Computer-based assessment of 6-7-year-old children's colour perception and interpretation

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Children are born with the ability of interpretation of visual language, but when they enter school, important elements of their visual thinking like colour perception and interpretation are neglected (Brumberger, 2007; Bintz, 2016). In order to educate visually literate adults, in the age of digital imaging, "with a plethora of visual information" (Bintz, 2016, 93), reliable and valid tests for monitoring visual language development are needed that utilise an interactive online visualising environment similar to those children often use.

Most studies agree that colour perception is a visual literacy construct (e.g. Eilam, 2012). Despite the fact that about 90% information children perceive through their eyes (Bintz, 2016) and process in their brain is visual. Our tests are based on curriculum requirements for the discipline called Visual Culture in Hungary and are aimed at providing teachers with a sophisticated feedback on the developmental level of integrate perception and interpretation. Rapid and personalized feedback is ensured by the eDIA, online, adaptive testing environment that provides an easy-to-use, freely available for all Hungarian schools (Csapó, Lörincz and Molnár, 2012). The spectacular imaging quality of the tasks of eDIA makes it an enjoyable visualisation tool that makes it easier to comprehend colour arrangements than traditional paper-based tests. During electronic assessments, students work in an environment that resembles social web sites as well as gaming applications and utilise familiar tools with ease.

Colour perception and interpretation performance is evaluated in comparison to other basic components of visual literacy: visual communication, spatial perception and creativity (Kárpáti and Simon, 2014, Babály and Kárpáti, 2016). This presentation will introduce the skills structure our test items are built in, show how elements of this construct can be evaluated and explains first results with a cohort of 1st and 2nd graders (age range: 6 -6.5 and 7-7.8 years). The data fit in the four hypothetic colour perception and interpretation component: colour sensitivity, colour-and form recognition, colour memory and colour-and meaning. The test battery is suitable for everyday school environment for development and assessment as well.

ICCPH22017

6th Colour Specialist International Conference in Hungary
International Interdisciplinary Conferenceon Colourand Pattern Harmony
21-23 May, 2017, Pápa, Hungary

Program

and

Abstractbooklet

2017, Pápa, Hungary

Welcome to ICCPH 2017 in Pápa

It is our great pleasure to welcome you to the 6th Colour Specialist International Conference in Hungary.

All previous conferences were organized in Budapest. The title of our last conference, held at the Óbuda University in 2012 was already International Interdisciplinary Conference on Colour and Pattern Harmony. The title had been extened, because in our view colour doesn't appear only in itself, but also in relation to pattern.

Our present conference is organized not in Budapest, but in a small historical town. There are two reasons we may mention for our choosing Pápa as the local of the event. The first is that the permanent exhibition of Professor Antal Nemcsics, the former president of our MTA-AIC-MNB committee was opened last year in the Eszterházy Castle, the venue of this conference. (Related to this, there will be a presentation on the first day of our conference, after which there will be a guided tour). The second reason is that the late pillar member of our committee, professor Gábor Winkler left his mark on the renewed face of Pápa. (Related to this, there will be a lecture by the main architect of the city.)

Pápa lies on the Transdanubia side of Hungary. There are many sights in the town and in the agglomeration as well. We may call this the third reason of the place selection. In the charming small town there are many sights in addition to the Eszterházy Castle. Walking in the lovely winding baroque streets, we can strike upon many interesting things. More than a dozen churches, one synagogue and many museums are here. Because of the topics of our conference among the museums the Museum of Blue Dyeing deserves special consideration. Many water-mills used to operate in the town, some of which are in ruins, others are renovated, waiting for the visitors. For recreation, there are the Várkert bath and many restaurants. Not too far from the town, in the Bakony mountains and in the Balaton-upland there are also many sights.

The conference has been organized using the scientific infrastructure of the Óbudai University. For the two-day conference, until the writing of this welcome note 7 keynote speakers, 9 oral papers and 8 poster presentations have been announced. The manuscripts will be published - after the review process - in the Óbudai University e-Bulletin scientific journal. The organizers wish a very successful conference to all participants.

Ákos Nemcsics, Prof. Conf. chair
Róbert Hirschler, Dr. Co-chair
János Zana, Dr. Co-chair
Antal Ürmös, PhD stud. Conf. secretary

Colour-check on websites of the Hungarian universities

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This paper presents the colorimetric testing of web-sites of the Hungarian universities. In this testing, the main subject of the investigation was how the people with different colour deficiency types can perceive the information on those web-sites. Many IT engineers and web designers do not pay attention to the accessible aspect of web-sites. This accessibility implies that users who have any colour deficiency should be able to use the Internet the same way as the people with no vision impairment.

