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THE POWER OF COLOUR LANGUAGE IN LEARNING CHILD

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Abstract²

This contribution introduces the study of a research project on the relevance of colour role in the learning child. Our presentation would take explicit several reflections, regarding a path of activities, actions and experimentations related the education of colour as a language in the school and preschool contexts. The research group on *Play and Colour Education* take reference from two courses degree: Science Education and Science of Primary Education of Department of Human Science "Riccardo Massa" at University of Milano-Bicocca, Italy. The study examines the opportunities for children to use colour experience not only as pigment paint, but also as colour significant experiences of the colour light, through emotional and cultural perspectives. The idea was founded on the colour can to become an opportunity of discover and education experience oriented on perceptive and sensorial training and communication act. The first questions are: what kind of activities we could designed as significant learning experiences trough an education of colour? What are the positive effects of the knowledge of colour since the early age of children? The first results indicated positive effects in the child's development on perception, emotion, language, basic of arts and scientific, using the colour exploration with play and other ways of learning. The research aims for children are:

- Contribute to increase knowledge of children's development, from 0-6 years, before school age, in the areas of perception, logic, social skills, motor skills;
- Knowledge on the child's language before the age of six (0-6);
- Contribute to increase knowledge of children's development, from 6 to 10 years, of basic skills for reading, writing and arithmetic, art and perception in school age.

The research aims for educators and teachers has founded to contribute an increase of competence on the teaching color experiences with children. Colour language is a language closely linked to artistic and communicative research. There are numerous artists (Itten, 1961; Kandinskij, 1989; Klee, 1918, 1925; Rothko, 2007, ...), art historians (Zuffi, 2013), critics and researchers (Ball, 2013; Pastoureau, 2006; 2008, 2013, 2016) who have tackled the colour theme as a research perspective. In this

¹ The article is the product of a common research, but the paragraphs are as follows: abstract, paragraph 3, 5 conclusion are by Annamaria Poli, paragraphs 1,2,4 are by Franca Zuccoli

sense, research done with children and with teachers and educators is based on the modes of artistic creation.

Keywords: Colour, Educational Research, Preschool, Primary School

1 COLOUR AS A FEATURE THAT REMAINS TO BE DISCOVERED AND EXPLOITED IN THE FIELD OF EDUCATION

1.1 Background

Colour is undoubtedly a key feature in the life of young children, as numerous studies have shown [1], both due to the emphasis placed on choosing colours and on account of how children use it in their drawings, and indeed in their expressive products in general (whether two- or three-dimensional). *Play and Color Education*, a research group based at the University of Milan Bicocca, and founded by Annamaria Poli and Franca Zuccoli, professors at the Department of Human Sciences and Education who teach on the degree courses in Primary Education and Educational Science, respectively, has spent many years investigating how the theme of the colour is approached in early childhood education and schools (nursery and primary) with children aged between 0 to ten years. The group based its initial analysis on field observations, interviews, and questionnaire data, going on to design experimental approaches for implementation with children, educators, and student and in-service teachers. The researchers' initial reflections led to further study and theorizing and the generation of new hypotheses. Their work has been reported in a series of publications addressed to the Italian and international scientific communities, which have been concerned with the theme of colour for many years, approaching it from many different disciplinary perspectives. [2] One of the group's main findings, from 2012 to date [3], based on studies conducted with both individuals and groups, is that colour is viewed as extremely important by both educators (working with 0-5 year-old children) and teachers (6-10 year-olds). However, despite teachers' great interest in colour, they are increasingly confused about how best to approach it, both from the personal and the educational points of view.

1.2 Reviewing the work of great educational thinkers from the past

The group's field investigations in schools and ECECs have been informed by the work of educationalists from the past, who at different times, and from different perspectives, have approached the theme of colour in relation to children. Indeed, historically, a number of scholars recognized the potential for colour to play a key role in the educational sphere. We here briefly overview their extensive work, focusing on a few of the better-known figures. The first of these, however, is not an educationalist but Corrado Ricci, a renowned art critic and historian, who was one of the first in the late 1800s in Italy, to take an interest in children's drawings. In a short work published in 1877, "Children's Art", he discussed very young children's relationship with colour, reviewing the thinking of contemporary scholars on the theme. Some authors (including William Gladstone) believed that the ancients perceived fewer colours than us, and that this peculiarity was shared by categories of modern humans viewed as limited, such as savages and children. Hugo Magnus and William Thierry Preyer, among others, for example, claimed that children can initially only see red and yellow, later also learning to discern green and the blue, though often confusing them with grey. Ricci was not persuaded by these theories, arguing that: "Certainly we need to

