

## A Study of Color Impact on Space Perception

Iman Alkhanjari, Reham Sanad<sup>1\*</sup>

### Abstract

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This study aimed to investigate the psychological impact of the physical learning environment on students' perceptions and moods. Three different colors were examined in terms of classroom space perception by college students, at Oman college of management and technology in Oman. 53 interior design students at different levels took part in a self-administered online questionnaire. In this survey they were asked to evaluate the three classroom images colored with different colors. Six feelings of space perception were investigated in this study; spacious (wide), narrowed, complex, simple, well-organized, and messy. According to the results, the cream-colored classroom evoked more positive impacts including the sense of spacious (wide), and well organized compared to the blue and pink-colored classrooms. On the other hand, blue and pink colors were attributed by negative emotions namely narrowness and complexity (for blue), messy, and complex (for pink). The results of this study show that using various colors in the classroom environment has various impact of college students which would be considered by interior design specialist and students. This research findings would be supportive for interior designers into the interior spaces color selection process.

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**Keywords:** Classroom; space; perception; students; color; educational environment; interior design.

### 1. Introduction

Color is physically processed through the eyes; the human can distinguish at least 2000 different colors. It carries specific meaning in human life and has impacts on various aspects of life, such as behavior, practical function, and cognition (Schauss, 1979),(Savavibool& Moorapun, 2017). Thus, it is important to achieve the user's needs by studying the color and how it affects interior spaces.

Space Perception involves recognizing a space's value, function, form, size, and proportions (Jaglarz, 2011). Moreover, color affects interior design perception in terms of spaciousness, openness, complexity, and order(Savavibool & Moorapun, 2017).By understanding the effect of color on space, designers can plan properly and fulfill users' needs (Wiercioch-Kuzianik & Babel, 2019).

The classroom is the most important area in a college, it is an environment that includes different aspects, where students and instructors interact with each other and spend a long time in it. High-quality design improves the function of the learning environment, and the users will be more confident in that designed area (Obeidat& Al-Share, 2012). Several research studies have investigated the effect of color on different interior design objects, such as the wall, furniture, floor, and space. The impact of color on various spaces of perception was examined in several previous studies. Savaibool & Moorapun in 2017provided evidence that using different colors in various room proportions can affect human perception in different ways; neutral colors are suitable for objects of various proportions in the workplace, but function and aesthetics should be considered; cool and warm colors create the opposite perception, and some of them would not be suitable for use in small areas as these colors can lead to negative impressions, but could be used in medium size and proportion spaces, with care when choosing color combinations (Savavibool&Moorapun, 2017).Moreover, Yildirim et al, 2015,indicatedthatthe use of various colors in school classrooms wall has an impact on the perceptual performance of male students, three different colors blue, pink, and creamwerestudied in a high school male classroom to see how different colors affect student perceptual performance; according to the results, the blue color got a positive rate than the cream and pink walls (Yildirim et al, 2015).It is noteworthy that the group of colors used in this research was adopted in the current study.

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<sup>1</sup> Interior Design Department, Oman College of Management and Technology, Muscat, Oman  
Reham.sanad@omancollege.edu.om

The purpose of the current research is to provide empirical knowledge regarding the effect of various colors on college classroom perception. It focuses on how college classrooms will be affected by various colors blue, pink, and cream. Therefore, classrooms from the interior design department, Oman College of Management and Technology OCMT will be examined to decide which color scheme is most suitable for classroom interior design. Therefore, the following three research questions will be addressed: Does different colors affect space perception? What is the most suitable color scheme for the classroom?, What is the relationship between color and space perception?

In terms of the study originality and value, it is expected to support interior designers, decorators, interior design students, architects, and researchers.

**2. Methodology**

**2.1. Questionnaire**

This research aims to study the effect of various colors namely blue, pink, and cream on college classroom perception (emotions), using an online survey.

A google form is developed to stating a range of questions i.e., 10 questions, divided into two sections, The participants general and demographic information such as gender, age, and level of study is included in section one, while design and color based are included in the second section these questions are concerned with students perceptions and feelings (emotion) regarding the colored classrooms.

**2.2. Subjects**

The survey is distributed to a sample of interior design students at OCMT (Oman College of Management and Technology) Oman, different genders, and levels of study, to evaluate the three colored classrooms' images regarding a range of emotion.

