas on the ground level and first level. The main areas are the workshop, gallery, cafe with seating area, and human-scale terrarium. From the entrance to the cafe area, the presence of terrariums was fully occupied. Customers can experience a variety of appealing terrariums through differences in size, design, and form. There are variations in size, design, and form, allowing customers to explore this captivating miniature.



Figures 7 and 8. The entrance and cafe area in Mossarium KL

Referring to [figures 6 and 7](#), the entrance and the cafe incorporated open space planning into its inner spaces. Customers can walk through the workshop and gallery area, which is designed to look like a forest. The customers can feel the concept of ‘the way of Zen’ through the arrangement of the space and the interior landscape. On the ground floor, the owner fully utilised the space in the cafe area for customers to enjoy the coffee surrounded with diverse range of terrarium such as zen garden, paludariums and tropical gardens. There are areas for customers to enjoy their drinks and meals, a workshop to create their own terrariums, and a gallery exhibiting human-scale terrariums. The entire space of this building has a balanced amount of terrarium to provide comfort for customers. The circulation of movement in the cafe is acceptable for the customers to move around from space to space without any obstacles.



Figures 9 and 10. The workshop area and human scale terrarium on the first level in Mossarium KL
Source: Mossarium_kl in Instagram

Referring to [figure 10](#), customers can be presented with human-scale terrariums equipped with various types of plants that are different in colour, shape, and form. The presence of these terrariums has a notable impact on the ambiance of the space, creating a soothing and gentle atmosphere. The circulation in the building connects customers to the natural environment to create a calm and peaceful feeling. The owner, Mr. Kenn Lim, built a human-scale terrarium in the cafe to create an attractive focal point in the interior space and to convey the feeling of nature into the built environment.

Results and discussion

Softscapes and hardscape in Mossarium KL

Softscape is used more than hardscape in the Mossarium KL. Terrariums clearly embrace

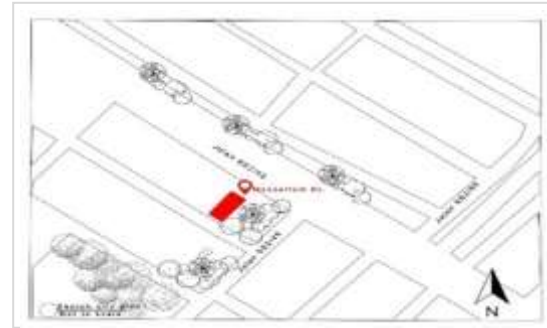
interiors, from the cafe's entrance to each corner of its interior. Open and closed terrariums serve as interior elements such as lighting, furniture, wall features, and ceilings. The interior softscapes' uniqueness boosted the aesthetic value of Mossarium KL. The composition in a variety of shapes, textures, and forms, as well as leaf patterns and beautiful flower colours, promote the Mossarium KL concept of 'the way of Zen'. Type of softscape that can be found in Mossarium KL are moss, fiddle leaf fig, boston fern, calathea lutea, caladium, strelitzia, colocasia, fittonia, pyrosia piloselloides and Tillandsia lonanthea.

In addition, the terrariums serve a practical purpose as well. They function as decorative elements, adding a touch of natural beauty to the surroundings. The combination of various plant species, rocks, and other elements within the terrariums creates a harmonious composition that complements the overall design of Mossarium KL. The terrariums play a significant role in creating a sense of balance and contrast, aligning with the concept of "the way of Zen". It emphasises the significance of finding serenity in the middle of a hectic world by showcasing the balance between nature and man-made structures.

Referring to figures 7 and 8, natural wood and dark-coloured ceramic tiles have been used in the Mossarium KL's hardscape. The material selection tends to be environmentally friendly. It shows that the owner is concerned about sustainability. Most of the use of wood is in furniture, such as tables, chairs, and benches. This cafe used white paint for the walls and ceiling to enhance the element of plants in its interior. A clear glass panel wall was installed to divide the spaces to enhance the entire view. To make maintenance easier, the floor of this cafe was tiled in a dark colour.

