Original Article
ISSN (Online): 2454-1907

International Journal of Engineering Technologies and Management Research
April 2025 12(4), 47–75

THE ROLE OF LIGHTING DESIGN ON HUMAN PSYCHOLOGY IN INTERIOR SPACES (FASHION RETAIL STORE CASE STUDY)

Ola Mahmoud Mohammed Ahmed [1], Amna Ali Talib Al Sheyadi [2]

[1] Assistant Professor, Department of Design, Oman College of Management and Technology, Sultanate Oman
[2] Student, Department of Design, Oman College of Management and Technology, Sultanate Oman

Received 15 February 2025
Accepted 10 March 2025
Published 30 April 2025

Corresponding Author

Ola M. Mohammed Ahmed,
omohammed@ocmt.edu.om

DOI
10.29121/ijetmr.v12.i4.2025.1560

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

Lighting is a powerful tool for creating atmosphere and enhancing the sense of space, not just ensuring that objects are visible. The study examines the impact of light on interior design and the relationship between lighting effects and human psychology in this context, with a focus on how these effects influence human well-being. It also identifies lighting types and concepts that enhance human emotions. The research employs a descriptive, theoretical, and analytical approach to exploring the relationship between lighting and human psychology in interior design studios, presenting several case studies that illustrate how thoughtful lighting design influences human psychology. Interior design relies heavily on lighting, which has a significant impact on interaction and mental well-being. This involves balancing artificial and natural illumination, incorporating biophilic elements, and considering psychological aspects. Therefore, studying the effects of sustainability can emphasize the relationship between natural and constructed environments, maximizing the use of natural light and minimizing the reliance on artificial light sources. Finally, the study will present a case study of the workshop in a design psychology course (603203), in Department of Design, Oman College of Management and Technology, which aimed to apply the concept of psychology and lighting design involving color in retail store spaces, that discover the impact of lighting on customers in fashion stores. In conclusion, the study contributes to the understanding of the relationship between lighting and psychology in interior design, providing criteria for interior designers to enhance their experience and promote the development of innovative, well-rounded designers. Designers must consider the psychological impact of light in alignment with the purpose of space. The perfect lighting design creates a well-balanced environment for humans, increasing productivity. The results of the workshop were outstanding, as they analyzed consumer psychology through various lighting and color design approaches.

Keywords: Lighting Psychology, Lighting Design, Well-Being, Sustainability, Retail Store Design

1. INTRODUCTION

Circadian lighting systems take into account the human circadian rhythm, adjusting the color temperature throughout the day to create environments that promote rest and productivity, such as hospitals, schools, and workplaces. Interior lighting offers a comprehensive understanding of the lighting principles and practices required to create visually appealing and functional interiors Ozenen (2023). The interaction between color, light, and human emotions can have a profound impact on comfort, productivity, and mood. The research explores the

psychological effects of lighting in interior design, with a specific focus on the diverse types of lighting, their emotional impact, and the importance of balancing artificial and natural lighting sources Boyce (2003). This study offers a comprehensive overview of interior lighting, encompassing various lighting techniques, fixtures, controls, and types that enhance the functionality and aesthetics of interior spaces. This comprehensive guide offers a thorough understanding of the role of lighting in interior design, providing insight into how it can enhance the functionality, aesthetics, and ambiance of an interior space Ozenen (2023). The study aims to enhance the understanding of the relationship between lighting and psychology in interior design, thereby improving designers' experiences and fostering the development of innovative, well-rounded designers Mahmoud (2023). Therefore, natural lighting systems enhance the health, productivity, safety, and customer satisfaction of buildings, as well as healthcare facilities, promoting a positive environment for occupants and improving patient recovery rates Edwards and Torcellini (2002). Light has a significant impact on human perception, psychological well-being, and cognitive maps. An ecological approach to light perception encompasses light design and art, as well as the analysis of mental, emotional, and behavioral responses in various experiential contexts Elnaggar and Arts (2022). Therefore, the study highlights the significance of lighting design in creating a comfortable and visually appealing environment, emphasizing the need for solutions that harmonize with color schemes and enhance functionality. It emphasizes psychological and design aspects through lighting in interior design Madumarova (2023). The study will provide a case study of a workshop in a design psychology course (603203) at the Oman College of Management and Technology's Department of Design. The workshop's goal was to apply psychological concepts and lighting design principles in retail store spaces to determine how lighting affects customers in fashion stores. The workshop's outcomes were outstanding as they examined consumer psychology through various lighting design techniques.

1.1. PROBLEM STATEMENT

Lighting is crucial in human psychology as it influences emotional reactions and overall well-being. Poorly designed lighting can cause headaches, eye strain, and anxiety. However, thoughtful lighting can enhance focus, improve sleep, and increase happiness. Currently, there are no specific criteria or standards for designing lighting in interior spaces that guide designers in selecting the proper lighting elements to evoke emotions in the user and enhance psychological factors and mood. Moreover, the study examines the psychological impact of lighting on interior design, specifically investigating the relationship between lighting effects and human psychology to address these issues through enhancing sustainability and green spaces.

1.2. RESEARCH SIGNIFICANCE

Interior design is heavily reliant on lighting, which significantly impacts both the aesthetic appeal of a room and the psychological well-being of its occupants. The study examines the impact of various lighting types on design perception, a crucial aspect of human psychology, particularly in interior design, where lighting types and concepts evoke emotional responses. By applying this knowledge, the study aims to determine the impact of lighting psychology concepts on consumers in a fashion retail store project.

1.3. RESEARCH QUESTIONS

- What is the role of lighting in interior design?
- How can lighting affect human psychology?
- What is the relationship between lighting design and psychological factors?
- What are the various lighting techniques, fixtures, controls, and types that enhance the functionality and aesthetics of interior spaces?
- What are the key elements in the design that enable lighting design to control human emotions?
- How can sustainability and green spaces affect the lighting design?
- How can good lighting design enhance human comfort, productivity, and mood?
- What are the effects of color lighting on consumers in fashion retail stores?

1.4. RESEARCH OBJECTIVES

- Identify lighting types and concepts that enhance emotions.
- Study the impact of lighting psychology on humans to change their mood, perception, Emotions, mentality, concentration, well-being, and ability to live better.
- Provide adequate and appropriate illumination, enabling visual tasks to be performed safely, comfortably, and efficiently while enhancing the visual appearance of the environment
- Equip architects, interior designers, and lighting designers with a comprehensive understanding of the principles and techniques of lighting design for diverse interior spaces.
- Discuss different types of lighting sources, including artificial and natural lighting, and their specific applications in interior design.
- Cover multiple lighting techniques, including accent, task, decorative, and ambient lighting, and provide practical examples of their application in different interior spaces.
- Examine professional lighting features, including high-quality lighting fixtures, layered lighting, lighting controls, and color temperature control, to illustrate how these elements collaborate to create a harmonious and functional lighting design.
- Provide a comprehensive overview of lighting design strategies and offer practical insights that can be applied to real-world design projects, such as retail stores.

1.5. RESEARCH LIMITS

The research limits are determined by the study's scope, which focuses on the psychological effects of lighting in interior design.

2. MATERIALS AND METHODS

The research employs a descriptive, theoretical, analytical approach to examine the relationship between lighting effects and human psychology in interior design, with a focus on how these effects impact human well-being. The study started with investigating the impact of various lighting types' design on the perception of design. The primary focus of the study was lighting, examining its effects on human emotions and the complementary relationship between color and light. Furthermore, lighting, design environment, perception, technological advancements in lighting design, and techniques and methods in lighting design, including sustainable lighting design and the significance of lighting design for well-being through biophilic design. Various case studies and projects will be discussed, describing the impact of lighting and psychology on comfort, productivity, and mood. The study focuses on a case study from the Design Psychology Course Workshop at OCMT, as shown in Figure 53, Figure 54, Figure 55, Figure 56, Figure 57, Figure 58, Figure 59, Figure 60, Figure 61, Figure 62, Figure 63, Figure 64, Figure 65, Figure 66, Figure 67, Figure 68, Figure 69, Figure 70, Figure 71, Figure 72.

3. BASIC PRINCIPLES OF LIGHTING IN INTERIOR DESIGN

3.1. LIGHTING DESIGN

Lighting design involves creating lighting systems that meet a space's functional and aesthetic needs, taking into account energy efficiency, sustainability, and human factors. Adequate lighting design strikes a balance between technical and artistic considerations, as well as understanding the physiological and psychological effects of light on humans Ozenen (2023).