The disorders in colour vision can be inherited and acquired. The cones' red and green colour specific paint cell's genes are linked to the X chromosome. Because of the gender-linked inheritance, this type of impairment is 20 times more prevalent in men. About 8% of Caucasian males and 0.4–0.5% of females are "red-green" colour-blind. Inherited blue-blindness (tritanopia) is much rarer – only about 0.05% of the population can be detected. Some colour vision disorders are not inherited, they are so called "acquired"; several ophthalmological diseases can result in colour perception disorders (e.g. retinal diseases, glaucoma, cataracts, etc.)

Testing has been completed not only with several colour deficiency simulators on the internet, but also with Variantor's special glasses.

We have not found any publications that consider the testing of colours of higher education home pages, lending credence to our view that IT engineers and web-sites developers do not think about people with colour deficiency. As a result of our testing, we reached the conclusion that, unfortunately not every Hungarian higher education web-site is clearly visible, so students or future students with colour deficiency cannot get the information in the same "easily" way as the normal sighted.h viewed emotionally becomes inspiration creating new interpretation possibilities.

New Color 'Editions' of Urban Space in Post-Socialist Societies

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As long as we have been living in cities we have been using colour to emphasise the social structure of urban space and social differences of townspeople. Colour in urban space is popular, easy of access and highly informative, and that is why it is successfully employed by citizens in their 'self-presentation' and 'manipulating of impression' (Goffman, 1951) that they wish to make on others. However, much more essential is the influence of collective actors on colour characteristics of the city. Having a great amount of recourses, they 'edit the city' (Koolhaas, 1999) by use of colour. They can create colour illusions and impress that urban spaces have particular qualities inside that are non-present in reality. The fall of state socialism changed the political system and the ideology of people. It brought new conditions for colour planning and colour design of urban space, for ways of productions and distribution of colour images in urban culture. Local authorities could not get rid of the existing architecture; however, they were able to use these accumulated architectural material as the base for expression of new ideas by means of colour. The main goal of the paper is to present the comparison of Slovakian and Russian color “editions” of urban space. It includes the necessary theoretical discussion, as well as the urgent experimental investigation involving observing and documentation of urban color, computer simulations and a combination of sociological and psychological methods of urban color analysis.

Scope of the Conference

The topic of papers are not limited to, the following topics.

- **Colour and architectural environment** (architecture, urban-, interior- and lighting design and related topics)
- **Systematization of Colour** (colour systems, harmony theories and other related theoretical topics)
- **Colour and technology** (optics, light sources, colour measurement, lighting techniques pigments, dye, inks, paints, coatings, coloured building materials, etc.)
- **Colour and art** (aesthetics, colour history, painting, graphic arts, electrograpy and new media)
- **Computational analysis of arts**(pattern formation analysis and related mathematical treatment of the coloured pattern in textiles and other materials, fashion design, cosmetics)
- **Human and colour** (colour and psychology, education, aesthetics, teaching methods and aids, synaesthesia, fashion design and other related topics)
- **Extended colour** (all colour and its pattern related topics which do not listed above)

Conference leading

Á. Nemcsics (conf. chair)
R. Hirschler (co-chair)
J. Zana (co-chair)
A. Ürmös (conf. secretary)

Scientific committee

Gy. Ábrahám
B. Bachmann
K. Bialoblocka
A. Csáji
A. Kárpáti
A. Koppány
A. Kwiatkowska-Lubańska
L. MacDonald
A. Mengyán
A. Nemcsics
L. Noury
O. da Pos
K. Schawelka
V. M. Schindler
L. Tolvaj
Z. Vukoszávlyev

Local org. committee

K. Boros (chair)
Zs. Adorján (accommodation)
Á. Szende (aic.mnb delegate)
P. Ürmös (aic.mnb delegate)

Archidea- architecture, painting, emotions

Ph.D. D.Sc. Arch. Katarzyna Słuchocka, Chair of Drawing, Painting, Sculpture and Visual Arts
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The way of viewing and interpreting architecture depends on human sensory activity, the relation between us and a particular architectural form and the context which constitutes the background of the narration. All the factors that construct the picture of a given solid structure, its part or the complex of solids in space, create a vision that is an autonomous interpretation of named reality – a composition reflecting emotional relationship of man and architecture. The artistic message of commentary on plans, sections and the elevations of spatial objects is a transfer facilitating understanding the surrounding reality, giving colours originating from function, from character passed from users to the whole architectural idea to often seemingly soulless products of the art of construction. Noise, hum, muffled sounds from behind the walls, seeping lights or aromas filling the whole interiors, etc. are what complements technical drawings which in their studied proportions create in an unnamed manner space for non-material phenomena of everyday life. Painted or drawn, they may represent architectural dedication or its change resulting from conscious decisions or from randomly gathered factors configuring the functional-utility system in a new order. The social aspect of the utility of designed space may be defined by the diversity of artistic expression, which may be a continuation of dialogue between pure and design art. The ideology of architectural analytical view and evaluation combined with a picture constituting an autonomous approach is expressed in the new creations of the emotional image of architectural representations where colour, gesture and composition play a crucial role of information carriers.

