
**Identify the colors effect in kindergarten
Environments**

Rania Abdul Ameer Al Saedi ***Mayada Alhayali ****Department of Interior Design, Faculty of Architecture
and Design, University of Petra, Amman, Jordan*
202230028@uopstd.edu.jo*Department of Interior Design, Faculty of Architecture
and Design, University of Petra, Amman, Jordan*
malhayali@uop.edu.jo**Abstract:**

This study explores the influence of color in kindergarten environments on children's emotions, behavior, and overall experience. Recognizing that interior design, particularly color choice, plays a critical role in early childhood education settings, this research revolves around how different colors impact young learners. Utilizing a descriptive-analytical methodology, the study involves surveys with educators, designers, and a review of existing literature. It aims to provide insights into the emotional language of colors and their psychological impact on children. The findings are expected to guide educators and interior designers in creating natural comfortable and conducive learning spaces that provides the holistic development of children in kindergartens.

Keywords: *Color, Kindergarten environments, children's emotions, behavior, interior design, emotional language of colors, psychology*

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Introduction

In the world of interior design, the space we live in or interact with we can refer to it as an art canvas, the interior canvas is not only known by the wall, floors, ceiling, furniture used in the space, it all goes to one place is the color palette that is using in all these mentioned. A color gives a remarkable emotion and atmosphere to the interior spaces.

Understanding the Emotional Language of Colors in Interiors is showing the impact and the feeling every color can give and its effect on our daily basis activities. Colors usually have a big connection with the psychology of the user which creates emotions and atmosphere between the user and the space that are being used or lived in, particularly in areas dedicated to early childhood education, such as Kindergarten environment.

Children embark on their educational journey, the surroundings in which they learn holds significant effect in shaping their experiences. Among these environmental factors is colors which leave remarkable influence on children's emotions, behaviors, and learning processes Certainly!

Every color within the palette has its own language and empower the space to give the needed emotions and experience of each as wanted and needed.

Designers should be aware of the importance of spatial color to children's physical and mental growth when designing the kindergarten interior. (Xiaoxiam & Meicheng, 2020)

Colour acts as an important feature in children's life. Children are sensitive and easily attracted by colour, especially bright and warm colour. Colour also acts as a tool for children to express their emotion. For instance, children use light colour to represent positive emotion, while dark colour as negative emotion (Thi Tam, Joeurairatana, & Sirivesmas, 2024)

Designing educational spaces for children requires creating an environment that nurtures their physical, mental, and emotional development without hindering their natural growth or enjoyment. Colors play an important role, influencing individuals' moods and performance. (Ahmadi & Tabaean, 2017)

The research in going to explore how these color languages translates the context of kindergarten areas, effect children's emotions, behaviors, and all in all the experiences they are gaining in this educational spaces.

(1-1) Research Problem

*Corresponding Author: | Email: 202230028@uopstd.edu.jo, malhayali@uop.edu.jo

1. How do color choices in kindergarten environments influence the emotional responses and well-being of young children?

2. What role do these selected colors play in shaping the atmosphere and behaviors of children in kindergarten spaces?

This examines the direct relationship between color palettes utilized in kindergarten settings and their effects on children's emotions and learning experiences.

By investigating these two key aspects, the study seeks to provide selected palettes and valuable insights into the emotional and effect of colors, ultimately informing the design and optimization of educational spaces for young learners.

- What is the Impact of Colorful Environments on Kindergarten Children's Behavior and learning environment.

- How colorful environment may affect their emotions response s during daily activities.

(1-2) Research Questions

What is the effect of colorful indoor environments on the behavior of children in kindergarten?

What is the effect of colorful environments on children's comfort and happiness?

What is the effect of colorful environments on children's education and learning?

(1-3) Research Importance

Children begin their educational journey. The surrounding environment in which they learn has a significant impact on shaping their experiences. Among these environmental factors are colors, which certainly have a noticeable impact on children's emotions, behaviors, and learning processes. The importance of this study lies in the importance of color, which is one of the main design elements in the interior design of kindergartens in Jordan.

