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REIMAGINING LIGHTING IN INTERIOR DESIGN: IMPACT ON SPACE, FUNCTIONALITY, AND ENVIRONMENTAL PERSPECTIVES

Ayman M Obeidat[1]*, Asem M Obeidat[2], Zeyad Alshboul[3], Ahmad M Obeidat[4]

[1]Ajloun National University, Jordan. Ay.Obeidat@anu.edu.jo, ORCID: https://orcid.org/0009-0003-5149-7141,
[2]Yarmouk University, Jordan. asem.obaidat@yu.edu.jo, ORCID: https://orcid.org/0000-0002-5635-7661
[3]Ajloun National University, Jordan. dr.zyad.shboul@anu.edu.jo, ORCID: https://orcid.org/0000-0002-9445-3347
[4]Ajloun National University, Jordan. A.Obeidat@anu.edu.jo, ORCID: https://orcid.org/0000-0001-6995-3692

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Corresponding author: Ayman M Obeidat (Ay.Obeidat@anu.edu.jo)

ABSTRACT

Lighting is a crucial component of home design, significantly influencing aesthetics and environmental sustainability. Effective lighting will establish the room's ambiance, utility, and mood, while also highlighting architectural elements and focal areas. When planning an interior design project, it is essential to consider several components such as natural light sources, artificial lighting options, and high-quality light fixtures. Natural ambient lighting pertains to elements that contribute to creating a purposeful and inviting look inside a given environment. From a holistic perspective, lighting transcends mere utility, functioning as an integral component of interior design that influences atmosphere, functionality, experience, and environment. Lighting is an essential element of interior design, enhancing visibility by establishing ambiance and highlighting architectural features and embellishments. Ambient lighting, task lighting, and directed lighting are distinct categories of illumination, each exerting a unique influence on the aesthetics and functionality of interior environments. This study examines the effects of specific lighting solutions on the overall aesthetics, functionality, and environmental considerations of interior spaces. The results demonstrated that lighting is essential in interior design, with different types of lighting creating distinct impressions and influencing the physical characteristics of places, so positively impacting the environment. This research endeavours to examine the nuanced dimensions of lighting by identifying its beneficial and detrimental effects.

KEYWORDS: Natural Lighting, Artificial Lighting, Overall Impression in Interior Design, Lighting Efficiency.

1. INTRODUCTION

Lighting is fundamental to interior design, influencing the overall ambiance of spaces and significantly impacting its appearance and functionality. Lighting methods have progressed historically, transitioning from oil lamps and natural illumination to contemporary technology such as LED bulbs and smart lighting systems. Various lighting technologies and designs are available to serve distinct aims, including boosting visual appeal, creating warm and inviting environments, and optimising efficiency (Aghajari & Chen, 2025). Lighting is a crucial design component that may define a location's visual identity and accentuate its architectural features. Carefully selected lighting influences individuals' comfort and emotions and can be a primary determinant of a space's formality, spaciousness, cosiness, tranquilly, or vibrancy. Lighting design incorporates several categories, including general, functional, and aesthetic lighting, to fulfil the desired goal of the setting (Figueiredo et al., 2021). For instance, white and direct illumination can enhance productivity and concentration in commercial settings, but warm lighting fosters comfort and tranquilly in residential environments. Technology enables users to modify the colour and intensity of illumination based on their preferences and the time of day. This study aims to investigate the influence of various lighting fixtures on interior design, enhance user experience, and facilitate a balance between the practical and aesthetic dimensions of interior spaces. This study examines interior lighting from two primary perspectives: the overall aesthetic appeal of the space and its functionality. Natural lighting is described as illumination derived from natural sources, such as the sun, which enhances the interior lighting of a building and invigorates it, playing a crucial role in boosting psychological well-being and comfort (Balocco et al., 2023). Artificial lighting refers to illumination produced by artificial light sources, such as various types of electric lamps. It is designed and implemented to enhance visual perception in interiors and to fulfil functions appropriate to the space's utilisation. Light distribution pertains to the dispersion of many light sources within an area to achieve an even illumination or to create certain lighting effects (Pracki & Krupiński, 2021). Visual comfort pertains to ideal illumination levels that minimise visual strain and promote clarity of vision, hence promoting safety and comfort inside a location. Functional lighting is described as lighting specifically designed to fulfil practical purposes. This type is appropriate for work or reading environments and primarily enhances visual performance in designated regions. Ambient lighting is the primary source of general illumination, providing comprehensive and diffused light throughout the area, ideal for facilitating optimal vision. Task lighting refers to targeted illumination designed to facilitate activities like as reading, working, or cooking, whereas directed lighting enhances depth, drama, and aesthetics by accentuating particular characteristics, including artwork or decorative elements. Aesthetic lighting, designed to enhance the area's visual appeal and emphasise educational design elements, includes practical examples such as concealed lights beneath beams, passageways, or decorative lamps that enrich the decor with artistic nuances (Osibona et al., 2021). Lighting efficacy is a measure of a light source's capacity to deliver necessary illumination while minimising power consumption, hence meeting design sustainability criteria. These definitions will facilitate the mastery of fundamental terms in the domain of interior lighting design, contributing to the attainment of comfort and aesthetic appeal in interiors (Tavares et al., 2021). This study examines the impact of colour and intensity choices, as well as artificial and natural lighting, emphasising the necessity of tailoring these elements to the characteristics of each environment to foster a motivating and harmonious atmosphere that satisfies users' psychological, aesthetic, and functional requirements. This study aims to understand how different lighting setups affect the overall appearance and functionality of interior spaces. Although lighting is an essential element of interior design, both designers and users may lack a comprehensive understanding of its patterns, effects, and applications. Inadequate or erroneous illumination might yield unfavourable effects that hinder users' comfort and ability to focus or relax (King et al., 2024). The research questions have examined i) the impact of lighting selection on the functionality of distinct spaces, whether designated for work, relaxation, or entertainment, ii) the influence of light colours and various lighting types (including natural, artificial, and smart lighting) on the visual perception of the space, iii) the degree to which thoughtfully designed lighting can enhance the psychological and physical comfort of users. The study seeks to offer data-driven recommendations for balancing the aesthetic and practical aspects of lighting, thereby enhancing interior spaces to accommodate diverse user needs. This work primarily focusses on analysing the influence of various lighting types on interior design and

