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# Best Illumination Scenes for Spaces Users

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## Abstract

Can we live in a dark environment? Light is the essential element, natural or artificial, traditional or sustainable, that helps us proceed in our life. Creating lighting scenes is one of the important roles of an interior designer, to create the interior environment for the users, whether in private or public spaces. Designing appropriate lighting to the function, the designer refers to the ideal set design using artificial elements in addition to the possible natural penetration to reach the complete lighting scene, which suits the type of interior function. The lighting design differs from interior type to others, and success of the lighting scene contributes to the success of the full experience of all the places we live. This chapter will explore the possible lighting design that affects positively on the life enhancement, as a physical and psychological tool, of most of the interior types.

**Keywords:** lighting design, interior design, lighting scenes for interiors, artificial lighting design, natural lighting design, lighting psychology design

## 1. Introduction

Illumination, or to be under the light, is a phenomenon that normally happens under the natural light. Every morning, with the sun rising, all its surroundings illuminate. For a long time, natural lighting was the essential tool to see what surrounds us, until the discovery of the fire, which remained the main light source until 1879 where the artificial light bulb started being used commonly.

A long time before civilization, the illumination process was only sustainable, since it used natural resources that occur without human intervention. The natural light does have its regulations as it appears in specific positions, which change over day times. To reach, a particular scene, using natural lighting, several solutions are possible, where some could be classified under sustainable solutions, and scientists along with designers have created new systems repeatedly. The tools that control, both natural and artificial lighting, are diverse but enable the interior lighting designer to create a particular scene that affects positively on spaces' users, to improve their quality of life [1].

Like many discoveries, scientific developments, and human creations, the specialization became an urge within any profession. Thus, the interior designer nowadays is much keen to comply with the users' needs, as many details are considered for his well-being, physical and mental health, and his entire safe life experience—as per the declaration of the International Federation of Interior Architects/Designers (IFI). The architect has his responsibility in the complexity of the buildings' layouts. However, the architect, while interfering in the interior space, as

he used to do for many decades before 1880, creates such sterilized interior lighting that could fit in many interior types, no matter the user's natures, needs, nor wishes. The results are usually boring, with the absence of any identity of those inhabitants, and with no care of the user's moods and desires [2].

Lighting design is a specialization within interior design, which has effects over the overall human life experience. By changing its density, its colors, and its positions, the interior lighting designer could create unlimited scenes that fit with the users' requirements—the power of light to transform any space—as per the International Association of Lighting Designers (IALD). This power of alteration affects both the physical and the psychological aspects of all humankind. These effects occur unconsciously; once the person is in a specific environment, he starts to react based on its cognitive and emotional responses to this environment [3].

## **2. Types of lighting and spaces' functions**

A long time before any civilization, humans used to live surrounded by nature, using the available resources given to them naturally. Each day, by sunrise, people indulge in their daily life, as a normal reaction to the natural phenomena. They spend their day working, and by the sunset, they start to feel unsecured as opposite to the day feelings. As time passes and by coincidence, they discover the fire that promoted their security as well as an extension to their days [4].

Many decades after this discovery, by 1880, and due to the development of sciences, knowledge, and life, the electricity and the electrical bulb occur in humanity. As all sciences keep developing, the discoveries in favor of the human health, safety, and comfort show up constantly and even became daily. These inventions are in favor of the human, but on the other hand, because the human creates them, they do have side effects. Only God's creations are safe, healthy, and comfortable for the human.

Each type of bulb is created for the people's benefits; after time and through their usage, science discovers their side effects and then tries to find the appropriate solutions to overcome these circumventions. For the past decade, some types of artificial lighting sources developed to overcome the previous version. The inventions reached the substitution of natural light by pure, sustainable lighting that could grow natural plants within it. Science did not discover the side effects of this great addition to humanity, from the scientists' point of view, but from the user ones.

The great polemic using either natural or artificial lighting is in its pick. The innovative sustainable systems that allow the consumptions of natural light open unlimited opportunities to the designers for additional sources of conceptions. Artificial "sustainable" lighting reaches a diversity that enriches the possibilities for the interior lighting designers in their duties for the favor of humanity. Also, this wide range of artificial light source options helps the designers to create the suitable visual environment tool to reach a convenient interior; this depends on the type of function in a specific case [5].

### **2.1 Artificial-natural lighting and interiors**

In 1875, Henry Woodward copyrighted the first electric light bulb. While in 1876, Pavel Yablochkov invents the Yablochkov candle, the first practical carbon arc lamp, for public street lighting in Paris. Finally, in 1879 Thomas Edison and Joseph Wilson Swan patent the carbon-thread incandescent lamp. It lasted for 40 hours, while today the light-emitting diode (LED) lamps could last for up to 12 years. Between these origins and the latest LEDs, many families of lamps appear. For each type of

bulb, after a certain time of usage, side effects start to appear, and therefore the scientists take responsibility to overcome their problems by healthy solutions as well as by developing the bulbs themselves. Each time, the argumentation reaches the point of what are the benefits of the artificial light and the natural light.

### *2.1.1 Artificial light sources*

The first group, the one which starts with Edison's incandescent, were the tungsten bulb and the halogen bulb. Both produce light by heating the tungsten filament, using the electrical circuit. The light produced is warm and gives the same feeling of the sunlight but with less brightness than natural illumination. Heating the tungsten needs a lot of electricity, and by several usages, the filament's life ends, in addition to the extra load of heat provided. This type of source is great for the residential and especially in the reception areas as they provide the warm, welcoming feelings (**Figure 1**). They are also great in the high-level restaurants as they do give the appetizing feeling to the food (**Figure 2**) [6].

