

Students and colors

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Abstract: *In this article, I describe my research on the attitude of elementary school students to color. I was interested in how color affects students, what qualities they attribute to a particular color, and how students would express themselves with colors. The purpose of the research was to verify the theoretical starting points regarding the properties of colors and their impact on a specific population of primary school children. The sample in the research is represented by students of the subject level from 6th to 9th grade, in the field of Slovenian schools.*

Keywords— fine arts; subject level; physiology of color; color symbolism

1. INTRODUCTION

When we talk about colors, we can say that there are no colors at all. It is a subjective perception created by an electromagnetic wave. Anton Trstenjak also said that color is supposed to be a subjective processing of what is objectively processed through the physical phenomenon of waves. And this physical objectivity is also reflected in the formation of colors, where it is the refraction of rays of white light through a prism and thus the formation of the color spectrum. All this is perceived by a visual apparatus that receives sensory data and structures them into meaningful information, including artistic components, signs and symbols. The interdisciplinarity of color extends to many areas, including psychology, symbolism, and physiology. It is through these areas that we find the connection and influence of color with man. Colors affect us positively or negatively, make us happy or sad, help us to calm down or invigorate, and can affect us in a symbolic sense of divinity or black magic. We also talk to students about the effects of colors, which colors affect their well-being, in what way and how, for example, this functionality of color could help students in a positive way in the educational process.

2. INFLUENCE OF COLORS AND STUDENTS

2.1 Physical influence of colors

In the field of colors, we distinguish three variables, which are also called physical dimensions. The basic fact stated by Trstenjak is that we never see a solitary color even if we want to intentionally isolate it. Each color is more or less influenced by the colors that surround it in its brightness and saturation. This interaction is best seen in simultaneous contrast. If we move away from color contrasts and move on to the physical effects of colors, we can determine the following dimensions. These are color, brightness and saturation. Of course, even these dimensions, which give the properties of color a certain component, affect a person. Chromaticity or color tone, variety or chromaticity depends on the wavelength of visible light, brightness, the strength of light energy and color saturation, which in turn depends on

the purity of the light wave. Or, to summarize Trstenjak, where the author gives, for the case of brightness, a color on a dark background on which the color looks brighter than it would otherwise be in the case of a light background. For the color tone, give an example of an intermediate color that contrasts with the main color from which it originates and tends to resemble a complementary color. He illustrates the dimension with an example of blue-green, which looks more blue on a green background and more green on a blue background. The last dimension, that is, saturation, Trstenjak [13] explains for each color that looks clean on a grayish background; however, if the background is pure color, the foreground looks grayish. Indifferent and neutral gray, in simultaneous contrast with other colors, always strive for Trstenjak's resemblance to the complementary color of the color with which we look at it together with gray [13].

2.2 Physiological influence of colors

Heinrich Frieling's quote combines the whole essence of human physiology and color. He said: "We experience the nature of color as a matter of course. But we should have the opportunity to fly a rocket to the moon to realize that there is only a glowing white sun in the universe that mercilessly casts a black shadow into the world space, and that there is no blue sky or scarlet announcing the golden sun because those atmospheric colors are there, where there is no atmosphere or spirit of life, they are necessarily lacking. The atmosphere that enables all life and surrounds us as a protective envelope is at the same time a carrier of colors. Colors symbolize life" (H. F. ; taken from Trstenjak, 1978, p. 358). We can see that colors have a strong effect on beings, especially humans, which is strongly confirmed by the increasingly widespread chromotherapy in the field of scientific medicine. Like cosmic, gamma, infrared and ultraviolet rays, the radiation of the visible spectrum with its specific energy and different wavelengths gives some effects and influences on humans.

2.3 Psychological influence of colors

Chromaticity through physical stimuli and with its physiological influence gives a strong repercussion or echo even in a person's mental life. Perceptions are in constant

interaction with all other perceptions, and due to this connection, a person usually perceives or experiences colors "non-specifically". In subjective experience and its stimuli, all specifically different receptors interconnect into a single action. Sometimes, instead of interaction or integration, they spoke of the "emotional" value or valence of individual colors, which Goethe had already spoken of. This naming is good because it more accurately justifies the interaction of the visual perceptions themselves. Through emotions, a person merges color with different experiences into a new experience. The psychological effects of colors are evident in nature, where, for example, lighter colors move away from space and darker ones narrow. Therefore, light colors give a feeling of distancing or moving away, as opposed to darker colors, which give a feeling of approaching, forcing and squeezing. The same is true for saturation, where color with less saturation somehow shifts and recedes. The impact is also seen in the vertical direction, where dark colors tend to the ground while light colors rise. It is similar in terms of weight, as darker colors are heavier compared to light colors. Heavier colors have a kind of horizontal direction and bright colors vertically. Psychological influence can also be manifested in the acoustic properties of colors, warm and cold effects, and even taste. This experiment was done at lunch and special lighting, where the dishes changed color and taste itself. We must also mention the effect of soft and hard colors through the perception of the material structures of colored objects. Therefore, solid colors, for example, are all those that remind us of metallic materials, while soft colors can remind us of velvet [13].

