# Chapter 3 Colour in Spaces: A Spatial Design Approach

*Douha Youssef Attiah, King Abdulaziz University, Saudi Arabia*
*Vien Cheung, University of Leeds, UK*

## Abstract

Spaces are often built under specific structures and are composed by different materials. The final appearance of a space is dictated by utilisation of all the individual elements, such as colour, texture, gloss, shape, that the materials carry. Additionally, ambience and mood of the spaces are usually impacted directly by light and the surroundings. This chapter provides an overview on design elements and principles in spatial design, followed by discussions in the area of colour interaction for the one element and the whole context.

## Keywords:

Colour, spaces, places, spatial design, design elements, design principles, colour interaction

# 1. Spatial design

In design discussions, the word *space* is used to indicate the field where the design setting itself takes place. A space can be positive or negative, seen or unseen, perceived or non-perceived. Space is usually the base of any composition, and where any design can be found (e.g. see Figure 1).
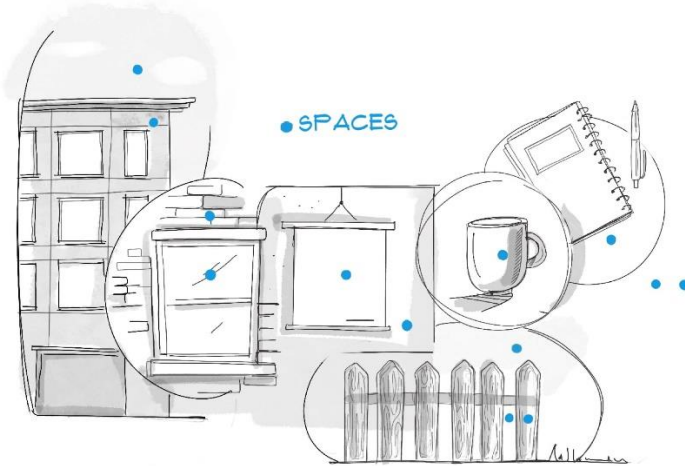


Figure 6. "Spaces" in design.

Various areas of study including Urban Design, Landscape Design, Architectural Design and Interior Design have been widely specialised in both industry and academia, whereas a more generic approach describes the different-purposed places as *Spatial Design* and this description includes various scales and functions of designs where users can physically interact, live, work, get entertained, transport and travel (small or big scale, different open public areas or enclosures), these varied grounds involve the study of spaces. See Figures 2 and 3.

It is important to highlight that spatial design can be temporary or long-time built spaces (such as buildings, blocks, stalls, small visiting area and any type of enclosures). It can include: an architectural building, its façade, its different interior areas, its outdoor area, a booth, pop-up areas that are considered visiting or temporary. This means that spatial designers need to be aware of many existing elements, and additional elements they have to create or choose to include in their spaces.
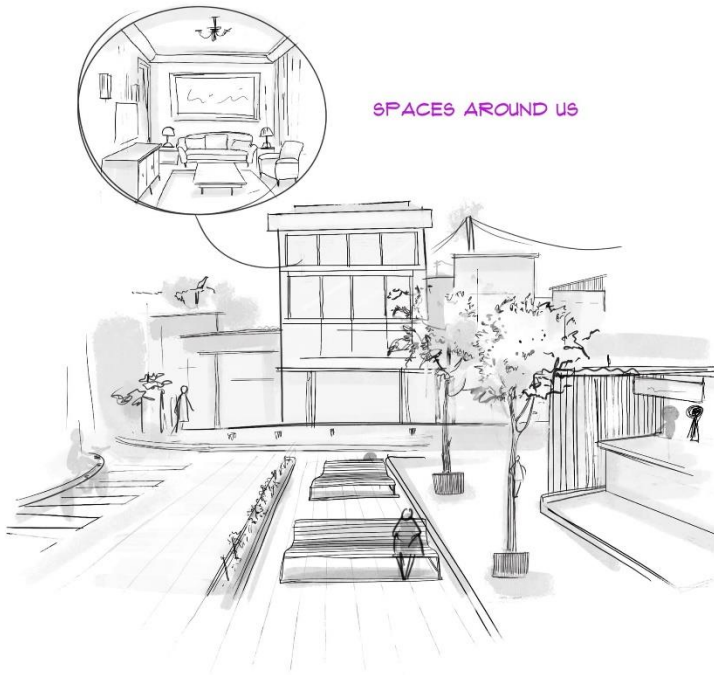
Figure 2. City view showing different scales, types, and functions of spaces.



