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## Exploring sensory mapping in interior design by using sustainable materials in residential spaces

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### Abstract

This study aims to review the usage of renewable resources to enhance sensory experiences sustainably and investigates sensory mapping in Residential spaces. The study also emphasizes how texture, sound, and scent impact how we perceive places. Several studies recommend enhancing sensory experiences with renewable resources including plants, bamboo, wool, and repurposed wood. This strategy encourages user involvement in using sustainable materials and ecological responsibility in line with biophilic design concepts. The study also covers techniques for recording and evaluating sensory experiences, emphasizing how comfort and satisfaction are affected by ambient sounds, textures, and scents. According to the research, using renewable resources with a multisensory approach can make interior design more sustainable, human-centered, and immersive. Integrating these sustainable materials in interior spaces has environmental benefits and enhances users' well-being. Natural materials like bamboo, wool, reclaimed wood, and plants offer unique sensory qualities that contribute positively to indoor spaces. For instance, using untreated wood or natural fibres brings warmth and texture that can be felt and appreciated. Natural scents from essential oils or plants provide a calming atmosphere, improving mood and reducing stress without synthetic chemicals. Meanwhile, renewable materials such as cork and recycled fabrics help manage sound within a room, making it feel quieter and more peaceful. This approach aligns with the principles of biophilic design, which seeks to connect people with nature through design elements. By using sensory mapping, designers can create spaces that are both ecologically responsible and highly engaging for users.

**Keywords:** Sensory perception, sustainable materials, environmental psychology, user experience, interior design

### Introduction

Sensory mapping in interior design is an emerging methodology that prioritizes the holistic experience of a space by engaging the senses-sight, touch, smell, hearing, and even taste-to influence emotional and physical well-being. Residential interiors, as intimate and personal environments, are especially suited for sensory-driven design approaches that go beyond mere aesthetics to create spaces that evoke comfort, relaxation, and a sense of belonging. Sensory mapping enables designers to consider how textures, colours, lighting, acoustics, and even fragrances shape perceptions and emotions, ultimately enhancing the functionality and liveability of a space. Parallel to this, the urgency of addressing global environmental challenges has brought sustainability to the

forefront of interior design. The adoption of eco-friendly materials such as bamboo, cork, and recycled glass, reclaimed wood, and natural fibres is not only an ethical imperative but also a creative opportunity. These materials offer unique sensory attributes-soft textures, natural patterns, and earthy tones-that can enrich the sensory experience of a space while promoting environmental stewardship. The combination of sensory mapping with sustainable materials in residential design allows for a harmonious balance between human-centric and eco-conscious practices. Modern residential spaces have evolved into multifunctional environments, often serving as homes, workplaces, recreational hubs, and spaces for social connection. This shift has heightened the need for interiors that support various activities while promoting mental and

emotional well-being. Materials like reclaimed wood or natural stone, for example, can evoke warmth, serenity, and a connection to nature, making them ideal for creating nurturing and productive environments. At the same time, sustainable materials contribute to a reduced ecological footprint, addressing the growing demand for environmentally responsible design. This research aims to explore the intersection of sensory mapping and sustainable materials in residential design. It seeks to analyse how sensory properties of sustainable materials impact human perception and emotions, and how these insights can be applied to create residential spaces that are both environmentally conscious and emotionally fulfilling. By developing a framework that integrates these two principles, designers can reimagine residential interiors that meet the functional, emotional, and ecological needs of modern living. This approach not only aligns with the global push for sustainability but also underscores the transformative power of design in enhancing quality of life.

### Literature Review

This paper investigates the evolving role of stone in contemporary interior design, examining the latest trends, techniques, and applications. It seeks to uncover how designers harness the unique properties of stone to craft inspiring and functional spaces. The paper also aims to provide valuable insights into the potential of stone as a dynamic and versatile element in interior design, offering recommendations for architects, interior and product designers, and industry professionals for further exploration and innovation in the building design field.