(1-4) Research Objective:

Identifying the different colors that affects the children and their activities and academic performance in designing the spaces of a kindergarten.

Establish recommendations for specific color palettes for every different space in kindergarten to positively meet the effect on the emotional response.

(1-5) Research Limitation

Spatial scale: Kindergartens in Jordan.

Time range: Last year.

Human limits: Children between 1 month -5 years old.

Object Boundaries: The research will cover the effects of different colors used in kindergarten various areas on children, their emotional response and their educational focus.

Year: (2023-2024).

Literature Review

(2-1) The Influence of Interior Design Elements on Children's Learning, Happiness, Comfort and Growth (Petra Nursery as A Case Study)

Mayyadah Fahmi Hussein, Aseel Abdulsalam Al-Ayash, Hassan Fahmi Hussein, 2022

The study focusing on Petra Nursery's interior design revealed substantial positive effects on children's learning, happiness, and overall growth, emphasizing the significant impact of design elements such as color, furniture, and spatial arrangement. The results confirmed a pleasant working environment for staff and intellectual development for children. Notably, warm colors were associated with increased motivation and happiness, while cool colors fostered comfort and sleepiness.

(2-2) A Comparative study on Color Preferences of Children for their School Environments: Two Private Schools in Ankara

Zeynep Başıoğlu, 2002

This study has been conducted to understand and show the effects of age, gender, and differences in the functions of the spaces on color preferences of children in their school environments.

Colors in a space are influenced by personal preferences, tied to how people feel and factors like culture, education, and physiology. It's tough to make general rules, but by combining studies, we can find common color patterns for spaces.

(2-3) The effect of visual art design on mood, creativity and stereotypical differences in gender

Viviane Lee Meyerhoff, 2016

In early childhood development, creating ideal interior spaces in educational settings is critical which ought to meet children's needs. Especially colors are a salient and powerful factor in children's lives Colors play a big role, affecting kids' feelings and thinking. Bright wall colors make kids feel comfortable, safe, and more creative. Colors also help express emotions, showing how colors connect with how we feel.

(2-4) Spatial Color Analysis of Kindergarten Interior Design Based on Children's Psychological Activities in Digital Environment

Shan Xiaoxian, Wan Meicheng, 2020

In digital environments, kindergarten interior design needs adjustments, particularly in spatial color palette. Technology contributes enhancing the comfort of children's educational spaces. Designers should pay more attention and recognize how spatial colors affect both the physical and mental development of children when crafting kindergarten interiors.

(2-5) The Impact Of Colour on Students' Perception in Learning Spaces

Husein HA, Baper SY, Salim SS, 2021

Color significantly affects how students perceive things. It creates a relationship between the expected learning results and the learning environment. This study aims to explore how students' perceptions of interior spaces are influenced by ambient colors.

“Demonstrated a significant role of colors on human perception, which means human response to colors. It affects the behavior, performance and mood of the space users. It is interesting to note that Humans perceive color by visual sensors which affect them both physically and psychologically.”

(2-6) Colour psychology in kindergarten classroom

Chin Xing Thung, Hakimi Ahmad, 2022

The aim of the study was to identify colors that help kindergarten classes feel calm and peaceful. Coordinating the colors in each location to the activities that take place there is important since colors set certain moods in different spaces. Bright colors are commonly used in kindergartens because kids are drawn to them. Children spend a lot of time in these classrooms, so choosing colors which promote calmness will be essential to their ability to concentrate and learn. The research concludes that the light green and light blue color is the ideal color for a calm and peaceful kindergarten classroom.

(2-7) Literature review results:

The literature review contains several studies exploring the influence of interior design elements on children's well-being, focusing on specific factors such as color, furniture, spatial arrangement, and their impact on learning, happiness, comfort, and growth.