Figure 3. Different types of spatial design.

## 2. Elements and principles in spatial design

*What* and *how* spaces are composed? Any design from a small 2D poster to a 3D product or even a big building, start with multiple elements which their role is to compose the design itself. A dot is a basic element, which when multiplied and continued can form lines, which then multiple lines start to construct shapes, and if the shape has a third dimension in its existence, a form or mass exist. A dot in 2D space is considered as a major element that can change the whole perception of the design, and a 2D shape or 3D mass compose 3D spaces too. Of course all these elements to happen and appear need spaces to handle their existence.

In design, the rationale and logic is always relative to how the various elements of the space itself is being composed, put-together, and organised, this justification is usually approached by explaining the ***design principles*** used to put the composing ***design elements*** together in one context. It is more likely similar to how the ingredients work together in the bigger picture.

Putting the various elements of spaces in a context by studying the design principles to be applied, usually help designers approach: circulation and movement, the look and feel, ambience, mood, functional aspects, aesthetics, visual compositions of spaces. When describing one element of a space we are analysing the one element components as in Figure 4, whereas if we want to analyse or construct a context that include many elements, the story is usually told or created by relating these elements together functionally and aesthetically. This relationship is usually built using one or more (not limited to) of the listed design principles in Figure 5.
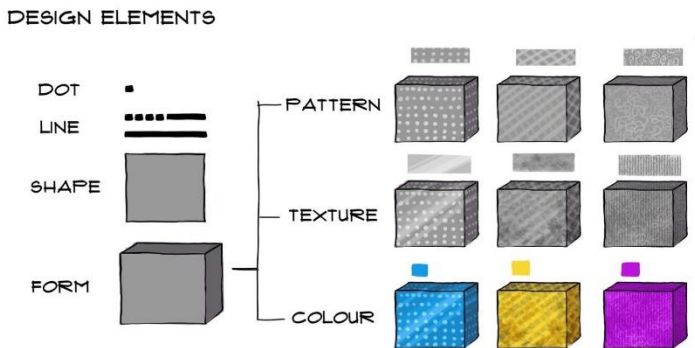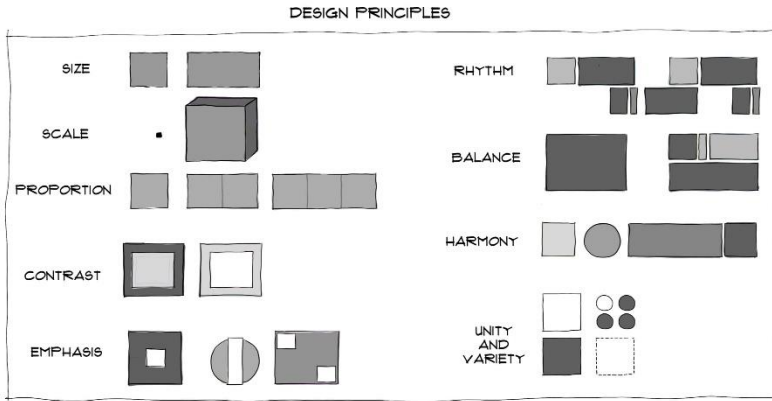


Figure 4. Design elements.

Figure 5. Design principles.

# 3. Colour in spaces and places

Colour is often the first element the viewers recognise, and it eases design communication when describing objects and spaces. Colour is an involving element and can be manipulated to compose a large variety of designs. It is a common practice to creating a suitable colour palette for spatial design projects. Individual colours in the palette must be appropriately integrated so that the designated spaces are seen as an entity.