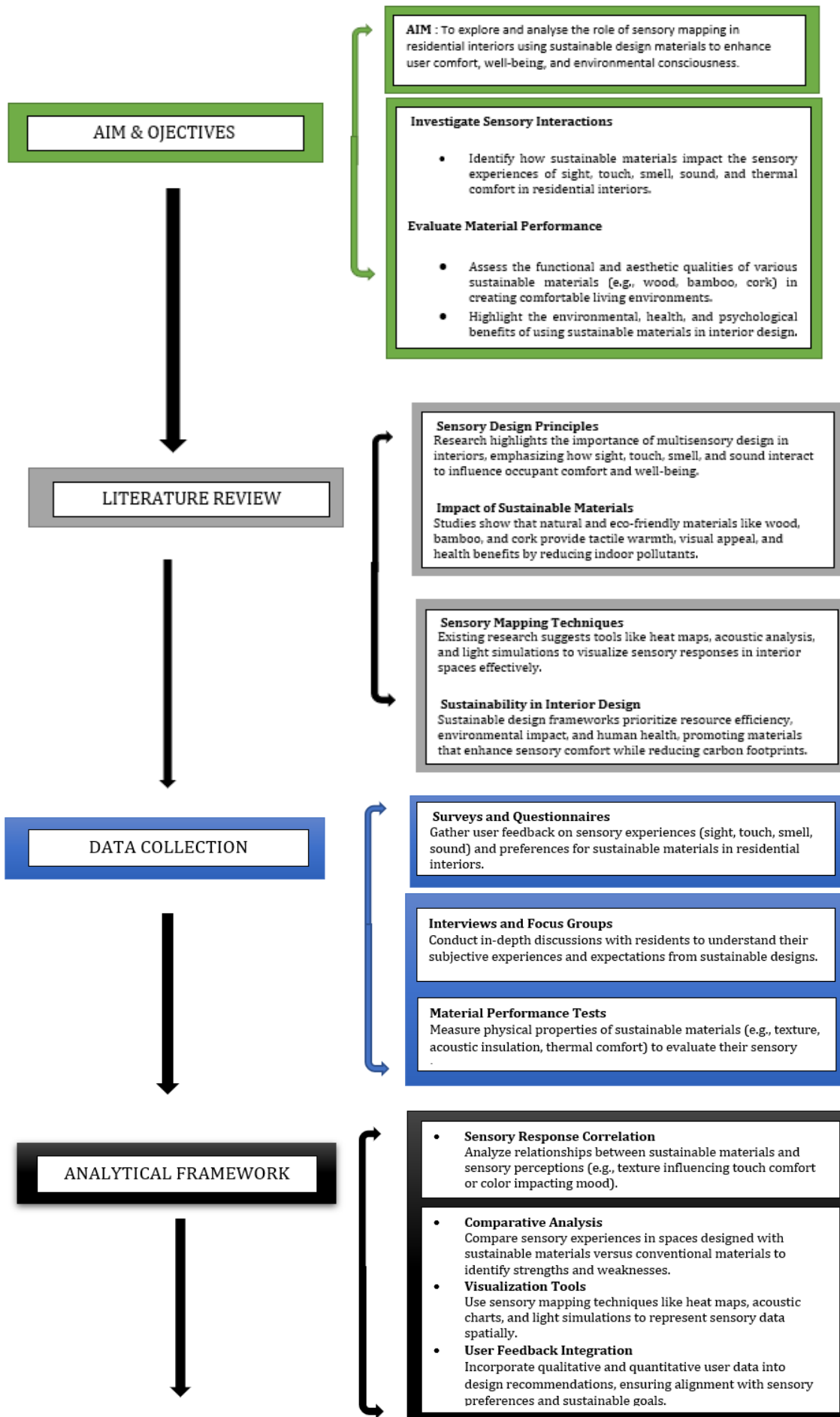
Edensor T. (2022) <sup>[2, 16]</sup>. The research discusses about how the sonic, tactile and visual qualities of stone contribute to the sensory and affective experience of places, shape the symbolic meanings and affective impacts of diverse memorials, and trigger a powerful sense of geological conviviality. In this paper, they have argued that conceptions of place have neglected the affective and sensory qualities of the material environment in favour of an overweening emphasis on symbolic and functional attributes. The material qualities of the built environment significantly influence sensory and emotional experiences, yet they are often overlooked in favour of symbolic or functional interpretations. Stone, with its unique sonic, tactile, and visual characteristics, serves as a profound medium in shaping place identity and emotional resonance. Its texture and durability evoke a tactile engagement, while its visual presence often carries symbolic weight in memorials and landmarks. Furthermore, the interaction with