The picture of architecture becomes a separate artistic value, a complementary story in the geometrised world of solids, following the identity of sensuousness and sense given to man existing within its range. Architecture created for man has its side which viewed emotionally becomes inspiration creating new interpretation possibilities.

Key words: depicted architecture, depiction of architecture, sides of architecture, picture and function

Interactive Demonstration of Colour Harmonies and Additive Colour Mixing

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A 1.8m tall egg-shaped body with a background surface illuminated by RGB LED-s was installed in the Central Market Hall in Budapest just during the International Year of Light in 2015. Based on Goethe's „Color Theory" this completed Color Space serves as an interactive demonstration how different color hues appearing on the surface of the egg harmonize. Nature of additive color mixing caused by different methods can be observed as well.

In this article we hereby expound the structure of the installation as well as it's operation. Based on a unique, novel revolvable 3-Layered (3LD) Color Wheel the installation is able to play pre- programmed time-varying sequences of remarkable color contrasts (60, 120, 180 degrees etc.) directed by control buttons.

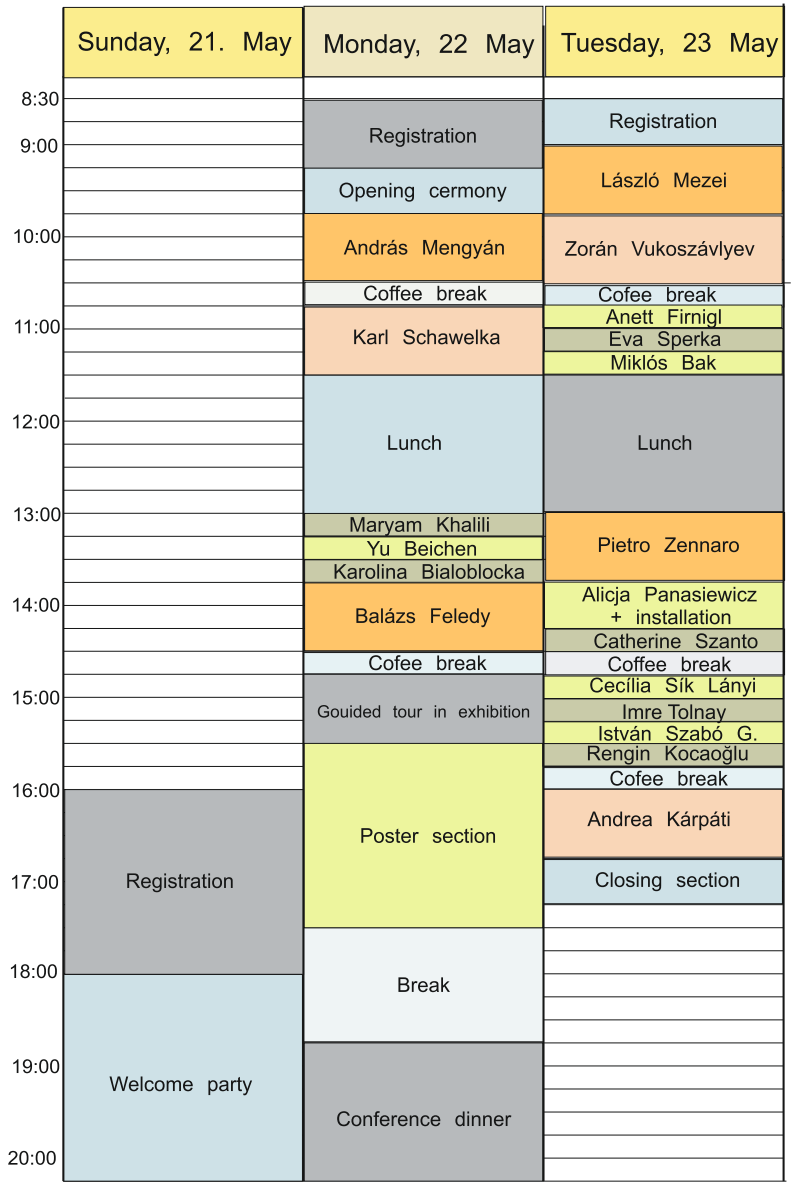
There are two basic mode of the illumination:

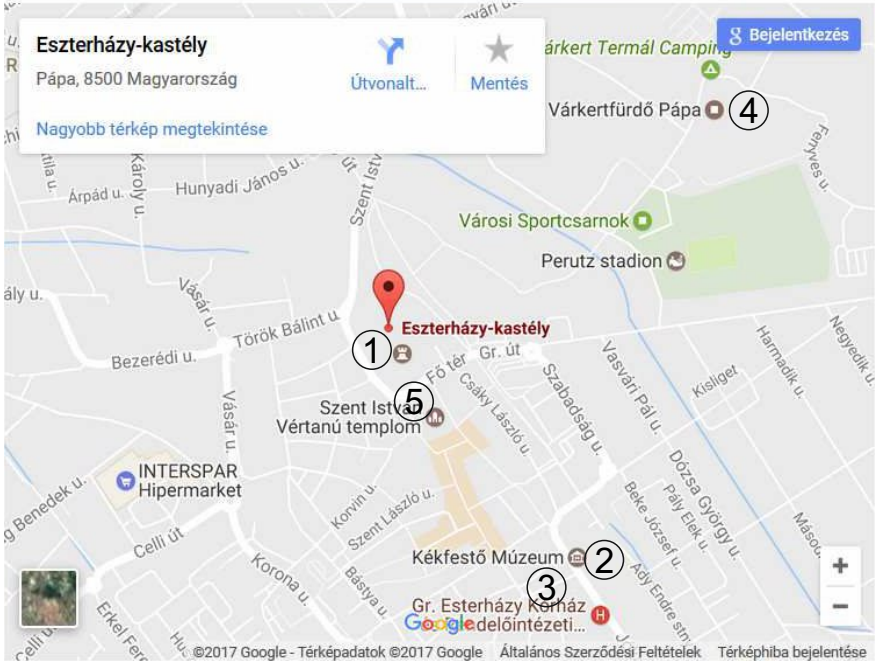
- in color harmony mode, all the egg surface is enlightened with the same color at a time, while the background is illuminated homogeneously with independent colors.

- in color mixing mode, additively mixed colors appear on the surface of the egg-form when illuminated with different colors from different directions. Almost all colors could be displayed at the same time ont he surface of the eggá-form giving a view very similar to the CIE chromaticity diagram.

In color harmony mode, the appearance of the colors on the egg-form and the background creates a color harmony pair. The consecutively displayed color pairs represent the color contrasts of colors choosen from different positions of a color wheel; by pushing control buttons one can choose from 6 predefined and representative color sequences, each representing a couple of color pairs.

Keywords: Goethe's color theory, additive colour mixing, colour contrasts, color harmonies





Conference location: Esterházy castle

Conference Dinner: Esterházy castle

Lunch during the conference: Esterházy castle

1. *Esterházy castle, 8500 Pápa Fő tér 1.*
2. *Blue Dyeing Museum, 8500 Pápa, Március 15. tér 12.*
3. *Reformed Collections of Pápa, 8500 Pápa, Március 15. tér 9.*
4. *Bath Pápa, Medical spa, 8500 Pápa, Várkert út 5.*
5. *Galéria Bistro Restaurant, 8500 Pápa, Fő tér 21.*

Colour Coordinates by naN

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The multimedia installation is inspired by Theory of Colours by Johann Wolfgang von Goethe, where he presents his views on the nature of colours and their perception by humans. The installation of a glass prism filled with water, which filters a moving image displayed by a projector; water container with slit projection; a mirror object reflecting moving image; the growth by crystallizing of the object; an image created to resemble pseudoisochromatic Ishihara's plates and coloured lights and an interactive computer program gives viewers possibilities to check the process of colour perception and the importance of the eye in perception.

Colour Coordinates is a multimedia installation and consisted of 6 parts:

- a glass prism filled with water, which filters a moving image displayed by a projector, inspired by graphics from Farbenlehre
- a cuboid container filled with water inside a shadeless tent serving as a screen and filter for slit projection
- a mirrored object with an amount of water reflecting and deforming a moving image
- a mirrored object containing a fragment from Goethe's Faust: Verweile doch! Du bist so schön! (Beautiful moments, do not pass away!) – referring to the words spoken by a scientist searching for truth, to the point of giving his soul to the devil. The growth by crystallization of the object is the "growth" of the idea of magenta; illumination; eureka
- projection of RGB colour from a spotlight reflector onto an image created to resemble pseudoisochromatic Ishihara's plates tests the viewer's ability to differentiate between colours. The installation tests that ability for shapes in a different way, also containing a fragment from Goethe's Faust: Verweile doch! Du bist so schön! (Beautiful moments, do not pass away!)
- an interactive program: colours shown on the monitor described with hexadecimal notation, become magenta #FF00FF through human interaction.

Colouring of the Frescos of the Arpadian Age Parish Churches

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In the present article the knowledge is summarized, related to the church frescos from Early Middle Age in the Carpathian Basin. First the questions of the era of the church is discussed. After this the pigment related knowledge of the material science an technological aspects are summarized. After this the paintings and the patterns of are showed, which are appear on the frescos. The aim of the work is the support of the authentic fresco reconstruction with summarized knowledge.