Figure 1

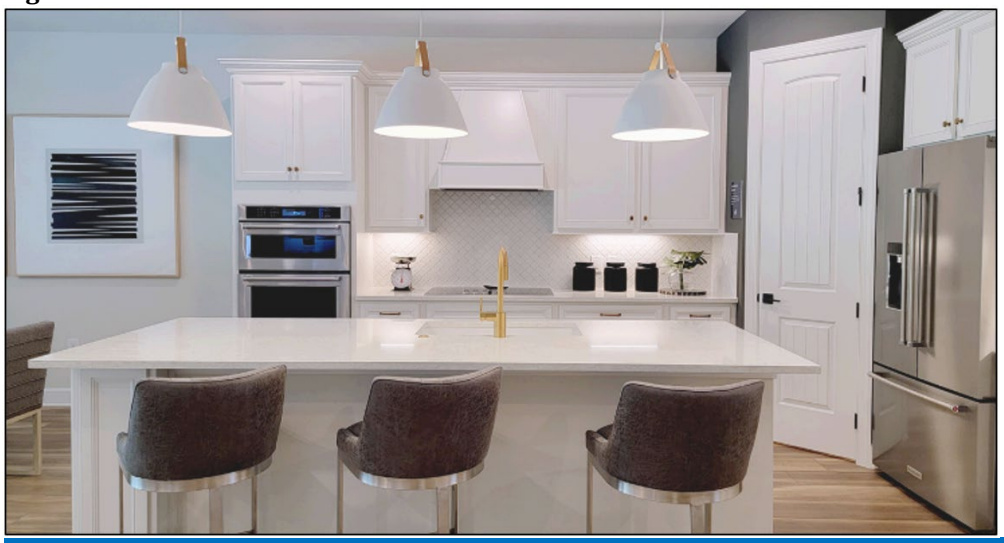


Figure 1 Illustrates the Lighting Design in Residential Spaces Almrsal (2024).

3.2. LIGHTING STANDARDS AND REGULATIONS

Numerous rules, standards, and regulations are in place to ensure that lighting systems are safe, efficient, and sustainable, promoting energy efficiency, human health, and environmental protection. Lighting standards and regulations are guidelines and requirements that govern the design, installation, and operation of

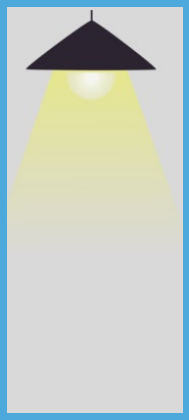
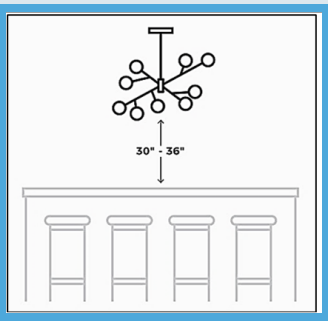
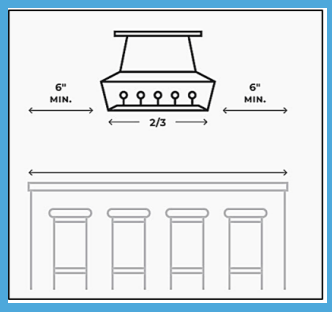
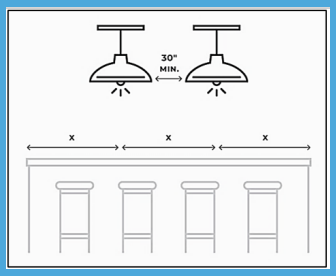
lighting systems in buildings, outdoor spaces, and transportation facilities Ozenen (2023).

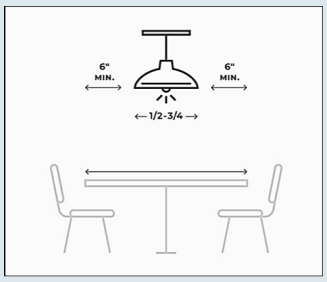
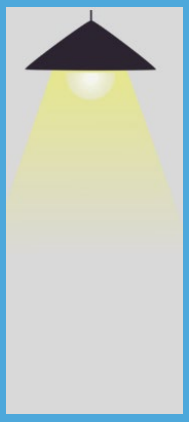
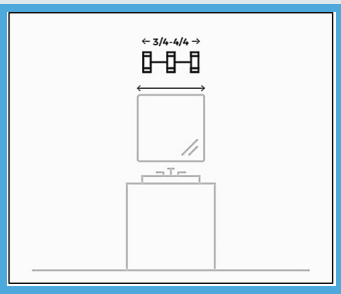
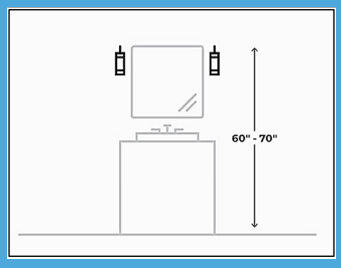
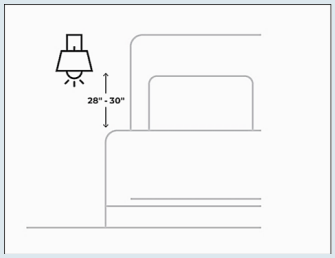
3.3. LIGHTING MEASUREMENT TYPES

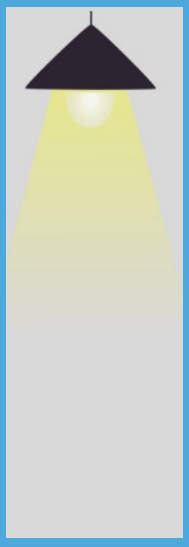
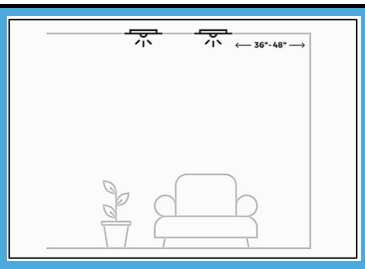
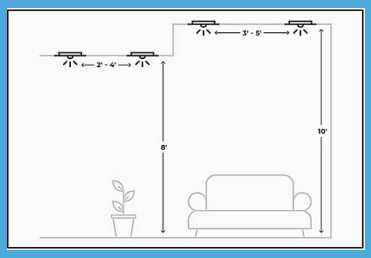
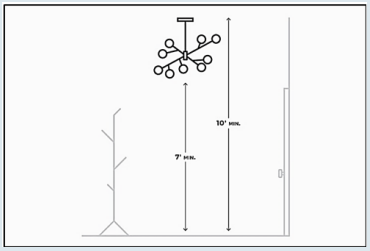
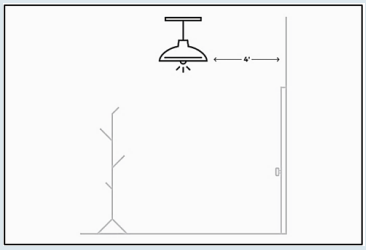
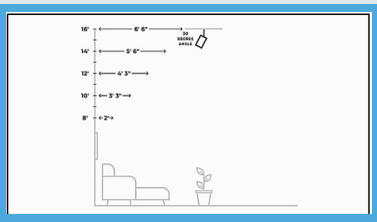
The guide emphasizes that not every fixture is the same and not every homeowner wants the standard installation, as shown in Table 1, Lightology (2025).

Table 1

Table 1 Lighting Measurement Types in Residential Design Lightology (2025).

N	Type	Description	Drawings
1	Kitchen Lighting 	To achieve the desired light height above a kitchen island, it is recommended to hang a chandelier or pendant 30 - 36 inches above the island surface. To determine the length of a linear suspension, divide the island into even segments, one higher than the number of pendants desired, as shown in Figure 2, Figure 3, Figure 4, Lightology (2025).	 **Figure 2** Illustrates Lighting Measurement in Kitchen Lightology (2025).  **Figure 3** Illustrates Lighting Measurement in Kitchen Lightology (2025).  **Figure 4** Illustrates Lighting Measurement in Kitchen Lightology (2025).

2	Dining Room 	A dining room pendant light should be 6 inches across, similar to a kitchen island, and positioned 1/2 to ¾ of the circumference of the table, as shown in Figure 5, Lightology (2025).	 **Figure 5** Illustrates Lighting Measurement in Dining Room Lightology (2025).
3	Bathroom 	Hang vanity lights at eye level, 60-70 inches from the ground, on the side of the mirror, ¾ of the way across the mirror's width, avoiding the edges, as shown in Figure 6,Figure 7, Lightology (2025).	 **Figure 6** Illustrates Lighting Measurement in Bathroom Lightology (2025).  **Figure 7** Illustrates Lighting Measurement in Bathroom Lightology (2025).
4	Bedroom 	The ideal height for a bedside sconce is 28-30 inches above the top of the mattress, ensuring eye-level reading. It should be within reaching distance from the bed, not too close to be in your way while sleeping, and not too far from the bed, as shown in Figure 8, Lightology (2025).	 **Figure 8** Illustrates Lighting Measurement in Bedroom Lightology (2025).