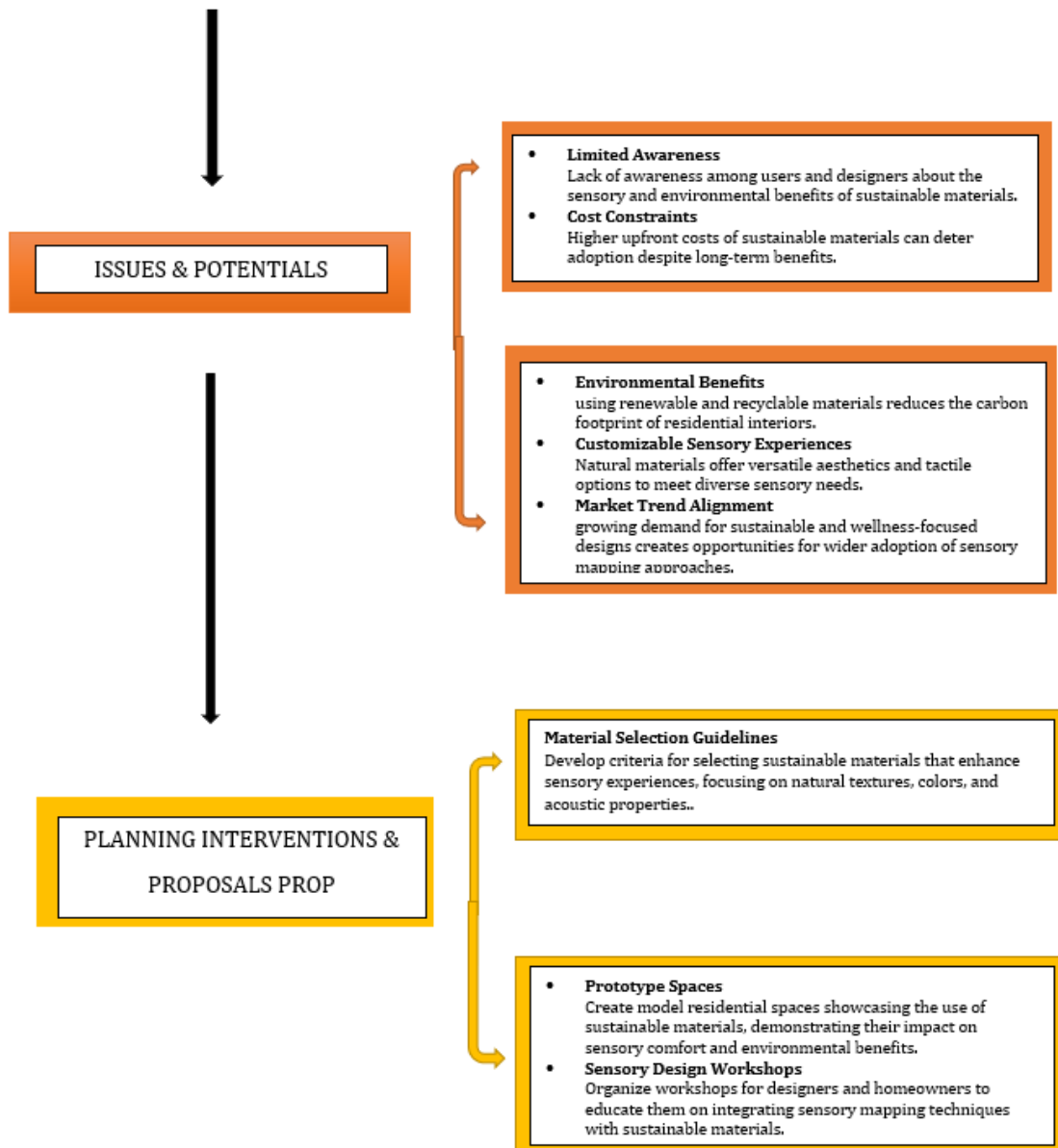
stone can elicit a sense of "geological conviviality," connecting humans to the Earth's temporal and material history. This perspective highlights the need to integrate sensory and affective dimensions into conceptions of place-making, enriching our understanding of the material environment's role in shaping lived experiences.