Magic Colours of the Glass Windows of the Gothic Chatedrals

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In the gothic age, the glasspainting was a significant branch of fine arts. There are some good examples in West-Europe (French, Germany), in South Europe (Italy). But there are some similar examples in the medieval Hungary. These glasses are SiO2-metal conposites, where the frequency of the transmitted light depends on the size and the distribution of the plansmonic structures (for example gold or silver nanoparticles) in glass matrix. In our article the optical properties of the glasses are investigated, produced on this way.

Keynote speakers

András Mengyán: Magic of colors and lights
Karl Schawelka: Wilhelm Ostwald's „Harmony of colours" (1918) and its mixed reception - a reassessment
Balázs Feledy: Color in science and in art
László Mezei: Pápa and Gábor Winkler
Zorán Vukoszávlyev: Depicting the transcendent - The light symbolics of Hungarian modern church architecture
Pietro Zennaro: Golden architecture on the contemporary age
Alicja Panasiewicz: Colour coordinates
Andrea Kárpáti: Bauhaus colour theory in the Moholy-Nagy Visual Modules, an educational innovation project

Oral contributions

Maryam Khalili: The Impact of Color on Diaper Bag Design: A Case Study on Iranian Young Mothers
Beichen Yu: Colour harmony in the urban environment: discussions and revisions
Karolina Bialoblocka: On notes on colour in Irish building regulations
Anett Firnigl, **Miklós Nagy**: Using colors at the roman villas of Balaton upland
Eva Sperka: Historical colour scheme of rondo-cubist facades in Bratislava
Miklós Bak: Possibilities of using nanotechnology in wood colour protection
Rengin Kocaoğlu: Measuring Sustained Attention and Mood of University Students: Effects of Correlated Colour Temperature
Veronika Szűcs, **Cecília Sik-Lányi**: Colour-fidelity of online-virtual museums
Imre Tolnay: Colour-resoluted world – the use of colour from the impressionists postmodern

Poster presentations

Éva Mester: Colour application of medieval frescos
Árpád Szende: Colour harmony in the architectural praxis
Ákos Nemcsics, **Antal Ürmös**: Colouring of the frescos of the arpadian age parish churches
Antal Ürmös, **Ákos Nemcsics**: Magic colours of the glass windows of the gothic chatedrals
István G. Szabó: Interactive demonstration of colour harmonies
Katarzyna Słuchocka: Archidea- architecture, painting, emotions
Yulia A. Griber: New Color 'Editions' of Urban Space in Post-Socialist Societies
Cecília Sik-Lányi: Colour-check on websites of the Hungarian universities
Alisa Tóth, **Andrea Kárpáti**: Computer-based assessment of 6-7-year-old children's colour perception and interpretation

Keynote speakers

The Application of Colours in the Medieval Church Frescos of Transylvania Depicting Saint Ladislaus

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Unitarian Church of Székelyderzs, UNESCO World Heritage site

The series of frescos depicting the legend of Saint Ladislaus painted on the northern wall of the medieval church of Székelyderzs in 1419 showing amazing technical skills and artistic prowess were covered with plaster by Unitarians in the name of Puritanism, but it was actually this layer of plaster that has protected the mural over the centuries from changes being made to it as well as deterioration. The series of frescos, with the exception of the blue one and the green one, have preserved the original colours. The mural was uncovered in the 20th century, and has recently been restored, making it visible as well as available for study. The sequence can be understood even without captions due to the colours and other elements of the composition.

Comment: The chemical components of certain paints in the fresco are changed during the centuries, which caused color mutation in the composition. These details can be observed on this poster.

Unitarian church of Homoródkarácsonyfalva

The colours of the large picture strip located on the northern wall of the nave made with al secco technique in the 15th century, which was uncovered from under a thick layer of plaster in 2006 are strong. It depicts a scene of the victorious battle of Kerlés Saint Ladislaus fought against the Kuns in 1068, which was a popular topic of painters of the age and has lived on as part of the legend of Saint Ladislaus. The intensity of ochre yellow, orange, russet and walnut brown colours is further enhanced by complementary colours, although the blue colour of the sky and the green of the grass have lost their strength over the centuries. The hues of the white and grey play a very important role in balancing the contrasts. The meaning of pictures is made clear by the application of colours and the composition's arrangement. The middle part of the picture sequence was destroyed when a window opening was made on the wall in the 19th century.

Comment: The chemical components of certain paints in the fresco are changed during the centuries, which caused color mutation in the composition. These details can be observed on this poster.

Magic of colors and lights (From a fine artist and designer point of view.)

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In my introduction I intend to talk about the dual behaviors of artists and designer in regards to colors and lights applied in visual education, design and visual arts. Based upon this duality I'm going to focus on the main tendencies of the application of colors and lights in visual arts. I provide a short historical revue about the application of colors and lights in visual arts in general. Further on l provide information with visual examples from internationally well-known artists who apply colors and light as tools, as matters, as medium and their combinations.

Finally I'm going to present some of my works in the title: Polyphonic Visual Space.