## 3.1 Spaces and places

We are concerned here with spaces that make *places* for users to live, study, learn, work, eat, entertain, transport, etc. In other words, spatial designs that are mainly built for users who can be influenced by the use of *colour* (Figure 6). *Interaction* in spaces is an area of study where many researchers tried and are still trying to study to build better connections with users and their places.

In order to know how to apply colours to the surrounding places, we need to understand the components of each space at first. The type of space including its lines and shapes, as the challenge for designers is usually how to imagine the overall spatial design for the one place and how, where, and why the composing elements are put together in a specific way, where colour plays a crucial role as an element that interacts with other adjacent and existing elements in the one place.

Figure 6. Where is colour in places?

A process of interaction needs to be addressed to reach the desired appearance and feel of the spaces when it comes to colour choices and applications.
The usual process for spatial designers can include the following steps:

1. The functions of the space itself;
2. The desired visual effect, mood, look and feel, ambience;
3. Project brief: client and/or user requirements, purpose of the designated space and the specification of the space including its size, shape, surroundings, structure;
4. **Starting point** for choosing colours;
5. The main colour study for the design project: adjacency, ratio and proportion of use;
6. In addition to major considerations to keep in mind for successful colour choices and applications for spaces: cultural – environmental – personal.

The **starting point** (in Step 4 above) can actually be an existing or important element in the space to be designed, where the other chosen colours can follow, or the whole colour thinking process can start from scratch. This can start as one or more of the following:

o A desired feel or visual effect such as: unity, harmony, contrast, conflict, mixed;

o   Depicting a style or movement or school in art, design and architecture;
o   Imitation of a scenery;
o   Inspired by "…";
o   Developed concept;
o   Eclectic and compound of multiple.

A colour study should be conducted that includes studying the adjacency of objects and all components of the one space, and to pay attention to the ration and proportion-of-use of each colour in the space, this way the spatial designer might approach an interactive method that will allow them to pay attention to all coloured elements in the one space, including lights too. Colour of each element in spaces interact with the space itself, and all its components of other elements and lighting conditions.

As a spatial context there are many interactions that affect the whole organisation and appearance (see Figure 7). Some may include:

o   Light: natural vs artificial, colour temperature, type, cone, angles;
o   Size and shape of the space itself;
o   Other surrounding elements: the interaction of the whole;
o   Users of spaces (individuals and groups): cultural, psychological, physiological and emotional states etc.



Figure 7. Colour interaction in spaces: for the whole context.

For the one element, designers need to be aware of each object or element in spaces (Figure 8):

- o   Size and shape;
- o   Texture: tactile vs visual;
- o   Pattern: line type, shapes, repetition;
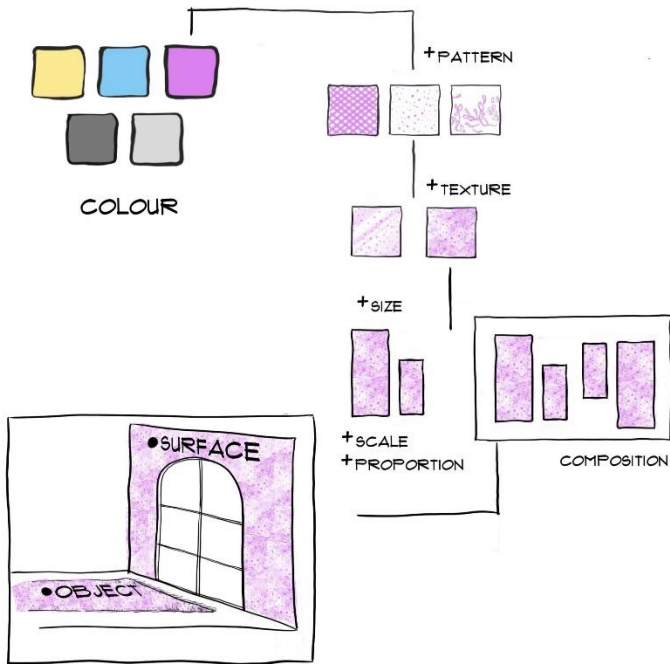- o   Special material characteristics: transparent, translucent, opaque, glow etc.



Figure 8. Colour interaction in spaces: for the one element.