investigating methods to enhance user experience through the implementation of diverse lighting techniques. The proposed strategy will concentrate on offering advice for selecting and distributing lighting to attain a balance between beauty and functionality. This is crucial for examining the impact of lighting on the quality of interior spaces, aiding interior designers in making informed choices regarding lighting types, and supplying data and outcomes that can enhance psychological well-being and comfort in indoor environments. A comprehensive analysis of how various lighting types influence the overall perception and functionality of interior environments, the distinct categories of lighting employed in interior design, and the impact of each lighting type on the ambiance of the space, as well as the role of lighting in enhancing or impairing the utility of these areas.

1.1. Methodology Overview

The researcher will employ a descriptive-analytical technique to examine the effects of various lighting kinds on interior environments. The descriptive analytical approach was employed to investigate the impacts of different lighting arrangements, focussing on task lighting, directed lighting, and ambient lighting. The investigation will encompass a detailed examination of the present circumstances, interpreting the impact of lighting based on user experiences and the insights of interior design professionals.

1.2. Related Work

a) Basic Ambient Lighting

Ambient lighting serves as the primary illumination source in a room, enhancing overall brightness and contributing to the atmosphere of the space. Natural illumination from windows and pendant lighting. Cool tones enhance the feeling of tranquilly and spaciousness, whilst warm ambient lighting promotes intimacy and comfort. Ambient illumination facilitates effortless motion within the region, providing both security and enhanced visibility (Ozenen, 2024). Task lighting illuminates designated areas to facilitate specific activities, such as working, cooking, or reading. This illumination is typically more intense and luminous. Task lighting enhances concentration and productivity, and when aesthetically integrated into the design, imparts an air of sophistication (Mahmoud, 2023).

b) Directional lighting and lighting with many layers

Directional lighting imparts depth and intrigue to a design by accentuating specific elements within a space, such as artwork or architectural features. Directional lighting enhances the design and imparts dimension to the room by accentuating specific areas and introducing an element of drama. Frequently employed in dining rooms, living rooms, and galleries, directed lighting serves as a decorative feature that enhances the vibrancy and allure of the space (Lu, 2025). Since the mood and function of the area may be readily updated, mixing multiple lighting kinds is an efficient technique to produce a comprehensive and balanced lighting design. Throughout the day, layered lighting can alter a room's atmosphere. During the day, intense work lighting is employed, whereas in the evening, gentler ambient and directional lighting is preferred for leisure activities. It provides exceptional versatility, allowing the space to function as a comfortable gathering area in the evening and a workspace throughout the day (Zaeva-Burdonskaya & Nazarov, 2021).

c) Lighting Innovations and Trends

Contemporary advances in lighting design include energy-efficient LED bulbs and smart lighting systems that allow for brightness and colour temperature regulation via smartphone applications. Smart lighting boosts the user experience by facilitating consumers' ability to adjust their mood (Choi & Suk, 2020). It conserves energy and mitigates environmental impact, rendering it an attractive option for modern interior environments. Diverse lighting applications in interior design can alter the ambiance, functionality, and aesthetic appeal of a room. For instance, natural light from windows can markedly enhance the mood of a place (Figure 1), whilst artificial light from lights guarantees sufficient illumination during nocturnal hours (Figure 2). Concentrating illumination in the kitchen can improve functionality and effectively accentuate work areas (Figure 3). Moreover, direct illumination on artwork can highlight key areas within a space (Figure 4). Optimal lighting in meeting rooms enhances productivity and fosters a hospitable atmosphere (Figure 5), while the incorporation of smart LED lighting systems facilitates adjustable brightness and colour, hence augmenting user experience and energy efficiency (Figure 6). When constructing a comfortable living room, a practical kitchen, or an appealing office, it is crucial to comprehend the many types of fixtures, their positioning, and their impact on the atmosphere. This guidance will facilitate appropriate navigation of interior illumination (Alkhatatbeh & Asadi, 2021).

Figure 1: Providing Natural Light from Windows. Source : (Amazon, 2023).

Figure 2: Providing Artificial Light from Lamps.
Source : (AdmVogin, 2020).

Figure 3: Focusing Lighting on the Kitchen.
Source : (Lights, 2020).

Figure 4: Direct Lighting on Artwork
Source: (Caterlux, 2024).

