

# The Role of Color in Improving the Educational Environment Quality

(Case Study: a Number of Girls' Elementary Schools in District 2 of Isfahan)

<sup>1\*</sup>Nasim Ahmadi, <sup>2</sup>Sayedeh Marzieh Tabaeian

<sup>1</sup> M.A. in Architecture, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, Iran.

<sup>2</sup> Associate Professor, Department of Architecture, Harand Branch, Islamic Azad University, Isfahan, Iran.

Received 22.05.2016; Accepted 12.02.2017

**ABSTRACT:** Designing places particular for children entails desire conditions for the physical, mental, emotional and social development in different age ranges, and this design shouldn't bring about any disturbance in the natural growth and their entertainment. In the modern educational system, the physical atmosphere of the school must be an alive and dynamic factor in the quality of educational and training activities for the students. In the creation of physical atmospheres based on identifying the principles of aesthetics, it is essential to put the perceptual principles of atmosphere, context and color into practice. According to the findings of the researchers, colors has miraculous effects on the mental and morale of human beings and the color type bring about joy, freshness, mobility or depression, tiredness, and dullness and they influence on the individuals' performance. The present study aims to explore the appropriate atmosphere features for children's learning and the effect of color diversity on education level and their attraction toward the educational setting in order to enhance the quality of educational environment. To do so, 6 schools in Isfahan were selected randomly as the sample group. To collect data, colorful brochures (questionnaires) followed by free questions about the educational environment were applied. When the data was analyzed, desirable results on the role of color in the educational settings and the students' interest to the educational settings were found suggesting that the sense of motivation and interest to educational settings are effective factors on the student's understanding about school and their educational progresses.

**Keywords:** Color, Educational Environment, Student's Attitude, Learning, Physical Factors.

## INTRODUCTION

Children are the most sensitive and impressionable group of the society and are in the most critical stage of their life when their characteristic, mental, physical and social bases are formed. They demand experiencing the social life in their own scale as long as they get involved in the urban life (Hossein pour & Najafi, 2012). Taking care of needs and demands of the children, the sensitive and impressionable social stratum, is one of the most important affair of the society and this is one of the most effective educational factors in the modern educational and training system. Attention to the quality of architecture, physical and environment of the school, are one of the most important need of children regarding the educational and training system. The physical environment of the school must be in a way that alive and dynamic factors play roles in the quality of educational and training activities of the students (Mortazavi, 1997). Schools are one of the impressive places for the comprehensive growth of the children. School is a home for children that they meet every day to learn, search, and imagine. Unfortunately, schools are most like prisons: buildings with broken down air conditioners, insufficient light, inappropriate

acoustic properties, and old and out of date heating systems (Ford, 2010). However, the educational and training activities must be performed in an appropriate environment with standard dimensions according to needs and interests of the students so that the teachers be motivated in the teaching and students in the sense of learning, both enjoy their job. While designing the educational environment, all needs of students must be met and the physical environment must be in a way that students feel attached. The appropriate educational environment and the equipment are highly important in the teaching quality and students' progress. The design physical environment is the one that provide an appropriate ground for learning and normal behavior. In the environmental psychology, a good number of research studies are on investigating appropriate physical features for satisfying different needs of human such as resting, nutrition, study etc. A school or an educational institute, for instance, is a physical setting with the following features: The quality of teaching crew, the running policies of the institution, the objectives of teaching, students' features, as well as physical and architectural environment. Students respond to such features in a heterogeneous way and use different settings (Tabaeian et al., 2011). One of the effective training factors in modern teaching and education is the