Blue Dyeing Museum in Pápa

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Indigo is one of the oldest textile dyes. Indigo dye is an organic compound with a distinctive blue color. Originally, indigo was a natural dye extracted from the leaves of certain plants. The primary use for indigo is as a dye for cotton. Using just indigo and a resist technique the Kluge family maid ends of blue dye textile and of course household items and cloving as well.

Wilhelm Ostwald's „Harmony of Colours“ (1918) and its mixed reception - a reassessment

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Wilhelm Ostwald's “Harmony of Colours” from 1918 was heavily contested in 1919 when he tried to demonstrate its tenets during the “1. Farbentag of the German Werkbund” in Stuttgart. Artists like Hölzel, Itten, Klee, Schlemmer, and art historians like Erwin Redslob, Paul F. Schmidt and Hans Hildebrandt were upset. Hildebrandt published a “Farbensonderheft” in 1920 where the critics of Ostwald raised their objections and later organized an action called “Verwahrung” (protest) to avoid that Ostwald's System could be taught at schools. Among others it was signed by many of the Bauhaus masters. When this proclamation was accepted by the Werkbund in 1921, Ostwald had to renounce his membership. What were the reasons for this refusal?

Then again some years later the “Zeitgeist” seems to have changed. Constructivists and artists from the de Stijl-group welcomed Ostwalds ideas. Ostwald could even lecture for a week at the Bauhaus in Dessau in 1927. In the Bauhaus Moholy-Nagy and younger teachers like Hinnerk Scheper or Herbert Bayer dealt with Ostwald's doctrine, however, without adopting it wholeheartedly. In spite of this not many artists – the Swiss artist Hans Hinterreiter being one notable exception – were inclined to use Ostwald's doctrine of the harmony of colours consistently.

What do we think of all this today? Are Ostwald's suggestions sound? Are the objections by Hölzel, Klee and others valid? Was it a conflict about areas of competence? Can the results obtained by using his method convince? Is the question of the harmony of colours ill-posed? In my intervention, I will try to discuss these issues.

Poster presentations

Colour-resoluted world - the use of colour from the impressionists postmodern

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After 150 years after the impressionists Delacroix seems to have prognostica of the appearance something of neo-impressionism. Impressionism indicated the beginning of the modernism in therms of colour-system and the quick sequels of it were the different kinds of „exoduses" and „sezessions" from the official, academic art. In the age of the postmodernism we ought to have a new view of the colours of early avantgarde, op-art end pop art. After one century of abstract art we have to have an overview of the colour-field of lyric and geometric abstraction. In the age of the globalism we should have a look at the meaning of the colours of land art and nature art. Our inquiries are important for autonomous and applied arts and education of visual arts.

And what about enviromental design? Can we talk about global and / or local trends in the colour-field of architecture and design? Would we detache from nature with our colour-decisions or do we copy the colours of nature?

Red, Blue, White, Yellow – and many shades of Green. The colours of the Garden.

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When thinking about colours and gardens, one tends to think of flowers. Indeed, since the 18th century and during the 19th century, the importation of plants from around the world to Europe and the inventivity of the horticulture industry have brought to Europe a wealth of flower and plant colours unknown in earlier gardens. While the gardens were going ablaze with the rich colourfullness of bedding plants, another approach to plants and gardens developed : it can be found in William Robinson's The Wild Garden, Gertrud Jekyll's writings, and continues today in the search for the « natural » and « ecological » garden, for instance in the work of Piet Oudolf in the United States, of Gilles Clément in France, and of many other less well known landscape architects. Inspired by the natural environment, these designers create gardens that are rich in shades of green (in spring and summer) and rust (in winter), displayed through a variety of leaf texture and branching patterns. Such gardens promote a new garden aesthetics and invite a new appreciation of the subdued colour variations of the plant communities that we encounter in our everyday landscapes. They offer thus a new way of understanding William Kent's discovery (in the words of Horace Walpole) that « all nature was a garden » - or, in Gilles Clément's words, that we live in a « planetary garden » (« jardin planétaire »), inviting us to become all gardeners, that is, keepers of the Earth.

Color in science and in art, introduction of the life-work exhibition of Antal Nemcsics, placed in the Esterházy castle, in Pápa

Balázs Feledy
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- Particular career of Antal Nemcsics, when artist will be a scientist (birth, descent, schools).

- The importance of his studies in the Hungarian College of Fine Arts as a painter (1945-1950).

- The beginning of teacher career in 1951, teaching and research of colour dinaimics

- Style realism, nature-based way of seeing things, formation and study of sacred art, flash of real works, cooperation with his wife Magdolna Takács.