Figure 5: Comfortable lighting in the Meeting Room
Source: (Pinterest, 2024).

Figure 6: Smart Lighting Systems LED.
Source: (Co, 2024).

A. Impact lightings on the overall impression

The perception and experience of a room are contingent upon the type of lighting employed. Cool lighting imparts an impression of cleanliness and modernism, whereas warm lighting evokes a feeling of cosiness. Directional lighting can enhance attention and aesthetic appeal in a place by highlighting focus areas.

1. The impact of natural lighting

Appropriate selection of colour temperatures allows ambient lighting to be customised for different moods, fostering a sense of warmth and spaciousness. It is crucial for preserving optimal vision inside the space, facilitating movement, and enhancing safety (Akl et al., 2023). Warm lighting (3000 Kelvin and below) promotes comfort and relaxation, making it suitable for living spaces and bedrooms. Offices and hospitals often utilise cool lighting (4000 Kelvin and above) as it enhances concentration. Cool lighting enhances employee alertness and productivity. Hotels employ warm ambient lighting to provide a sense of comfort and hospitality for guests (Hjetland et al., 2020).

2. Task Lightings and Directional Lightings Effect

Task lighting enhances alertness and concentration, hence improving productivity and performance. Research indicates that task lighting enhances concentration and reduces visual distractions, in addition to being a practical feature. For example, reducing eye strain by positioning moderately strong lighting over a workstation enhances task efficiency. It provides focused illumination that reduces eye fatigue and is essential for environments such as home offices and kitchens where precision is required (Bhattacharya et al., 2022).

Directional lighting not only adds drama and elegance but also enhances the visual allure of artistic environments or décor. In addition to its visual appeal, it delineates the attributes of the site and amplifies the clarity and elegance of its elements. Numerous studies indicate that directed lighting produces "visual interest points" that enhance the depth of a room and provide a distinctive style. To capture attention and imbue the space with emotional and visual character, certain elements of the architecture or décor are accentuated (Cuttle, 2022). Examples of task lighting applications include: Targeted lighting in food preparation sections in kitchens enhances visibility and mitigates accidents. Task lighting is employed in reading nooks and libraries to provide sufficient illumination for reading. Analysis of art galleries: Directed lighting accentuates the nuances of artworks at museums and galleries, so enhancing visitors' engagement with the items. It emphasises essential elements and directs attention, hence guiding visitors through different locations (Šveb Dragija & Jelinčić, 2022).

3. Multiple layers of illumination

Combining the three lighting styles results in a versatile and efficient design that lets the space's ambiance be altered as needed. By using this lighting technique, places may be made to satisfy a variety of

needs and help to create an integrated environment. It can be altered to suit users' requirements and emotions (Wood, 2020). For instance, the combination of ambient and directional lighting can turn a multi-layered lighting living room from a place to work during the day to a place to unwind at night, by selecting the right color temperatures to match activities and comfort (Figure 7). In office environments, highlighting specific areas ensures clear visibility for tasks while maintaining ambiance (Figure 8). In libraries, focused lighting on tables enhances visibility for reading while maintaining a calm environment (Figure 9). In restaurant design, different color temperatures and focused lighting on tables can increase the perceived space and enhance customer comfort (Figure 10). Using LED lighting and focusing it on office areas further supports efficient and comfortable work environments (Figure 11). Understanding the variations in color temperature is crucial for creating effective layered lighting to suit different spaces and purposes (Figure 12). Real-world case studies demonstrate that multi-layered lighting is frequently utilized in restaurant design, with task lighting brightening table sections, directional lighting drawing attention to décor, and ambient lighting creating a cozy ambiance.

Figure 7: Selecting the Right Color Temperatures.
Source : (India, 2025).

Figure 8: Highlight the Office for Clear Visibility.
Source: (Home, (n.d.)).

Figure 9: Highlight Tables in Libraries.
Source: (Calvet, 2015).

Figure 10: Different Color Temperatures. Source: Focus Light on Tables in a Restaurant to Increase Space. Source: (Hotels, (n.d.))

Figure 11: Using LED Lighting and Focusing it on Offices.
Source: (Wire, (n.d.)).

Figure 12: Different Color Temperatures.
Source: (Amazon.ae, (n.d.)).

A. Contemporary lighting advance

Smart illumination with technological advancements, smart lighting has assumed a pivotal position in interior design. Smart lighting facilitates user customisation of brightness, colour temperature, and scheduling, thereby fostering environments that are both comfortable and energy-efficient. Modern offices and smart homes exemplify this influence (Gentile, 2022). A recent study from Harvard University indicates that offices utilising smart lighting can enhance productivity by up to 25%. This is because employees may modify the lighting to suit their mood and level of activity. Energy-efficient lighting, including LED technology and eco-friendly designs, is gaining popularity (Alhammadi & Amer, 2022).

B. Comprehensive analysis of the effect of colour temperature lighting

Warm lighting (2700–3000 Kelvin) is appropriate for spaces necessitating comfort and tranquilly, such as bedrooms and living rooms, as it amplifies the sensation of warmth and intimacy. Natural lighting (3500–4000 Kelvin) is commonly utilised in functional environments like kitchens and workplaces, as it enhances vitality and improves visual clarity. Cool lighting (5000 Kelvin and above) is appropriate for environments necessitating high concentration, such as hospitals and contemporary offices, as it enhances alertness and focus (Pradhan et al., 2024).