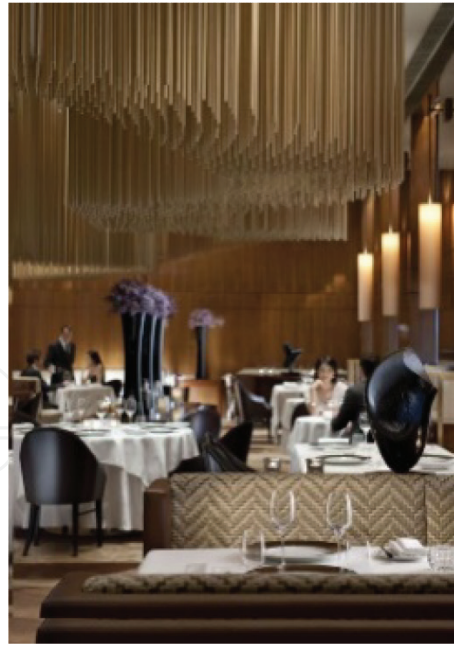
The second family is the gaseous group and consists of two subgroups: the low-intensity discharge (LID) and the high-intensity discharge (HID). The LID, famous enough with the popular light tube, the fluorescent, and then the more popular safe-energy lamps are in the everyday usages nowadays. They need special electrical systems yet less expensive and much longer in terms of lifetime. The quality of light produces pale and bluish yet efficient in terms of electricity. These tubes and bulbs are the best in commercial low-budget places. Ordinary offices, factories, schools, and universities are among the top interiors that use them despite the bad effects on the human skin if used away from some warm illuminations.

The second subgroup in the second family is the HID. Many lamps belong to this subgroup. The most effective for the interior functions are the metal halide (bulb shape) and the cold cathode (as the most flexible lamp, for the cove integration

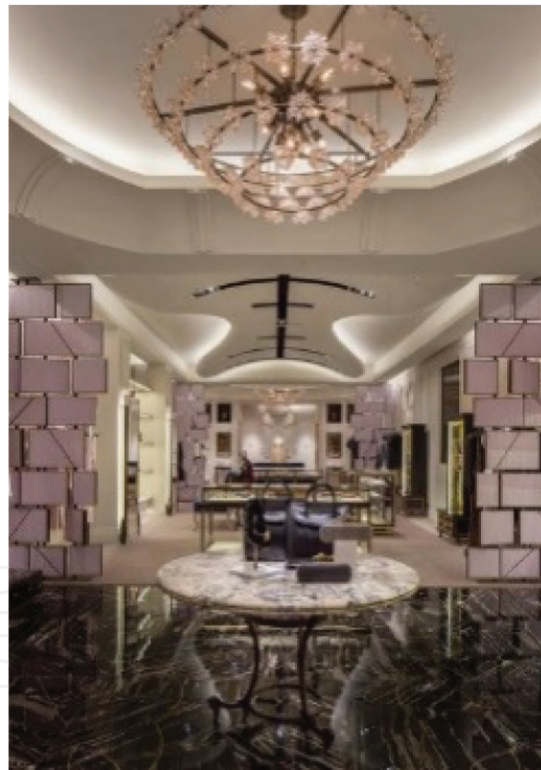


**Figure 1.**  
*Reception. Source: Google Search—Images.*





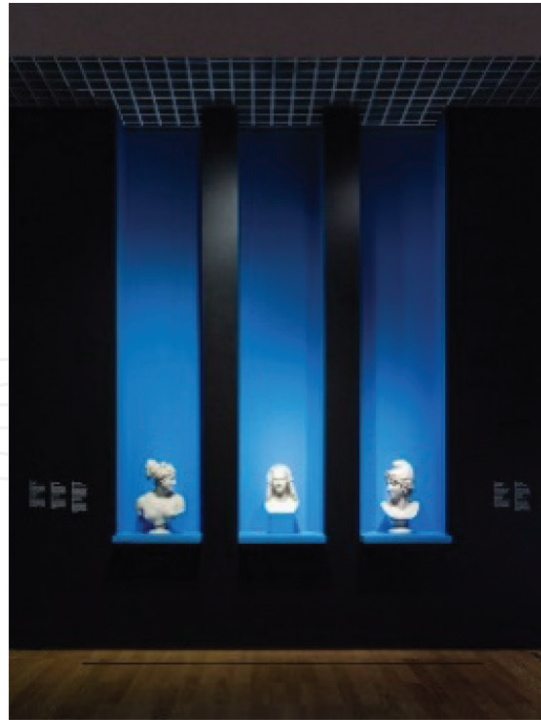
**Figure 2.**  
*Restaurant. Source: Google Search—Images.*



**Figure 3.**  
*Shop. Source: Google Search—Images.*

system to fit any shape, any color of light in a very limited space). Metal halide lamps are bright and are more efficient concerning the lifetime and the electricity consumptions. Elegant public spaces use them widely (**Figure 3**), the same as for the cold cathode or the light cove tube that fits in and affords adequate illuminations for the leveled public interior (**Figure 3**).

Finally, the electrical family of artificial light sources consists of the LED and the organic LED. In addition to their properties that exceed the electrical efficiency, their light is safer to the users regarding harmful rays and heat production, so the museum is the ideal interiors to rely on these illumination sources (**Figure 4**). The



**Figure 4.**  
*Museum.* Source: Google Search—Images.

flexible OLED that came in shape, especially the OLED that came in shape of a thinner plate of light, is a real evolution of the artificial light sources. As an extended lifetime light source, they are the sustainable ones. Therefore their applications in private spaces are more than public spaces, yet depending on the level of awareness of the clients, they are the expensive type concerning their installation, but they are the most economic concerning their consumption of electricity and their lifetime.