- Connection into the architecture, environmental design, cityscape, colour plans,

- Scientific career, coloroid color system, theory of complex colour harmony, environmental theory of colour dinaimics and its dokumentation,

- Painting abstraction, geometrical, constructivical viewpoint, connection to Eurpoean tendency, concrete paintings,

- Practice of colour theory: study of paintings

- Topics of painting world: philosophy, mitology, hungarian history, human relations, behaviours

- His art in the hungarian paintings of the XX-XXI century, context Konok, Deim, Balogh, Mengyán, Fajó, Aknay),

- His art in international context, relationships, closeness, dependently and independently from time and era, architecture, paintings, statues (Mies van Der Rohe, Moholy-Nagy László, Piet Mondrian, Paul Klee, Victor Vasarely, Joseph Albers, Max Bill stb.)

- Scientist of the art, artist of the science

Pápa and Gábor Winkler

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That Fridays when he came to Pápa became Whitsun. We took a seat around a table in the city hall drinking the daily coffee and listening lovely stories. The moment of his arriving left behind the official things and were talking about architecture. Real city planning, building designing was it, a living architecture within a consultation day. We never thought that we live in an intellectual manufactory leaded by him.

I learnt this city managing science from him, not in the university. There was nobody in that occasions who left the room without satisfaction. The mentality he suggested to us and the inhabitants was unique. We had no regulations, no city norms. He was the law himself. Everyone who lived in Pápa accepted that in case you are going to get licence for a building you should arrange it with the city architect. After he had agreed with it you got it from the authority.

Sometimes when I called this mobile: +36 30 994 8096 a voice recorder answered:

Welcome! Will leave a message after the beep!

I am going to welcome this man, Dr. Gábor Winkler and leave a message that I haven't heard the beep: couldn't thank him.

From 1994 Gábor as a young architect worked for the Ex-City Council in planning the city reconstruction plans, especially the protected downtown. Pápa has a world-famous heritage based on a city structure from the middle ages, was shaped from the baroque in the 18th century till the end of the last century. We socialist modern city rebuilding movements avoid the large number of old buildings, the street network. Thanks to the city expert committee Pápa won a Hild-prize in 1989, which was the first serious result of the local city protection activity. They worked-out a special data collecting and researching method. Started to find the medieval ruins, foundations, cellars and draw a historical master plan of the city. On this historical base were the new city plans made. All street elevation got a proposal how to complete the missing parts, what building height is adviced to realize. Were also recommendations what intensity would be necessary in the built density. Gábor made a catalogue for each building within the area of the downtown containing not only the protected buildings. These pages in the black city book was the bible of all building possibilities.

The hungarian building affairs officially never accepted this approach of city and building protecting principle. He got many congratulations for his activity, for the results, but for a long time they thought that the regulation of each lots separately doesn't fit to the European legal standards.

But we found the truth on the other side: City of Pápa got a color! Not only on the front side of the buildings but also in all corners or house gates of the downtown. We lost him, but lives in our heart with his smile, his wisdom and his friendship.harmony of colours ill-posed? In my intervention, I will try to discuss these issues.

Colour-fidelity of online-virtual museums

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Today many digital reproductions of artefacts can be seen while surfing on the Internet. The question investigated was, whether there is a substantial colour difference between the digital reproductions of the artefacts downloaded from several online databases and the original works. Tests and measurements aimed to explore the reasons for the differences, which were detected and are described.

Several paintings were selected for detailed investigation. Representative coloured patches were measured on these reproductions from the Internet, displaying them in three popular web browsers and the data sets were compared.

Results from this research demonstrate that there are significant differences between the original artefacts and their digital reproductions, and there is a significant difference between the different web browsers. The source of this difference is very complex. One is the difference between the displaying techniques of the various web browsers, which produces a relevant aberration in colour rendering. This consequence can arise from the JPEG encoding and decoding methods. Implicit use of colour spaces in browsers, missing or incorrect EXIF data, and non-calibrated displays together can result in very different forms of colour representation.

To sum up, measuring the typical colours of artworks displayed with the use of the reproductive technique found in virtual museums, the virtual pictures strongly differ in terms of colours seen in the original pieces. The colouring of paintings and frescos (wall-paintings) in virtual museums is not realistic.

Measuring Sustained Attention and Mood of University Student: Effects of Correlated Colour Temperature

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Humans spend most of their time in man-made settings and the physical components of those settings, such as lighting affect humans' psychology, feelings and cognition. Lighting; both natural and artificial, has an effect on human body and changes how humans perceive and react. One of the qualities of lighting is correlated colour temperature (CCT) which also influences humans remarkably. The aim of this study is to understand the effects of correlated colour temperature on sustained attention and mood of university students in learning environments. In this study, 4000 K (warm white) and 6500 K (between warm and cool white) was used. Since CCT is the colour appearance of light sources, it has a role in affecting students' visual performances; sustained attention and also mood. Exploring the effects of CCT on sustained attention and mood of students, and trying to find the most proper CCT level for education environments will contribute to the current literature. In this study, students were asked to perform two paper- based tests; one about sustained attention, the d2 Test of Attention, and the other about mood, PANAS (Positive and Negative Affect Schedule). It was found that being exposed to light of 6500 K for 110 minutes positively affects students' sustained attention in comparison to 4000 K. According to the results, CCT has no statistically significant effect on concentration performance, errors of omission and total numbers of items processed in d2 Test of Attention. However, colour temperature has a significant effect on errors of commission and number of errors; it was found that 6500 K significantly decreases errors of commission and number of errors. A certain conclusion could not be derived about the effect of CCT on mood.