Abhijeet Saxena, *et al.* (2020) <sup>[3, 17]</sup>. The research explore the role of touch or tactile sense in interior design and its impact on emotional experience. Through experiments, this study will examine the effects of different types of touch surfaces, such as smooth versus textured. Touch plays a critical role in human perception and the emotional experience of interior spaces. Research highlights how surface textures, such as smooth or rough finishes, influence mood and comfort. Smooth surfaces like glass or metal are often linked to modernity and calmness, while textured materials like wood or stone evoke warmth and a sense of natural connection the significance of tactile qualities, such as texture and temperature, in shaping user interactions with materials. Incorporating diverse tactile elements in interior design can enhance emotional engagement and overall spatial experience.

Shakthi. K, *et al.* (2023) <sup>[4, 18]</sup> They investigate about the significance of the five senses and the sensations that architecture can evoke. How we feel impacts how we live, how we inhabit space, and how we construct our lives. Designing our environment with our expertise helps human evolution and development. After everything that the pandemic has caused, the globe must remain optimistic today. The emotions and sentiments may alter depending on the location. The five senses consist of sight, touch, smell, and hearing. Their relationship with architecture and examination of various parts of the built environment. From there, the relationship between persons and their emotions is formed. The purpose of the study is to learn about the various senses, to identify the architectural components that aid the senses, and to examine the link between the senses, the architectural aspects, and how they affect the space. Architecture and interior design significantly influence human emotions and behaviour by engaging the five senses-sight, touch, smell, hearing, and taste. Post-pandemic, the integration of multisensory design is increasingly recognized for its potential to foster optimism and resilience, enhancing the human connection to spaces through thoughtful, sensory-aware architectural interventions.

### Aim & Objectives Methodology





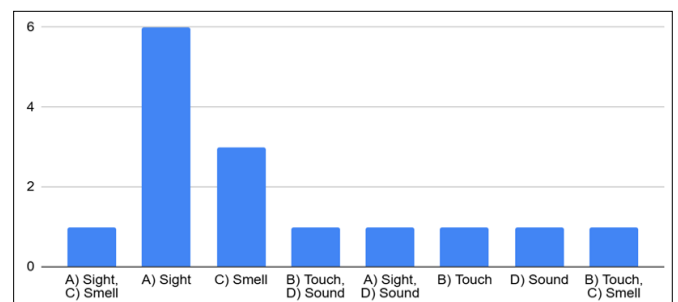
**Results and Discussion**

Some of the benefits identified in the results are included below; they provide information about how sensory and sustainable materials are obtained in the participants' well-being and raise awareness of the following advantages:

1. **Enhanced Sensory Comfort** Residents reported improved sensory experiences, particularly in tactile and visual comfort, due to the natural textures and aesthetics of sustainable materials like wood, cork, and bamboo.
2. **Health and Well-Being Benefits** The use of non-toxic and breathable materials significantly reduced indoor air pollutants, contributing to a healthier living environment.
3. **Positive Emotional Responses** Sustainable materials, coupled with natural lighting and calming color palettes, created spaces that promoted relaxation and emotional well-being.
4. **Acoustic and Thermal Performance** Materials like cork and bamboo demonstrated excellent sound absorption and thermal insulation, enhancing the overall functionality of interiors.