C. Understanding Fixture Types

Numerous categories of lighting fixtures exist, each fulfilling distinct functions in interior design (Table 1).

Table 1: Types of Interior Lighting with Purposes, Fixture Types, and Placement Guidelines.

	Purpose	Fixtures Type	Placement
Ambient Lighting	Gives a room general illumination, resulting in a cozy and well-lit space.	Ceiling-mounted fixtures (chandeliers, flush mounts), wall sconces, recessed lights.	Evenly spaced around the room, ensuring uniform lighting.
Task Lighting	Provides concentrated lighting for particular jobs or pursuits, such working, cooking, or reading.	Pendant lights above kitchen islands, under-cabinet lights, and desk lighting.	Positioned directly over the task area to minimize shadows and glare.
Accent Lighting	Highlights specific features, objects, or architectural details, adding depth and drama to a space.	Track lighting, wall-mounted spotlights, and picture lights.	Strategically placed to draw attention to the desired focal points
Decorative Lighting	Adds visual interest and serves as a decorative element in the room.	Artistic chandeliers, pendant lights, sculptural lamps.	As a central piece in the room, it is often chosen for its aesthetics.

a. Effective Fixture Placement

The placement of lighting fixtures can significantly impact a room's functionality and ambiance. Here are some placement guidelines (Table 2):

Table 2: Practical Tips for Effective Placement of Interior Lighting Types.

Ambient Lighting	For even illumination, space ceiling-mounted fixtures evenly. Use dimmers to adjust brightness and set the mood.
Task Lighting	Place task lights where it mostly needed (e.g., a reading lamp near a chair). Ensure the light source is directed toward the task area.
Accent Lighting	Illuminate artwork, sculptures, or architectural elements from above or the side. Adjust the angle and intensity to achieve the desired effect.
Decorative Lighting	Use decorative fixtures as the room's main attraction. Ensure they complement the overall design and style.

b. Creating Ambiance

Ambiance is the emotional and sensory response to a space. Lighting is a powerful tool for crafting ambiance:

Table 3: Advanced Lighting Strategies for Interior Spaces.

Warm vs. Cool Lighting	Warm lighting (yellow and orange tones) creates a cozy, intimate atmosphere. Cool lighting (white and blue tones) enhances alertness and productivity.
Lighting Layers	To add depth and dimension, use job, ambient, accent, and decorative lighting. Adjust each layer to achieve the desired mood.
Smart Lighting Controls	Install dimmer switches, timers, or smart lighting systems to customize lighting levels throughout the day.
Natural Light Integration	Maximize natural light sources through well-placed windows and mirrors. Consider window treatments to control the intensity of sunlight.

Lighting is a versatile instrument that influences our perception and utilisation of a space. Understanding various fixture kinds, strategically positioning them, and establishing the appropriate ambiance can enhance a room's functionality and aesthetics, fostering a more inviting and pleasant environment. Despite the challenges of navigating this environment, the possibility of custom-built light fixtures remains available (Ozenen, 2024).

c. Lighting's Function in Interior Design

Lighting is crucial to interior design since it can transform a space and enhance both atmosphere and functionality. Properly designed and applied lighting may enhance a room's overall appearance and ambiance, rendering it more visually appealing, inviting, and engaging. Besides offering illumination, it highlights architectural features, such as ceiling apertures that admit natural light (Figure 13), and enriches the environment by employing pendant lights to augment layered lighting and vertical interest (Figure 14). Lighting accentuates focus points, successfully emphasising architectural features or decor to establish depth (Figure 15). Additionally, varying colour temperatures can generate diverse atmospheres inside the room, contingent upon the intended mood (Figure 16). Lighting designers collaborate with architects and interior designers to enhance a room by strategically positioning lights to create height, depth, and emphasise significant elements (Li et al., 2024).

Figure 13: Bringing in Light from Ceiling Openings. Source : (Metals, 2025).

Figure 14: Using Pendant Lights to Increase Lighting. Source : (Amazon, 2024).

Figure 15: Highlighting the Space. Source: (Calvert, 2019).

Figure 16: Different Color Temperatures. Source : (Lushome, 2025).

Effective lighting design takes into account various factors, including the purpose of the space, the activities to be conducted, the desired environment or mood, and the overall beauty of the design. It involves achieving the optimal equilibrium between artificial and natural illumination sources. Daylight is an essential element of interior design as it links us to the external environment and influences our perception of colour and texture. To optimise the space, incorporate windows, skylights, or light shelves to facilitate ample natural light during the day. Artificial lighting supplants natural light to fulfil illumination requirements when the latter is inadequate or absent. Artificial lighting has multiple purposes, ranging from providing aesthetic enjoyment to facilitating practical job illumination. It is classified into three main categories: highlight lighting, task lighting, and ambient lighting (Gaston & Sánchez de Miguel, 2022). Ambient lighting is defined as general illumination that emits a soft, uniform radiance throughout the environment. It ensures fundamental visibility and delineates the overall ambiance of an area. Pendant lights and recessed lights exemplify ceiling-mounted fixtures capable of achieving this. Accent lighting serves to emphasise objects or architectural features within a room. It imparts volume and depth by the juxtaposition of light and shadow. Accent lighting is often accomplished using spotlights or track lighting. (Crews, 2022). Task lighting is a specific type of illumination intended to facilitate activities such as working, reading, and cooking. It should concentrate primarily on the sites where tasks are performed. Examples of task lighting include desk lamps, under-cabinet lights in kitchens, and vanity lights in restrooms. Lighting is crucial to interior design as it modifies the mood and functionality of a room. Effective lighting design takes into account the desired ambiance, the purpose of the area, and the aesthetic of the design. It involves achieving the optimal equilibrium between artificial light sources, categorised into task, ambient, and accent lighting, and natural daylight. Effective lighting may highlight architectural features, emphasise focal points, establish atmospheres, and enhance comfort levels. An effective lighting design significantly depends on the amalgamation of fixtures and the calibre of the light (Cuttle, 2022).