5	Recessed 	Recessed lighting can be customized based on various factors, such as wall wash effects or artwork lighting. A general rule of thumb is to maintain a distance of 36 to 48 inches between the light and the wall. For 8-foot ceilings, a 4-foot spacing is required, and for 10-foot ceilings, a 5-foot spacing is necessary, as shown in Figure 9, Figure 10, Lightology (2025).	 **Figure 9** Illustrates Recessed Lighting Lightology (2025).  **Figure 10** Illustrates Recessed Lighting Lightology (2025).
6	Suspensions 	To ensure proper light output and adequate breathing room, it is recommended to provide 4 feet of clearance, especially when hanging fixtures near doors, as shown in Figure 11, Figure 12, Lightology (2025).	 **Figure 11** Illustrates Suspensions Lighting Lightology (2025).  **Figure 12** Illustrates Suspensions Lighting Lightology (2025).
7	Track	A versatile solution can be adjusted to suit various applications, including artwork, reading, cooking, and general lighting. Spacing them 2' to 4' apart ensures ample lighting, with the ability to adjust the distance as needed, as shown in Figure 13, Figure 14, Lightology (2025).	 **Figure 13** Illustrates Track Lighting Lightology (2025).

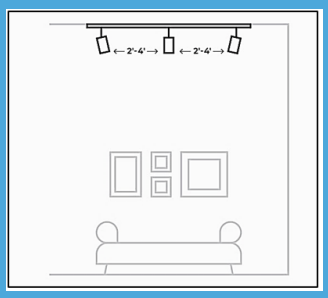


Figure 14 Illustrates Track Lighting Lightology (2025).

8 Wall

Light switch height typically ranges from 48 to 48 inches, making it accessible to people of all ages. Wall sconces should be placed 8-10 feet apart for even lighting, taking into account both lumen output and the wall layout, as shown in Figure 15, Figure 16, Lightology (2025).

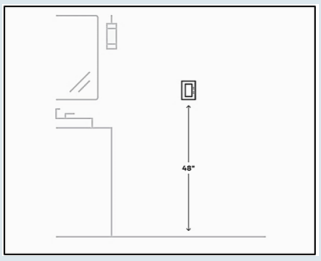


Figure 15 Illustrates Wall Lighting Lightology (2025).

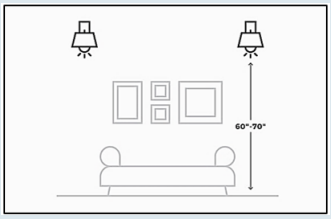
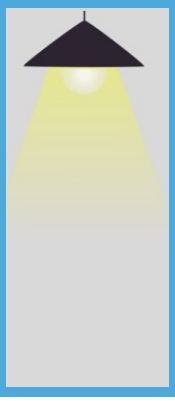


Figure 16 Illustrates Wall Lighting Lightology (2025).

9 Outdoor



Outdoor wall lights should be placed on either side of the door or on the same side as the doorknob for optimal illumination. Path lights should be spaced 6-8 feet apart but may need to be closer together depending on the lumen output. For indoor walkways, a safe bet is to place them closer to the doorknob for better illumination, as shown in Figure 17, Lightology (2025).

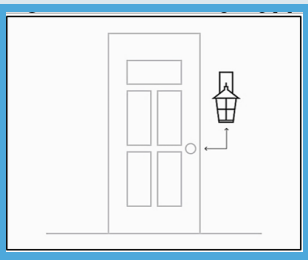


Figure 17 Illustrates Outdoor Lighting Lightology (2025).

4. LIGHTING AND ITS EFFECTS ON HUMAN EMOTIONS

Lighting designers possess a transformative power within the realm of interior design. By altering the nature and classification of light stimuli within a continuum of variations, they can instigate profound changes in the perceiver's psychophysiological responses. This ability to measure subjective impressions

under various lighting conditions inspires new possibilities and pushes the boundaries of design Elnaggar and Arts (2022). LED lighting is not just a technological advancement; it is a revolution in the way we create and manipulate light. It is turning light into an art form, a medium that is becoming increasingly popular in homes, hotels, and offices, inviting us to appreciate and understand light in a new way Allen (2024).

4.1. LIGHT AS AN ILLUSTRATIVE TOOL

The light source, the energy it emits, and the biopsychological effects produced by light become the focus of all the perceptual mechanisms and interpretive processes carried out by each perceiver: light plays a role not only in making an object visible to the viewer but also in placing it in its context within the environmental space, as shown in Figure 18, Elnaggar and Arts (2022).

Figure 18

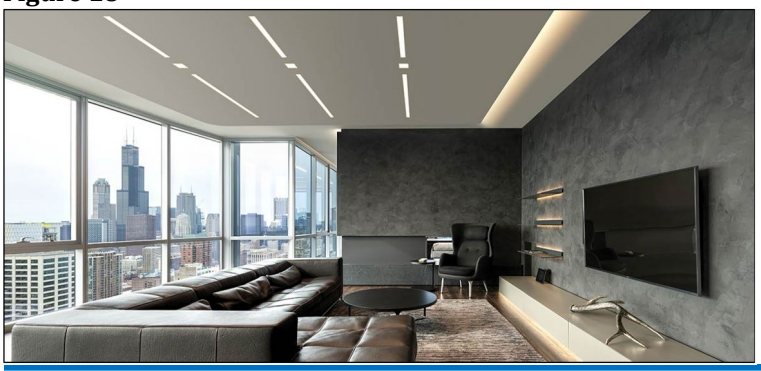


Figure 18 Illustrates the Significance of Light in the Perception of Spaces. Allen (2024)

4.2. LIGHTING, DESIGN ENVIRONMENT, AND PERCEPTION

The relationship between light levels and colors has been demonstrated that light influences biochemical and hormonal processes, body temperature, mood, psychological well-being, and brain electrical activity, as well as affects neurotransmitters Elnaggar and Arts (2022). Human environmental experience is closely tied to the realm of light, as space is primarily perceived through the visual sense, as illustrated in Figure 19, Figure 20, Figure 21.

Figure 19

Figure 19 Illustrates the Design Environment of the Kitchen Through Different Light Design Units Allen (2024).

Figure 20

Figure 20 Illustrates the Design Environment of the Kitchen Through Different Light Design Units Allen (2024).

Figure 21

Figure 21 Illustrates the Impact of Warm Lighting in Changing Moods and Perceptions for Humans to Feel Comfortable in the Space Lightology (2018).

4.3. HARMONIOUS COMBINATION OF COLOR AND LIGHT

The harmonious combination of color and light is not just a design element but a crucial factor in creating a well-balanced interior design. The proper selection of lighting fixtures, color temperature, and color rendering indices can significantly enhance color perception and presentation in a space. Given the interactions of color and light, designers can maximize the desired feeling, environment, and functionality by avoiding imbalances that can cause visual discomfort. Successful color and light coordination requires careful consideration. Designers should consider the desired focal points, hierarchy, and intended activities within the space, as shown in Figure 22, and Figure 23, Madumarova (2023).

Figure 22

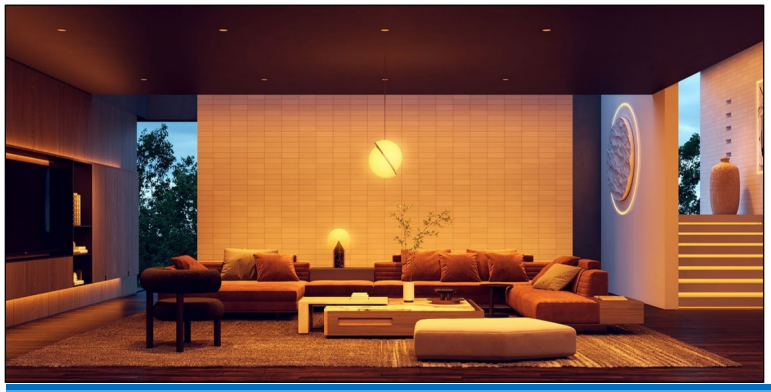


Figure 22 Illustrates Harmonious Combination of Color and Light in Living Space Lightology (2018).

Figure 23

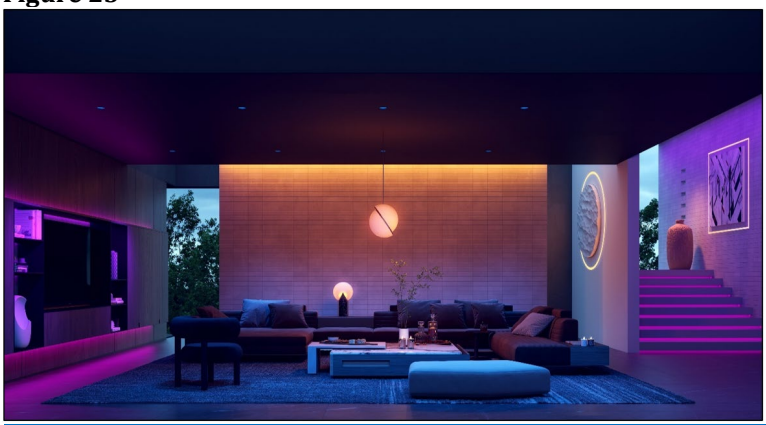


Figure 23 Illustrates Dark, Colorful Lighting that Reflects the Impact or Romantic Atmosphere Lightology (2018).