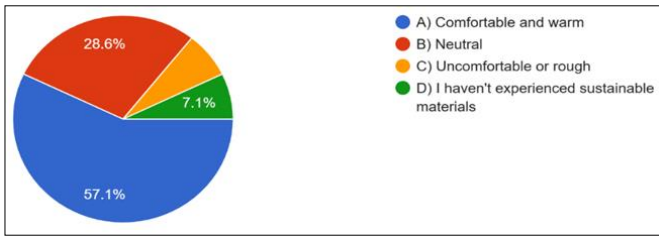
**Increased Awareness**

Participants became more conscious of the environmental and sensory benefits of sustainable design after engaging with the project.



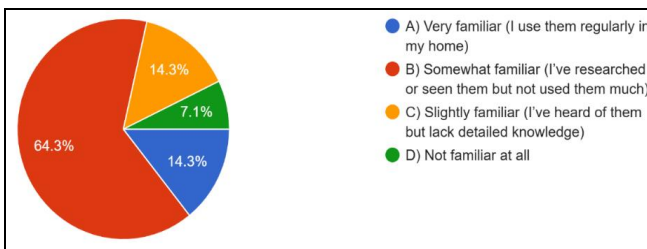
**Fig 1:** Which sense do you feel is most important when experiencing a space in your home?

The graph shows that sight and touch are the most important senses when experiencing a home space, with smell and sound being less influential. This suggests a focus on visual appeal and comfort in home design.



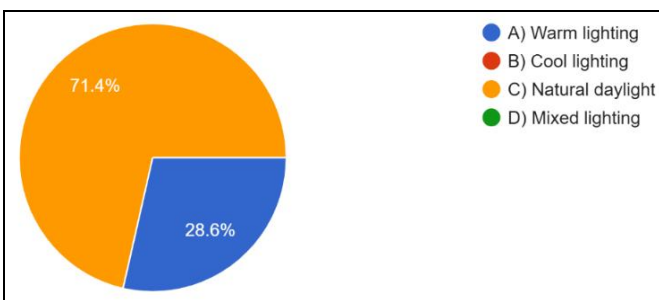
**Fig 2:** How do you perceive the texture of sustainable materials in your home?

The pie chart illustrates the perception of sustainable materials' texture in homes. A significant majority (57.1%) find them comfortable and warm, while 28.6% perceive them as neutral. A small fraction (7.1%) finds them uncomfortable or rough, and 7.1% haven't experienced them. This suggests a positive perception of sustainable materials' texture.



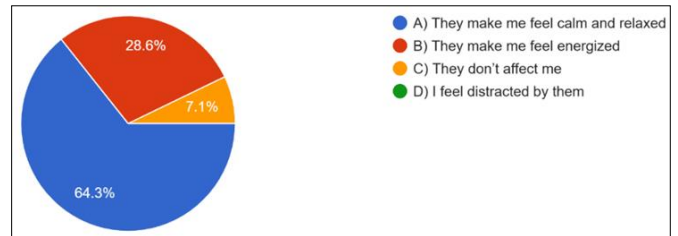
**Fig 3:** How familiar are you with sustainable Materials?

The pie chart reveals that 64.3% of respondents are somewhat familiar with sustainable materials, having researched or seen them but not used them extensively. A smaller portion (14.3%) are very familiar and use them regularly in their homes. 14.3% have slight familiarity, while 7.1% are not familiar at all. This suggests a general awareness of sustainable materials but limited practical experience.