### *2.1.2 Natural light source*

As a natural phenomenon, the earth moves around the sun at very high speed, the fact that makes us feel stable, and we used to say “Sun Movement”. The natural light starts with the sun rising of the sun, reflecting over the environment and affecting the universe. Natural light then splits to direct sunlight and simply daylight. The natural light benefits depend on the location toward its path through the day.

In general, the advantages of the natural illumination on a human, in addition to the energy saving, are the soft distribution of light that reveals the true colors and the enhancement of the visual acuity. The natural light ensures the security feelings in all human kinds. Moreover, the natural light helps to add exterior views to the interior that promote a direct link to the alive movement that stimulates the time feelings and prevents the seasonal affective disorder (SAD), which is the most mental effect of the absence of natural lighting. As a conclusion, the natural light enhances the life productivity [7].

On the other hand, the disadvantages of the natural light are associated with the penetration of excessive glare, the ultraviolet rays (skin health problems and color fading effects) and noise, the lack of privacy, the heat gain especially in summer, and maintaining the cleanliness level. In general, the solutions that face these problems are many and suit the different needs and situations [8].

Early morning, the sun rises from the east giving bright luminous light (spring and autumn, from east to north in summer, and from east to south in winter). At the midday, the sun is toward the south, affecting the interiors with different

angles depending on the season and our position on the globe. The light is warm and vivid (around 45° in mid-seasons, less in summer about the 60°, and more in winter reaching the levels of the 30° to give more benefits to the users). Then in the afternoon timing, the sunlight faces the west with radiant reddish light (spring and autumn, from west to north in summer, and from west to south in winter).

Therefore, the sun movement affects the interiors depending on a different time with variable color and intensity. As an example of interior functions and its relations to the natural illumination, the selection of the function position is crucial to enhance the human life. As an example, the residential case will clarify the best position and location of the interior functions as the following:

- The bedrooms should face the east so in the early mornings the sunlight creates a vivid push to the users to start their day, fresh and full of energy, (**Figure 5**). Also, the health benefits that result from the direct sunrays on the sleeping surface are enhancing the vitamin D absorptions (the best time to expose the human bodies) and confronting the bedsheets' microbes.
- Kitchen (**Figure 6**) and hobby areas facing the south direction will improve the activities done, giving the linkage feeling to the exteriors. Nature promotes the housewives' lives in a great way!
- The afternoon soft, warm, and cozy illuminations endorse the living areas (**Figure 7**) where the family gathers after the lively activities. Therefore, these areas facing the east are the best positioning.
- In the special area where artists practice, the best location would be facing the north. The north never has direct sunlight, and therefore the level of shades is soft, creating a uniform level of illumination to the artistic productivity (**Figure 8**).



**Figure 5.**  
*Bedroom. Source: Google Search—Images.*





**Figure 6.**  
*Kitchen. Source: Google Search—Images.*



**Figure 7.**  
*Living room. Source: Google Search—Images.*

These natural lighting scene examples are the ideal configurations of the sunlight benefits on human activities and therefore its productivities taking into considerations its physical and mental benefits [9].

## **2.2 Sustainable lighting and interiors**

As previously discussed, vis-à-vis the responsibility of the interior design over the human's well-being, sustaining the natural resources becomes a master duty. Our planet grows in population, and the diminution of natural resources increases. Designers and industrials play an important role, today, to create solutions that





**Figure 8.**  
*Artist studio. Source: Google Search—Images.*

counteract this global and critical problem. Furthermore, users need to have a wider perspective and an appropriate awareness, to use these innovative solutions in favor of pertaining the remaining natural power.

The interior lighting designer needs to have the full scope of possibilities, to start integrating them into the interior design. These sustainable lighting tools represented devices and creative design systems.

### *2.2.1 Light sources*

LED lamps are the top sources of artificial lighting. They are available in all range of white and colored light tones. As they depend on electricity composition, they produce the most neutral balanced white light that helps in the lighting sets in favor of the users.

### *2.2.2 Light systems*

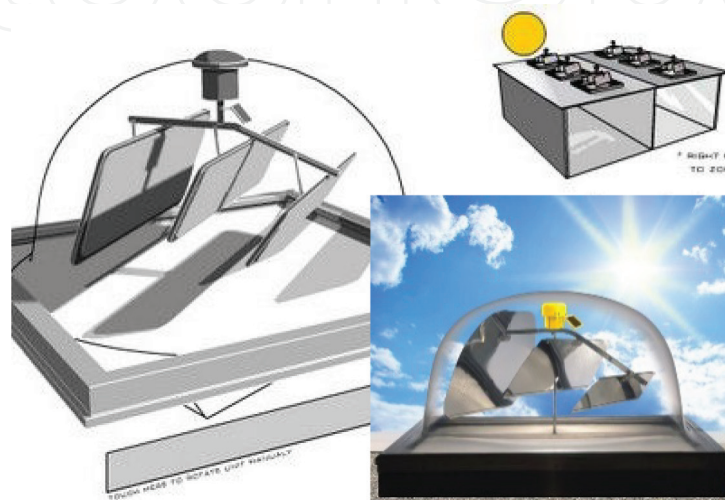
The main strategy of nowadays interior lighting designers is to exploit to the maximum the available products for a sustainable methodology. The innovative systems, created by the scientists, help in creating a convenient interior environment for the benefits of the users, in conditions of their positive applications. The results are different lighting scenes, natural and artificial, under the canopy of sustainability. These systems are:

- **Light pipes: (Figure 9)** consists of the main high reflective surface at the top of the building, connected to a pipe tube, ending on the point of needed light. The composition of the inner surfaces of the full connection should be from highly reflective surfaces. A tiny solar panel could be joint, facing the solar energy, and function as an extra natural-artificial light source at nighttime. The resulting lighting scenes are not diverse.