The study of Petra Nursery emphasizes the positive effects of well-thought-out interior design, with warm colors associated with increased motivation and happiness, while cool colors foster comfort and sleepiness.

Another comparative study in Ankara explores color preferences in school environments, considering age, gender, and spatial functions, highlighting the subjective nature of color influenced by personal preferences and cultural factors. Addressing the impact of visual art design on mood and creativity, a study underscores the critical role of creating ideal interior spaces in early childhood development, where colors play a significant role in affecting children's feelings and thinking.

The spatial color analysis study emphasizes the need for adjustments in kindergarten interiors in digital environments, recognizing the impact of spatial colors on children's physical and mental development.

Lastly, the study on color psychology in kindergarten classrooms identifies light green and light blue as ideal colors for creating calm and peaceful learning environments for children.

Overall, these mentioned studies illustrate the critical relationship between interior design elements (colors) and children's well-being in educational spaces, providing valuable insights for creating optimal learning environments.

Theoretical framework:

Colors:

Colors are visual perceptions created by different wavelengths of light. In the context of human vision, colors are the result of the eyes and brain interpreting the varying wavelengths of light. Each color has its unique wavelength and corresponds to a specific hue, saturation, and brightness, forming the spectrum of visible light.

Colors in Interior Design:

Colors are essential elements of interior design that establish moods, define a space's character, and produce visual harmony. The overall visual appeal and practicality of an interior space are influenced by the thoughtful choice and arrangement of colors.

Colors in interior design go beyond mere decoration; they impact the psychological and emotional experience of users.

Warm colors may promote energy and warmth, while cool colors can induce calmness. The thoughtful integration of colors contributes to creating atmospheres that align with the intended purpose of a space, enhancing its visual appeal and affecting the well-being of its users.

In educational settings like kindergartens, the careful selection of colors becomes particularly crucial. It goes beyond creating a visually pleasing environment; it contributes to the creation of a stimulating and supportive atmosphere for young learners.

In our study we concentrated on these six perspectives that helped us in understanding colors, the relationship between colors and children's emotion, and to give us the results we need from the study to provide a suitable color palette for kindergarten environment to enhance the designs and make sure to meet all the children's needs.

Here are the six Perspectives:

(3-1) Color Psychology:

Color psychology explores the impact of different colors on human emotions and behavior. For example, warm colors like red and yellow are often associated with energy and excitement, while cool colors like blue and green are linked to calmness and relaxation. In the studies we discussed in literature review we have some of the studies that contains the psychological effects of

colors to understand how they might shape emotional responses in the context of kindergarten environments.

Adding to the study of literature review we studied theories such as Kandinsky's color theory, which connects colors with emotions and spirituality. Highlighting the emotional responses elicited by different colors, providing a for us a clear foundation for understanding the potential impact of color choices in kindergarten spaces.

According to Kandinsky, colors contain natural properties that can be used to create a visual language that expresses concepts and feelings. He proposed the theory that every color has an unique emotional impact and that color directly influences human emotions. Red would make someone feel alive and energetic. Picture (1) we can see almost every color and what is the emotion it gives in Kandinsky beliefs as he placed it in his theory.

(3-2) Environmental Psychology:

yellow	<i>"warm," "cheeky and exciting," "disturbing for people," "typical earthly color," "compared with the mood of a person it could have the effect of representing madness in color [...] an attack of rage, blind madness, maniacal rage."</i>
blue	<i>deep, inner, supernatural, peaceful "Sinking towards black, it has the overtone of a mourning that is not human." "typical heavenly color"</i>
green	<i>mixture of yellow and blue stillness, peace, but with hidden strength, passive "Green is like a fat, very healthy cow lying still and unmoving, only capable of chewing the cud, regarding the world with stupid dull eyes."</i>
white	<i>"It is not a dead silence, but one pregnant with possibilities."</i>
black	<i>"Not without possibilities [...] like an eternal silence, without future and hope." Extinguished, immovable</i>
gray	<i>mixture of white and black "Immobility which is hopeless"</i>
red	<i>alive, restless, confidently striving towards a goal, glowing, "manly maturity" Light warm red: strength, energy, joy; vermilion: glowing passion, sure strength Light cold red: youthful, pure joy, young</i>
brown	<i>mixture of red + black dull, hard, inhibited</i>
orange	<i>mixture of red + yellow radiant, healthy, serious</i>
violet	<i>mixture of red + blue "morbid, extinguished [...] sad"</i>