educate children's chromatic sense just as we educate their hand to draw well. Not because it is true that they cannot perceive colours, but so that they may be able to harmoniously match them with reality. For just as they are initially well able to see things but unable to represent them using signs, so they can see colours but are unable to and disinterested in identifying them on the palette." [4("The child and colour", pp.74-75) At the end of this passage, Ricci invited teachers and parents to guide children in observing and correctly perceiving reality, and especially to focus on shades of colours because "[...] many children perceive colours, but often inaccurately and discordantly." [4, p.75] The theme of educating to colour was also treated by three famous figures in Italian education, albeit from different perspectives: the Agazzi sisters (Rosa 1866-1951, Carolina 1870-1945), Giuseppina Pizzigoni (1870-1947), and Maria Montessori (1870-1952). Carolina and Rosa Agazzi devised methods of working with objects and trinkets (brought to school by the children or by the teachers themselves), which were to be divided by colour: "*The Educator's Museum*. For each colour the educator presents, she will collect a set of objects in a suitable box. In a red box, she may place: a poppy and other red flowers: (pinks, carnations, geraniums etc.); red fruits and vegetables: (tomatoes, bell peppers, currants, strawberries, apples, etc.); miscellaneous objects: (thread, paper, tape, ball, powder, earrings, necklace, clothes, hat, parasol etc.). The lesson. When presenting these and the other things making up the museum of the colour red, precedence should be given to the object that is most characteristically of that colour; that is to say, the object that by its nature cannot be of any other colour. For each of the main colours, only a few things will meet this criterion: let us seek them out and exploit this special characteristic to accustom the mind of the child to investigating and understanding." [5] Giuseppina Pizzigoni encouraged observation of the world of nature in which the colour is a key feature, for this reason devoting much time to the copying of real-life subjects as well as to more ornamental drawing. "d) *Copying from Real Life*. I always approach drawing in terms of directly copying the real-life subject, not a drawing on the blackboard or a model. Right from first grade, I bring children in front of a barren tree and, after getting them to observe it, I invite them to draw it. On another occasion, I will get them to look at an evergreen, such as a pine tree, and then invite them to draw it. The first grader knows no hesitation, and draws both trees, just as, without hesitation, he or she draws men, homes, and ships. [...] e) *Colouring*. The use of colour plays a large part in drawing lessons; from kindergarten to the highest grade, colour is applied, although it may be obtained by different means. There is a progression from the knowledge of basic colours to the composition of colours and their various hues. Colour is obtained using crayons, coloured pencils, watercolours, oil paints and other special paints that are ideal for painting toys. It is used to make geometric figures stand out and to copy real-life subjects; it also enlivens spontaneous drawings." [6] Maria Montessori, in contrast, approached colour via three different types of educational activity: a set of visual discrimination exercises, which also serve to check the child's eyesight; attending to materials and furniture from the point of view of their chromatic quality (notably in all the Montessori materials, colour is present as a key variable); direct experimentation by children with the creation of the colours and different shades of colour. The following is a first mention in Montessori's writings of the importance of attending to colour: "Aesthetics. Another characteristic of objects is that they are attractive. The colour, brightness, and harmony of shapes are aspects to be attended to in everything that surrounds the child. Not only the sensory material, but the whole environment is thus prepared to attract him/her [...]. And the child obeys the object that corresponds in that moment to his or her deepest need to act." [7] A second passage refers to the actual work to be carried out with the children: "To appreciate colours (children), have a particular sensitivity, which begins to develop in the earliest years of life, through sensory exercises. [...] Regarding colour, note that right from the "house of the child" stage, the children learn to prepare their own paints, making them up themselves to obtain different shades, etc. and they are greatly

motivated by this. When they are older, it is fascinating to observe the care they take in striving to prepare colours that correspond exactly to the natural shades: they try again and again with varying proportions of the different colours, diluting them, or increasing their concentration, until they achieve the precise hue they are after! And it is wonderful to see how the eye is able to appreciate finer differences in colour, and to reproduce them, frequently with wonderful precision." [8] To bring us up to the present day, we may include in our review the work of Loris Malaguzzi and the *Reggio Children Approach*, in which colour (both pigment and light) is the focus of a series of workshops designed to offer a different way of getting to know the world [9].

