The colour consultant training for the future: a holistic view of design and technologies

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The questions about the teaching of colour are central to the AIC community. The SCGE project run by Robert Hirschler in the last two years collected the participations of delegates from 40 countries around the world. The difficulties in this goal are due to the intrinsic multidisciplinary nature of colour and to its many different possible applications and related technologies. Moreover, colours have emotional, cultural and symbolic valences and designing with colour can sometimes look like a matter of personal preference. In order to be able to teach at higher level all aspects related to colour and make the students experience them, Università degli Studi di Milano and Politecnico di Milano have organised in 2015 the first edition of the Master program in *Color Design & Technology*, with the aim of providing in-depth training in the complex field of colour design and colour technology. The master aims at forming professionals able to manage the technological and design complexities of using colour in creative and industrial processes and in many application domains: from industrial product design to interior architecture, from communication to fashion and entertainment, and even in designing the urban environment. The master's program is organised in two separate learning phases. The first phase is theoretical, while the second part consists of project works to make students apply what they have learned in the fundamentals in scenarios of typical colour design. At the end of all these modules, students are called for an internship in one of the companies, professional study or research centers related to the master.

The first phase of training

The didactic is organised in two phases. Four teaching modules compose the first theoretical phase. Colour culture, history and scientific basis are introduced in the first two modules, together with an overview about the aspects of perception that are the basis of its complexity. The third module is dedicated to the digital colour: the theoretical and practical fundamentals to manage, display and reproduce digital colour contents on different media are provided. The last module describes the profession of colour designer through examples and case studies, in various professional contexts. In the following, details about the didactic are given. Interim checks on students' learning progress are scheduled for all didactic modules. Figure 1 shows the students practicing with colour atlases and measuring tools.

Figure 1: Three moments involving the students, during the lessons: practicing with a spectrophotometer (left), using colour atlases (middle) and exercise for the Design Week about colour trends (right).

Perception and color history

The aim of the first module was to present aspects related to culture, history and colour perception. The use of colour in motion picture industry and in photography has been shown. In the field of cultural heritage, different techniques are used to measure and monitor the conservation of colour artwork. Another important aspect considered in this module is colour perception. The perceptual mechanisms that affect the colour and vision in general, such as simultaneous contrast, assimilation, colour in context, have been examined in order to enable the students to recognise and design them.

Colorimetry and colour systems

Although colour is a subjective characteristic, the colour of a surface or a light source has to be measured, communicated and represented in an accurate way, to be clearly identified. The starting point, however, is the human visual system, therefore an overview about the physiology of the vision has been presented. Then, lectures had addressed the theoretical basis of colorimetry, photometry and radiometry as well as the colour atlases, an alternative way to select, represent and communicate colour. The module presented the essential technical skills that are the basis of the colour designer, whatever the application areas on which she/he will choose to specialise in the future. The fundamentals have been presented both through frontal lessons, and practical or laboratory activities. Students have been encouraged not only to understand the laws that govern, i.e. a spectrophotometer, but also to learn how to use it correctly.

Digital color

With the diffusion of new technologies, more and more aspects of communication and colour reproduction are becoming digital. In this module, theoretical and practical fundamentals for manage, view and reproduce the digital colour applied to different media have been provided, with particular attention to the limitations and problems associated with the use of different devices (scanner, camera, monitor, printer) and colour profiles. Beside the description of the common digital workflow, some hours have been dedicated to innovative topics as colour in stereoscopy and virtual reality.

Colour applications

The success of a project that requires the conscious choice of colours depends on the experience, the preparation and the diligence of the designer. This module showed how the knowledge acquired in the previous modules can be applied in most professional fields and applications, through examples and case studies deriving from different contexts: marketing, visual communication, restoration of cultural heritage, photography, architecture, product and lighting design and more. A week after the beginning of the Master, in Milan started the Design Week, one of the most important world event related to the

topic of design. The event was an important occasion for the students, who were asked to actively participate, looking for future trends in colours and finishing and reasoning about the change in the use of colours, in terms of decorations and schemes, from 1950s to now and more.

The empowerment

A number of hours of the master program have been dedicated to the empowerment of students for their introduction in the world of work and professional activity. Some of the companies (NCS, Barbieri, Mammafotogramma, Flukso, Barco, X-rite, Konica Minolta, Fontegrafica, Mantero, Missoni, Elementi Moda, F.lli Giovanardi, Oikos, De Longhi, Nankai Co Ltd, Merck, TIGER Coatings GmbH & Co. KG and Materis Paints) willing to host interns came in the classroom to tell their story and explain why there is the need of a colour expert. They also brought devices and materials to show to the students. Moreover, two visits were made to companies that deal with colour design: Clariant Color Work and Lechler, who opened us the doors of their laboratories (Figure 2). Empowerment supports the student's process of personal and professional growth by developing the ability to form relationships and to work successfully in a variety of dynamics.