Figure 24

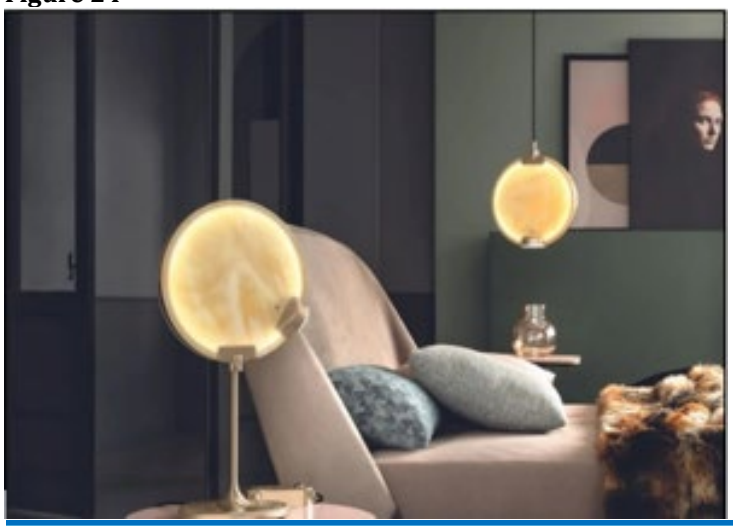


Figure 24 Illustrate the Design of Pendant Lighting in Different Spaces that Combine Light and Color Effects Abbattista (2025).

Figure 25

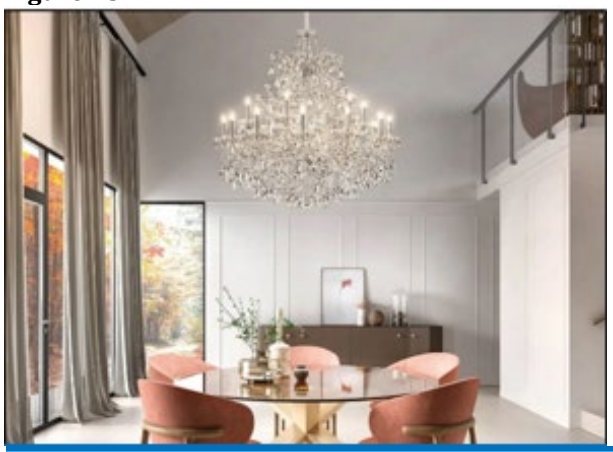


Figure 25 Illustrate the Design of Pendant Lighting in Different Spaces that Combine Light and Color Effects Abbattista (2025)

4.4. PSYCHOLOGICAL EFFECTS OF DIFFERENT LIGHTING TYPES

Human psychology is significantly influenced by lighting, with different lighting conditions evoking distinct emotional responses Edwards and Torcellini (2002). Additionally, the importance of studying different types of lighting, which has a significant impact on humans by evoking various emotions, is shown in Table 2and Table 3

Table 2

Table 2 Types of Lighting on Function Edwards and Torcellini (2002).

A. The Design of Ambient Lighting	B. The Design of Task Lighting	C. The Design of Accent Lighting
		
Figure 26 Illustrates Ambient Lighting Allen (2024).	**Figure 27** Illustrates Task Lighting Allen (2024).	**Figure 28** Illustrates Accent Lighting Lightology (2018).
It acts as the primary light source, producing consistent light. Ambient lighting has a significant impact on a room's overall atmosphere. While softer lighting might promote relaxation, bright ambient light can foster openness and dynamism, as shown in Figure 26	This lighting is designed for tasks such as working or reading. It lessens eye strain and enhances attention. Task lighting is crucial in home offices and study areas, as shown in Figure 27, to improve productivity.	Accent lighting can accentuate a space's unique qualities and create a sense of drama, as shown in Figure 28, Lightology (2018).

Table 3

Table 3 Types of Lighting and Aesthetic Factors Edwards and Torcellini (2002).

Warm Lighting	Cool Lighting	Natural Lighting
		
Figure 29 Illustrates Warm Lighting Lightology (2018)**.**	**Figure 30** Illustrates Cool Lighting Lightology (2025)**.**	**Figure 31** Illustrates Natural Lighting Allen (2024).
Warm light creates a cozy, intimate atmosphere by emulating the natural tones of sunsets, as shown in Figure 29, Lightology (2025).	Commercial settings, such as offices and retail stores, frequently employ cool, bright lighting (between 4000K and 5000K) to promote focus and alertness. This type of lighting can give a room an energetic feel and simulate natural daylight. However, prolonged exposure to cool light may occasionally increase stress levels if not properly balanced, as shown in Figure 30, Lightology (2025).	In living and working spaces, natural light is particularly crucial as it can boost productivity and foster a sense of openness to the outside world, as shown in Figure 31, Lightology (2025).

5. TECHNIQUE AND METHODS IN LIGHTING DESIGN

5.1. SUSTAINABLE LIGHTING DESIGN

Sustainable lighting design is an approach that prioritizes energy efficiency, environmental responsibility, and human well-being. It involves utilizing techniques and technologies that reduce energy consumption and minimize negative environmental impacts while providing sufficient lighting to enable people to perform their tasks comfortably and safely. In addition, sustainable lighting design often incorporates natural lighting strategies, such as utilizing natural light to supplement or replace electric lighting and lighting controls that enable users to adjust lighting levels according to their needs. However, the responsibility of a sustainable lighting designer goes beyond these immediate considerations. It also includes using recycled or renewable materials in fixtures and systems, reducing light pollution by controlling the direction and intensity of light, and integrating lighting into a building's overall energy management strategy. Sustainability in lighting design refers to the practice of designing lighting systems that are environmentally and socially responsible while meeting a space's functional and aesthetic requirements, as shown in Table 4, Ozenen (2023).

Table 4

Table 4 Key Features of Sustainable Lighting Design Ozenen (2023).

Energy Efficiency	Sustainable lighting design prioritizes energy efficiency to reduce energy consumption and mitigate environmental impacts of lighting systems Ozenen (2023).
Daylight Harvesting	Sustainable lighting design employs daylighting strategies to optimize natural light sources and decrease the need for artificial lighting Ozenen (2023).
Reduce Light Pollution	Sustainable lighting design minimizes light pollution by reducing the amount of light that escapes into the sky or neighboring properties Ozenen (2023).

Use of Environmentally Friendly Materials	Sustainable lighting utilizes environmentally friendly materials, including recycled and biodegradable components Ozenen (2023).
Lighting Controls	Sustainable lighting design utilizes lighting controls to adjust lighting levels according to occupancy, daylight availability, and user preferences, thereby reducing energy consumption Ozenen (2023).
Human-Centered Lighting	Sustainable lighting prioritizes the health and well-being of building occupants by utilizing lighting that supports circadian rhythms and promotes productivity Ozenen (2023).
Maintainability and Serviceability	Sustainable lighting design prioritizes systems that are easy to maintain and service, reducing waste and promoting sustainability Ozenen (2023).

5.2. THE IMPORTANCE OF LIGHTING DESIGN FOR WELL-BEING THROUGH BIOPHILIC DESIGN

Interior design emphasizes the importance of lighting in human well-being, as poor lighting can cause headaches, eye strain, and anxiety, while thoughtful lighting enhances focus, sleep, and overall happiness Boyce (2003). Biophilic design utilizes sunlight, green walls, and skylights, and professional lighting designers balance brightness, color, contrast, and glare control to ensure visual comfort Ozenen (2023). Biophilic design emphasizes the connection between natural and constructed environments, utilizing natural light to create healthier interiors through the strategic placement of lighting fixtures, large windows, and reflective surfaces, as shown in Figure 32, Figure 33, Boyce (2003).

Figure 32

Figure 32 Illustrates Biophilic Design that Utilizes Natural Lighting in the Spaces to Enhance Well-Being Sculptform (2021).

Figure 33

Figure 33 Illustrates Biophilic Design that Utilizes Natural Lighting in the Spaces to Enhance Well-Being Sculptform (2021).

Fluctuating light mimics circadian rhythm, connecting us to the outdoor environment and enhancing visual comfort by maximizing natural light throughout the day, as shown in Figure 34, Figure 35, Figure 36, Figure 37, Figure 38, Figure 39, Figure 40, Sculptform (2021).

Figure 34

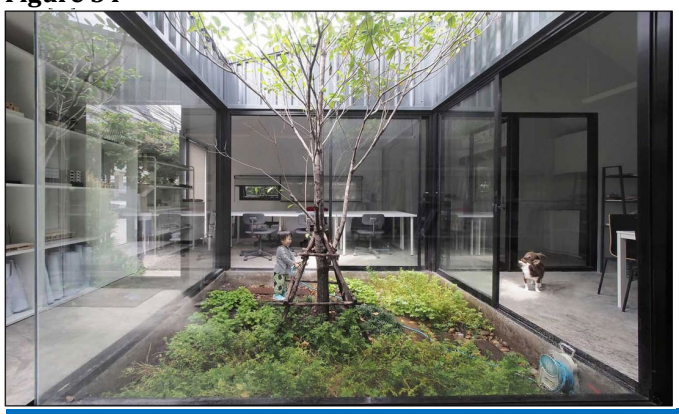


Figure 34 Illustrates Natural Light in the Landscape Space Marchese (2024).