- Solar tracking system: (**Figure 10**) comprises a set of moveable mirroring materials that track the sun movement and then reflect it back to the interiors. This system increases the natural lighting penetration in the interiors, promoting variable lighting scenes for the benefits of the occupants.
- Lighting shelf: (**Figure 11**) it is a very simple tool to add more reflective natural illumination and prevent the excessive glare from the direct sunray. It consists of glossy white shelf added to an approximate level from the ceiling while facing the sunray. It is near to the dynamic louvers, which provides the reflected natural lighting when needed, and close it totally if not needed. The difference between the two systems is that the fixing system of the second one is from the outside not from the inside as the first one. The dynamic louvers create variable illumination scenes based on the users' needs and desires for the favor of the function.
- Sun scoop system: (**Figure 12**) it is so similar to the solar tracking system, where the only difference is that they fixed the mirroring materials. Both of them add natural lighting to the nearest level of the roof [10].



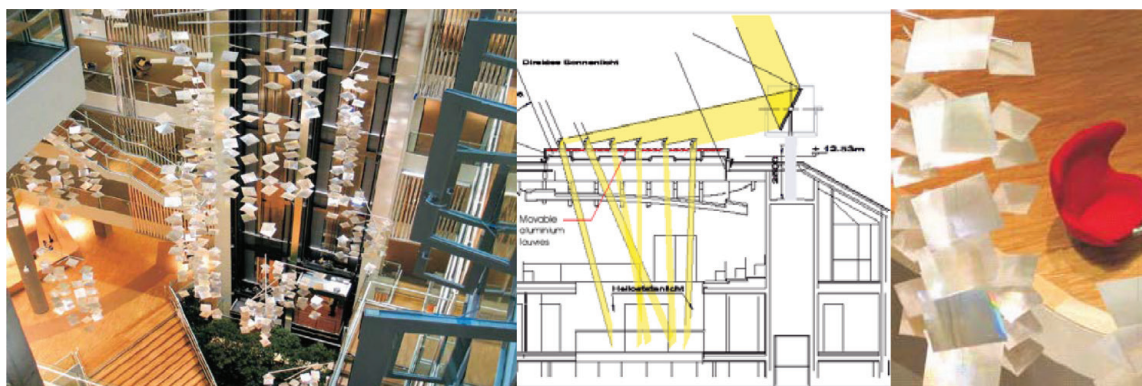
**Figure 9.**  
*Solar light pipes system. Source: Google Search—Images.*



**Figure 10.**  
*Solar tracking system. Source: <https://www.treehugger.com/interior-design/solar-tracking-skylights.html>.*



**Figure 11.**  
Light shelf and dynamic façades systems. Source: Google Search—Images.



**Figure 12.**  
Sun scoop system. Source: Google Search—Images.

### 3. The interior lighting designer role

The interior lighting designer, today, has an ethical obligation to protect the health, safety, and the welfare of the interior inhabitants. The expansion of knowledge required the respect of the specializations studied at the undergraduate level, to prepare the future professionals with the knowledge and applications needed to face the real developed life. Interior Design became a multifaceted profession, where many specializations are available under its umbrella and need a special focus to study its aspects for producing professional designers. With the growth of specialization in all kinds of knowledge, one of the specialized fields became more complex and needed particular focus, the lighting design [11].

#### 3.1 Interior designer vs. architect

Respecting the specialization in all fields is important. The more science develops, the more details appear, as each profession should respect the other. The architect focuses on the standards, as they are responsible for much detail concerning the complexity of the buildings. While the interior designer with strong lighting design background creates the lighting that illuminates the users based on the physical needs and requirements as well as the mental and psychological necessities and effects.

A simple comparison as in **Figure 13** shows two different lighting scenes for the same interiors, between lighting applications by architects and lighting design by interior lighting designer. The warmer the residential space, the better it is for the





**Figure 13.** Two different locations in residential interiors (architects vs. interiors designs). Source: Google Search—Images.

users. The couples [1] are for the same kitchen where applying the users' needs and taking in considerations the psychological effects of all the interior elements, shows the lighting scene enhancement happened to the same interior, on the right side from both interiors. The couples [2] are the same small lobby where the two lighting scenes show the difference of applications.

In general, when the architect adds the standards, the interior appears under sterile conditions. The psychological studies for the favor of the specific users compliment the message that these users want from their spaces. The studies of the entire design program promote the creation of interior and especially the lighting setting that enhances the lives of these users, as the design decisions are part of their inputs.

#### 4. Philosophy of lighting scenes

Lighting design creates the physical needs as visibility for different tasks. It ensures the psychological needs of the visual comfort, mood, atmosphere, health, and safety. The philosophy behind designing the lighting scenes, or the lighting scenography, is to stimulate the environmental conditions of the light but in a manner to suit the specific needs in time and position. The main philosophy of the natural light is that it is variable. Every 3 minutes, the natural light changes in intensity, color, and direction. The natural light occurs in irregular scenes over the day, which is the essence and the philosophy behind that any designer seeks to realize in its lighting design.