**2.3. Stimuli**

The interior design classrooms are different from other classes; the so include Architectural Drafting Tables of significant shape and size. The samples used in this study were created from realistic photos of the interior design department classes, after selecting the most suitable photo from a group of photos for various classes (shown in Figure 1), then the wall paint of this classroom was recolored using photoshop software (shown in Figure 2).The color schemes used in this study have been adopted from the previous study conducted on classes walls of high school in Turkey (Yildirim et al., 2015). The current study is conducted to investigate different educational institution, population and culture to study culture and background significances and differences.

The samples were examined in terms of the following emotional impacts: spacious (wide), narrow, complex, simple, well-organized, and messy.



*Figure 1 Picture of original classroom*

*Table 1 Lab and RGB values of colors used*

Colors	Lab values			RGB values		
	L	a	b	R	G	B
<b>Cream</b>	39	4	-14	47	85	151
<b>Blue</b>	97	-1	19	255	245	208
<b>Pink</b>	84	24	4	255	192	203

**Results and discussion**

The primary data was collected using online survey, according to the result, 53 participants from the interior design

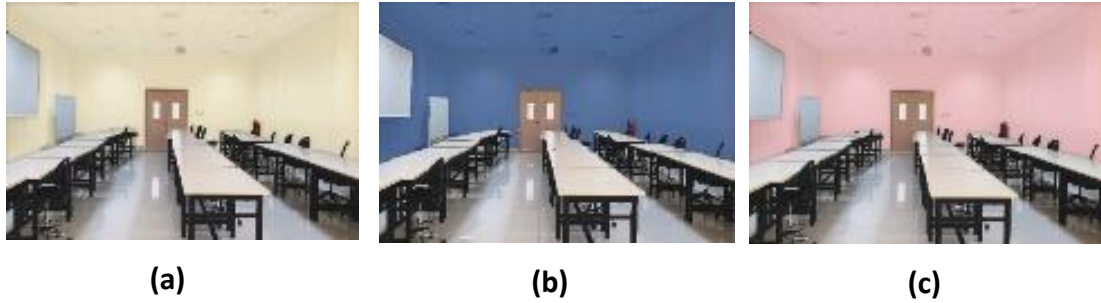


Figure 2 Picture of colored classrooms. (a) Cream, (b) blue, and (c) pink.

department at OCMT filled out the questionnaire. They are between the ages of 18 and 24 on different levels of study.

**2.3.1. Analysis based on emotions**

**2.3.1.1. Spacious, Wide and Narrow**

It is evident from the results shown in Table 2 and Figure 3, that 86.5% of students selected cream color which gives a spacious feeling, 9.1% chose blue and 4.4% picked the pink color; while for the narrow feeling, 56.8% students selected blue color, 27.3% for cream color and 15.9% pink color.

**2.3.1.2. Complex and Simple**

From Table (2), 36.4% of participants choose blue as a color that gives a sense of complexity and the rest 34.1% cream and 29.5% pink. In terms of simplicity feeling, 79.5% of students choose cream color, 13.7% goes with pink color, and 6.8% blue.

**2.3.1.3. Well organized and Messy**

Most of the participants/students selected cream color as well organize feeling with 81.8%, while 25% chose pink color, and 6.8% indicated blue color for this emotion.

**2.3.2. Analysis based on colours**

Regarding the colors, the emotion of the **cream** color gives a feeling of spacious (wide), well organized, and simple, which is a fact, most of the classrooms are in cream color, it's a color that gives a sense of wide and the student don't distract in the class.

While **blue** color gives a sense of narrow and complexity and messy, and **pink** color with messy and complex emotions. 79.5 % of students selected the **cream** color as the most preferred colored classroom, it gives a sense of spacious (85.5%), well organized (81.8%), and simple (79.5%).

A previous study conducted by (Yildirim et al., 2015) revealed that male high school students found that the blue color evokes positive emotions than the cream and pink colors (Yildirim et al., 2015). Also, the research of conducted by Savavibool&Moorapun, 2017 showed that neutral colors are suitable to use in all proportions of the workplace, but function and aesthetics should be considered; small areas are not recommended for using neither cool or warm colors which lead to perceiving negative appraisal, but these colors would be used the interior design of medium sized spaces (Savavibool&Moorapun, 2017). Therefore, it is concluded that current research agrees with previous research work confirm the appropriateness of cream color for educational institutions classrooms wall paints.