Figure 35

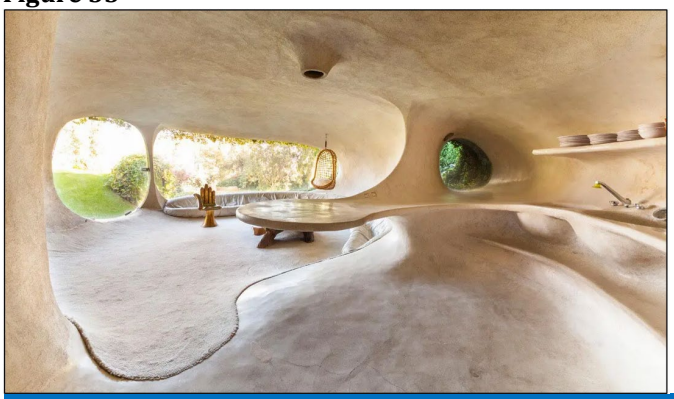


Figure 35 Illustrates Organic Shapes and Emphasizes How Biophilic Design Employs Natural Light to Improve Human Lives Marchese (2024).

Figure 36

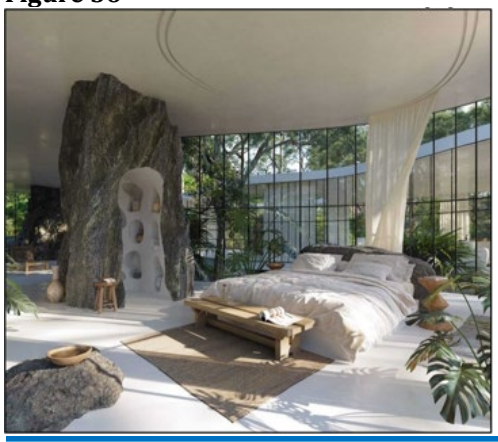


Figure 36 Illustrates Sunlight, Green Walls, and Glare Control to Ensure Visual Comfort in the Spaces Marchese (2024).

Figure 37

Figure 37 Illustrates Sunlight, Green Walls, and Glare Control to Ensure Visual Comfort in the Spaces Marchese (2024).

Figure 38

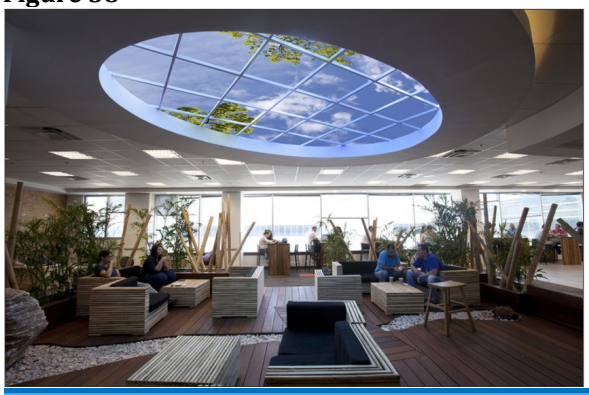


Figure 38 Illustrates the Skylights and Professional Lighting Balance Brightness, Color, and Contrast in the Space Snapshots (2024).

Figure 39

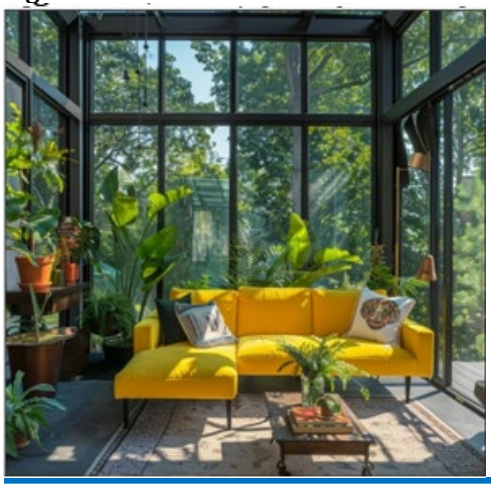


Figure 39 Illustrates Design Lighting in the Living Spaces that Enhance Concentration and Well-Being for Users Edwardgeorgelondon (2024).

Figure 40

Figure 40 Illustrates Design Lighting in the Living Spaces that Enhance Concentration and Well-Being for Users Edwardgeorgelondon (2024).

5.3. THE POWER OF CIRCADIAN LIGHTING

Modern lighting design increasingly takes into account the human circadian rhythm, the body's natural cycle of alertness and sleep. Circadian lighting systems can adjust the color temperature of the light throughout the day, using warmer light in the evening and more extraordinary light during the day. This tactic is particularly useful in interior environments where people spend a lot of time, such as hospitals, schools, and workplaces. Lighting in homes has a significant impact on our daily lives, affecting our cooking experiences, reading, and overall safety, as shown in Figure 41, Hunsaker (2023).

Figure 41

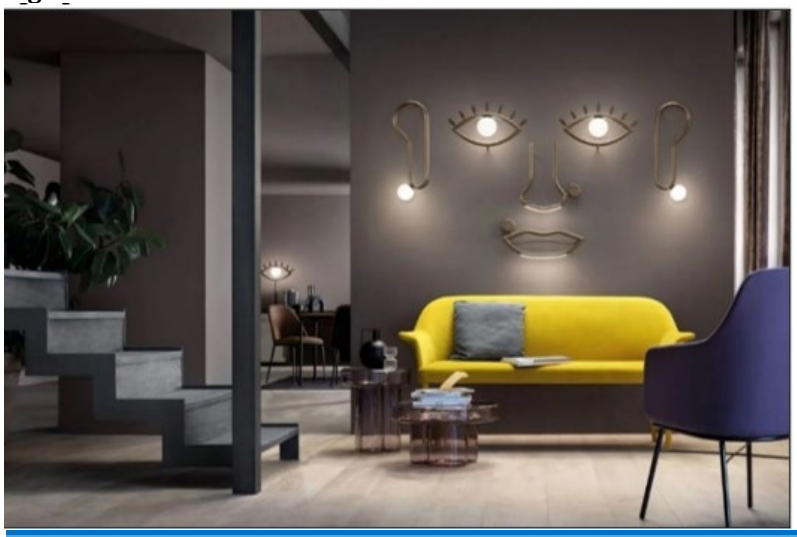


Figure 41 Illustrates Creative Design that Presents Different Experiences in the Living Space Abbattista (2025).

6. TECHNOLOGICAL ADVANCES IN LIGHTING DESIGN

With the advent of LED and innovative lighting technologies, interior design lighting has undergone a significant transformation. Built-in LED lighting seamlessly integrates with modern designs, transforming spaces into artistic expressions. It enhances ambiance and functionality, contributes to energy efficiency, and is popular for contemporary interiors. Built-in LED lighting can effectively manage heat emissions by generating less heat compared to traditional incandescent bulbs and incorporating advanced thermal management systems, making them suitable for residential and commercial settings, as shown in Figure 42, Figure 43, Figure 44, Lightology (2025).

Figure 42

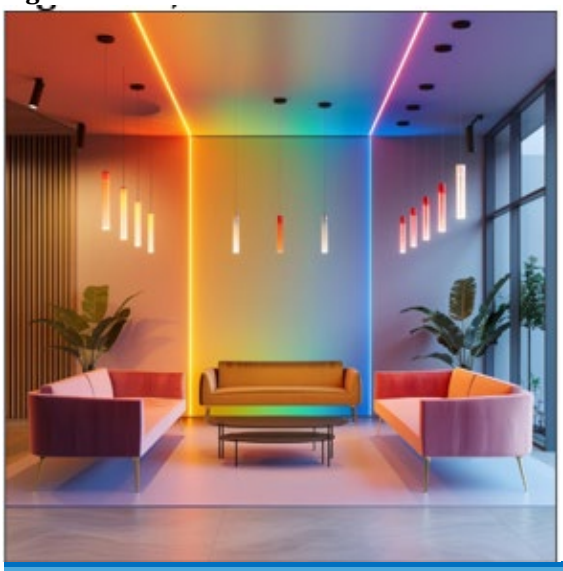


Figure 42 Illustrates Colorful LED Technology in Lighting Design that Creates an Impressive Atmosphere in the Spaces **Edwardgeorgelondon (2024)**.

Figure 43

Figure 43 Illustrates Colorful LED Technology in Lighting Design that Creates an Impressive Atmosphere in the Spaces Edwardgeorgelondon (2024).