The human is constantly under changeable lighting scene, in nature, that becomes the goal of any designer to realize. If the artificial light remains fixed, the full environment leads to boredom and sterility. To reach such sets, industrials with the consultancy of designers created the tools and systems to change in controllable ways the sequential changes needed in the lighting in safe, economical, and user-friendly tools [12].

##### 4.1 Lighting scene tools

In the scenography, or the lighting scenes, several tools were available to ensure the purposed functions. Among these tools, the primary one is the switches. Switch devices vary from basic on/off to complicated devices that suit the innovated technologies of lamps and integrated lighting fixtures. The lighting scene design or the lighting scenography refers in some settings to the usage of colored light. Additionally, the lighting scenography, when involving a number of lighting fixtures, should recall for a programming system to ensure its functionality.



#### *4.1.1 Switches*

The primary tool to control the lighting design is the switches. Simply by switching on/off, we create two different scenes. These switches, if appropriate to the type of lamps or luminaires, could involve the dimmer properties. Once the dimmer is used, many scenes are created in the interior. The availability, only, of switches/dimmers, could produce unlimited variations of lighting scenography in a condition that the primary light distribution meets the users' needs and mood.

#### *4.1.2 Color and scenography*

Colored light is best produced by red, green, and blue (RGB) color mixing luminaires or by using color filters. The use of different color temperatures and colored light augments the spatial emphasis on specific objects. The uses of saturated colors help in the creation of intense environmental lighting effects.

#### *4.1.3 Programming the scenography*

A lighting program is a tool that controls a larger number of groups of luminaires. It allows light scenes to be recalled at the touch of a button. The program permits to take place over a given period. It allows controlling the light by daylight (using sensors) [13].

### **4.2 Analysis of lighting scenes and function**

As any space consists of a three-dimensional layout, lighting scenes approaches should consider more visual textures by using layers of light. The more depth created, the more varieties in interior perceptions allow the vibrant interior experiences.

We all live in a place over the day. These spaces when fixed became a routine that leads to boring feelings and after time reduce the human energy. To keep the life challenging, an analytical approach to the main type of interiors will share in creating such a challenging life experience. Through the types of interiors, we all use houses, exhibitions, offices, and school or universities in daily consistency [14].

#### *4.2.1 Residential interior scenography*

Throughout the world, in capitals, cities, or suburbs, residential interiors encompass a large variety of structure compositions. Residences are available in an extremely broad range of sizes and in an amazing array of configurations [5].

The complexity increases when adding a variety of the interior components such as furniture, textures and surfaces, color schemes, equipment, and accessories, which are unique in each residence. In **Figure 14** is a single living area analysis through some example of lighting scenography:

- First (1) scene: The full space is completely unlit. An eye-catching feature is the fireplace.
- Second (2) scene: The bright luminous ceiling produces a scene analogous to an overcast sky bringing diffuse light into the room. Additional wall washing allows the textured wall to be recognized.
- Third (3) scene: More dark ambient, where only the fireplace plays as a focal point and the two narrow beam pendants with extra focus on the greenery.

#### 4.2.2 Office interior scenography

Lighting design in the office follows the functional approach in workstation areas but depends on the message and the type of business that need to appear to the clients. Philosophy of design plays major role in creating the multiple scenes needed in such spaces, especially in the reception area, exhibition area, and in the meeting rooms, all along the productivity quality of the workable area. In **Figure 15**, an example of a reception—exhibition area of an office shows the possible scenes which allow the company the professional presentation:

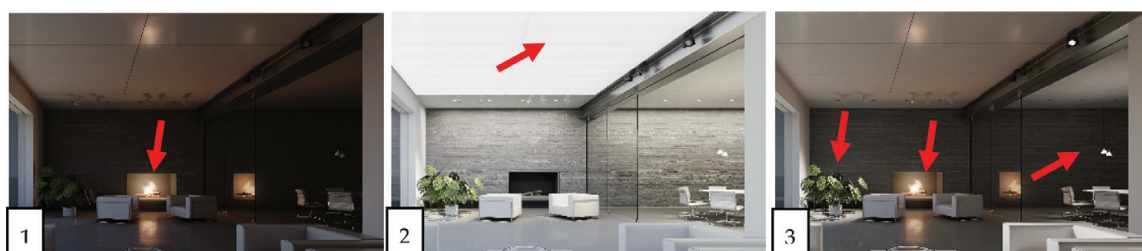
- First (1) scene: Accent light in combination with wall washers produces a balanced and differentiated lighting solution. The lighting supports the different functional zones of reception, small and large displays.
- Second (2) scene: Effectively stage the exhibits and create rich contrasts by using recessed spotlights.
- Third (3) scene: The uniform vertical illumination creates depth and provides a calm background. The wall washer is arranged on the ceiling and underneath the gallery.

#### 4.2.3 Exhibition and scenography

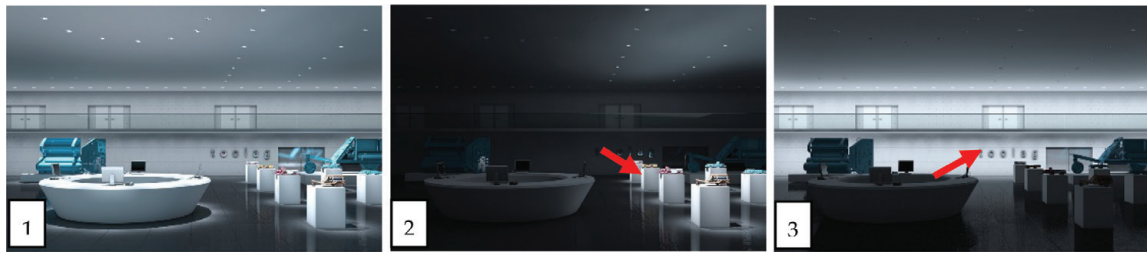
Exhibition design, (**Figure 16**) especially the temporary setting where the artwork in the hall emphasizes in subtle ways the uses of only slight contrast with the surroundings or set off in rich contrast using sharp-edged projections, will create the end appearance. The following scenes could help in creating some attraction to the medium to long exhibition timing:

- First (1) scene: Uniform lighting sets to the overall components of the space, including the space layout.
- Second (2) scene: Only uniform vertical illuminance over the main orange artwork.
- Third (3) scene: The directed light highlights the sculptured element.
- Forth (4) scene: The artworks on the rear wall illuminated by nonuniform lighting.