Table 2 Results of the survey conducted towards the investigated colors

Perception feeling	Cream	Blue	Pink
Spacious (wide)	86.5%	9.1%	4.4%
Narrowed	27.3%	56.8%	15.9%
Complex	34.1%	36.4%	29.5%

Simple	79.5%	6.8%	13.7%
Well organized	81.8%	6.8%	25%
Messy	29.5%	34.1%	36.4%
Preferred colored classroom	79.5%	6.8%	27.3%

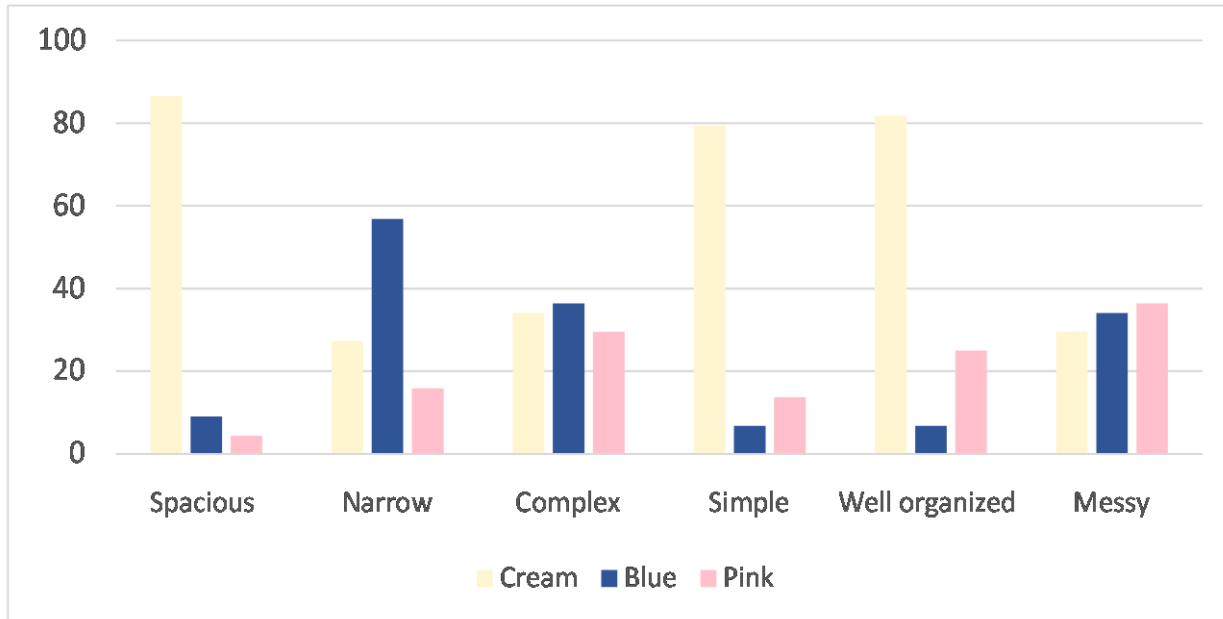


Figure 3 Number of respondents and their emotional impacts towards the studied colors

The findings of the study indicated that 79.5% of the students at OCMT highly preferred the cream color, while 27.3% choose pink color, 6.8% blue; it shows the students feelings towards the interior spaces and perception are affected by different colors used in painting classrooms' walls. Based on the results indicating that cream color signifying spaces as spacious, simple, and well organized, while the blue and pink colors as narrow, complex, and messy. In conclusion, cream color is suggested for classrooms as it got a positive rate, whereas blue and pink are not recommended for working interiors such as educational institutions especially classrooms.

### 3. Conclusion

Three different colors have been used in this study, cream color as neutral, blue as warm, and pink as a cool color. The result of the study shows that using various colors in the classroom environment has a statistically significant impact on the student's feeling of space perception. The results showed that the cream-colored classroom was got a positive rate it described as spacious, simple, and well-organized compared to the blue and pink-colored classrooms. Moreover, cream-colored classrooms were considered less narrow, complex, and messy. One of the research goals is to identify a suitable color scheme for a classroom. This goal is achieved through primary data collected and analyzed. Cream color was found in this study and previous research work conducted in different cultures and institution evokes the most positive emotions among undergraduate students where used in painting classroom walls.

### 4. Further research work

Further studies could also explore the effect of different color schemes in the different classrooms from other departments. Moreover, further research should be done on the various color and their impact on different emotions.

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