

Impact of Color on Human Behavior

Case – Interior Space

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Abstract: Colour is considered as the basic visual perception of any space. There are numerous developed theories and assumptions related to the aesthetic comfort offered by colours, and to their effect on human psyche. In this paper, it is inspected how the choice of colour changes with age and its impact on that age group of people. This investigation will focus all the factors those are predicted to be more influential in architecture, interior spaces and the psychological status of users. The research aim of this study is to increase the concern about the importance of the interaction between interior space and human behaviour responding to the colour of the interior space. Paper talks about the importance of colour in an interior space where the different user groups spend most of their time like- schools for kids, offices for adults and meditation centre, old age homes for senior citizens. This research would help others to understand the importance of colour in the interior space and how people of different age groups respond to it. Based on the analysis of the conducted surveys and interviews, conclusions are drawn about the effect colours have on human behaviour in an interior space.

Keywords: architecture, comfort, emotion, experience, psychology

1 INTRODUCTION

The relation of a human and the space which he inhabits is undeniable as they spend most of their time in an interior space, be in house, office or café. Space Psychology deals with the interaction between people and the space they live in [1]. It has a direct impact on human's subconscious, that part of the brain which reacts to different spaces and colors, contributing to your emotions and perceptions [1]. Different people react differently to spaces. "According to environmental psychology, each person is realized and perceived through an invisible shelter or a series of shelters surrounding his body [2][3].

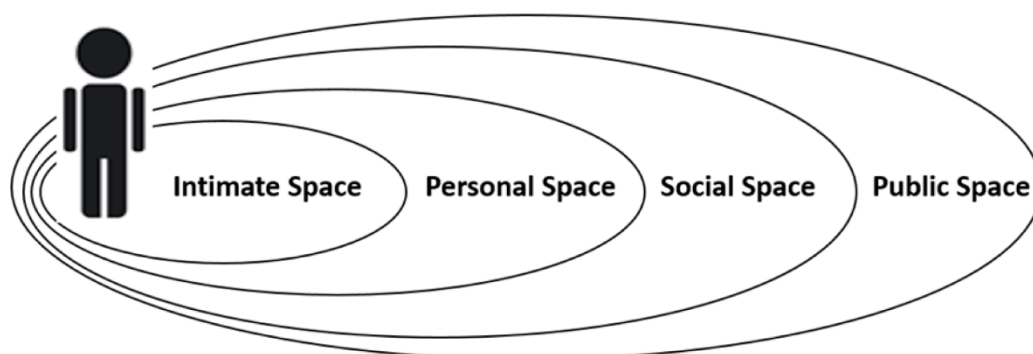


Fig. 1. Proximity of Personal Space of a Human [2]

A person perceives the environment, on the basis of social interaction within that environment [4]. In an interior space a person responds to many elements like- colour, lighting, form, scale and texture [5]. The most important element is colour as wherever one goes the place is either black and white or colourful. If one actually understands the concept of color they would know that it's just an effect of electromagnetic waves registered by our brains and eyes although human behavior is an important factor. Color has a strong influence on psychological well-being and creates [3]. A color can communicate feeling of excitement, passion, serenity or mystery [3]. Color externalizes human-being's tastes and styles. Color is the fundamental quality of our visual perception [6]. Therefore, it becomes important for one to understand the concept of color within an interior space in regard to the quality of space, giving a positive knowledge and awareness to both the users and the designer. By understanding the color theory in interior design, one can create just the right mood for the human. Using different colors in interior space can have different impact on a human's psychology, it could make people to want to work, if the space has a soothing environment.

Colour is an important aspect of the design of interior spaces. It is known that a well-planned space can be enhanced by using 'appropriate' colours. An appropriate colour for a space is relative and cannot be prescribed. The primary goal of colour used in interiors is to equip the designers as well as house owners and making them to understand the use of colour and its effects not only aesthetically but also architecturally and design vice. It is important to define color and its dimensions to understand the reason behind its effectiveness.

Color definitions in the literature have different approaches. Scientifically, color is defined as "a specific visual sensation produced by visible radiation, or color stimulus that occurs when light from a natural or artificial source is interrupted by an object or a dust particle" [7]. Apparently, there are many theorists with observations related to this issue. There are many things about which colour theory can be explained, but basically it is an examination of color, how colors are arranged, are formed, and how they interact. The classification system for various things has been made prominent for better understanding and easier usage. It begins with simple geometric figures (squares, circles and triangles), showing the different hues in spectral sequence. For an artist the colour can be classified on the basis of the colour wheel, the pigment primary colors-red, yellow and blue were arranged with their secondary-orange, green and purple-in between, and likewise with the tertiary [8].