White paint creates a sense of cleanliness and freshness, giving the space a bright and inviting feel. It enhances terrariums and artificial lighting, making the cafe appear spacious and airy. It also serves as a natural backdrop, allowing other elements such as furniture, artwork, or decor to stand out.

Sun orientation and lighting system in Mossarium KL



Figures 11. Location plan of Mossarium KL

Referring to figure 11, the lighting in the cafe is aimed at conserving energy by maximising natural lighting during the day and taking advantage of the benefits of sun orientation. Referring to figure 9, the workshop area on the first floor received the most daylight in the morning because the window faces north-east, allowing the space to receive cool light. Moreover, the daylight diffuses through the windows into the white paint inside Mossarium KL, helping brighten the area. The diffused light in the space provides warmth and comfort. It also produces soft and warm lighting colours to increase customer's comfort.

Artificial lighting was also used in the Mossarium KL, such as downlights, pendant lights, and table lamps. Downlights and LED lights use less electricity compared to other types of lights. Terrarium plants require a bright area but not direct sunlight. The diffuse light in the space is sufficient for the terrarium to survive. Moss, the most common plant for making terrariums, needs a bright environment to photosynthesize and produce its own nutrition.

Furniture design in Mossarium KL.

Referring to figures 7 and 8, the furniture selection is influenced by the overall concept of 'the way of Zen'. Most furniture is durable, sturdy, long-lasting, and affordable. The furniture in Mossarium KL is mostly made from wood. The cafe has various types of wood furniture, such as benches, console tables, armchairs, bar stools and coffee tables. The idea of being environmentally friendly in the cafe could be seen through the various wood furniture designs. It could not be argued that wooden furniture is still in trend nowadays. When incorporating wood furniture

into the cafe's design, several factors should be taken into consideration, including strength, durability, maintenance, cost, and more.

Wood furniture adds warmth and is aesthetically pleasing to the entire space in the cafe. It brings in natural elements and creates a cozy atmosphere that customers often find appealing. The natural wood grains and textures enhance the overall design and aesthetic of the space. High-quality wood furniture is a wise investment for the owner due to its durability and strength. Moreover, wood furniture is versatile. This is because it comes in various designs, styles, and finishes, allowing the owners to align with the concept of the cafe. Wood furniture is suitable for any concept, such as industrial, traditional, or even modern, concept such as Mossarium KL. In addition, wood furniture can provide comfort to its users. Comfortable furniture encourages customers to stay longer on-premises, increasing customer satisfaction.

Ventilation system in Mossarium KL

Artificial ventilation systems, which include split air conditioning and exhaust fans, were used in Mossarium KL. Air conditioning creates a comfortable indoor environment, especially in a hot and humid country like Malaysia. It will help regulate the temperature, reduce excessive heat, and provide a pleasant atmosphere where customers can enjoy their meals and beverages. To achieve customer satisfaction and comfort, the air conditioning will filter the odours from soil and plants. Other than that, it also helps to remove dust and allergens to ensure customer's and staff's well-being.

Since terrariums require minimal maintenance, the use of air conditioning in Mossarium KL will protect the plants from heat stress. This will ensure that the plants can thrive. In addition, terrariums efficiently filter the air through the process of photosynthesis, in which plants absorb carbon dioxide and release oxygen. This could help cool the temperature and lower the humidity within the interior. Other than that, using air conditioning helps prevent pests such as mites and mealybugs, which will affect the terrarium ecosystem.

This comprehensive review examines the potential influence of terrariums on eating behaviour in cafe design. Focusing on the Mossarium KL as a case study, the analysis explores how the incorporation of terrarium elements enhances the cafe space, providing

diners with an optimal eating experience. The study also investigates the impact of external factors on customer satisfaction and lifestyle, including softscape and hardscape integration, lighting, materials, and ventilation. By synthesising existing literature, this review sheds light on the significant positive effects of terrariums on customers' eating behaviour in a cafe setting.