i. Lighting for Ambience and Vision

Lighting is a crucial factor in interior design as it influences both ambiance and visual perception, in addition to functionality. Proper lighting enhances visibility by alleviating eye strain and providing adequate illumination. Sufficient task illumination ensures clarity and reduces ocular strain during reading, working, or executing daily activities (Boyce, 2022). Productivity may decline due to eye strain resulting from insufficient lighting. It can tailor the lighting according to requirements and establish an adequately illuminated workspace that fosters attention and concentration by utilising concentrated task lighting, such as a desk lamp with adjustable brightness and colour temperature. The mood and ambiance of a location are significantly affected by lighting as well as visual perception. Diverse atmospheres and emotions can be elicited by various light sources, colour temperatures, and intensities. In living rooms or bedrooms, warm lighting with lower colour temperatures (ranging from 2700K to 3000K) fosters a cosy and inviting ambiance. In contrast, cooler lighting with elevated colour temperatures (about 4000K to 5000K) creates a vibrant and uplifting ambiance suitable for kitchens or workspaces (He et al., 2020). The overall mood of a space can be affected by the selected lighting fixtures. Soft pendant lighting in restaurants fosters a pleasant and inviting atmosphere, whilst a chandelier adorned with shimmering crystals imparts elegance and glamour to the dining area. Interior designers can influence behavioural patterns, evoke emotions, and enhance a space's functionality through the strategic selection of lighting fixtures and the regulation of light intensities. By comprehending the significance of light in vision and atmosphere production, we may better appreciate its capacity to influence our daily experiences in diverse

environments. In subsequent parts, we will examine how natural and artificial lighting might collaborate to attain optimal outcomes.

ii. Daylight's Significance in Interior Design

Natural light illuminates any place, fostering a sense of warmth, openness, and connection to the external environment. It fosters a conducive and amicable environment for individuals and guests. In addition to enhancing visual clarity and vitality in a space, daylight is crucial for our overall health and well-being (Bashir et al., 2024). Daylight serves as a powerful physiological stimulant, enhancing our mood and regulating our sleep cycles. Exposure to natural light is correlated with improved immunity, reduced stress levels, and increased productivity. When meticulously incorporated into interior design, it may enhance the ambiance and provide a more spacious, inviting feel to interiors. Incorporating the interaction of daylight with other elements in the environment is essential in daylight design. To optimise natural light, one must consider furniture arrangement, colour, and material choices. Light hues on walls and furnishings will reflect illumination, creating an impression of increased spaciousness and brightness. Positioning mirrors adjacent to or in front of windows facilitates the reflection of natural light across a space, hence enhancing its impact (Ahmad et al., 2020).

iii. Including Different Lighting Types in Design

Although natural lighting serves as the foundation for interior lighting design, artificial lighting is essential for creating ambiance, highlighting focal areas, and providing useful illumination. To achieve a balanced and varied lighting scheme, it is essential to incorporate several types of lighting fixtures (Baeza Moyano et al., 2020). Decorative lighting elevates a room's aesthetic allure and serves as a visual centrepiece. Wall sconces, pendant lights, and chandeliers are commonly employed to convey a specific aesthetic or create a focal point. In addition to providing illumination, these fixtures can function as art and enhance the aesthetic appeal of a location. Architectural lighting focusses on accentuating architectural characteristics or nuances within a space. It includes concealed lighting within walls or cabinetry to highlight features or textures and generate drama overall. Architectural lighting enhances general illumination and elevates a room's ambiance. Integrating architectural and ornamental lighting can yield a dynamic and multifaceted lighting scheme. Architectural lighting emphasises architectural elements, accent lighting focusses on specific areas or objects, and ambient lighting provides overall illumination. Achieving an optimal combination of these three lighting characteristics ensures that the room will be aesthetically pleasing, functional, and inviting (Florea et al., 2025).

iv. Organizing Lighting Design: Position and Illumination

An effective lighting strategy requires meticulous planning and consideration. The transformation of space from mundane to extraordinary can be achieved by the strategic positioning of light fixtures and the modulation of light levels. Ambient lighting establishes atmosphere in a kitchen, whilst task lighting is essential in zones allocated for food preparation. Accent lighting in a living environment can emphasise architectural features or artworks, whereas general lighting distributes illumination uniformly over the space. It is essential to balance functionality and beauty. Consider how different lighting fixtures will integrate with the room's existing architectural elements and design components. Do you prefer striking pendant lights that provide a significant visual effect, or would recessed downlights seamlessly integrate with the ceiling? These selections will influence the room's overall aesthetic allure as well as its functionality.