Colors affect us psychologically in terms of some color effect they trigger. They can calm us down, relax us, upset us, and so on. Certainly colors affect the emotional aspect and from this we can understand that colors are not only accepted and emotionally valued, but also expressed through them. This can be the expression of clothing, other material goods and especially the expression of colors, e.g. in fine arts. Trstenjak [13] wrote as the essence of the psychological influence of colors that the connection between visual perception and human personality is the ultimate goal of psychological interpretation of phenomena and thus the development of a better understanding of man and his understanding. With every psychological influence of color on a person, physiological processes are triggered, as well as psychomotor, visual-auditory and other reactions that are triggered in our body [13].

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The same goes for color combinations and the symbolic value of colors. Considering that the main problem of the research is the survey presented below and shows the connection between colors and students, in a physiological-psychological and symbolic way we mention similar research by Trstenjak, who in an extensive research (1000 people) identified popular and disgusting or. reflective colors, among which blue as the popular and purple as the nasty prevailed. Such results confirm all the characteristics of the colors and the reasons why these two colors are also determined by the respondents. In addition to such research, he also did research on favorite colors of dresses, where gray predominates in men, while blue stands out in women. He also sought sympathy for certain colors among the townspeople and the rural, and the like [9].

2.4 Color and symbolism

Trstenjak explains that color, in addition to the object, also has a symbolic function, which serves as a recognizable function of objects. In addition to objects that have the function of direct carriers, we also recognize other phenomena by color, which colors represent, illustrate and thus also point to. The specificity of symbolism is reflected in colors that have their own peculiarities, that with their properties and content they show themselves through phenomena that we cannot use in colors in themselves. By this, Trstenjak means national colors, colors of mourning, and colors that signify jealousy, love, hope, and other qualities of a person's personal experience [14]. The connection with psychological influence is therefore interesting, which also triggers a personal experience in a person, but the difference in the subjectivity of psychological influence can be the result of a symbolic value of a more objective character. This is shown by the example of the color symbolism of our flag, which, as in every country, represents a symbol of power, independence, sovereignty, and so on. This is somehow determined through color symbolism and the symbols themselves; it also determines which colors have certain psychological properties that can actually affect an individual in this way. Subjectivity, however, is shown in the event that an individual does not have such an attitude towards this country and these color symbolisms provoke discomfort, disappointment and perhaps even hatred.

2.5 Influence of colors on students

Of all the artistic elements, color has the strongest effect on human emotions, especially in children. Their interest in expression and their connection with colors intensifies with

decreasing age, and this is triggered by the right choice of tasks, which literally forces the child to express themselves with color, which needs to be more asserted at a later, higher subject level. Here is one of the tasks of a teacher in art education, who must guide the student and bring the color closer to him in the everyday and used way. In any case, the teacher must take care of the student's development throughout the educational process, by enabling the child at the age of eight a rich choice of different colors and mixing colors, which influence the development of his perception of color and his idea of colors [6]. It is important to emphasize the connection between the science of colors and creative work, where the child learns about the use of colors and its properties through practical work. If we turn to Trstenjak, who talks about color in terms of the educational process, about the color covered in the learning process, which in addition to the two directions that talk about the purpose of visual aids in the classroom mentions another and that is color as a visual aid in school. student instruction. The usefulness is shown in the fact that color is not only an auxiliary means to achieve certain goals, but also, so to speak, a purpose in itself. We are talking about creative thought when we suddenly find ourselves in a world of colors that directly affects the student's mentality, creative thinking, imagination, the formation of an aesthetic sense and the enrichment of his entire inner experience. As Trstenjak mentions, this is most established in the lessons of drawing and art education. The lesson of drawing and painting is not only intended to enrich the student's interior, but also in an expressive and expressive sense, where color opens up as a special or special diagnostic tool for recognizing a person. Trstenjak talks mainly about three aspects, among which is the experiential value of color in shaping the student in education, which helps to bring him directly closer to life and in a way replaces his life experience. In the second aspect, the illustrative and illustrative value of color is excluded, insofar as, in the power of symbolic meaning, color opens to us the interior of its deepest senses. In the last, third aspect, the expressive or expressive value of color opens up, which is important especially in the developmental direction of the student's creative forces and opens up a new means of educational influence on the student.