2 EDUCATION THROUGH COLOUR

Coming back to the contemporary educational context, among the data collected and analysed by our research group over the last number of years, one key finding concerns the kind of use that is made of colour in educational contexts. "For example, questionnaire data collected in 2015, showed that of 49 student teachers who had just completed a period of teaching practice in nursery schools, 71% had observed the implementation of at least one educational activity related to colour, based on the use of tools and materials such as markers, crayons, paints, pencils, sheets of paper or cardboard, and involving actions ranging from colouring shapes with pre-set contours or free painting. Similar activities were reported by student teachers who had done their teaching practice in primary schools (but less frequently, in 27% of cases). The themes ranged from: an in-depth exploration of a single colour, warm versus cold colours, primary and secondary colours, and colours associated with emotions or sounds. This cross-section of observed activities, which has remained stable over the years, has led us to conclude that there is an implicit and almost inflexible tendency to choose colours of pigment and the related experimental activities." [10, p.506] Thus educational activities in schools are focused almost exclusively on colours of pigment. We explored the reasons for this preference by discussing it directly with teachers, who have reported that, given the complexity of colour, working with colours of pigment is the only tried and tested approach of proven success, while alternative approaches, such as working with colours of light, falls outside their area of competence and they would be reluctant to try them without the support of an expert. We thus set out to identify new opportunities, within teacher education programmes, to foster a culture of colour that would make teachers feel more competent and less inclined to restrict exploration of colour with their pupils, as we will describe in more detail in the next section. Paraphrasing the title of a famous book by Herbert Read: *Education Through Art*, [11] which set out to situate art in education not so much as a discrete subject, relegated to a small number of hours a week at each of the various levels of schooling, but as an operational approach to knowledge construction and social sharing, we have interpreted colour as a possible interdisciplinary path with infinite potential, which has in great part yet to be discovered in the field of education.

3 COLOUR AS LANGUAGE

As implied in the previous paragraph, teachers often underestimate the effects of failing to provide the cognitively developing child with the opportunity to engage in exploration; yet a lack of exploratory experience may prevent the child from enriching and expanding its capacity to learn. In this regard Tomás Maldonado, drawing on the work of Jacques Mehler (1974), has written: "It would seem indeed that our brain needs, at a certain point, to sacrifice neurons that are never (or rarely) used, and this for the purpose of making available, so to speak, more space for the most frequently used neurons. It is thus evident that the sensory and motor experience that we encourage (or discourage) in children during the early years of their lives is not without consequences. Such experience may, in some cases, foster or inhibit intellectual development, promote or block certain skills. [...]". [12] The emotional meaning of a trace of colour, a creative expressive, material, artistic, and aesthetic sign, may also bear the value of a symbolic expressive linguistic experience. [13]

With regard to the use of colour in schools, it is rarely used as a functional language in educational praxis, for example as an aid to the memorization of linguistic meanings, or the identification of relationships of meaning. [14] The Bliss method is one of the numerous systems of AAC (Augmentative and Alternative Communication) that already use colours to facilitate learning and

recognition of the syntactic components in an utterance and the logical relationships between words. However, the educator and speech therapist only use colour as an aid for students who have difficulty communicating verbally. [15] Thus, this particular use of colour is not extended to the entire class, although it is unknown to what extent this might facilitate the linguistic learning of the other pupils also. Colour is also seriously overlooked in the school setting as a possible language of geometry and mathematics: from the analysis of the elements forming geometric figures to the recognition of sets, and from the relations governing geometrical transformations to the use of colour to illustrate mathematical theorems.

Frequently, but not in all cases, colour is used in schools as a language of geography, as well as in relation to listening to the music and to exploring emotional experience. However, our experiments in the last-mentioned areas, have led us to conclude that in these cases too colour is explored timidly and in a partial manner. We should especially note how little attention is devoted to the use of the colour as a basis for sensory exercises designed to foster children's perceptual sensitivity from the early years.