Figure 44

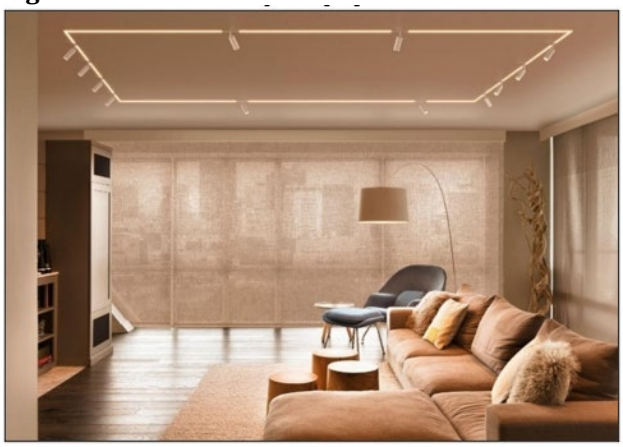


Figure 44 Illustrates A Modern Track and Monorail Lighting Solution that Offers Versatile, Stylish, and Practical Lighting for Walls, Featuring Multiple Track Head Options and Continuous Runs Lightology (2018).

Emphasize the product's innovative features, functionality, and environmental sustainability, highlighting its suitability to meet customer needs. Emphasize the company's values to build brand loyalty, capitalizing on the design sector's openness to various motivations. Abbattista (2025)

Built-in LED lighting offers several advantages over traditional incandescent bulbs, including reduced energy consumption, longer lifespan, and better color rendering. Additionally, LED lights require fewer replacements and provide a more vibrant and true-to-life color experience, making them a cost-effective solution for homes, as shown in Table 5, Lightology (2025). They are often made last in design, resulting in constraints and budget considerations. The complexity of product industrialization is frequently underestimated. 11.

Table 5

Table 5 Technological Advances in Lighting Design Types Edwards and Torcellini (2002).

Smart Lighting	Energy Efficiency

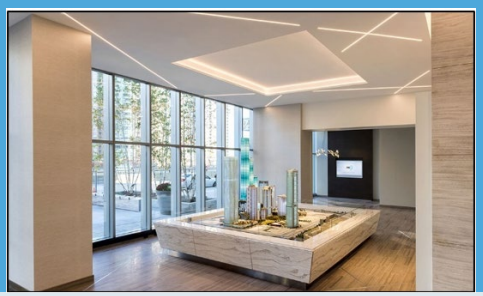



Figure 45 Illustrates Smart Lighting in Interior Design Lightology (2025).	**Figure 46** Illustrates LED Technology in Living Room Space Lightology (2018).
Intelligent lighting systems can be configured to replicate natural light patterns, enhancing productivity and overall well-being, as shown in Figure 45, Lightology (2025).	Thanks to advancements in LED technology, lighting is now more environmentally friendly and energy efficient. Contemporary designers can produce energy-efficient, aesthetically pleasing, environmentally conscious, and practical lighting designs that contribute to a building's certification as a green building, as shown in Figure 46, Lightology (2025).

6.1. WARM DIM TECHNOLOGY AS A SUSTAINABLE LIGHTING SOLUTION

Warm Dim LED technology offers a more soothing ambiance than traditional incandescent and halogen bulbs, providing a more comfortable and relaxing atmosphere for nighttime activities.

Warm Dim technology is integrated into many LED suspensions and lamps, providing a relaxed setting in various settings, including living rooms, bedrooms, kitchens, restaurants, and boutique hotels. Energy-efficient, compatible with modern fixtures, and easy to retrofit, it enhances the lighting experience and fosters a deeper emotional connection, as shown in Figure 47, Figure 48, Figure 49, Lightology (2025).

Figure 47

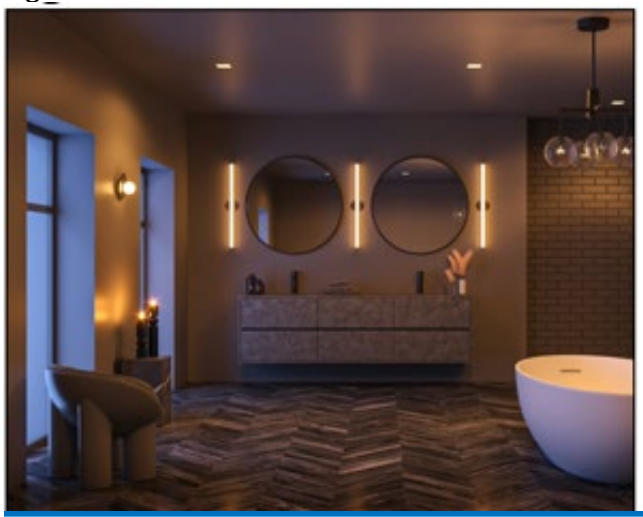


Figure 47 Illustrates Warm Dim Technology Lightology (2025).

Figure 48

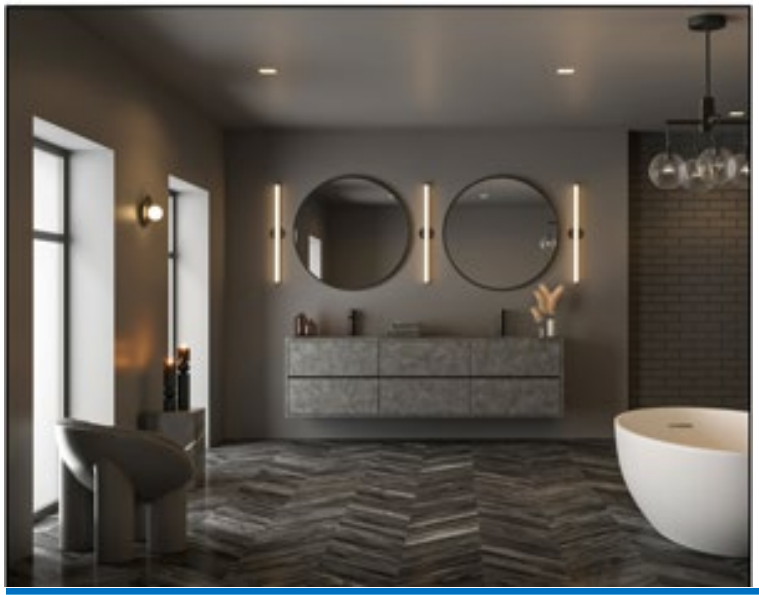


Figure 48 Illustrates Warm Dim Technology Lightology (2025).

Figure49

Figure 49 Illustrates LED Lamps, Providing A Relaxed Environment through Warm Dim LED Technology Lightology (2025).

7. REAL PROJECT APPLICATIONS FOR LIGHTING PSYCHOLOGY

Several case studies demonstrate how thoughtful lighting design impacts human psychology, as illustrated in Table 6, Table 7, and Table 8.

Table 6

Table 6 Illustrate Case Studies of Lighting Applications Inc (2011).

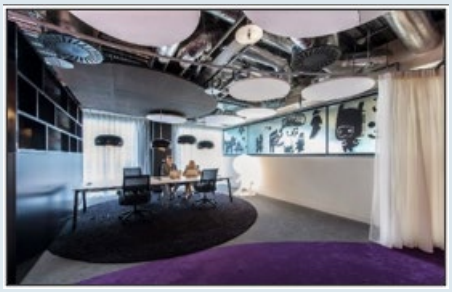
Case Study 1 Google's Office Design		
	Description of Project	**Lighting Design**
7.1	Lighting design plays a significant role in Google's well-known emphasis on employee well-being at its offices worldwide. Combining energy-efficient LED lighting, natural light sources, and adjustable task lighting creates a well-balanced workspace that increases productivity. This method highlights the importance of having a variety of illumination sources available to support various activities throughout the day, as shown in Figure 50	

Figure 50 Illustrates Google's Office Design Interior Inc (2011).

Table 7

Table 7 Illustrate Case Studies of Lighting Applications.

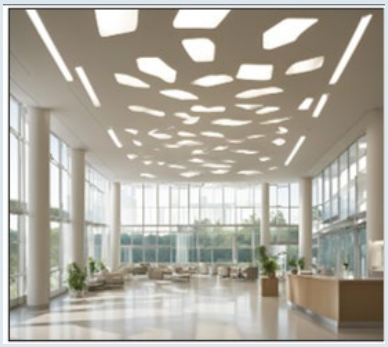
Case Study 2 Healthcare Facilities		
	Description of Project	**Lighting Design**
7.2	The illumination in medical institutions is intended to help patients heal and feel less stressed. Research has demonstrated, for instance, that patients recovering in rooms with abundant natural light typically experience less pain and require fewer prescription medications than those in rooms with less light. Using circadian lighting systems in these settings helps maintain a sense of time, facilitating better sleep and overall recovery, as shown in Figure 51.	

Figure 51 Illustrates the Interior Design of Healthcare.

Table 8

Table 8 Illustrate Case Studies of Lighting Applications Pymnts (2016).

Case Study 3: Starbucks Reserve Roastery, Seattle		
	Description of Project	**Lighting Design**
7.3	The Starbucks Reserve Roastery in Seattle features an immersive lighting design that enhances the sensory experience of coffee tasting. The combination of accent lighting focused on the brewing apparatus and natural light streaming through large windows creates a pleasing ambiance. This thoughtful lighting design encourages customer engagement and enhances the overall experience, as shown in Figure 52.	

