[1]Michela Lecca
lecca@fbk.eu
[2]Osvaldo da Pos
osvaldo.dapos@unipd.it

[1]Fondazione Bruno Kessler, Center for Information and Communication Technology, Technologies of Vision, Trento, Italia;
[2]Università degli Studi di Padova, Italia

COLOUMN

Communications and Comments

τό διαλέγησθαι εστί τό μήγιστον αγαθόν

The dialog is the highest good.
[Socrates]

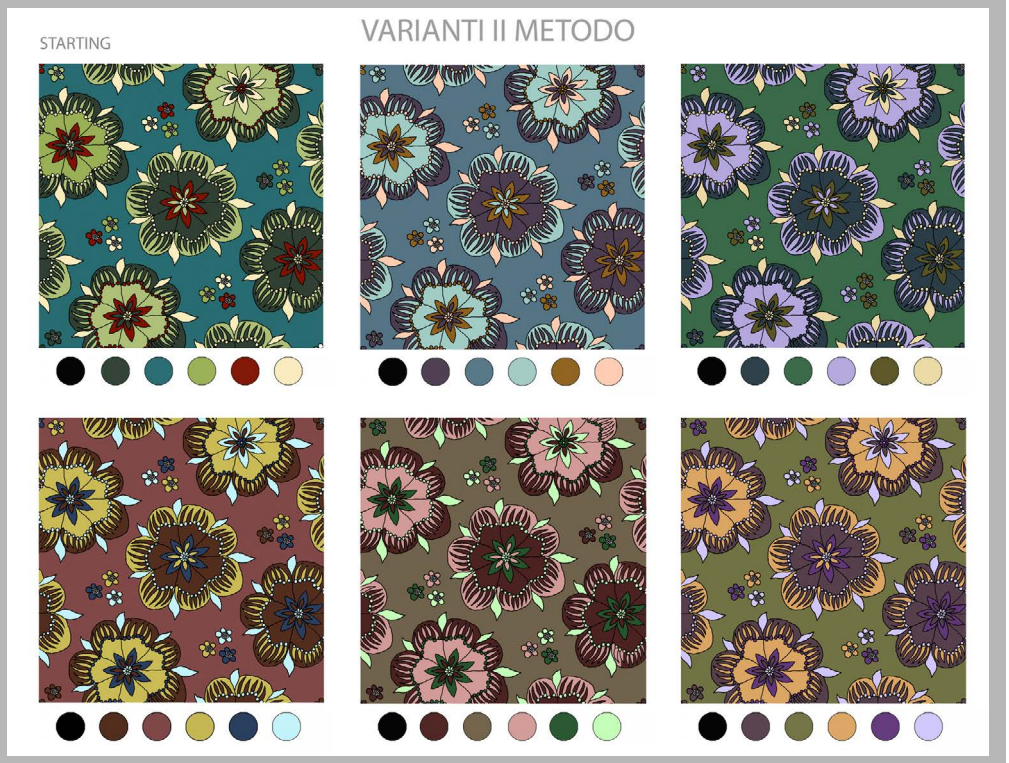
This page originates to promote and stimulate the exchanges of ideas and comments among the members of the Associazione Italiana Colore. In this framework, the page is inspired by the classic Greek philosophy of Socrates, which considered the dialog among respectful speakers as an important tool to achieve and enrich the human knowledge.

In this number, we report the ideas and comments expressed by seven members of the GDC during a workshop, organized in September 2014 by Prof. Osvaldo Da Pos as a satellite event of the 10th Color Conference and hosted by Università degli Studi di Genova (Italy).
The workshop, entitled *"What is the color for me?"*, aimed at collecting the viewpoints of the participants about color. The attenders were asked to define color, to explain how they use color in their work or in their day life, which are the characteristics and the functions of the color they consider important and why, how they deal with color, who is the people working with color. Any other issue they felt relevant was welcome. The apparently trivial question of the title was addressed in different ways by the speakers. The final result was an interesting vision of the polymorphous entity *"color"*, directly derived from the individual experience of the participants.