\*Corresponding Author Email: [nasim13ahmadi@gmail.com](mailto:nasim13ahmadi@gmail.com)

quality of schools' architectural environment, teacher books, students, methodology, educational management, and families, they are such factors that inspire the learning process. In the modern teaching and education, the educational and physical environment of schools not only is not an unfriendly and strict environment with no effect on the learning process, but also it is an alive and dynamic factor which plays important roles in the education and training quality. The physical body of the school such as books, tall and rough walls, dark and narrow corridors, can convey messages suggesting the feeling of captured. On the other hand, an environment enriched with trees and flowers, clean and impeccable classrooms with light and bright colors suggest the feeling of relaxing and joy. What a society highly demand is finding a ground for the comprehensive growth and development, which is an environment surrounded by security, beauty, and honesty. In such an environment, children grow up healthier and constructively. Childhood is full of playing, imagination, and exploration, everything is brand new for children and they need to experience new things and confirm them. Children are the smallest members of the society, at the early stages of his life, they have no knowledge about themselves or their soundings, and therefore they have insufficiency preparation for encountering the difficulties and problems. From one hand, a child must be aware of himself and his relation and from the other hand he must be aware of his world. With fast moving, rebellious morale, and free nature with no string attached to adults, they demand for a different environment. An environment in accordance with his elegant,

exciting, honest, fragile and snowflake morale observing balance, simplicity and other requirements (Talebi, 2005). Schools, as the setting for teaching and educating young adults and adolescents, play a very important role in the social and cultural structure of the society. The educational system, method and material for teaching from one hand, and the educational environment from the other hand are two important factors in the growing and nurturing the children and adolescences (Tabaeian, 2014). To design schools in accordance with children's demands, numerus architects and psychologists presented considerable theories. Their common points, for example, are about designing the educational environments appropriate to morale and status of the students, so that it creates the sense of social life accompanied with sense of responsibilities. The Future Systems Group, established by Jan Kaplicky and Amanda Levet (1979), mainly follows innovative but nature – centered approach. This group designed a project by the title of a "World Classes" to provide new environmental opportunities for teaching and learning, free from traditional complications of schools. They believed that the quality of the environment where children are learning that is at atmosphere, color, light, sound, and the amount of joy effect on the quality of learning (Tabaeian et al., 2011). Psychologists have found that colors have miraculous effects on human's morale and favoring particular colors reveals a lot about mind and personality. It seems that, the primary reactions of children toward colors is manifested by emotional features but as the time passes, they

Table 1: The Effective Factors on Selecting Environment. (Source: Ebne Shahidi, 2011)

|  |  |
|--|--|
| <b>The effective factors in selecting the environment for children</b> | age  |
|  | Gender   |
|  | Social and physical limitations                |
|  | Aesthesis issues                               |
|  | Mental background about different environments |
|  | Training in the rural or urban places          |
|  | Limitations imposed by the parents             |
|  | Priorities of peer and friends                 |

Table 2: Synthesizing the Theories Related to Environment Design (Tabaeian, 2014)

| <b>Environment deign model (the combination of theorists and psychologists)</b> |                           |   |                             |
|---|---------------------------|---|-----------------------------|
| <b>psychologists</b>  |                           | <b>Architects</b>   |                             |
| Giving importance to reinforcing social interaction                             |                           | The effective factors on creating appropriate environment |                             |
| Taking responsibilities   | Social growth             | Sense of the location                                     | Observing the scale         |
| Interaction and combination with the environment                                | Increasing the creativity | School as the home  | Meeting the emotional needs |

Table 3: The Concept of Colors According to Student Perception. (Source: Tabaeian et al ., 2011)

| Row | Color  | Concept                              |
|-----|--------|--------------------------------------|
| 1   | White  | Thinking and science                 |
| 2   | orange | Energetic and jolly                  |
| 3   | Pink   | Happiness, power, science thinking   |
| 4   | Yellow | Energetic anti-tiredness provocative |
| 5   | Red    | Life-giving powerful, anti-tiredness |
| 6   | Green  | Thinking, science, provocative       |
| 7   | blue   | Thinking,science, provocative ,calm  |

Table 4: Proposed Colors in the Design and Applying then in the Educational environment (Source: ACECR, 2013)

| Row | school | level             | Proposed colors                 |
|-----|--------|-------------------|---------------------------------|
| 1   | girls  | Elementary School | Red, pink, blue                 |
| 2   | girls  |                   | Red, green, blue, yellow        |
| 3   | girls  | Middle School     | Green, orange, light yellow     |
| 4   | girls  |                   | Green, orange, light yellow     |
| 5   | girls  | High school       | Green, blue-green, light yellow |
| 6   | girls  |                   | Green, blue-green, light yellow |

learned to see the colors and perceive them exactly. The lack of attention to colors and coloring of educational environments, and its wonderful effect of color in the past made the authors to review the early instances of school design in which the poverty of color and visual attraction are conspicuous. However, we cannot turn a blind eye on the recent innovations and attempts. Color, as the distinguishing element in the architecture, has an effective role on the morale and behavior of people and influences the emotional and mental status. Color creates joy, freshness, movement, attempts or tiredness, depress, and dullness, influencing the performative processes.( Gifford, 2005).