Figure 52 Illustrates Warm Lighting Design in Starbucks Pymnts (2016).

8. RESULTS AND DISCUSSIONS

8.1. A CASE STUDY, DESIGN PSYCHOLOGY COURSE WORKSHOP, OCMT

A case study of a workshop in a design psychology course (603203) at the Department of Design, Oman College of Management and Technology, will be presented. The workshop's goal was to apply psychological concepts and lighting design principles in retail store spaces and investigate how lighting affects customers in fashion stores. The workshop's conclusions, which examined consumer psychology through various lighting design techniques, were exceptional. A comprehensive color and light strategy, developed through pre-design workshop, layouts, and professional leadership, is crucial for ensuring the desired visual impact and user experience performance, as shown in Table 9.

Table 9

Table 9 The Workshop Projects of Design Psychology Course (603203) in the Department of Design, Oman College of Management and Technology (OCMT) OCMT (2024).

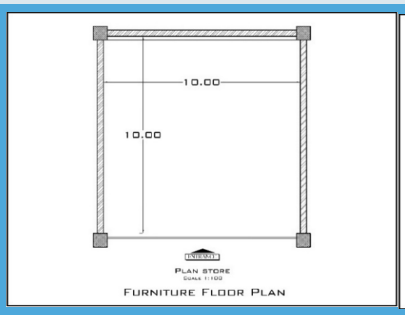
Projects: Rendering Different 3D Fashion Retail Stores to Measure the Impact of Lighting Color on Consumers Using AI Tools OCMT (2024).

8.1.1 Workshop Description

The workshop discusses a study examining the impact of lighting colors on consumer behavior in 3D fashion retail stores. Students will utilize AI tools to develop virtual models of various retail environments with distinct lighting scenarios. The goal is to measure the effects of these lighting variations on consumers' shopping experiences, mood, purchase intentions, and store ambiance. The workshop enhances customer engagement and sales. The findings can help optimize store designs and lighting, leading to increased customer satisfaction and sales OCMT (2024).

8.1.2 Workshop Aims

The workshop explores the impact of lighting color on consumer behavior in fashion retail store design. The workshop involves creating realistic 3D visualizations of various store layouts to simulate different lighting conditions through AI tools. It also examines how lighting color affects product views, with warm lighting creating a cozy atmosphere and more astonishing lighting enhancing a modern or sleek appearance. The workshop aims to foster an understanding of how shoppers respond to these lighting colors, including their emotional reactions and purchasing decisions. The use of AI tools helps identify patterns and correlations between lighting color and consumer behavior. The findings could help students make informed decisions about store design and lighting strategies to improve customer engagement and increase sales. The students created various examples of lighting design based on the same given plan. Additionally, these results demonstrate the impact of color lighting on consumers in fashion store design, as illustrated in the given floor plan for the store (Figures 53, 54) OCMT (2024).



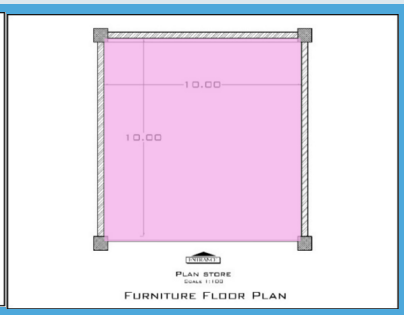
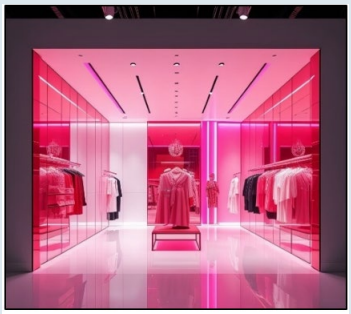


Figure 53 Illustrate the Given Fashion Store Floor Plan in the Workshop, Including Aan Area of 10 M^2 × 10 M^2 OCMT (2024).

Figure 54 Illustrate the Given Fashion Store Floor Plan in the Workshop, Including Aan Area of 10 M^2 × 10 M^2 OCMT (2024).

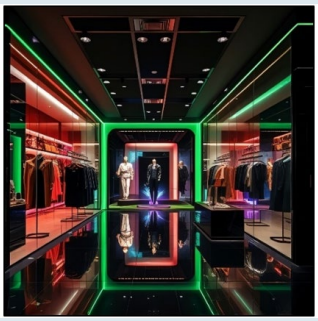
8.1.3 Workshop Results, Including 3D Modeling with Rendering.

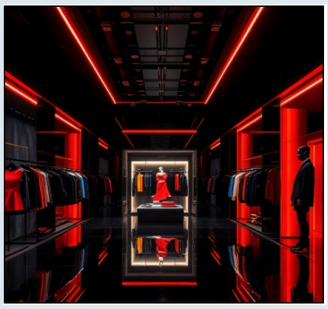
N	Lighting Design and Color	The study of Impact color lighting on consumer	Project

8.1	**Pink and White LED Lighting**	• **Pink lighting**, associated with romance and femininity, creates a soft, inviting atmosphere that appeals to young women and women's fashion stores, as shown in Figure 55, OCMT (2024). **The results of the design:** • Provide influence consumer behavior and brand perception. • Create a welcoming atmosphere. • Appealed to female demographics. • Enhance visual merchandising. • Establish strong brand identity. Create psychological effects.	 **Figure 55** Illustrate a 3D Render of the Fashion Store with Pink and White LED Lighting OCMT (2024)
8.2	**Black and Pink LED Lighting**	• **Pink lighting** enhances clothing and accessories' visual appeal, creating vibrant colors and textures and establishing a brand's identity and emotional connection with customers, as shown in Figure 56, OCMT (2024). **The results of the design:** • Create a balance of sophistication and warmth. • Create visually striking space. • Cater to diverse consumer preferences. • Increase foot traffic and sales. Enhance consumer experience, engagement, and sales.	 **Figure 56** Illustrate a 3D Render of the Fashion Store with Pink LED Lighting OCMT (2024).
8.3	**Pink and Black LED Lighting**	• **Pink lighting** influences consumer behavior by creating a warm, inviting atmosphere that promotes comfort, relaxation, and playfulness, thereby encouraging more extended store visits and increased merchandise engagement. , as shown in Figure 57, OCMT (2024). **The results of the design:** • Emphasize clarity and a modern aesthetic. • Add warmth and approachability. Enhance the shopping experience, optimize product visibility, and align with brand identity.	 **Figure 57** Illustrate a 3D Render of the Fashion Store with Pink LED Lighting OCMT (2024).
8.4	**Light pink LED Lighting**	• **Pink lighting** is connected to romance and femininity, as shown in Figure 58, OCMT (2024). **The results of the design:** • Influence consumer perceptions. Drive sales and enhance brand loyalty.	 **Figure 58** Illustrate a 3D Render of the Fashion Store with Light Pink LED Lighting OCMT (2024)

8.5	**White and Light Purple LED Lighting**	• **Purple lighting** adds refinement and exclusivity, appealing to customers looking for distinctive trends, as shown in Figure 59, OCMT (2024). **The results of the design:** • Enhance aesthetic appeal. • Influence consumer emotions. Drive purchasing decisions.	 **Figure 59** Illustrate a 3D Render of the Fashion Store with White and Light Purple LED Lighting OCMT (2024)
8.6	**Green and Yellow LED Lighting**	▪ **Green lighting** is linked to nature and calm, spotlights eco-friendly goods, and creates a refreshing atmosphere that fosters peaceful and harmonious shopping, as shown in Figure 60, OCMT (2024). **The results of the design:** • Create an environment that is both energetic and calming. • Draw customers in, encouraging them to browse. • Highlight products or areas. • Influence purchasing decisions. Shape consumer perceptions and behaviors.	 **Figure 60** Illustrate a 3D Render of the Fashion Store with Yellow and Green LED Lighting OCMT (2024).
8.7	**Yellow LED Lighting**	• **Yellow lighting**, a cheerful and optimistic color, can evoke feelings of happiness and impulse buying; however, excessive brightness can cause eye strain and discomfort, as shown in Figure 61, OCMT (2024). **The results of the design:** • Creates a joyful environment. • Enhance product visibility. Encourage more extended shopping experiences.	 **Figure 61** Illustrate a 3D Render of the Fashion Store with Yellow LED Lighting OCMT (2024)
8.8	**White with Light Orange LED Lighting**	• **Orange lighting**, which combines red energy and yellow happiness, is energetic and playful, making it ideal for casual fashion brands or collaborative spaces that stimulate enthusiasm and social interaction, as shown in Figure 62, OCMT (2024). **The results of the design:** • Create a visually stimulating environment. • Attract customers. • Enhance the shopping experience. Align with brand values.	 **Figure 62** Illustrate a 3D Rendering of the Fashion Store with White Light Orange LED Lighting OCMT (2024).