In the case of color light interfaces, the ambiance of scene design changes in its setting as (**Figure 17**):

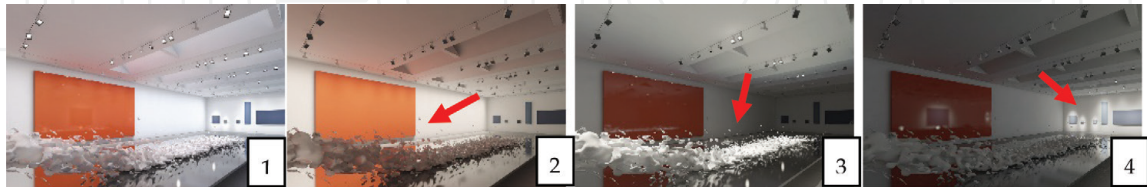


**Figure 14.** Different lighting scenes (residential) using simple switch/dimmer. Source: ERCO guide and catalog. [https://www.erco.com/guide/indoor-lighting/planning-examples-5867/en\\_us/](https://www.erco.com/guide/indoor-lighting/planning-examples-5867/en_us/).



**Figure 15.**

*Different lighting scenes (offices). Source: ERCO guide and catalog. [https://www.erco.com/guide/indoor-lighting/planning-examples-5867/en\\_us/](https://www.erco.com/guide/indoor-lighting/planning-examples-5867/en_us/).*



**Figure 16.**

*Different lighting scenes (exhibitions). Source: ERCO guide and catalog. [https://www.erco.com/guide/indoor-lighting/planning-examples-5867/en\\_us/](https://www.erco.com/guide/indoor-lighting/planning-examples-5867/en_us/).*

- First (1) scene: When the lighting design relies exclusively on white light, the brightness levels produce the differentiating contrast. The focuses on the three-dimensional object enhance the display.
- Second (2) scene: Using a cold light color intensifies perspective and creates an open feeling of space for the objects accentuated with warm white light.
- Third (3) scene: Using colored light can alter the appearance of white objects and transform the neutral-colored room concept into a world of intensive color.

#### 4.2.4 Classrooms and lighting scenes

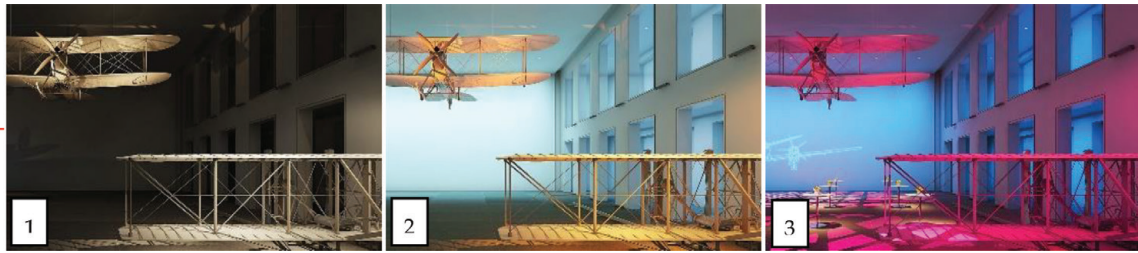
In the classroom, where the educational experience occurs, the lighting should follow the efficiency philosophy and promote the educational strategies to support the learning philosophies. Quality of light, curiosity, and an attractive environment are key design tips for these specific interiors. **Figure 18** will give an idea of lighting scene in the classroom:

- First group of scenes: The natural light and the artificial light play together for creating different appearances related to the functions needed.
- Second group of scenes: The artificial light with different intensities, focuses, and directions again to suit different activities in the same classroom.

### 4.3 Additional lighting scene as life enhancement

The environmental impacts that have the light on the users and their surroundings exceed the control of the light scenes or the creation of these scenographical lighting sets. In addition to the importance of creating multiple lighting scenes that break the monotony of any spaces, it is part of the natural phenomenon that any lighting designer seeks in their creations. It is clear that each interior could hold some light scenes that will enrich its functions and will excite its users in favor of their duties.





**Figure 17.**  
Different lighting colored scenography in a temporary exhibition. Source: ERCO guide and catalog. [https://www.erco.com/guide/indoor-lighting/planning-examples-5867/en\\_us/](https://www.erco.com/guide/indoor-lighting/planning-examples-5867/en_us/).



**Figure 18.**  
Different lighting scenes for a classroom. Source: Google Search—Images.

Additional regulations could help the lighting designers, when the specific environment is in the request, no matter the type of interior. Such additional elements could reach with any interior to a level of high perfection, yet nothing could be complete.

These specific ambiances could appear as an interior as pleasant, public, spacious, relaxing, or interior that promotes privacy. The following guidelines help to create these special sets of lighting design [15].