## MATERIALS AND METHODS

### Colors and its Effects on the Educational Environment

The effect of colors is gradual but profound and bring positive and negative effects in the people. Colors may cause sensation or tranquility for children and naturally it can effect personalization. The effect of color may last for a long time and be manifested in the rest of life. Applying inappropriate and maladjusted colors regarding the age range of children and adolescences bring about undesirable effect in later ages; to overcome such problems, a great deal of time is required (Tabaeian 2014). In school and educational environment, the colors of places and equipment is of a highest importance, and it is due to the critical age of children and adolescences. Applying dark colors reduces the learning. A mentally healthy child enjoys warm and energetic colors. Warm, energetic, and

provocative colors make children be active, energetic, inspired, and hustle and bustle. Red and orange are of energetic colors, but norms of the society dictate that they are not appropriate for boys, and this may make the boys disillusionment or frustrated if they use these colors. Unfortunately, at the present conditions of the society, gray is a natural color, not dark not light, and it's very frequent in the schools. Gray bring laziness, feebleness, and depression and it is free from any movement or mental circulation (Navid Adham, 2003).

Applying variety of colors at schools creates sense of liveliness, joy, mobility and hustle and bustle and it can even improve the process of learning. It's proved that light color effects on the children visual or non- visual perspective. Colors have a huge effect on the learning progress, increase the intelligence reduce tension and enhance compatibility. It has a profound effect on thinking, creativity, and mentality and it's known as a tool for their thinking and development. The most conspicuous attribute that distinguishes a person from the surrounding is color. Controlling the amount and degree of light and decreasing the bad effects resulted from darkness is by colors. Also, coordination and harmony in every environment create tranquility and the contrast of colors create mobility and excitement (Mortazavi, 1997). In the research studies on the effect of colors on learning and education, almost all students agree that color is effective on their learning progress. One research study by "ACECR" ,Academic Center for Education, Culture and Research (1998) and The Office Renovation of School, 4 schools (1000 students) were selected as the sample

to examine the effect of color on the educational environment, considering the etiquette, age rang, and even climate conditions the following results were in Table 3.

Dinsmore, (2010) following the color patterns, disagreed with the conventional definitions in schools and describes that using happy and bright colors are highly needed. His study suggested that light blue, and purple have a relaxing effect on children and could be an appropriate color for schools walls. Light colors could reduce stress and tension while warm and light colors improve the concentration. He believes that white is a rejected and old fashion color that reflect the light twice more causing tiredness, sore eyes and disturb the concentration (Dinsmore, 2010).

In 2013, “Academic Center for Education, Culture and Research of Tehran” provided a brochure on appropriate colors for educational settings (elementary, middle, and high schools) and submitted to the Office of Renovation of Schools. The brochure suggested that appropriate colors for different schools’ levels are in Table 4.

The present study presents for main (level 1) and secondary colors (level 2) for different school levels and gender through. According to mentioned distinctions, appropriate colors for celling, walls and floors are proposed.

### Methods

Considering the previous research studies, the main reason for the present study is to examine the student’s attitude in some selected schools toward the educational environment color and provide working method about improving the quality of educational environment. To do so, and to extract the factors the users pay attention, students, experts, and psychologist’s opinions were collected.

As we all know, maintaining mental health is highly essential for students and educational systems must supply them. Architects and psychologists have always introduced points for providing appropriate environment according to the morale and mentality of the students to meet the demands and needs

of students.