v. Developing a Lighting Layout That Works

The intent and ambiance of a space are significantly influenced by the strategic placement of lighting fixtures. The dimensions, form, and positioning of natural and artificial light sources are all factors considered in well-designed building. In addition to shadow avoidance, appropriate fixture placement ensures equitable light distribution across the area. Work rooms and conversation places should be equipped with task lighting or overhead lighting directed towards them. Wall washing techniques can produce a soft, diffused illumination that highlights the architectural details and textures of a space. To ensure consistent illumination throughout the space, one may opt to position recessed downlights in a grid configuration across the ceiling when planning the lighting for a conference room. Wall sconces create a warm and welcoming ambiance, whereas pendant lights above the conference table offer focused job lighting (Baeza Moyano et al., 2020).

vi. Finding Equilibrium in Architectural and Decorative Lighting

Illuminating an area is a fundamental component in crafting a well-designed environment. It pertains to achieving an optimal equilibrium between architectural and decorative lighting. A space can be elevated from mundane to extraordinary by the harmonious integration of both elements. By accentuating features or functioning as focal points, decorative lighting enhances a space's visual appeal. Imagine slender pendant lights suspended above a kitchen island or elegant chandeliers positioned in a grand entrance. These light fixtures enhance the visual value of the area

by serving as design statements in addition to providing illumination. Relying solely on decorative lighting may lead to insufficient illumination for daily tasks and practical needs (Battle et al., 2020). Attaining an aesthetically pleasing interior design necessitates the optimal equilibrium between architectural and ornamental lighting. It can provide light intensities that enhance a space's aesthetic allure and functionality through adept integration. For example, it may use wall sconces or table lamps as highlight elements that enrich the overall ambiance in a living room, while employing recessed downlights for general illumination (Song et al., 2020).

vii. The Effect of Good Lighting on Design Results

Illuminating a space is but one facet of creating a thoughtfully designed setting. It involves achieving a meticulous equilibrium between architectural and decorative lighting. A space can transition from mundane to extraordinary when these two elements function in unison. Decorative lighting acts as a focal element to augment a room's aesthetic appeal. The Impact of Optimal Lighting on Design Outcomes. Lighting is a fundamental element of interior design, capable of profoundly affecting the appearance and ambiance of a space. When effectively executed, it can generate an environment that is both functional and engaging. Well-designed lighting enhances the overall aesthetic by incorporating depth, height, and emphasising essential areas or aspects within a place. Utilising highlights and shadows generates depth and evokes a sense of drama or intrigue. Envision a dining table adorned with pendant lights suspended above, emanating a warm, inviting luminescence that fosters an excellent ambiance for dialogue and communal dining (Baeza Moyano et al., 2020). Effective lighting serves both functional and aesthetic purposes. By illuminating stairs and pathways, it guarantees safety while offering task lighting for activities such as cooking or reading. Optimal illumination is crucial for enhancing productivity and reducing ocular fatigue in workplace environments. Designing lighting systems necessitates consideration of natural daylight. The benefits of natural light encompass enhanced mood, elevated wellbeing, and a feeling of connectedness to the external environment. Incorporating several windows, skylights, or light wells can impart a room with a natural sense of vitality (Ayoub, 2020).

viii. Key principles of interior lighting design

Lighting design is governed by several fundamental principles that guarantee rooms are aesthetically pleasing and functionally efficient. These concepts assist designers in crafting spaces that accommodate diverse needs while preserving aesthetic coherence. By integrating various lighting kinds and contemplating scale, colour temperature, and sustainability, grasping these fundamental concepts facilitates the development of well-illuminated, comfortable, and efficient environments that improve everyday life. The subsequent table delineates the fundamental principles of interior lighting design, accompanied by the primary considerations for each element to facilitate appropriate application in diverse interior environments (Table 4).

Table 4: Key Principles of Interior Lighting Design and Main Ideas of Interior Lighting Design (Krieger & Higgins, 2002).

Principle	Description	Considerations
Layering	To develop a lighting system that is both balanced and adaptable, combine ambient, task, and accent lighting	Ensure different types of lighting work harmoniously together
Functionality	Create illumination that is tailored to the space's requirements to improve usability for a range of tasks (cooking, reading, et).	Assess the primary functions of each room before choosing lighting.
Scale and Proportion	Select light fixtures that are appropriately scaled to the size of the room and furniture to maintain visual harmony.	Use larger fixtures in spacious rooms and smaller ones in compact spaces.
Colour Temperature	Choose the right colour temperature (warm, neutral, cool) to create the desired mood and complement the decor style.	Consider the psychological effects of color temperature on occupants.
Focal Points	Accent lighting can be used to draw attention to decorative elements, architectural details, or artwork, adding depth and visual appeal.	Plan the placement of accent lights to draw attention to specific features.
Control and Flexibility	Incorporate dimmers and smart lighting solutions to allow for adjustable brightness and mood settings throughout the day.	Provide multiple control options for users to customize lighting.
Sustainability	Opt for energy-efficient lighting options (like LED) and design for natural light integration to reduce energy consumption and enhance comfort.	Consider the long-term impact on energy bills and environmental sustainability.
Contrast and Balance	Create visual interest by using contrasts in light levels between different areas and fixtures while maintaining overall balance in the design.	Aim for a harmonious balance between bright and dim areas.
Safety and Accessibility	Ensure adequate lighting for safe movement, particularly in high-traffic areas, staircases, and entrances.	Position lights strategically to avoid dark corners and hazards.
Consistency	Maintain a cohesive lighting style throughout the space to ensure a seamless visual flow.	Choose fixtures that complement the overall interior design theme.