2 IMPORTANCE OF COLOUR

Colours in interior spaces are generally used as translated abstract forms of color schemes, theories and meanings into real materials, surfaces, experience and use in a space is a complex matter requiring creativity, judgment and often comes with experience. Therefore, for successful interiors there has to be advanced methodology and planning of usage of colours. Pile, J. argues that just as one would not start construction of a building without construction drawings and plans, one should not start working on colors in interior spaces without careful planning [9]. An understanding of the color theories, their applications and effects develops an understanding of this subject and with time one gains confidence to apply it in interior spaces as well as exterior facades. The colour schemes are devised to check its effect on human behaviour and mood, its different effects and provides a suitable background with appropriate use of colors.

An understanding of color psychology and symbolism play an important role while choosing colors for interior spaces in different settings for different functions. Challenges arise in whatever you do, helps in making the solution even better. Similarly with colour, when one selects a certain shade or tone of colour it gives them the challenge to be able to predict the result of the colour scheme choice. Effective color selection can be an inexpensive yet powerful element in any design. Color plays multiple roles in affecting the mood of the person, energy levels and sense of order/disorder. It can set the tone of an interior space making it look more welcoming. The aim of successful interior color design is to be able to control those effects through the masterful use of color as a design tool itself.

3 PSYCHOLOGICAL IMPACT OF COLOUR

It is recognised that colour influences the reaction given by a human. There are theorists and researchers who are trying to find something reliable [9]. The psychological and physiological well-being is heavily influenced by two man made factors- colour and light. It is no longer valid to assume that the only role of light and colour is to provide tolerable illumination and a pleasant environment [10]. Colour holds strong power which effects the human emotions. As John Oil wiles said "Behind the psychological response to color are more fundamental responses to specific radiant energy wavelength", [11]. A person is likely to feel cheerful on a sunny day and gloomy on a rainy one. The kind and amount of energy that color effect to the space, evoke some of feeling response, it can calm or stimulate, cheer or depress. In the design of modern environments color is very important. In fact, it is ahead of form in man's feelings. To talk about people, and their feeling about color, many psychologists have noted that response to form is a kind of logical processes, while reactions to color are more impulsive and emotional [11].

Over a period of time psychological and physiological aspects of color will become prominent in design decisions. The theorists have observed a certain way in which the human personality reacts to certain warm and cool colors. The society have divided introverts and extroverts on the basis of their choice of color selection, they feel warm color have the energy of an extrovert human, whereas cool colour portrays the calmness of an introvert person. For example: red indicate extroversion. Such persons may not be too reflective and may be more ruled impulse than by reflection. They are thought to speed up heart and respiration rates and to raise blood pressure. To quote Maria Rickers [11]: Color experience, when it occurs, is thus a much immediate and direct sense datum than the experience of form. Form perception is usually accompanied by a detached, objective attitude in the subject. Whereas the experience of color, being more immediate, is likely to contain personal, affectively toned notes [11]. The colour used has a psychological effect on human brain like making us feel happy or sad just by looking at it. This relation is rather emotional in every sense of the word.

4 VARIOUS EFFECTS OF COLOUR ON INTERIOR SPACE

Colour holds a very important role in designing the interiors of any space. The way one uses different colours, it can also make the same room look bigger or smaller. Thus, it can be used to modify and make a smaller space look bigger, just by the choice of colour. Color also works as an element you want put more focus on. For example: trim might be painted in a color with strong contrast with its surrounding to give emphasis to the elements. Or a doorway can be given importance. The general purpose of a space can be made by functional color choice to show calm or relaxing, excitement or activity [9].

In general terms color can serve in four main functions:

- It can catch attention,
- It can hold attention,
- It can convey information,
- It can make information memorable.

At various places colours are used to grab attention of the viewer, even though you can't read the words from far. As an example: most of the times while standing at the traffic signal, one can't see the countdown but able to see the colour of the light changing from red to green or vice versa even when one standing at a distance. For designers who work within the space, the comparative color will advance and when used as a major room seems smaller: darker value, greater saturation and warmer hue. As surrounding color in interior space, the variation will make the room appear larger.