As Table 5 , shows designing educational environment appropriate to morale and mentality of students is due to provoke the sense of social and creative life as well as sense of taking responsibility. After studying and researching about children, color, and its effect on the educational environment, and examining the comments made by psychologic on the educational system, a colorful brochure (questionnaire) was designed based on the color circle. Having some administrative preparation and making request for referring to some schools, the authors got permission from the State Office of Education in Isfahan to start the study the at schools. To collect the required data, the brochures on the student’s interests about coloring different environment such as educational environment were distributed. One free question about desired and favorite school was also presented. The present study enjoyed mixing qualitative and quantitative method. In the qualitative study, the research is done in the real world and identifies the very elegant and deep issues such as psychological issues which is about the mutual relation between human and environment. The present study has a close relation with psychology and qualitative method could be a great help. Also, the present study enjoyed applying the quantitative method in which the statistical data were analyzed. The present study aims to overcome the shortcomings and deficiencies in the society and human relation development. it is considered as developmental research studies because from one hand it’s based on present knowledge and experiences gained by previous studies about children, color, and school and from the other hand it is for innovation and improving the school environment emphasizing the color and its effect.

### Sample Size and Sample Method

After complimenting the administrative requirements and requesting for research, 6 schools were introduced by The Educational and Training System of Isfahan. The schools were classified as desired and undesired schools. The sample

Table 5: The Summary of Architects and Psychologist Theories About Educational Settings. (Source: Tabaean, 2014)

|   |                          |                 |  |
|---|--------------------------|-----------------|--|
| Architects and Psychologist Theories About Educational Settings | Architects and designers | Walter Groupius | Creating a creative, mobile and effective setting                                      |
|   |                          | scharoun        | Creating the sense of settlement and belongings  |
|   |                          | Hertzberger     | Creating the sense of life, reinforcing social relations                               |
|   |                          | Lawson          | Attraction of educational setting for growth and socializing students                  |
|   |                          | pirnia          | Introducing a magnificent architecture appropriate to the needs of students in setting |
|   | Psychological            | Glasser         | The necessity of attention to the emotional needs and sense of responsibility          |
|   |                          | Louis           | Emphasizing cooperation, creation, and taking responsibility of the students           |
|   |                          | Wheeler         | The effect of using appropriate setting on behavior                                    |
|   |                          | Dewey           | Creating the sense of life and reinforcing social relations                            |
|   |                          | Bruner          | A dynamic process in the education by combining individuals and educational setting    |

were selected randomly, and they were girl school students at second, fourth, and sixth grades. The colorful brochures were distributed and students were supposed to answer as the teachers and author present.

Table 6: The Information about the Sample.(Source: Ahmadi, 2015)

| Row   | Group    | Level        | Gender | No  |
|-------|----------|--------------|--------|-----|
| 1     | Students | Second grade | Girl   | 88  |
| 2     | Students | Fourth grade | Girl   | 76  |
| 3     | Students | Sixth grade  | Girl   | 108 |
| TOTAL |          |              |        | 272 |

**Data Collection Instrument**

A questionnaire was designed to obtain the required data accompanied with one free question about a desired school for the students. The instrument helped to collect the data, and through processing and analyzing the data we moved to hypothesis. The present study enjoyed written, verbal, nonverbal and physical resources. The verbal resources include dialogue and conversations to reach a desired results; that is the role of color and coloring of educational environment for improving the student quality of learning. The written resources include questionnaires ( colorful brochures) designed for understanding the needs, interests and demands of school children required factors for designing the questionnaire and question was based on reviewing the literature. These factors are as the following:

- The degree of educational environment coloring on the students' learning;
- The way students relate with the educational environment;
- The degree of willingness and motivation of students toward school environment;
- Interest and needs of students increasing the educational

environment as the main user of this place;

A desired mental image toward the future of educational environment;

Operational working methods and suggestions for creation of joy and attraction.

To fulfill the mentioned requirement, the educational environments were classified according to degree of students use and spending time and in each class 3 elements of atmosphere such as floor, ceiling and wall were asked. Students were supposed to choose their favorite color for each environment. After selecting the color for each environment students were supposed to answer the free question "what's your favorite school like"?

**RESULTS AND DISCUSSION**

**The Statistics and Examining The Data**

Data analysis connect the related information to the subject matter. The present study which is a combination of psychology and architecture and one of the main steps was analyzing the psychological concepts about defining and identifying children, recognizing the needs and related features with architecture as well as getting familiar with color concepts and its effect on children.