Environmental psychology shows how physical spaces influence users' thoughts, emotions, and behaviors. Ideas like place attachment and environmental affordances

emphasize the importance of the environment in shaping human experiences. Applying these ideas to kindergarten spaces can help with exploring how the environment, including color choices, can dominant the overall atmosphere.

Discussing in the study how environmental psychology principles apply to educational spaces, emphasizing the role of colors in creating a playful, comfortable and engaging atmosphere.

(3-3) Early Childhood Development:

Early childhood development focuses on the critical period of growth and learning in young children. Many theories in the art and interior design field highlight the significance of experiences, including exposure to colors, in creating an emotional development during early childhood.

(3-4) Design Psychology:

Design psychology explores the psychological principles underlying effective design. Considering how design elements like color, layout, and aesthetics combine to create positive atmospheres in various environments, such as kindergarten areas. Color choices can enhance the overall design.

(3-5) Cultural Influences on Color Perception:

While studying the impact of colors cultural backgrounds in shaping users' perceptions of colors was considered. Colors sometimes carry cultural meanings and symbolism that affect the emotional responses for the users of the space.

In designing a kindergarten area including culturally relevant color choices in kindergarten environments may enhance the sense of belonging and engagement for children from different cultural backgrounds specially that kindergarten spaces include a huge diverse in backgrounds for the children.

(3-6) Connection to Nature:

Incorporating natural elements into built environments can enhance well-being of the users. Considering how colors can give the true image of nature, such as greens and blues, this can impact children's emotional status. Knowing that connecting kindergarten spaces to nature through imitating color choices can give more harmonious, comfortable, and calming learning environment.

Nature-inspired colors can create a more aesthetically pleasing and calming atmosphere, specifically contributing to reduced stress and increased focus among kindergarten students.

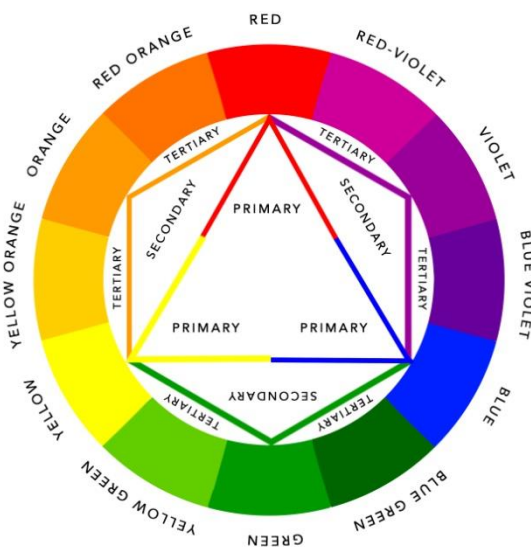
These different viewpoints mentioned in the theoretical framework. Emphasize how a full understanding of the possible effects of colors in kindergarten environments is given with the integration of color Psychology

environmental psychology, design psychology, early childhood development theories, color psychology, Cultural Influences on Color Perception, and Connection to Nature.