a) Visual perception and appearance

The contemporary standards utilised by interior lighting design professionals to enhance a room's visual experience can be summarised as follows: i) the capacity to conceptualise how light distribution influences individuals' perceptions of the space and its contents, including people, is essential to lighting design; ii) the aim is to deliver visible illumination while also presenting participants with a perceived product that integrates object appearance elements into a comprehensive design concept. Conversely, the core concepts of "diverse lighting practice" focus on improving vision, enabling the execution of "visual tasks," which may lead to fatigue or discomfort. Consequently, it pertains not solely to illumination for visibility but also to the whole perception of the place. This is transformative as it compels the profession to transition from perfunctory design that merely adheres to existing laws and regulations to exemplary design that elevates the experience of its users.

b) Combining Architecture and Lighting

The integration of architecture and lighting was initially addressed in the early 1950s, delineating three facets of light that persist in influencing contemporary design methodologies: (i) ambient light, commonly known as spatial brightness, which delivers overall illumination devoid of shadows; (ii) sharp detail or the interplay of luminous sources, which invigorates the spirit and stimulates the optic nerve; and (iii) focal glow or accentuation, which distinguishes the significant from the trivial.

c) Levels of Energy and Illumination

Cuttle (2022) critiques the illuminance norms specified in rules and standards concerning the pressure on energy use. Cuttle illustrates in Figure 17 that optimal visual performance can be attained with merely 20 lux when reading a 12-point font on white paper. He asserts that the illumination needs exceed 100 lux to read font size 6. However, this 100-lux measurement is far lower than the lighting level. Cuttle's research indicates that standard illumination levels, typically ranging from 300 to 500 lux, may be inadequate for PAI despite exceeding the requirements for visual performance. To effectively pursue net-zero energy buildings or significantly reduce their energy consumption and associated CO2 emissions, authorities must be cognisant of this imperative. As will be seen later in this study, the opinions of building occupants regarding sufficiency are not invariably improved by increased horizontal illumination. Furthermore, it is apparent from the following that the existing lighting levels may be excessively high. The reader is 25 years old, possesses normal eyesight, and has a 350mm visual field. Three distinct types of paper—light (reflectance ρ = 0.9), medium (ρ = 0.6), and dark (ρ = 0.3)—are utilised for the reading material, which features black text in sizes varying from 6 to 14 points.

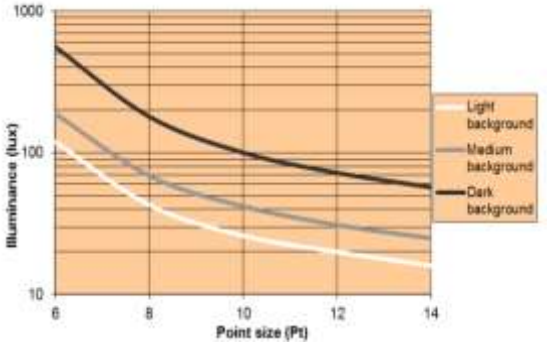

Fig 17: Cuttle's Use of the Task illuminance needed to Support a Variety of Reading Tasks in Terms of Visual Performance. (Cuttle, 2022).

Nevertheless, structures illuminated to the aforementioned minimal brightness levels are likely to be quite dim. Nonetheless, this constitutes the essence of Cattell's theories, which focus on illuminating workspaces subsequent to an emphasis on the (spatial) ambient brightness levels of structures. Cattell asserts that it is fundamentally erroneous and energetically inefficient to achieve adequate ambient brightness by increasing lumens at the working level. Ambient brightness is likely to diminish if an engineer chooses bulbs that focus light at the working level to enhance efficiency. The engineer may reject indirect lighting solutions, believing them to be inherently wasteful according to current norms and procedures. Research conducted at the ITI indicates a different conclusion.

d) Case Study

Stockholm Public Library, situated in Stockholm, Sweden; Established: 1928 Designed by Gunnar Asplund, a renowned Swedish architect, the structure features a distinctive circular construction and a grand dome that permits natural light. Its elegant and unembellished design exemplifies a fusion of classic and contemporary forms. The distinctive circular design of the Stockholm Public Library necessitates that lighting is pivotal in fostering a conducive environment for reading and studying. The library provides a distinctive setting for reading and studying due to its architectural design and the significant influence of internal lighting. The primary objectives of the Stockholm Library's lighting design were i) achieving sustainability through the maximisation of natural light to reduce reliance on artificial lighting, and ii)

enhancing the reading experience. Cosy illumination enables guests to read for prolonged durations without experiencing stress, while preserving the architectural integrity by utilising lighting to enhance the library's unique aesthetic rather than disrupt its circular configuration.