EXCEL and SPSS measured the degree of color usage according to the classifications of color circle, main colors (level .1), secondary colors (level .2) and natural colors in environment and different schools level. The highest usage of each color in each element was obtained. Based on the descriptive statistics related to color choice and considering the differences of selection ratio as well as measuring chi-square in the statistical analysis we obtained the colors from the most to the least favorite.

Table 7: Colors selected from the color cycle. (Source: Ahmadi, 2015)














|                 |  |
|-----------------|--|
| <i>Color 1</i>  |  |
| <i>Color 2</i>  |  |
| <i>Color 3</i>  |  |
| <i>Color 4</i>  |  |
| <i>Color 5</i>  |  |
| <i>Color 6</i>  |  |
| <i>Color 7</i>  |  |
| <i>Color 8</i>  |  |
| <i>Color 9</i>  |  |
| <i>Color 10</i> |  |
| <i>Color 11</i> |  |
| <i>Color 12</i> |  |
| <i>Color 13</i> |  |

Table 9: The Descriptive Statistics of Main Colors.

|                   | Main Colors |            |            |            | Total |
|-------------------|-------------|------------|------------|------------|-------|
|                   | Red         | Yellow     | Dark Blue  | Light Blue |       |
| Unselected colors | 6614        | 6708       | 6678       | 6468       | 26468 |
|                   | 93/5%       | 94/9%      | 94/4%      | 91/5%      | 93/6% |
| selected color    | <b>458</b>  | <b>364</b> | <b>394</b> | <b>604</b> | 1820  |
|                   | 6/5%        | 5/1%       | 5/6%       | 8/5%       | 6/4%  |
| Total             | 7072        | 7072       | 7072       | 7072       | 28288 |

Table 10: The Descriptive Statistics of secondary Colors.

|                   | secondary Colors |            |             |             |              | Total |
|-------------------|------------------|------------|-------------|-------------|--------------|-------|
|                   | Orange           | Dark Green | Light Green | Dark Purple | Light Purple |       |
| Unselected colors | 6752             | 6850       | 6818        | 6699        | 6643         | 33762 |
|                   | 95/5%            | 96/9%      | 96/4%       | 94/7%       | 93/9%        | 95/5% |
| select the color  | <b>320</b>       | <b>222</b> | <b>254</b>  | <b>373</b>  | <b>429</b>   | 1598  |
|                   | 4/5%             | 3/1%       | 3/6%        | 5/3%        | 6/1%         | 4/5%  |
| Total             | 7072             | 7072       | 7072        | 7072        | 7072         | 35360 |

Table 11: The Descriptive Statistics of Neutral Colors.

|                   | Neutral Colors |            |            |            |            | Total |
|-------------------|----------------|------------|------------|------------|------------|-------|
|                   | White          | Black      | Pink       | Dark Gray  | Light Gray |       |
| Unselected colors | 6510           | 6893       | 6523       | 6930       | 6801       | 33657 |
|                   | 92/1%          | 97/5%      | 92/3%      | 98/0%      | 96/2%      | 95/2% |
| select the color  | <b>562</b>     | <b>179</b> | <b>549</b> | <b>142</b> | <b>271</b> | 1703  |
|                   | 7/9%           | 2/5%       | 7/8%       | 2/0%       | 3/8%       | 4/8%  |
| Total             | 7072           | 7072       | 7072       | 7072       | 7072       | 35360 |

## CONCLUSION

The findings on the students' responses to the free question (their definition on the desired school) are in Table 12.

Table 12: The Needs and Demands of The Students.

|                                 |   |   |
|---------------------------------|---|---|
| Students needs and requirements | Creating big environment                | Classrooms<br>Sport place<br>Parking space<br>Conference hall |
|                                 | Interaction with nature and green space | Yard, classrooms, corridors, entrances                        |
|                                 | Color application                       | Educational space<br>Uniforms                                 |
|                                 | Applying natural light                  | Classrooms, corridors, entrances                              |
|                                 | Applying technology                     | classrooms  |

The findings on teachers' opinions about using and not using colors in the educational setting are presented in the Table 13.