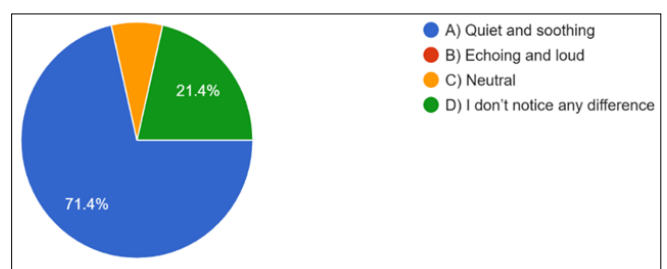
**Fig 4:** What type of lighting enhances the natural look of sustainable materials in your home?

The pie chart shows that 71.4% of respondents prefer natural daylight to enhance the natural look of sustainable materials in their homes. 28.6% opt for mixed lighting. This suggests that natural light is highly valued for showcasing the beauty of sustainable materials.



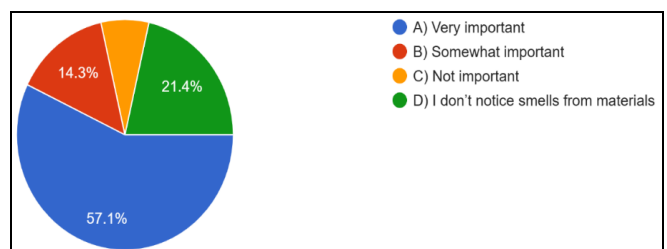
**Fig 5:** How do natural sustainable materials impact your emotional well-being in a space?

The pie chart reveals that 64.3% of respondents feel calm and relaxed in spaces with natural sustainable materials. A smaller proportion (28.6%) feels energized, while 7.1% report no impact or feeling distracted. This suggests that natural sustainable materials are perceived to have a positive influence on emotional well-being, primarily promoting feelings of calmness and relaxation.



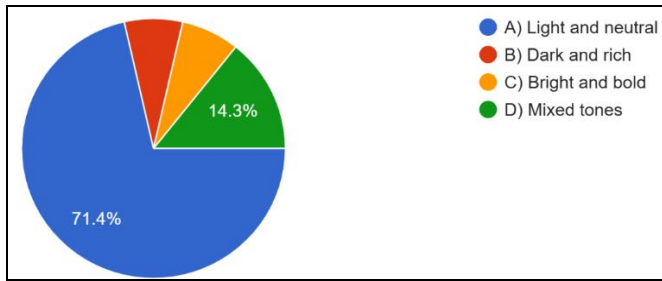
**Fig 6:** Which sound profile do you associate with interiors using sustainable materials?

The pie chart shows that 71.4% of respondents associate interiors with sustainable materials with a quiet and soothing sound profile. A smaller proportion (21.4%) find them neutral, while 7.1% don't notice any difference. This suggests that sustainable materials are perceived to contribute to a peaceful and tranquil acoustic environment.



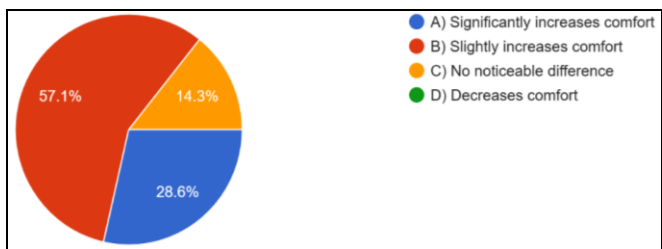
**Fig 7:** How important is the smell of natural materials in your home?

The pie chart indicates that 57.1% of respondents consider the smell of natural materials in their homes as not important. 21.4% find it somewhat important, 14.3% consider it very important, and 7.1% don't notice any smells from materials. This suggests that while some value the scent of natural materials, it's not a primary consideration for most respondents.



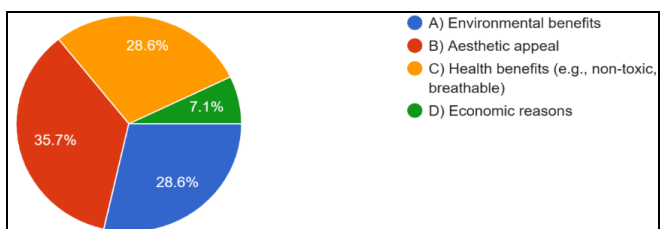
**Fig 8:** Which sustainable material do you find most visually appealing in a residential interior?