The lighting design of the Stockholm Library has been meticulously crafted to include natural illumination, with expansive windows and a dome above the central reading area that allows ample sunlight to penetrate (Figure 18). Natural light enhances the library's tranquil and organic atmosphere, fostering a sense of comfort and augmenting its artistic value (Figure 19). It additionally conserves energy by diminishing the need for artificial lighting during daylight hours while offering visually comfortable illumination (Figure 20). Task lighting is employed mostly in areas with insufficient natural light or during late hours, where reading lamps facilitate concentrated efforts. Task lighting promotes concentration, encouraging individuals to read and study with greater intensity, while also improving eyesight by reducing eye strain, especially in poorly lit environments (Figure 21). Accent lighting is employed to emphasise the library's distinctive displays and bookcases. Directional lighting enhances bookshelves, highlighting books and special exhibits while giving depth to the interior architecture, facilitating guests' ability to identify books (Figure 22). The library's overall illumination is enhanced with medium-intensity bulbs that do not disrupt task or directed lighting, while contributing to a hospitable atmosphere for the environment. This enables visitors to unwind and admire the aesthetic of the design, while ambient lighting provides uniform illumination for optimal visibility and fluid navigation within the library.

Figure 18 : Stockholm Public Library: (Wikipedia, 2023).

Figure 19: Lighting used to accent the library's distinctive beauty: (Lomholt, 2024).

Figure 21: Natural Light Helps to Save Energy. Source : (Goodreads, 2015.)

I. Design outcomes and the effect of lighting on guests

1. Improving the user experience, the layout and lighting, according to visitors, create a relaxing and reading -friendly environment where they may spend a lot of time without feeling rushed.
2. Sustainability in keeping with environmental sustainability trends in public buildings, the widespread use of natural light has contributed to a reduction in energy use.
3. Drawing visitors and lovers of architecture the library is now a popular tourist destination and a source of inspiration for architects and designers worldwide because of its stunning architectural design and lighting.
4. Make good use of natural lighting public buildings should ideally be designed to let in natural light as this lessens the demand for artificial lighting and promotes sustainability.
5. Including directed lighting at strategic locations: Emphasizing key components, like bookshelves or artwork, improves the aesthetics of the interior design and makes resources easier to find.
6. Providing multi-layered lighting: Mixing various lighting styles creates a flexible space that can be adjusted to suit various activities and helps satisfy the various needs of guests.

II. Results and Discussion

The study demonstrated that ambient lighting is the foundation of interior design since it offers clear vision and makes a substantial contribution to the creation of a cozy and complete space. Additionally, it was demonstrated that while cold lighting improves cleanliness and a feeling of modernity, warm lighting hues produce a cozy and intimate character. The study demonstrated that ambient lighting enhances users' contact with a space and makes it easier to move around and prevent eye fatigue, which makes it crucial in public areas like dining rooms and living rooms. Task lighting improves concentration and productivity, which makes it perfect for areas like offices and kitchens where accuracy is necessary. Its application in particular locations also demonstrate layout and

organization, which raises the area's appeal. Function-related results: According to the study, task lighting promotes increased productivity and less eye strain, particularly in areas used for reading and working, by providing suitable and focused lighting that facilitates the efficient completion of everyday duties. The results demonstrated that the directed lighting gives rooms a dramatic and beautiful personality that raises the value of artistic and architectural components. It is frequently utilized in art galleries and museums to draw attention to and emphasize significant aspects. However, directional lighting helps people navigate around areas and makes it easier to see decorative and artistic components, which draws attention to the area's best characteristics. Multi-layered lighting gives a space flexibility and appeal since it allows users to alter the ambiance to suit their needs, which promotes comfort and variety. The findings verify that this lighting makes it possible to modify the space for a variety of purposes by allowing the lighting intensity to be adjusted based on the activity that is needed. This enhances the adaptability of spaces and makes it simple to change them from one use to another, like working to rest. The effects of LED and smart lighting technologies on a space's overall appearance and functionality. The study demonstrated that smart lighting boosts the sense of personal control over the space since it makes it simple for users to alter the lighting's temperature and intensity, improving comfort and making it easier to change the mood as needed. However, LED and smart lighting technologies enhance energy efficiency, lower expenses, and provide more lighting options for homes, workplaces, and hospitals, all of which enhance user satisfaction and lessen environmental effects.

CONCLUSION

Lighting is crucial in interior design as it conveys uniqueness, affects mood, and enhances a space's aesthetics. The quality of life in specific locations is augmented by the deliberate selection and arrangement of lighting. Comprehending the requirements and application of the region is crucial for cohesive lighting, necessitating the evaluation of practical, environmental, and aesthetic factors. Lighting selections ought to enhance the overall aesthetic and impart a distinct character to each area. As technology advances, we may explore innovative options such as intelligent and eco-friendly lighting, allowing us to create adaptive and customised environments according to individual preferences and daily requirements. Reconceptualising interior lighting design is crucial for enhancing practices that promote environmental sustainability by decreasing energy consumption, solid waste, and carbon emissions associated with energy production and the manufacturing of lighting components. The environmental benefits of improved lighting systems are evident in the adoption of energy-efficient solutions, including smart lighting, sensor-based systems, natural illumination, and sustainable design utilising recycled materials. Smart lighting systems promote sustainability by optimising energy efficiency, minimising waste, and extending lifespan. They reduce carbon footprints by decreasing energy consumption and reliance on renewable resources, improve indoor quality by utilising fewer heat-generating components, incorporate materials derived from recycling, and foster public awareness by emphasising reduced energy consumption and sustainable practices.

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