Figure 2: Pictures taken during the visits to Clariant Color Work (left) and Lechler (right). Images courtesy of B. Travieso.

The second phase of training

In order to practice the gained theoretical knowledge, the second part of the master consists of five project works, referred to typical colour design scenarios. The first module is about communication, where students are asked to interpret the colour in the context of publishing. The second module deals with fashion design, while the third module focuses on the chromatic planning for innovative retail spaces designed to ensure a harmonious relationship with the values coming from the brand and the corporate identity. The fourth module is about product design, and has the purpose to acquire methods and operational tools in order to design and develop proposals for the chromatic industrial product. The fifth module theme is the relationship between the colour in urban spaces and the meanings of the human interactions that take place within it. The discussion focuses on the aesthetic upgrading of buildings in modern construction, to solve their visual impact. For the project works, the students have to work in-group to present a final project for each module.

Colour for communication

This module focused on the function and communicative dimension of colour within the project of Communication Design. Each communicative artifact arises from a series of choices that fit into a well-defined design process. The design and implementation of a brand start from the visual identity (name,

brand, logo, lettering, packaging, integrated communication) that ensures the recognition and affirmation of the company. It is clear the importance of colour in this strategy: the visual identity is built on the evocative and persuasive aspects of the chromatic language.
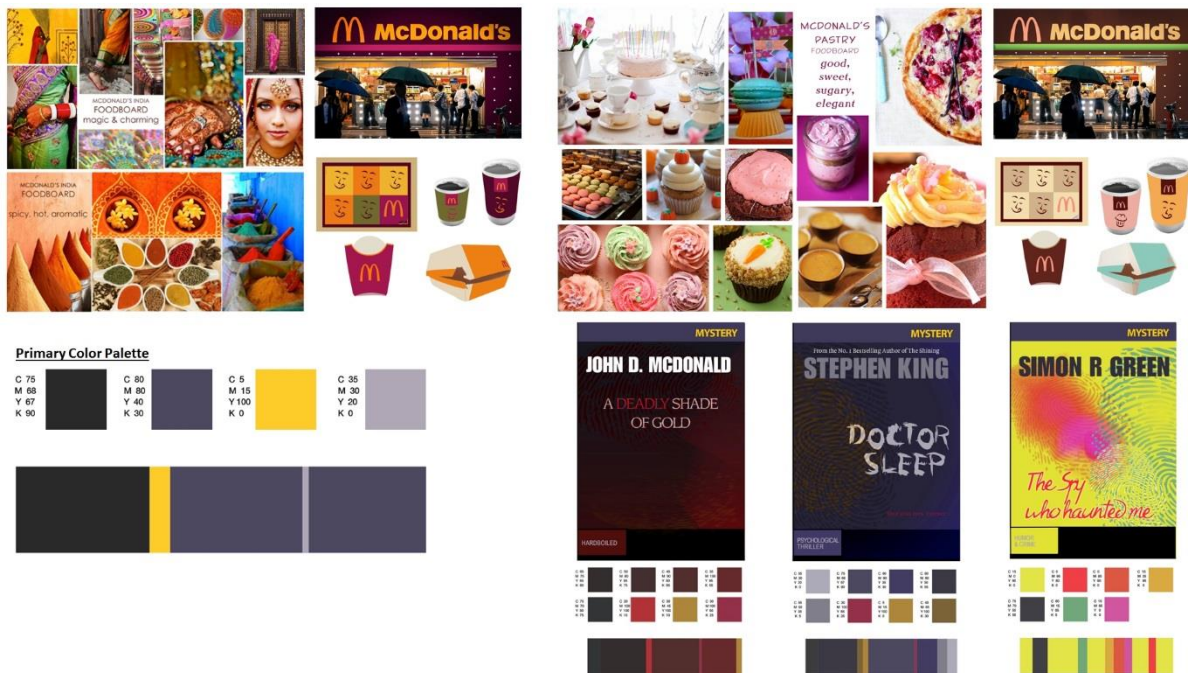