Table 13: The Teachers' Opinions.

| Spaces with colors  | Spaces without colors                           |
|---|---|
| The positive effect on students' morale                               | Causing tiredness and dullness in long hours    |
| The positive effect on students' progress                             | Creating unwillingness for continuing education |
| The positive effect on compatibility of students with the environment | Creating disinterest to the educational setting |
| The positive effect on reducing stress                                | Creating dissatisfaction                        |
| Creating a refreshing environment                                     | Creating unattractive and boring environment    |

## Finding

Children are born with some potential abilities, and most of these potentials turn to active abilities following by some learned activities. Most parents seek to explore and flourish their children's talent. The role of education, training and teaching is of highest importance for forming the children personalities; in this regard one important place is school. According to some research studies, the physical environment not only is an unfriendly place, but also it is a dynamic and alive factor in the quality of teaching and training process. The quality of architecture and other elements such as light, color, sound, system, and other equipment could be as important as other

educational and training factors. Color, as the distinguishing element in the architecture, has a great effect on the user's, behavior and morale. Moreover, light and colors influences the students visually or non- visually.

Figs 1 to 3 summarize the colors that girl school children chose. To describe the findings, it should be mentioned that considering the facts that some designing standards in the educational environment have changed or reformed recently and some schools are designed and implemented by design consulting companies under the supervision of the office or renovation. The index of color about interior design for the classrooms (ceilings and walls) are better now than those of the past. The statistic results also confirm that color is the most important index in the interior design. Color has a great effect on the learners because they spend a quit long time in the educational settings. It is suggested that further studies focus on the boys, other educational levels, and age ranges.



Fig.1: The Ratio of Main Colors (Level 1) From The Most to the Least.



Fig. 2: The Ratio of Secondary Colors (Level 2) From the Most to The Least.



Fig.3: The Ratio of Neutral Colors From The Most to the Least.

## REFERENCES

- Ahmadi, N. (2015). *The Design of School for Children 7 to 12 Years with the Approach of Color on Improving the Quality of Education*, Unpublished master's thesis, Khorasgan University, Isfahan.
- Dinsmore K. (2010). *The Best Paint Color for Classroom Walls*. Available from: [http://www.ehow.com/way\\_6167416\\_paint-color-classroom-walls.html](http://www.ehow.com/way_6167416_paint-color-classroom-walls.html).
- Ebne shahidi, M. (2011). *Designing Bed in the specialized hospital for children: Reducing children's panic in the therapeutic environment Approach*. Unpublished master's thesis, Khorasgan University, Isfahan.
- Ford A. (2010). *Designing the sustainable school*. (Saeedeh, Trans.). Tehran.

Gifford R. (2005). *Applying Social Psychology to the Environment: Six Goals of Social Design*. (SAGE Trans.). Tehran.

Hossien Pour, SA., & Najafi, M. (2012). *Designing kindergarten with glance at sanctity in Iranian architecture*. Tehran: Tahan.

Jahad Daneshgahi RCoTB (1998). *Selecting the Best Paint color for learning spaces*. Tehran: The organization of modernization, development and equip schools in the country.

Academic Center for Education, Culture and Research of Tehran ,ACECR, (2013). *Preparing the Right Color Brochure for Learning Spaces in the Elementary, Guidance and High school*. Teheran: The organization of modernization, development and equip schools in the country.

Mortazavi, Sh. (1997). *Learning Spaces from the Perspective of Environmental Psychology*. The organization of modernization,

development and equip schools in the country ;. Tehran.

Navid Adham, M. (2003). *The School Message*. Tehran: School publication;

Tabaeian, SM, & Habib, F, & Abedi, A.(2011). Attitude of students at standard and non-standard high schools toward the color of educational setting and some suggestions for improvement of the quality of educational setting. *Journal of Educational Innovations*, 10(38).

Tabaeian, SM. (2014). *Humans and the environment: the psychological approach to architecture and urbanism*. Isfahan: Azad University (Khorasgan).

Talebi, Zh. (2005.). *designing playground for children, Iran welfare organization publications*.