#### 4.3.1 Pleasant interiors

Places like homes and hospitality, where pleasant illumination can endorse the psychological effects of their users, especially in hotels and restaurants, so clients can remember their pleasant experience that will promote their turn back to the place more than one time. To reach these feelings, use wall wash lighting (**Figure 19**), instead of directly down from the ceiling. In addition to the uses of the accent, nonuniform distributions of brightness in the space.

#### 4.3.2 Public interiors

All public spaces should respect the social and public proxemics. For some interiors, the physical clearance is hard to reach due to some considerations, like the spaces' expenses. In such examples and others, designers seek to add the public



feelings to the users. The public interiors should respect the individualism as strangers are surrounding each other, so the secure feeling is necessary.

If a person feels unsecured, he will be under one of two options: fight or flight. Due to the limited personal space, once a stranger intrigue in his bubble and the escape way is not clear, they start fighting each other. In the case of a clear path to the outer space, the person who feels in the trap will fly away from this specific space. To confront the limitations in public, lighting designers have to use high levels of illumination with more distribution of light from overhead lighting sources to provoke these senses (**Figure 20**). Strangers need to see each other's faces to augment their feelings of security.

#### 4.3.3 Spacious interiors

Open spaces give human the senses of security, especially in the daytime under the direct sunlight. As he used to be, the human being needs to feel in a spacious environment. Again, the personal proxemics will take part in any interior design. The interior designer is responsible for people's comfort as well as to secure their physical needs.

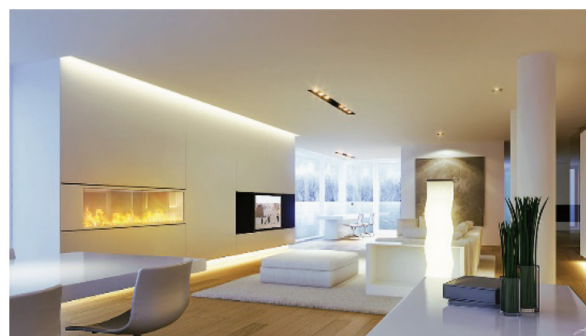
For other situations, when the public function, like lobbies, is limited in dimensions yet receive some visitors, the lighting design could help to create a feeling of spaciousness by providing high levels of illumination and uniform distribution lighting on all surfaces (**Figure 21**). Horizontal luminance modifies the impressions of spaciousness, especially when focus on low ceiling heights.

#### 4.3.4 Relax interiors

In our heavy lives full of duties, each needs to take a breath, particularly in his/her home. Many consider that just by lowering the light levels, the relax feeling will occur. Well in contrary, a specific lighting scene is necessary for such condition. Further to the pleasant interior conditions, a nonuniform distribution is essential. Moreover, the wall washer lighting or lower light levels distributed all over the place will create this relax feelings (**Figure 22**). Finally, the warm light level that stimulates the sunlight increases the relax feelings as it reminds the user of being under the sun on vacations [16].

#### 4.3.5 Interiors that promote privacy

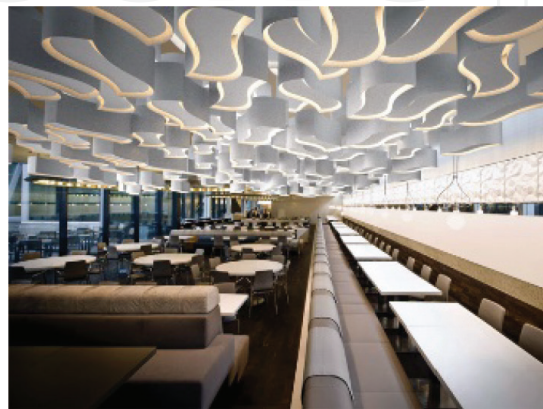
Private space suggests separating people, so each feel at ease. When a human is in public but need to practice some private experiences, like being in a restaurant



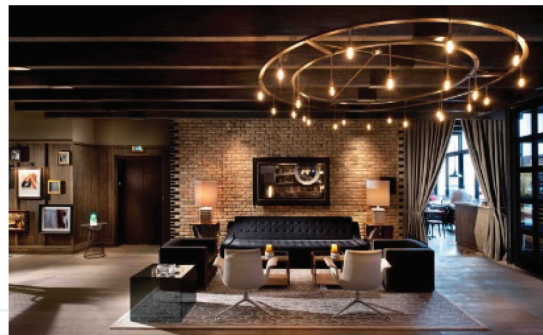
**Figure 19.**  
*Lighting scene for pleasant interior. Source: Google Search—Images.*



**Figure 20.**  
*Lighting scene for public spaces. Source: Google Search—Images.*



**Figure 21.**  
*Spacious interiors. Source: Google Search—Images.*



**Figure 22.**  
*Relax interiors. Source: Google Search—Images.*



**Figure 23.**  
*Lighting for privacy. Source: Google Search—Images.*

surrounded by strangers and needing to eat in peace, the island of the light scene is the best tool to create the privacy within public (**Figure 23**).

Shadow and silhouette reinforce feelings of privacy. Moreover, the quantity and nonuniform lighting prevent the details of faces, from a distance, while the spot of light centered at each distribution setting will reinforce the intimacy feeling between the same spot [17].