5 IMPACT OF COLOUR ON DIFFERENT AGE GROUPS

Case study for different age groups were conducted and analysed to get a better understanding on how a person responds to the colour of an interior space. To get different age groups perspective, interviews were held at playschools, offices and meditation centres. Children from playschools were observed while they were inside the classroom doing activities. In the office spaces the colours used were shades of beige, so as to give a calming environment to the people working there. As you get in the category of old age you tend to look for a peaceful place with stillness. What better place than an old age home could one think of, hence the interiors of an old age home was also examined.

Case 1- School for Children

Children in their foundation years have a very concrete thinking. Everything is exactly as they see it. They don't think in conceptual terms, they have a rational thinking. They get support and strength from their homes, schools and environment. They learn with all their heart and excitement. They are very observant of their environment. They try to grasp knowledge from their surroundings. Due to the fact that they are naturally very active, warm and bright colours attract their attention [12]. The years when children gain basic knowledge is in their preschool years of education. They learn about colours also. It is considered a milestone for students to be able to identify colours at a young age. At younger age, everyone learn the names of colours as it is considered an important part of a child's development. The identification of colours helps children to create an empirical connection between visual clues and words.

Children in the age bracket of 3-6 years are attracted by bright colours. Red and yellow are the two among the primary colors they get attracted to the most. The complementary colours have a similar nature as the children in that age group, and the brightness and intensity of colours catch their attention. Children are energetic and active in nature [12]. The colour of the side walls and the walls faced by the students and the teachers should be different. The walls that students are facing should not have colours that strain their eyes. Also, the wall faced by the teacher should be moderate. There could be other points that need to be given attention. For example, the blackboard is an important factor, and the colour behind the blackboard must be relaxing and ensure continued attention [10]. As a child reaches their puberty age the choice of colours varies. They prefer cool colours over warm colours, but a few colours remain constant like orange. They probably prefer blue and green colours more. These colours indicate maturity and calmness. The basic behaviour of a student in this age group is more calm and composed, focusing on their studies instead of being energetic in the classroom. The colour palate used in the classroom for this age group is beige, light green and blue. The corridors in high school have shades of beige along with green. This colour combination works really well together.

Case 2- Working Space for Adults

Over the past few years in interiors space the use of colours have changed. Previously dull colours were used but nowadays vibrant and colourful workplaces are preferred. The designers have started giving importance to colour being used in the workplace. Different colours can affect a person in the workplace differently [13]. The colour used in an interior space directly impacts the psychology of the person working there. In a workplace the colour used in the interior space plays a very important role in determining the environment of workplace and has a major impact on the mood of the employee productivity, workplace wellbeing and most importantly, their general mood. In fact, the great Picasso is quoted as stating that '*Colors, like features, follow the changes of the emotions*' [14]. The colours of the office space needs to be decided very carefully. Firstly the colour palate is decided and then the implication of the colour palate is decided. Questions like where and how are answered.

In today's world the companies are trying to create a workplace which reflects the values of their company. In the process of doing this the workplace becomes a strategic branding tool, the positioning of logos, choosing the colour palate has an important role in designing the office space. Considering the office space, other spaces that play a major role in determining the impact on people is the reception and corridor space. This helps in influencing the opinion of the visitors and the staff of the office space. This gives positive feedback from the visitors leaving a lasting impression. Before designing any workplace, it is important to understand the effect of colours in the interior space before creating a new workplace. Recently University of Texas study found that grey, beige and white offices led to staff showing increased feeling of sadness and depression, especially in women, while men encountered similar emotions when placed in purple and orange work environment [14], which implies that the choice of colour is very important. If the person is seated in their preferred choice of colour space, then the amount of work they can produce would vary as compared to being seated in a room which has a negative effect on them. [14].

Case 3- Old Age Home for Senior Citizens

When one enters the category of becoming a senior citizen, they cannot be left alone and require care and attention of somebody, hence old age homes were developed. An old age home is a supportive environment made for the elderly where they can live and spend their life when no one is there to care of them. This age called 'old age' is an inevitable part of human life and they don't receive any kind of love and affection from their loved ones, hence the need of old age home arises.