In the educational process, the student encounters color at the very beginning of the journey. It is present everywhere, from the surroundings, people, didactic and teaching aids, and most of all, of course, it is encountered in art education. There he learns what color is, how to use it, and how to blend a particular color. Such an approach probably gives students a better understanding of colors, but this is not so much about the impact of colors on well-being. It can be about gaining knowledge of how to use these colors in life, e.g. in our case in education, to make classrooms with colors more enjoyable and to be influenced by these colors in a positive way. When we talk about the psychological, physical, and physiological impact on a person, we are

talking about some general influences that work with a person's subjective perception. We must emphasize that these color effects have a particularly strong effect on children. Success in the use and influence of colors in school should be reflected through a pleasant feeling. The walls where the student's gaze is directed are supposed to be surrounded by cool colors because these colors optically distance the walls and enlarge and expand them. The walls where the windows are should be in bright colors to avoid too much contrast. The hallways and the lobby are supposed to be equipped with bright colors, which is supposed to give some warmth and welcome. All of this effect of color is supposed to bring students only a reduction in visual fatigue. The ideal classroom should have a cool subdued color on the wall where the views are directed. The ceiling and other walls should be brighter to reflect as much light as possible. A dark green color using yellow or pink chalk is suitable for the board, due to the contrast of the optimal resolution. There should be no colors with special effects on the walls, colors with excessive saturation, that is, colors that are tiring. The brightness of the ceiling distracts the student from view and redirects him to the board, and also the teacher has a more vibrant color on the wall, which students show their backs. This brings him to liveliness, dynamism, communicativeness, while the student's own influence of colors focuses on the board, thinking and participation in the lesson itself. Such an influence of colors is supposed to bring a better teacher-student relationship and progress in the educational process [10].

3. RESEARCH

Through research within the survey, I wanted to obtain results that relate to how students perceive colors, what properties he attributes to them, and how the colors themselves affect them psychologically, physiologically, and symbolically. The research sample was large (506 respondents). We focused on students from 6th to 9th grade. class, ages 11-15. These students had an art education in their education, encountered color and also knew how to use it. The survey was conducted in the area of Slovenian schools in the Maribor region, which has 21 primary schools. Five schools were randomly selected, which provided a sufficiently large number of respondents and were also diverse according to the location (urban, suburban), age, etc. The survey questionnaire is one of the most commonly used data collection tools in pedagogical research. When planning the survey, I had to follow certain rules, such as a) clarity, b) non-suggestiveness, c) reasonableness, d) appropriate specificity, d) no vague and unnecessary terms, e) appropriateness in terms of the accuracy of expected answers and the type of data according to which we ask, f) insurance regarding the assumption of respondents being informed with filter questions, h) appropriate personalization i) no danger of socialization, j) no dangerous mechanisms, l) appropriate type and type, and l) appropriate distribution in the questionnaire [11].

The purpose of the research was as follows: to explore the relationship between color and students, how color affects students, in what sense and what qualities do students attribute to it and how do they express themselves with it? The goal is definitely to use the knowledge gained in this research to better equip classrooms and thus better well-being of students in the classroom. In the research, we used a survey questionnaire to present the data. The questionnaire consisted of 15 questions, which were of the closed type, both dichotomous and multiple-choice.

4. RESULTS AND CONCLUSION

The results of the research show that in most cases, students use colors consciously and with purpose. It has been found that colors greatly affect students, especially positive feelings and emotions. When monitoring the physiological influence of colors, it was found that students attribute it mainly to red, blue and black. In a very small percentage, students attribute positive feelings and emotions to achromatic colors (i.e., black, white, and gray). However, students attribute physiological and psychological properties to most colors, while there are very few symbolic markings. These are found only in black and white. Research shows that students' favorite colors are blue and red. These choices coincide with the theoretical explanation of these two colors, as they are related to the expression of happiness. The study confirmed the expected connotative value of black, as a high percentage of students labeled it as a color that expresses sadness. The results of the study showed that students' age does not affect color awareness, while gender does. Awareness and experience of colors is greater in girls than in boys. The research also confirmed the assumption of stereotypical colors according to gender and the connection between a favorite color and the expression of joy.

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