Terrariums can have a significant impact on eating behaviour through their influence on psychological and environmental factors. Firstly, they can reduce stress levels, promoting better eating habits by diminishing emotional or stress-related eating. Moreover, the presence of terrariums creates a soothing atmosphere, improving moods and increasing feelings of happiness (Yeo 2021). Individuals in a positive emotional state tend to make healthier food choices and are less likely to engage in emotional eating.

Next, terrariums have been associated with increased productivity and enhanced cognitive function in work or study environments (Han, Ruan, and Liao 2022). When individuals are more focused and productive, they are less inclined to engage in mindless snacking or unhealthy eating habits. The visual appeal of terrariums also plays a role in influencing eating behaviour. By improving the aesthetics of a space, they create a more inviting and pleasant dining experience, potentially leading to slower eating and greater satisfaction from meals.

Terrariums can also contribute to better air quality and oxygenation. Certain plants, like peace lilies and snake plants, purify the air by removing toxins and releasing oxygen (Yeo 2021). Improved air quality supports a healthier environment, which can positively impact overall well-being and subsequently influence positively eating behaviour (Lohr 2010).

Furthermore, the presence of terrariums in the cafe serves as a reminder to practise mindful eating. Mindfulness involves paying attention to the present moment, including the sensory experience of eating (Keeler 2014). By having terrarium nearby, individuals are encouraged to slow down, savour their meals, and be more aware of their hunger and fullness cues. This mindfulness can lead to healthier portion control and a more enjoyable eating experience.

Finally, ambient light can influence stimulation levels, cognitive associations, and overall behaviour (Spence et al. 2014). A dark

atmosphere or a cold light would lead to high-calorie intake while brighter ambiance and presence of natural light would lead to healthier food choice (Jacquier and Giboreau 2012). When customers are exposed to bright light during the day, it will help to suppress appetite and promote weight loss while dim light at night can lead to feelings of hunger that lead to overeating and weight gain (Biswas et al. 2017).

Conclusions

In conclusion, the thoughtfully designed interior design components of the Mossarium KL have proven to have a beneficial effect on customer eating behaviour. The terrariums cafe has successfully created an environment that enhances customers' choices and experiences by adding terrariums, natural materials, proper lighting, and well-designed furniture. The presence of terrariums is one of the main design elements that contribute to the cafe success. These terrariums not only enhance the aesthetic value of the space, but it also creates a sense of freshness and peace. The terrariums' natural green colour provides a soothing atmosphere that appeals to both the cafe owner and customers. Exposure to nature and greenery has been shown in studies to have a soothing effect on people, lowering stress levels and improving overall well-being. Terrariums not only provide visual attractiveness to the cafe, but they also help purify the air, resulting in a healthier and more comfortable dining experience.

Furthermore, furniture and seating arrangements also significantly impact on customer's eating behaviour. Comfortable seating arrangements will promote social interaction, encourage customers to stay longer, and possibly increase the quantity of orders. In addition, the material of Mossarium KL complements the overall look of the cafe, creating visually pleasing and improving dining experience. Mossarium KL demonstrates that the terrarium cafe potentially impacts on customers eating behaviour. As a result, there is great potential for the cafe owner and designer to develop and engage the terrariums into the cafe design in the future to attract customers and encourage a healthy eating lifestyle.

Terrarium cafe should continue investing in research and development to understand better the

exact design elements that enhance customers eating behaviours. By studying customer preferences and behaviours, designers and cafe owners should continuously adapt new trends in terrarium design for future development. Finally, this paper successfully highlights the objectives that incorporating terrariums, appropriate lighting design, well-designed furniture, and materials positively enhances customer eating behaviour. This potential of a terrarium cafe has created an environmentally friendly space that promotes relaxation, well-being, and an enjoyable eating experience. It should be continued to harness, positively impacting customer's health and well-being.

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Author(s) contribution

Aisya Nadra Achmad Nizam contributed to the research concepts preparation, methodologies, investigations, data analysis, visualization, articles drafting and reRoslan Talibvisions.

Heristama Anugerah Putra contribute to the research concepts preparation and literature reviews, data analysis, of article drafts preparation and validation.