In the below table we are showing some of the colors and what emotions it gives to the user and to the atmosphere:

Color	Emotions connected to it
Red	Passion, Energy, Warmth
Blue	Calmness, Serenity, Trust
Green	Growth, Harmony, Renewal
Yellow	Happiness, Optimism
Purple	Royalty, Luxury, Creativity
Orange	Joy, Enthusiasm, Warmth
Pink	Sweetness, Romance, Calm
Brown	Stability, Earthiness
Gray	Neutrality, Sophistication
White	Purity, Simplicity
Black	Elegance, Power, Mystery

Table (1) : Colors and the emotions connected to it.



Picture (1): The Picture below shows the color wheel explaining the Primary, Secondary and Tertiary colors and the connection between them

Methodology

Mixed Method

(4-1) Study Data collection:

Qualitative methods: The data were collected in our study from the literature review we studied and analyzed earlier, from the websites we visited to understand our theoretical framework.

Quantitative method: The questionnaire that was shared online to get answers from a wider audience.

(4-2) Study Methodology

Descriptive – analytical approach

It's all about collecting detailed information about the colors and its effect on the children and the kindergarten environment, and then we are going to analyze the collected data to draw a meaningful and useful conclusion.

(4-3) Web based Survey/ Questionnaire:

The shared questionnaire contained fifteen questions which focuses on the interaction between the colors in the interior design and the children's emotions, comfortability, behavior.

Questions in the survey were concluded from the literature reviews and the theoretical framework.

(4-4) Questionnaire Questions:

Experts Survey:

Q Number.	Questions
1	What considerations or guides your selection of color palettes for kindergarten environment?
2	Can you share with us an example of how the use of certain colors in a kindergarten design impacted the spatial perception or behavior of the children using the space?
3	From your experience, what is the role you think color play in a certain environment that promotes effective atmosphere?
4	What are the recommendations for specific color palettes for play, learning, and sleeping areas that have a positive impact on children in kindergarten?
5	From your perspective do you see that bright colors affect in a the child and give it comfortable atmosphere if no why?

Table (2) : Experts' Survey Questions

<https://forms.gle/m8FknZGX2zePuQvy9>

Educators Survey:

No.	Questions	yes	No	Maybe
	Do you believe that vibrant colors impact the			

	children's learning performance positively?			
	Have you ever experienced situations where certain colors negatively impacted children's attention?			
	Do you think that color psychology plays a main role in creating an ideal learning environment?			
	Do you think different colors should be used in various spaces of the kindergarten with a strategic way?			
	Do you think the use of colors in kindergarten affect the children's social interactions?			
	Does colors used in kindergarten helps with the child creativity?			
	Do you believe that the usage of red color in the eating room affects the appetite of the children?			
	Does using blue color in designing the classroom gives peaceful and comfortable for the children ?			
	Are there particular colors or palettes that you find more conducive to provide positive effective experiences?			
	From teaching children do you see any differences in the interactions towards the colors regarding the gender and age?			

Table (3) : Educators' Survey Questions

<https://forms.gle/5LmSgA1Ngyrxp7KG9>

(4-5) Study Sample

In this study, probability sampling is employed to select participants for web based surveys. There are various types of probability sampling methods. In our study, we will select the most appropriate probability sampling method based on the characteristics of our target population, which includes educators, and

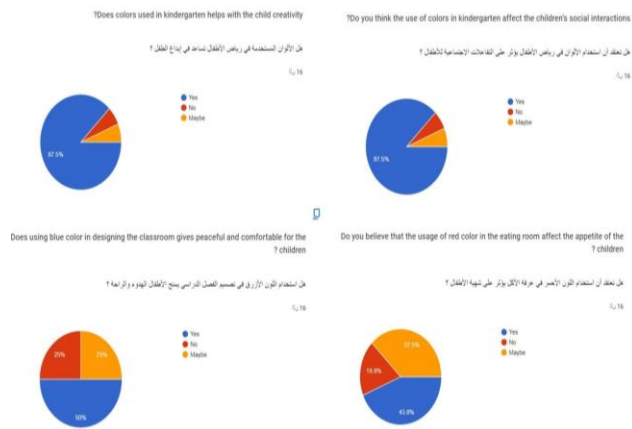
designers in kindergartens. This approach will contribute to the accuracy and reliability of our research findings.