8.9	**Black with Orange LED Lighting**	• **Orange lighting**, which blends yellow joy with red energy, is lively and fun, making it perfect for casual fashion businesses or group areas that encourage excitement and social engagement, as shown in Figure 63, OCMT (2024). **The results of the design:** Enhance ambiance, attracting high-end consumers, but excessive use can be heavy or intimidating if not balanced with other elements.	 **Figure 63** Illustrate a 3D Rendering of the Fashion Store with Orange LED Lighting OCMT (2024)
8.10	**Off-white LED Lighting**	• **Off-white lighting** creates a cozy, inviting atmosphere that enhances the appearance of products and fosters positive feelings about merchandise, complementing various styles, as shown in Figure 64, OCMT (2024). **The results of the design:** • Enhance aesthetics. • Shape consumer experiences. Encourage sales.	 **Figure 64** Illustrate a 3D Render of the Fashion Store with Off-white LED Lighting OCMT (2024)
8.11	**White with Gray and Yellow LED Lighting**	• **Gray lighting** creates a neutral, sophisticated backdrop, evoking calmness and stability while highlighting colors without overpowering them. It conveys a trendy and contemporary style, appealing to fashion-forward shoppers, as shown in Figure 65, OCMT (2024). **The results of the design:** • Influence consumer perception and behavior. • Enhance the shopping experience. Influence purchasing decisions.	 **Figure 65** Illustrate a 3D Rendering of the Fashion Store with white and Yellow LED Lighting OCMT (2024).
8.12	**White with Black and Red LED Lighting**	• **Red lighting**, which is linked to passion and excitement, can effectively highlight promotional displays and create a sense of urgency, but too much of it can be overbearing, as shown in Figure 66, OCMT (2024). **The results of the design:** • Create dynamic, visually appealing environments. • Enhance product visibility and influence purchase decisions. Transform the store into an immersive experience that fosters brand loyalty.	 **Figure 66** Illustrate a 3D Rendering of the Fashion Store with white and Red LED Lighting OCMT (2024).

8.13	**Blue LED Lighting**	**ue lighting** evokes a sense of calmness and ıst, making it ideal for luxury brands and omoting relaxation in consumers during ırchasing decisions, as shown in Figure 67, :MT (2024). **The results of the design:** • Enhance customer experience. • Influence product perception. • Drive sales through psychological and aesthetic effects. Combine with layout, decor, and music.	 **Figure 67** Illustrate a 3D Render of the Fashion Store with Blue LED Lighting OCMT (2024)
8.14	**Black and Purple LED Lighting**	• **Purple lighting**, associated with luxury and creativity, enhances sophistication and exclusivity, making it ideal for high-fashion areas and showcasing premium products, appealing to consumers seeking unique styles, as shown in Figure 68, OCMT (2024). **The results of the design:** • Influence product perception. • Create an inviting atmosphere. Enhance the shopping experience.	 **Figure 68** Illustrate a 3D Render of the Fashion Store with Purple LED Lighting OCMT (2024)
8.15	**Black and Green LED Lighting**	• **Green lighting**, associated with nature and tranquility, creates a refreshing ambiance that promotes harmony and peace, encourages leisurely shopping, and highlights eco-friendly brands, as shown in Figure 69, OCMT (2024). **The results of the design:** • Create a dynamic visual experience. • Guide consumer attention. • Highlight highlighted products. • Promote the brand's sustainability and luxury values. Enhance aesthetic appeal and align with shoppers' emotional motivations.	 **Figure 69** Illustrate a 3D Render of the Fashion Store with Green LED Lighting OCMT (2024)
8.16	**Black with Pink and Blue LED Lighting**	• **Blue lighting** evokes calmness and trust, making it ideal for luxury brands and promoting relaxation in consumers during purchasing decisions OCMT (2024). • **Pink lighting**, often associated with romance and femininity, creates a soft, inviting atmosphere that appeals to young women and women's fashion stores, as shown in Figure 70. **The results of the design:** • Cater to fashion trends. • Elicit emotional responses. • Promote customer engagement. • Enhance brand identity and consumer engagement. Promote more extended visits and potential sales.	 **Figure 70** Illustrate a 3D Rendering of the Fashion Store with Pink and Blue LED Lighting OCMT (2024).

8.17	**Black and Red LED Lighting**	• **Red lighting**, which is often associated with passion and excitement, can draw attention to promotional displays and instill a sense of urgency. However, excessive use of red in promotional displays can be overwhelming, as shown in Figure 71, OCMT (2024). **The results of the design:** • Enhance the shopping experience. • Influence purchasing decisions. Contribute to store brand identity.	 **Figure 71** Illustrate a 3D Render of the Fashion Store with Red LED Lighting OCMT (2024)
8.18	**Black and White Lighting**	• **White lighting** creates a modern atmosphere, enhances visibility, and creates an inviting atmosphere, making clothing and accessories more appealing and vibrant, as shown in Figure 72, OCMT (2024). **The results of the design:** • Enhance aesthetic value. • Shape consumer experience and behavior. • Communicate brand values. Influence purchasing decisions.	 **Figure 72** Illustrate a 3D Render of the Fashion Store with White Lighting OCMT (2024)

9. CONCLUSIONS AND RECOMMENDATIONS

Lighting is a crucial element of interior design as it defines how people interact with space, in addition to being practical. By understanding the psychological effects of various lighting schemes, designers can create visually appealing settings that promote mental well-being. Balancing artificial and natural illumination, incorporating biophilic elements, and considering cultural aspects, as well as circadian rhythms, can significantly enhance the quality of interior settings. By understanding both elements' psychological and design aspects, designers can create visual and functional locations that enhance the occupants' experience and comfort. Incorporating relevant color schemes and lighting solutions can help improve interior design projects, ensuring harmony, comfort, and overall satisfaction.

In conclusion, making the right choice can significantly enhance the shopping experience, guide consumer behavior, and effectively promote brand identity. The workshop on design psychology course in OCMT, Department of Design, focused on Color lighting in fashion stores, which can significantly influence consumer behavior and mood. Blue lighting evokes a sense of calmness and trust, making it an ideal choice for high-end brands. Green lighting suggests harmony and peace, encouraging leisurely exploration and contemplation. Yellow lighting evokes happiness and optimism, ideal for youthful brands. Orange lighting evokes energy and joy, making it a suitable choice for casual fashion brands. Purple lighting evokes luxury and exclusivity, perfect for high-fashion areas. White lighting enhances product visibility and promotes the modern aesthetic. Pink lighting, associated with romance and femininity, creates a soft, inviting atmosphere, particularly effective in stores targeting young women or women's fashion. Furthermore, designers must consider the psychological impact of light in alignment with the space's intended purpose. The perfect lighting design creates a well-balanced workspace that

increases productivity. Further research on this topic is crucial for understanding and effectively applying light theories in interior design.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

REFERENCES

Abbattista, P. (2025). Decorative Lighting Industry.
Allen, A. M. S. (2024). Open Kitchen Lighting.
Almrsal. (2024). Barstools Kitchen Island Lighting.
Boyce, P. R. (2003). Human Factors in Lighting. Crc Press. https://doi.org/10.1201/9780203426340
Edwardgeorgelondon. (2024). The Ultimate Guide on how to Create and Master the Modern Color Palette.
Edwards, L., & Torcellini, P. (2002). Literature Review of the Effects of Natural Light on Building Occupants. https://doi.org/10.2172/15000841
Elnaggar, H. B. J. J. o. D. S., & Arts, A. (2022). Illumination and Color in Interior Design of Living Room, 3 (1), 50–63. https://doi.org/10.21608/jdsaa.2021.76256.1112
Hunsaker, C. (2023). Circadian Lighting.
Inc., G. (2011). Google Offices, Dublin.
Lightology. (2018). How to Light a Living Room.
Lightology. (2025). Future of Lighting.
Lightology. (2025). Lighting Measurements for Installation.
Lightology. (2025). Warm Dim Technology.
Madumarova, M. J. G. I. I. R. J. (2023). The Influence of Color and Light on Interior Spaces: An Analysis of Psychological and Design Perspectives, 11 (11), 210–212.
Mahmoud, N. A. (2023). The Lighting Effects on the Tactile Perception in Interior Design Studios. In EDULEARN23 Proceedings. IATED.
Marchese, K. (2024). Biophilic Design Guide - Kellert's Principles and the Benefits of Nature.
Oman College of Management and Technology (OCMT). (2024). Workshop Projects of the Design Psychology Course (603203) in the Department of Design, Sultanate of Oman. Tools of Design.
Ozenen, G. (2023). Lighting Sources used for Interior Design. In Architectural Interior Lighting (pp. 37–49). Springer. https://doi.org/10.1007/978-3-031-49695-0_5
Pymnts. (2016). Starbucks Invests in Italian Bakery Princi.
Sculptform. (2021). Biophilic Design Theory.
Snapshots, O. (2024). Biophilic Design.