Figure 3: Project Work "Color for communication". Teachers: Elena Caratti and Elisabetta Del Zoppo. Works of Salma Hussein and Tanja Polegubic.
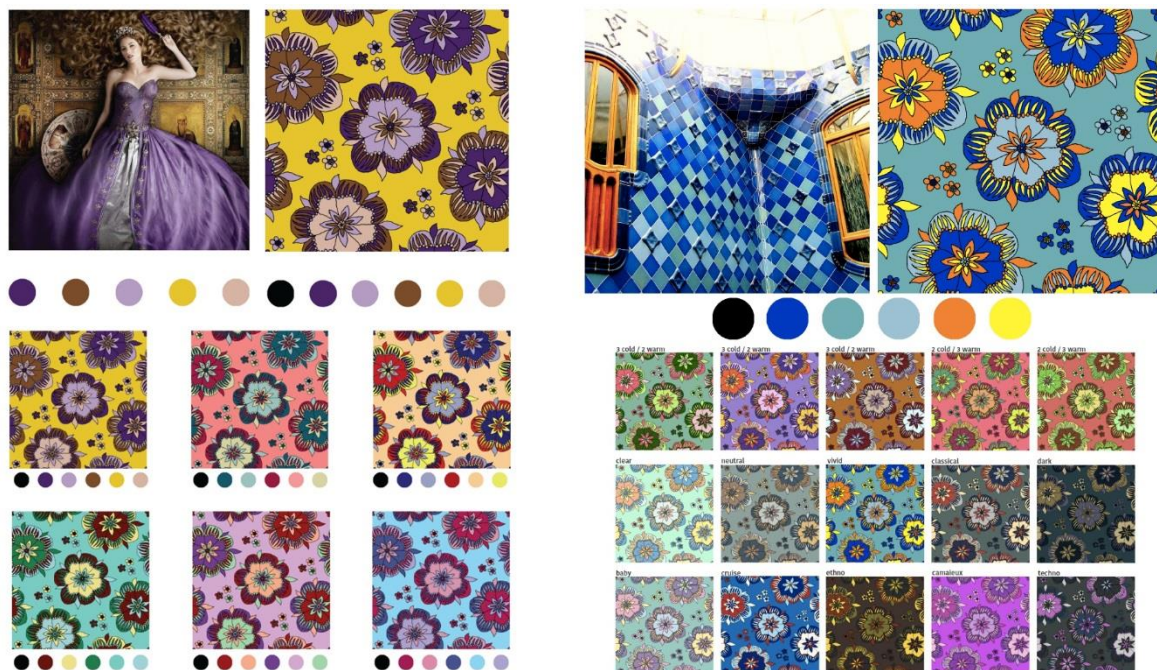
Color for fashion design

Figure 4: Project Work "Color for fashion design". Teachers: Nello Marelli and Renata Pompas. On the left work of Francis Wild. On the right, work of Alba Pedrini and Veronica Sarbach.

This project work is dedicated to the study of the colour texturing in fashion with the aim of being able to offer the same product with different colour variation, in order to reach culturally different markets and to offer the sensation of a personal choice to individual consumers. The starting point is the construction of the colour palette, composed by individual colours, for the fashion collection, combined in two or three main approaches in relation to the messages conveyed, their aesthetic and social characteristics. The basic concepts of pigments for dyeing and printing textiles as well as the quality standards for the marketing of fashion products have been presented: clothing, footwear and accessories.

Color for interior design

The project work on interiors design is dedicated to the analysis of the application possibilities of a chromatic design, for the creation of innovative retail spaces that can ensure a harmonious relationship, with the values from the image communicated by the brand and corporate identity. Starting from practical applications, examples of different approaches to retail design have been shown, proposing a new type of commercial space (permanent or temporary) where the colour is integral part of the experience design.

Figure 5: Project Work "Color for interior design". Teachers: Arturo Dell'Acqua Bellavitis and Lorenzo Morganti. Work of Suheir Darhouth, Beatriz Travieso and Joni Kirk.

Color for industrial product design

The aim of this project work is to develop a methodology to design a real product (a De Longhi coffee machine in the specific case) through the simulation of a CMF project (Color/Material/Finishes). All the methodical phases needed for the definition of the product identity have been considered: study of the market (position, competitors...), study and definition of the target, study of CMF trends in the sector and creation of CMF scenarios. The CMF responsible for the De Longhi group taught to the class about tendencies, brought colour samples used on the market and a new prototype ready for the commercial launch. After this first part, students have gone through the proposal phase with the design of colours, materials and finishes to apply to the new product. The final output for the presentation has been shown also to the responsible from De Longhi that integrated the notes of the teachers with comments based on the experience on the real market.
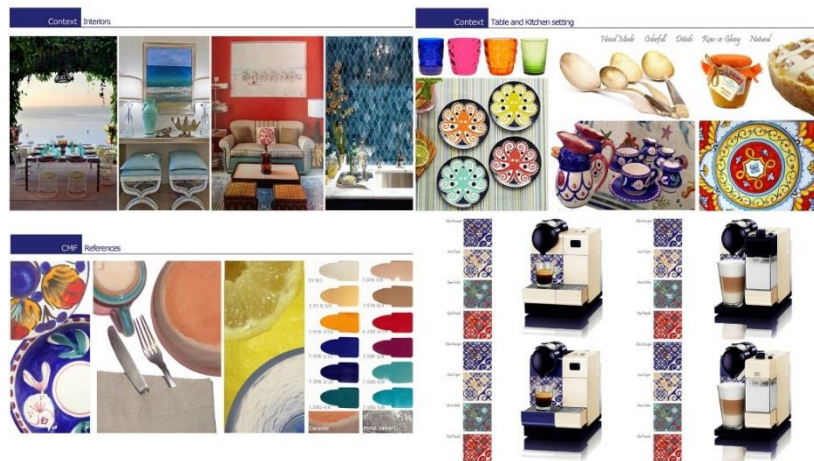
Figure 6: Project Work "Color for product design". Teachers: Stefania Perenich and Francesca Valan. Work of Costanza Fausone and Ilaria Sarà.