And we need to ask why this aspect is overlooked, given that, as mentioned in paragraph 1.2, in the first half of the twentieth century, Maria Montessori had already initiated a debate on the perceptual-sensory use of colour in education, contributing profound and modern reflections on this theme.

Also of interest is the work of Johannes Itten, who studied how people subjectively experience colours, both on their own and in combination with other colours. Itten conducted key experiments on the relationship between sound/music and colour, an interest shared with other scholars and artists, also studying subjective colour propensities and habits. His research on the perceptual effects of the depth of different colours formed the basis for his famous abstract compositions. [16] Despite the numerous studies devoted to the relationship between colour and sound in the course of the twentieth century, the theme has yet to spark significant debate or interest in the field of education.

4 COLOUR-BASED ENQUIRY

As suggested above, colour is a theme that is constantly approached from multiple perspectives in early childhood and primary education. The range of approaches is broad, although the most widely adopted are based on colours of pigment and to a lesser extent on colours of light, two modes of experimentation that may be implemented with children and on which this paper has focused. In relation to these paths of discovery, key feedback received from educators and teachers, however, suggests that they are somewhat intimidated by the complexity of a theme that offers countless variables, generally sticking to established practices that they have already implemented and avoiding ones that are very different to those learned during their initial training. Our own proposed approach, which is informed by *art-based enquiry* [17, 18], draws on the work of artists who have used colour as a key element of their aesthetic enquiry. And who can thus offer expert guidance and encouragement to teachers setting out on previously unexplored learning trajectories.

Two examples may be drawn from books by Alberto Boatto [19] and Stefano Zuffi [20], respectively, who trace the key role of colour throughout the history of art. Throughout the various chapters of his book, Boatto recommends approaching one colour at a time, drawing on the work of individual artists to explore the myriad possibilities offered by each colour. For example, in relation to the colour red, the author summarizes the journey that it has allowed us to make in the following terms:

"The journey of red that I have reconstructed here, starting from the lightness of the pure colour in Matisse and the magic of Klee, passing through the gravitational heaviness of the material colour in Burri, and winding up with the typographic version of Lichtenstein and the building construction colouring adopted by Segal. From the *joie de vivre* of the French master, via the drama of Burri, we have arrived at the squalor stripped of any psychological resonance of the American pop sculptor." [19, p.48] Thus the different "reds" are presented to us as paths of enquiry, initially unknown even to the artists themselves. After ranged through a selection of colours, Boatto eventually addresses polychromic colour. A similar form of enquiry may be carried out by directly comparing the work of multiple artists, using colour as a magnifying glass to explore how their art developed and changed. Figures such as Klee, Kandinskij, Mondrian, Pollock, and Rothko, may be "used" as masters accompanying us on our journey of discovery through colour. Such an approach offers endless opportunities for experimentation.

5 CONCLUSION

If educators and teachers are to meaningfully approach colour from a broader perspective, overcoming their fears about how abstract knowledge that is distant from their personal and scientific backgrounds may impact on their pupils, they will require training in exploratory learning paths for early childhood education settings. Both the educators and students who participated in our research reacted enthusiastically and expressed the desire to further experience colour, not only as a pigment, but also as light, when offered the opportunity to attend ad hoc training on the theme. The general lack of training in this area constrains educational offerings within the parameters of the better-known colours of pigment, often in the limited terms of asking the children to stereotypically transcribe the colours observed in reality, with the result of inhibiting over time both children's and teachers' curiosity and desire to experiment with colour.

In conclusion, we invite teachers and educators to use colour with children, and, as adults, to embrace it themselves as an infinite interdisciplinary experience that is rich in cultural potential to be sought especially in the field of art. By extending the boundaries of our experimentation, it is possible to approach the work of past and contemporary artists in a very simple manner, and to move from the materiality of pigment to the intangibility of light.

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- [9] Edwards, Carolyn, Gandini, Lella and Forman, George, eds., *I cento linguaggi dei bambini*. Azzano San Paolo (Bg): Edizioni junior, 1995. A special experience is the one realized by Atelier Raggio di Luce, was founded in 1996 from a collaboration between the pedagogical experience of the nursery schools and preschools of Reggio Emilia, Reggio Children and the Department of Science and Methods of Engineering at the Faculty of Engineering of University of Modena and Reggio Emilia.
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