All of the above factors take part in the colour interaction process and how we see and perceive colour in the one context of a space. However, the users of the space (e.g. see Figure 9) play the biggest role in the success of applying colour schemes to designs, it is at the end how we see and perceive our surroundings, a setting can remind a person of a nice memory, where to another can be an uncomfortable space with its colours.
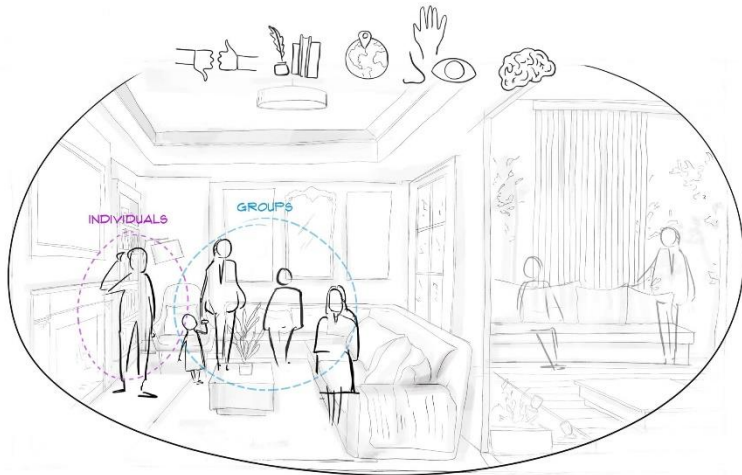
Figure 9. Users of places.

## 3.2 Common colour terms is spatial design

For spatial designers, there are terms that widely used to visualise and communicate colours (see Figures 10-12). It is important to note that some may not be used as precisely as for colour scientists.
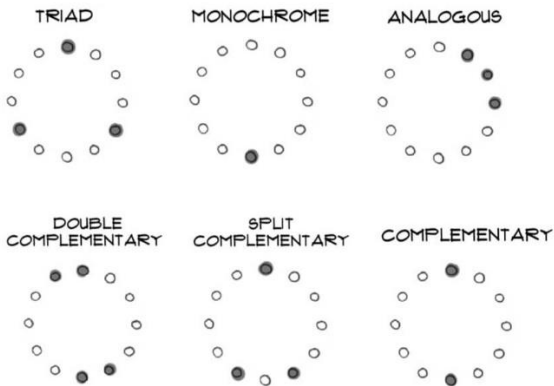


Figure 10. Colour relationships/schemes widely applied in spatial design.

## COLOUR WHEELS

- PIGMENT / 12-STEPS
- LIGHT
- PROCESS
- MUNSELL
- VISUAL
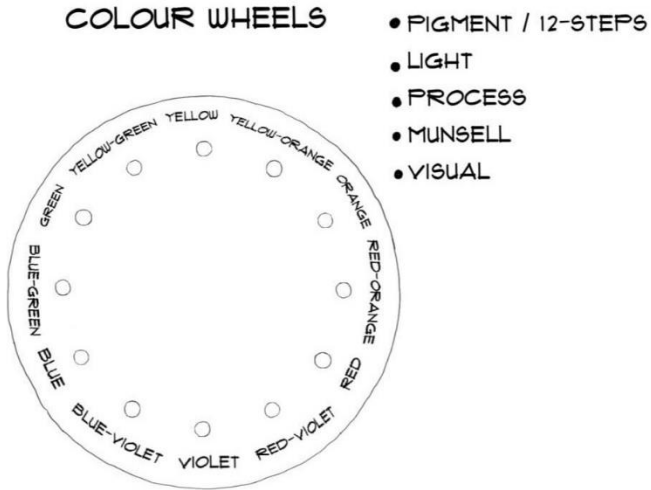
Figure 11. There are different types of colour wheels. Pigment-based colour wheel is widely used in spatial design.