Stratified Sampling: The population is divided into subgroups that share similar characteristics. (Male/Female) (Mangers) (Teachers) A random sample is then taken from each subgroup. This method ensures that specific subgroups are adequately represented in the sample.

In our study, we employed Stratified Sampling to ensure a comprehensive and representative exploration of the impact of kindergarten designs' colors on children.

Recognizing the distinct roles each group plays in the educational environment, we stratified our population into subgroups based on these roles.

For children, we considered age groups to account for developmental variations. Designers were stratified to capture diverse perspectives and approaches in creating educational spaces. Additionally, teachers, being pivotal in the daily interactions within the kindergarten environment, were included as a distinct subgroup.



By choosing Stratified Sampling, we aimed to guarantee that each subgroup (children, designers, and teachers) was suitably represented in our sample. This approach enhances the validity of our findings, offering insights into the varied experiences and perceptions related to color in kindergarten designs across different individuals.

(4-6) Surveys' Results:

1. Emotional Well-being:

Teachers reported that children in classrooms with a diverse and well-planned color scheme appeared happier and more content, with reduced instances of agitation or distress.

2. Impact on Teachers:

Educators reported feeling more energetic and positive in well-designed, color-rich environments, which in turn influenced their teaching methods and interactions with children.

3. Inclusivity in Design:

Research revealed from the answers of the experts that the importance of considering children with different sensitivities and learning needs when choosing colors, emphasizing the need for inclusive design.

4. Educator Perspectives:

Surveys for educators highlighted a preference for balanced color schemes that stimulate, yet do not overwhelm, children. There was a consensus on the need for environments that are both energizing and soothing. Designers' Approach to Color Selection:

Designers emphasized the importance of context in color choice, considering factors such as the natural lighting of the room, the age of the children, and the intended use of the space.

Here we can see some of the answers that we received from the survey that was shared online with a specific sample to collect the data we need:

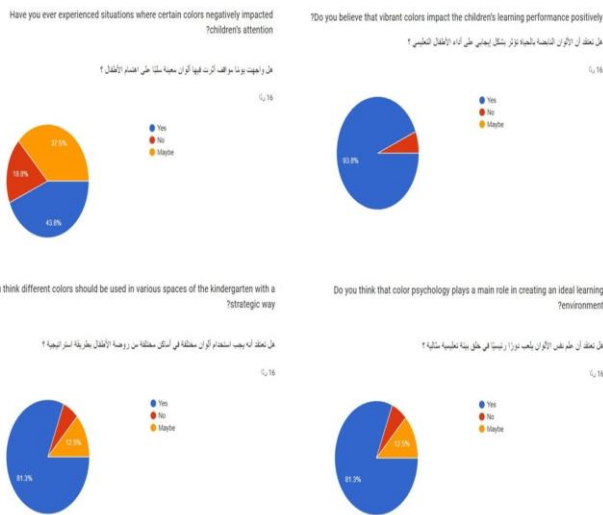


Chart (1): Survey Results

Chart (2): Survey Results

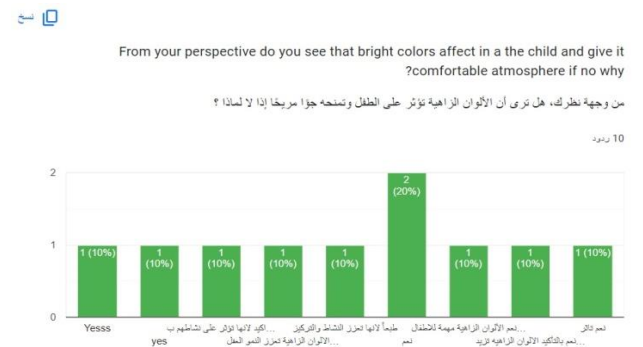
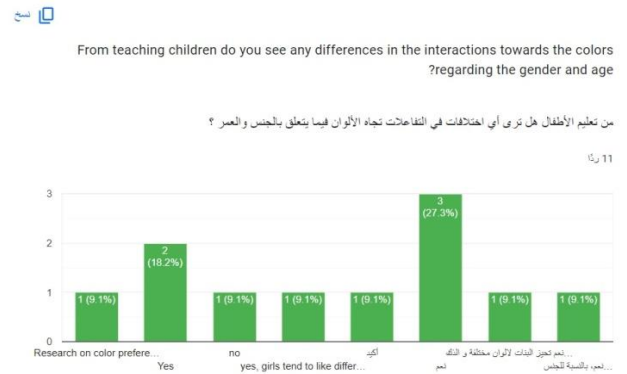


Chart (3): Survey Results

Results and Future Recommendations:

(5-1) Results

Impact of Color on Emotions and Behavior:

The study revealed a significant correlation between color choices in kindergarten environments and the

emotional and behavioral responses of children. For instance, warm colors like red and yellow were associated with increased energy and engagement, while cooler colors like blue and green promoted calmness and concentration.

Younger children (ages 3-4) showed a preference for primary colors such as red, blue, and yellow. In contrast, older children (ages 5-6) were more attracted to secondary and pastel colors.

So upon that we can say that creating color schemes based on age groups can enhance the visual appeal and engagement level within kindergarten spaces.

And having strategic color choices can influence the social dynamics and overall behavior of children in educational spaces.

Impact of Color on Academic Performance:

A notable improvement in academic performance was observed in classrooms where color schemes were harmoniously balanced, avoiding overly vibrant or overly subdued tones.

As the researcher sees that the optimal color balance plays a role in creating an environment conducive to enhanced learning outcomes for kindergarten students.

Impact of Color on Space Utilization:

Different color zones within the same environment led to a more dynamic use of space. Children were observed to engage in more active play in areas with stimulating colors and quiet activities in areas with calming colors. The researcher suggest to consider while designing classrooms to design it with diverse color zones so it can support varied activities and play styles, catering to the dynamic needs of young learners.

These findings that were mentioned contribute to a critical understanding of how color preferences, behavioral dynamics, academic performance, and space utilization intersect in kindergarten environments. They offer practical implications for educators and designers aiming to create enhancing and adaptable learning and comfortable spaces to help with the child’s growth from all possible sides and to meet the need of the children who attend the kindergarten.



Picture (2) The Colors and it emotions’ effect in Interior Design



Picture (3) Different colors in different areas in kindergarten



Picture (4) Colors implementation in Kindergarten interior

(5-2) Suggestions for using Artificial Intelligence:

The researcher used artificial intelligence programs to support the research by implementing the results. The researcher reached and applied recommendations that were concluded in order to present practical, applied examples of kindergarten classrooms.



Picture (5) AI Implementation Samples (By the Researcher)

(5-3) Future Recommendations:

1. The researcher sees that the Balanced Color Schemes should be studied and searched about because the Future kindergarten designs should focus on creating balanced color schemes that cater to both the energetic and calming needs of children. This involves a careful selection of both warm and cool colors in appropriate proportions. Consideration should be given to how color choices affect children with different needs and sensitivities. Inclusive design practices that cater to a diverse range of learners are recommended.
2. The findings suggest a need for updated guidelines and policies in educational design that acknowledge the importance of color in creating conducive learning environments so the Educational Policy and Design Guidelines is recommended.
3. Sustainable and Eco-Friendly Color Solutions.
4. Color and Learning Outcomes.

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I extend my heartfelt gratitude to all the participants who generously contributed their time and insights. Special thanks to the children, designers, and teachers who shared their perspectives, enhancing our understanding of the relationship between colors and kindergarten environments.

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