Three definitions of colors have been provided during the workshop. The first one was given by Osvaldo Da Pos, Senior Scientist and professor at the Università degli Studi di Padova (Italy). He defined the color as a mental tool that humans use to interact with the world. In this respect, color is not a physical property of the objects, rather it is an instrument of the perception mechanism. Prof. Da Pos explained this idea by an example. Let us consider a spaceship, which travels across the universe and suddenly stops under the influence of an unknown entity. The board scientists make experiments and collect data in order to develop a new technology allowing humans to interact with the unknown entity and to continue their trip. After many studies, the scientists represent some features of the field of forces by colors and develop a color based model, where a color variation corresponds to a variation of some characteristic of the mysterious object that stopped the spaceship. These colors, that are called pseudo-colors to be distinguished from the colors are physical radiations, help people to interact with the new body and thus to plan their further actions.

The second definition was given by Michela Lecca, researcher at the Research Unit Technologies of Vision of the Fondazione Bruno Kessler (Trento, Italy). She reported the mathematical formalism of color, as it is used in computer vision. In this framework, the color of a certain point in an observed scene, captured by a camera, is modeled by a mathematical equation, termed the "image formation equation". This models the color response of a camera in imaging science and computer vision, where color plays a crucial role in many applications, e.g. object recognition/ tracking, and image retrieval.

The third definition of color was shared by all the speakers: color is a powerful communication tool. Michela Lecca gave some examples of color as communication tool in science: colors



are used to distinguish or highlight concepts in a text (e.g. a book or a scientific presentation); colors improve the understanding of data, collected in a table or plotted in a graph like a pie chart, where colors are employed as legend; they can be used also as unit measure, like in the case of the litmus test for quantifying quickly the PH of a chemical substance. Renata Pompas, specialist of color and textile design, described the content of a course she organized some years ago about inject printable surfaces. One part of this course was devoted to study how the choice of a certain palette of colors can be interpreted by an observer and what a color can communicate also from a symbolic point of view (this color is cold, warm, heavy). Renata also addressed the verbal and visual communication of the color: the verbal communication consists in creating cromonyms, i.e. words that indicate an object through its color and vice-versa; the visual communication relates to the synesthesia, where colors are perceived not only by eyes but also from other senses.
An example of color based synesthesia was reported also by Francesca Valan, industrial designer with strong competences on color. She described an event organized by the Ricordi Music School during the exposition Van Gogh Alive in Febuary 2014. One hundred children of the Under 13 Orchestra played some well known classic music pieces of Mozart, Verdi, Bardok, Piazzolla, Hisahishi, Shostakivoic, and Naglieri. At the same time, other hundred children associated a color to each playing instrument, e.g. emerald to clarinet, black to oboe, cobalt blue to trumpet, cadmium yellow to violin. The synesthetic relationship between color and music was experienced also by Vincent Van Gogh that compared his paintbrush to the fiddlestick.

The definitions given above implicitly reveal two important functions of color: the interaction with the surrounding world and the communication of data and emotions. In her talk, Michela Lecca also mentioned the function of color as a powerful descriptor of the visual appearance of objects in daily life as well as in technology.

Anna Marotta, Professor at the Department of Architecture of the Politecnico of Torino (Italy), explained the relationship of the color with other features relevant to architecture. Her

analysis showed that the choice of a certain color for an architecture project strongly depends on a number of different factors: among the others, the historical and cultural context, the geographic position and its topology, the global and local illuminant conditions, the physical and chemical characteristics of the materials, the perception of the users, the symbolic meaning of a color into a certain community, the final usage of the product. Designing color is thus a complex procedure that investigates many issues and requires many different competences.

There are artists, scientists, architects, designers working with color. To Giulio Bertagna, architect of B&B ColorDesign in Genova (Italy), all these professional figures are characterized by a large amount of creativity, that it is the raw material for solving problems, pushing innovation, and stimulating emotions. But they have very different cultural background, so that they approaches a same problem differently. To Giulio, for example, an architect that proposes a certain project bases his work on a social, historical, almost philosophical analysis. He does not consider more technical issues, such as the physical properties of the materials that will be used to realize its project. These are questions for engineers and/or scientists. In this mosaic, a tessera is still missing: it is the work of the color designer, that chooses the colors in order to harmonize the project according to the neurophysiological principle of the human perception. Color designing is not decorating, rather configuring a scene where color is perceived as an intrinsic property:

> *"This is the difference between to paint a wall and to configure a scene",*
> as Giulio told.

To conclude, the talks presented at the workshop showed very different positions about color, that appeared as a complex, multi-facetted entity.