## **5. Conclusion**

- Originally, natural lighting is the sustainable lighting ever created. It was the main source where people used to run through their life.
- As natural light is variable regarding quantity, color, and intensity throughout the day and the year, the wise selection of functions in interiors about these restrictions should be wise to enhance human life.
- The more the lighting designer uses the sustainable systems to introduce the natural light into the interiors, the more audience will be familiar with applying them. The available variety could fit any specific interior and architectural layout.
- From the wide range of artificial light sources, the sustainable LED and OLED should remain the first choice when designing. It provides the best intensity, the appropriate color temperature, and the distribution for any specific interiors.
- The respect of specialization in all aspects of knowledge promotes its development in humanity favor, so the respect of the interior lighting designer is the key to success to produce the best illumination for the people. Architects do have their responsibility, so it is time to give space to the designer to carry the human life.
- Best illuminations scenes for places' users start by the tools to control them, the exploration of the importance to have such scenography, and the additional tips to produce them, ideally. Each type of interior has a specific guideline in the courtesy of the function, in addition to the users and space layout and design.
- Lighting levels and lighting color affect our behavior and our perception of interiors.
- The impression of space results from the relationship between lighted surfaces and surroundings (focus and background), to provide public lighting scene, or pleasant, or private, or even spacious scenography.
- Standard lighting design lead to sterile environments. If all objects and surfaces in an interior receive the same importance of illumination, over time, the occupant will feel depressed. Assuring the brightness contrast will lead to an inviting and inspiring interior.
- If all objects and surfaces in an interior receive the same importance of illumination, over time, the occupant will feel depressed, so the changeable variations in the lighting scene will help to fight this negative feeling.
- Controlling the brightness contrast results in an inviting and inspiring interior.

## Nomenclature

|      |  |
|------|--|
| ftcd | foot-candle is the level of light. Outdoor varies from 10,000 to 10 ftcd (sunlight to very dark days). Indoor varies from 20 to 10,000 ftcd (public areas with low focus to health-care operation rooms) |
| lm   | lumens, measuring unit for the quantity of light output from the light source or the lamp  |
| w    | watts, measure the quantity of power (electricity) needed by a lamp to provide light   |
| K    | kelvin, the measuring unit of the color temperature of light   |
| CRI  | color rendering index is the unit that shows the level of appearance of the object under a specific lamp   |
| lx   | is the luminous intensity based on the quantity of illumination  |
| LID  | low-intensity discharge, group of lamp including “fluorescent” and “CFL—compact fluorescent light”   |
| CFL  | compact fluorescent light  |
| HID  | high-intensity discharge, group of lamp including “metal halide” and “cold cathode”  |
| LED  | light-emitting diodes, lamp type based on electricity technology   |
| OLED | organic LED, the last invention of lamps   |
| RGB  | red, green, and blue. They are the principle color of light  |

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## References

- [1] Steffy G. *Architectural Lighting Design*. 3rd ed. New York: Wiley; 2008. ISBN: 978-0470112496
- [2] Advocacy Platform: <https://ifiworld.org/> [Accessed: March 10, 2018]
- [3] The Power of Light: <https://www.iald.org/> [Accessed: May 9, 2018]
- [4] Brandi U. *Lighting Design; Principles, Implementation, Case Studies*. Munich, Germany: Birkhäuser Edition; 2006. ISBN: 978-3764374938
- [5] Bacon L. *Interior Designer's Attitudes toward Sustainable Interior Design Practices and Barriers Encountered when Using Sustainable Interior Design Practices* [thesis]. Lincoln: Architecture Program: University of Nebraska; 2011
- [6] Descottes H, Ramos C. *Architectural Lighting: Designing with Light and Space*. New York: Princeton Architectural Press; 2011. ISBN: 978-1568989389
- [7] *Environmental Health Perspectives*: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2290997/> [Accessed: May 10, 2018]
- [8] Fowles D. Interior design education in the year 2000: A challenge to change. *Journal of Interior Design*. 2008;17(2):17-24
- [9] Sami Abdelaziz N. Specialization in teaching the lighting design courses between the interior design program and the architectural engineering program. In: 6th International Technology, Education and Development Conference; 5-7 March 2012; Valencia, Spain; 2012. pp. 2875-2883. ISBN: 978-84-615-5563-5
- [10] Bergman D. *Sustainable Design: A Critical Guide*. New York: Princeton Architectural Press; 2010. ISBN: 978-1568989419
- [11] Brooker G. *What is Interior Design?* Rockport Publishers; 2010. ISBN: 978-2888930174
- [12] Winchip SM. *Fundamentals of Lighting*. 3rd ed. New York: Fairchild Books–Bloomsbury; 2017. ISBN: 978-1-5013-1766-8
- [13] Martin L. *The Lighting Bible–Ideas for Every Room in Your Home*. Page One–Quarto Publishing; 2011. ISBN: 978-981-245-743-1
- [14] *Discovering Light–Design Examples*: [http://www.erco.com/guide/indoor-lighting/planning-examples-5867/en\\_us/](http://www.erco.com/guide/indoor-lighting/planning-examples-5867/en_us/) [Accessed: May 20, 2018]
- [15] Sami Abdelaziz N. Linking and applying ‘psychology of design and interior design’ courses to enhance spaces functionality and aesthetics. In: 5th International Conference on Education and New Learning Technologies; 1-3 July 2013; Barcelona, Spain; 2013. pp. 1162-1170. ISBN: 978-84-616-3822-2
- [16] Colombo B, Laddagaa S, Antonietta A. Psychology, and design. The influence of the environment’s representation of emotion and cognition. In: 6th International Conference on Applied Human Factors and Ergonomics (AHFE); 2015. DOI: 10.1016/j.promfg.2015.07.370
- [17] *Lighting Nomenclature and Definitions*: <https://www.nap.edu/read/24619/chapter/11> [Accessed: August 17, 2018]