## TERMS:

HUE

COLOUR TEMPERATURE

WARM
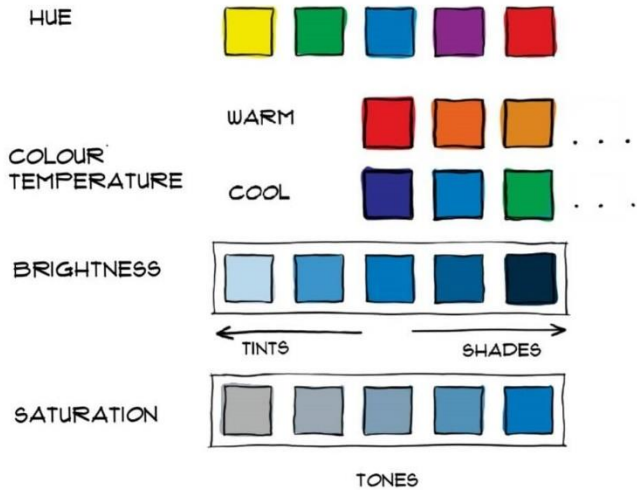
COOL

BRIGHTNESS

TINTS

SHADES

SATURATION

TONES

Figure 12. Common colour terms used to visualise and communicate colours.

# 4. Conclusions

We can conclude now after an overview of colour in spatial design, that *testing* and trying the samples of colour on site (the actual architectural or urban setup, its size, scale, openings, lighting conditions, etc.) will always be an ideal method before deciding on the final chosen colours for any space. Users of the space themselves, their preferences, psychological and physiological situations and states, cultural backgrounds and the colour semiotics and meanings to both individuals and groups are important factors while deciding on which colours to start with, the final colour combinations to be applied to any space, and for setting the whole mood of the place. In addition, the chosen materials' characteristics themselves play a significant role; it is important for the designer to recognise that one colour can be chosen for two material samples, where one can has a glowing characteristic and the other is semi-translucent, this variation affects the whole colour seeing and perceiving processes. Thus, the concept of colour in spaces is complex and relies much on multiple factors varying from physical to non-physical aspects.

# 5. Copyrighted works

All images © 2021 Douha Youssef Attiah & Vien Cheung.

# 6. Conflict of interest declaration

Potential conflicts do not exist.

# 7. Funding source declaration

No funding or research grants (and their source) received in the course of study, research or assembly of this manuscript.

# 8. Short biographies

**Dr Douha Youssef Attiah**. Assistant Professor, MSc Spatial Design coordinator and Head of Partnerships and Community Services Unit in the College of Human Sciences and Design at King Abdulaziz University (Saudi Arabia). Interior Designer, with PhD in Colour in Interior Design. Founded *The sketchiniZer* in 2015 – a tool to organise architects and designers brainstorming processes.

**Dr Vien Cheung**. Associate Professor in Color and Imaging Science at University of Leeds (UK). Published over 100 refereed papers, book chapters and book in the areas of colour imaging, colour science, colour vision and colour design. President of the International Colour Association

(AIC) which has a global membership of 30 colour societies over five continents.

## Bibliography

Attiah, D. Y. (2016) 'A constant-theoretical sampling and comparison approach to optimise colour thinking in the interior-design process', PhD Thesis. University of Leeds. Available at: http://etheses.whiterose.ac.uk/13834 (Accessed: 12 April 2021).

Berns, R. S. (2019) Billmeyer and Saltzman's Principles of Color Technology. 4th edn. Hoboken, US: Wiley.

Brooker, G. and Stone, S. (2010) What is Interior Design? (Essential Design Handbooks). 4th edn. Brighton, UK: Rotovision.

Caan, S. (2011) Rethinking Design and Interiors: Human Beings in the Built Environment. London, UK: Laurence King Publishing.

Ching, F. D. K. (2015) Architecture: Form, Space, & Order. 4th edn. Hoboken, US: Wiley.

Lawson, B. (2005) How Designers Think: The Design Process Demystified. 4th edn. Abingdon, UK: Routledge.

Westland, S., Laycock, K., Cheung, V., Henry, P. and Mahyar, F. (2007) 'Colour harmony', Colour: Design & Creativity, 1(1), 1, pp. 1-15. Available at: https://aic-color.org/resources/Documents/jaic_v1_review.pdf (Accessed: 12 April 2021).