And it becomes the duty of the person constructing the old age building in such a manner that it doesn't affect their health or happiness, while living there. In this age humans tend to observe more and perceive little things in a different manner. An old age home is a multi-facility centre with housing facilities for senior citizens. It is designed to create a homely environment for the elderly. Becoming old makes one feel lonely and brings a sense of fear and insecurity. Thus, the choice of colour used becomes very vital in determining their mood and keeping the cognitive functions alive. Older people prefer soft pastels as it has a calming energy. The impact of colour changes on the senior citizens as their vision deteriorates with age. The colour they prefer are softer shades which give them a sense of security and harmony. Softer shades of reds and oranges impart a very warming energy. Peaches, apricots, warm tans, terracotta's, and pinks can also be used for this purpose. Shades of blue, lavenders and violets have a direct connection with spirituality [15]. The terms cool and warm have been derived from the obvious meaning it has, cool colours portray a sense of calmness to the viewer hence a good choice for spaces for elderly people. On the other hand, the family of reds and oranges have a very discomfoting effect on the viewer.

6 ANALYSIS

A survey was conducted among different age groups to understand their point of view on the impact of colour it has on them in an interior space. This helps us in analysing the perspective of the users and analysing how the perception changes in different age groups. This questionnaire was filled by people belonging to various occupational background. Through this one can understand the view of different sector. The survey was conducted among all the age groups.

- Mostly people have an idea about what a colour wheel is. But there are some people who love to explore it more. Through this response one can understand that people have a mixed emotion regarding how certain colours changes their mood.
- Through this one can see that there is an almost equal preference of choice given to both warm and cool colours. It indirectly tells us about their mood. Most of the users prefer cool colours that is shades on blues and greens.
- Through this again one can understand their point of view and inclination towards a specific colour scheme. Half of the users are inclined towards neutral colour scheme which includes shades of beige and brown.
- Through this one can infer that most users agree that their mood is dependent upon the colours they see around them. In this the response was distributed equally among all the options and there was a mixed response with respect to dark colours appearing to be depressing.
- In contrast to the response for the previous question, here most percent of users have agreed that bright colours give a cheerful vibe, making them happy and lightening their mood.
- After understanding the occupation of the user group, it can be concluded that most of them are the working class- office going and home-makers, hence spend most time of their day either in office or at house. A few percent spend their time in classroom or their bedroom, hence it becomes important to understand their need for a peaceful mind-set so as to they can spend their time there having a cheerful mood.
- This made us understand if the user liked the space where they spend most of their time or not. In continuation with their previous response to where they spend most of their time, now one can understand if given an option to redecorate their working space they would want to change the existing colour scheme.
- This made us get an idea about the choice of colour they would prefer to change the room and most of the people said yes, that colour has an impact on human behaviour.

7 RESULTS

- The choice of preferred colour in an interior space change with age.
- According to the survey many people wanted to change their colour palate for the interior space where they spend most of their time.
- The most picked colour scheme was neutral shades.

8 CONCLUSION AND FUTURE DIRECTION

Through the entire span of this study, various aspects are explored and influences that color holds, it helps us in recognizing the objects from afar, it has a direct influence on the human moods, and it can make objects look obvious. Furthermore, this dissertation emphasized the effect of color on human surroundings, especially in living environment. The structure of this dissertation is made simple for the users to understand this by simply giving the general view of color, psychological, color structure and functioning of human's visual system. This research was done to obtain deeper understanding of color relationship in the space and direct relation to human psychology conditions. Thus, it indicates that the color can have effect on human psychology in its entire life. In other words, the following are concluded:

- Colours has different impact on different age groups.
- The colour palate for pre-schools chosen is bright and exciting, representing the nature of the students.
- Elementary school and high- school choice of colours for the interiors changes from bright colours to warm and cool colours.
- An adult in the office prefers shades of beige and vibrant colours in the interiors as it helps in improving the focus of the employee.
- The interior space of a meditation centre has dull colours according to the mood of the old age people.

In future, studies can be carried out to understand the impact of colour on different age groups and exterior spaces. It can then be compared to the impact of colour on different age groups in interior spaces. Giving us a clear distinction between the two.

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ETHICS STATEMENT

This study did not involve human or animal subjects and, therefore, did not require ethical approval.

STATEMENT OF CONFLICT OF INTERESTS

The authors declare no conflicts of interest related to this study.

LICENSING

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