The pie chart reveals that 71.4% of respondents find light and neutral sustainable materials most visually appealing in residential interiors. A smaller proportion (14.3%) prefer mixed tones, while 14.3% find dark and rich materials appealing. Only 7.1% opt for bright and bold materials. This suggests a preference for understated elegance and a natural aesthetic in sustainable interior design.



**Fig 9:** How does the use of sustainable materials affect your perception of comfort in your home?

The pie chart shows that 57.1% of respondents perceive a significant increase in comfort due to the use of sustainable materials in their homes. 28.6% notice a slight increase, while 14.3% report no noticeable difference. Only 7.1% feel a decrease in comfort. This suggests that sustainable materials are generally perceived to enhance comfort in homes.



**Fig 10:** What is your primary reason for choosing sustainable materials in your home?

The pie chart reveals that 35.7% of respondents prioritize environmental benefits as their primary reason for choosing sustainable materials in their homes. 28.6% are motivated by aesthetic appeal, while 28.6% cite health benefits like non-toxicity and breathability. Only 7.1% choose sustainable materials for economic reasons. This suggests that environmental and health concerns, along with the desire for a beautiful and healthy home, are the main drivers for adopting sustainable materials.

**Discussion**

According to the survey graphs above, the results of the poll

show that people typically view sustainable materials in home design favourably, and they particularly like natural, light, and neutral hues. Comfort and emotional health are important to most, and sustainable materials help create a more relaxed and comfortable environment. While aroma and sound impact are less important, visual appeal and environmental benefits are the main reasons people choose these materials. In general, sustainable materials are becoming more well-known and valued, particularly due to their advantages for the environment, human health, and aesthetics.

**Here are the few challenges mentioned below.**

- 1. Integration of Sensory and Sustainable Design:** The study emphasizes the potential of integrating sensory mapping with sustainable design to create interiors that prioritize both user well-being and environmental sustainability.
- 2. User-Centered Design Challenges:** Aligning material selection with diverse sensory preferences requires personalized approaches, highlighting the importance of participatory design processes.
- 3. Overcoming Cost Barriers:** Initial cost challenges were identified, but long-term benefits in durability, comfort, and energy efficiency make sustainable materials a cost-effective solution over time.
- 4. Role of Education and Advocacy:** Increasing awareness among designers and homeowners is crucial to overcome misconceptions and expand the adoption of sustainable materials.
- 5. Future Research Opportunities:** Further studies could explore advanced sensory mapping tools and the integration of emerging sustainable technologies, such as smart materials, to enhance residential interiors.

This analysis underscores the transformative potential of sensory mapping in advancing sustainable design practices while addressing challenges and opportunities for future applications.

**Conclusion**

The integration of sensory mapping and sustainable design in residential interiors offers a transformative approach to creating spaces that prioritize human well-being and environmental sustainability. This study highlights the positive impact of sustainable materials, such as wood, bamboo, cork, and recycled components, on sensory experiences, including visual aesthetics, tactile comfort, acoustic performance, and olfactory appeal. Residents reported improved emotional and physical well-being, demonstrating the potential of these materials to enhance the quality of life. However, challenges such as cost constraints, variability in material performance, and limited awareness among users and designers were identified. Despite these barriers, the long-term benefits of sustainable interiors—such as reduced environmental impact, healthier indoor environments, and customizable sensory experiences—underscore their value. By incorporating user-centered design processes, educational initiatives, and supportive policies, the adoption of sustainable materials can be further accelerated. Ultimately, sensory mapping provides a critical framework for understanding and optimizing the interplay

between sustainable materials and human experiences, paving the way for innovative and responsible residential design solutions.

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