Color for urban space

This part of the master program dealt with the close relationship between architecture and urban space. The aspects related to the interaction between the human being and natural environment has been analysed. It has been highlighted the role of the "perceptual project" for the growth of civic and urban identities. The module analysed the issues related to the phenomena of perception and colour in the urban scale by providing theoretical and procedural tools with the support of pictures, cognitive maps and case studies.

Figure 7: Project Work "Color in urban spaces". Teachers: Giulio Bertagna and Aldo Bottoli. Works of Sandra Niggl, Simona Troiano, and Sara Ubaldini.

Conclusions

In this paper we illustrated the training idea of the Master in Color Design & Technology for the colour consultant profession of the future. Students coming from all around the world, and with different backgrounds, attended it, as demonstration that colour is a key aspect of every individual's

life. The various sectors, in which the companies hosting a trainee operate, reveal the multidisciplinary nature of colour and the different application fields.

After the internship, students had to provide a final report considering goals achieved and skills developed during the experience that have been judged by the academic board during the final exam.

During the final exams (Figure 7), students showed their project works to the academic board as well as a presentation of the work they conducted during the internship. The hosting company was chosen directly from the students, in order to let them follow their personal attitudes and interests. This was an opportunity to use, from a practical point of view, the theoretical knowledge acquired during the didactics. In some cases, the knowledge derived from topics covered in the master, not directly related to the specific business object of the company, allows suggestions to improve the business workflow.

Below, some feedback from students who participated in the master program:

"The masters exceeded my expectations, as we were given access to experts from industry and academia as well as an internship program to hone our knowledge in a colour field.

On a professional level, the masters exposed me to an international audience of colour practitioners, through site visits, conferences and online networks. Having a new 'mastery' of colour awareness gives me an advantage in all aspects of my professional work - as colour is present in all aspects of communications and design. On a personal level, I am a more aware consumer, and have joy pursuing the use of colour in data visualisation and a newfound appreciation for colour management. Everyday objects and experiences hold much more meaning to me now, as I know all the work that goes into creating perfect colour combinations."

- Tanja Polegubic, Croatia.

"I chose to do this master because my main expectation was to get all the scientific knowledge I needed, and that's why I appreciated very much the first part of the program, dedicated to colour theory, colour perception, visual system… Then we had also a second part, with more practical workshops, to know all of the different applications of colour design."

- Veronica Sarbach, Switzerland

"I had a stage in a company in which I designed a proposal of tints for the motorcycle industry. The internship considerably increased my knowledge and my passion.

It was the first time for me in a company; a work made of analysis, design, proposal, exchange and realisation of ideas. An experience that enriched me both professionally and personally."

- Simona Troiano, Italy

"The master gave me a really great understanding of the overall world of colour, and introduced me to a lot of people who I've have never had met if I've haven't come here. In addition, our class was international, we had people from all over the world, and this experience was fantastic because we were able to integrate the ideas people have from different cultures about colour. This is very interesting for me because I have a science background and it was interesting to meet people with different background, like architecture, design and other things."

- Joni Kirk, Australia

"I am really happy with the Masters. It has given me the chance to meet people coming from different Countries, with whom I have developed a strong and deep bond, plus my spoken English has improved considerably.

In terms of contents, we've been given lectures from the most important and well-respected academics in the field of colour studies, we got the chance to take part to the annual Italian Color Group meeting and we've also met a lot of professionals who are actually working as colour designers.

I am convinced the Masters has given each of us the main instruments one needs to start a career in the colour field and, most important; it has showed us the limitless application that colour might have in different industries."

- Alba Pedrini, Italy

"I studied this because there is a big offer of graphic designers in Latin America and I wanted to show something different and unique in my perspective and the master offered me this. Initially I really did not know wat to expect because no one teaches this kind of things, it's really new, but it was pretty good.

It incorporated the technical, physical and mathematical part, and a very much more practical workshop type environment in which we interacted with professional that work on the field. That was very interesting and new."

- Beatriz Travieso, Honduras

Acknowledgements

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