Depicting the transcendent - The light symbolics of Hungarian modern church architecture

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The buildings of modern architecture has been created strictly applying the principle of form-structure-function. The honest use of elements would result in a simple and puritan appearance - which is raised to a higher aesthetic quality by the compositional skills of the creator. In case of churches, where the material appearance of function is relatively simple, the symbolism of light enriches the meaning. In our presentation we examine the toolkit that was applied by the masters of Hungarian modern architecture in the middle of the 20th century. Our examples describe the aesthetics of our churches built during the very divergent social and political background of the half a century between 1930-1980 - in which we focus on the one common element, the symbolism of light that is handled as the fourth building material: the composition of immaterial material that helps to show the transcendent effect.

Golden Architecture on the Contemporary Age

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Gold has always been a precious metal used in a representative way. His particular, vibrant yellow attracted the men attention from the pre-historical period till now. Religions and power represented themselves making a big use of golden objects. In the case of a laically use power and possessions acquired that vibrant yellow to show an achieved status symbol or as it surrogate. In the case of religions the use of gold was to give the greatest importance to gods or to the otherworld in general. If you put aside the interior decoration, in a certain way protected from an architectural envelope, there are not many buildings showing outside this vibrant material. Also in this case the location of the golden parts usually is difficult to be reached by a prowler. Many examples we can see on the church roofs (orthodox churches, minarets, Buddhist temples and so on) or during some historical periods on some external wall decorations (Renaissance, Liberty, Arts & Crafts, Blaue Reiter, and so on). In any case we can find very few examples of architectural envelopes where gold can easily be touched. Instead of gold many substitutes came up to imitate the colour characteristics and reflection. In fact, in contemporary times, contrary to what happened in the past, many buildings are finished in golden colour, but they are not in real gold. On the other hand only very few examples are built to demonstrate that a change has occurred in the interpretation of architecture and society by use of gold. Where the otherworldly power seemed to require the maximum human effort to represent what cannot be represented, the earthly power try to imitate it transferring on the materialism what can be represented. The use of gold in the outer part of the buildings was limited to express publically what must be a common sentiment. Now the private message seems to be used as self-referential, expressed by gold possession. Is the global economic empire era moving in the private what once was public and sacral? The paper will investigate this new way of using this colour and its new meanings.

Keywords: Golden Architecture, Contemporary Colors, Contemporary Architecture, New Technologies

Possibilities of using nanotechnology in wood colour protection

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The utilization of nanoparticles to improve the properties of wood is not widely investigated recently. On the other hand, many promising results were achieved with the use of nanoparticles in relation to the mechanical, combustion, hydrophobic and some other properties of different polymers, papers or textiles. Recently there is only limited information available about the utilization of nanoparticles to improve the wood properties, but all results are positive. With the use of different nanoparticles the moisture uptake is reducible, UV-protection, mechanical properties and durability is improvable. In some cases fire resistance could be improved as well. According to the careful examination of the results mentioned above, for the research received nanoparticles can be selected (different titanate nanotubes and nanowires, nanozinc, titan dioxide, montmorillonite and other nanoclays). The novelty of these researches is the investigation of some nanoparticle, which effect on wood properties and the applicability on wood is not known until yet. Beside surface treatments a full cross-section treatment is possible which can make the service life of wooden products longer. The technical properties of most of the European wood species are in many respects behind some competing materials, which are originating from sources that are disadvantageous in aspect of sustainability (endangered tropical wood species, plastics). An important objective is the expressive improvement of the properties of European wood species. Colourfastness is an important factor in the estimation of wood, but unfortunately the colour of the most wood species is not stable under outdoor conditions, it is mainly against UV-radiation not stable. The final result of outdoor weathering on unprotected wood surfaces is the well known greying effect. To protect the woods colour, only surface protection is available nowadays, but in case of surface damages (scratching, cracks, etc.) this protection is not adequate. The impregnation of wood in the whole cross section with nanoparticles that is stable against UV-radiation can protect the wood long-lasting. Most promising results can be found about the utilization of TiO2, ZnO, CeO2 and Fe3O2 nanoparticles to protect the wood against UV-radiation. The advantage of using nanoparticles for wood protection against UV irradiation is that this treatment usually remains the initial colour of wood unchanged, or there is only a slight change in colour. This paper is a summary of recent results and possibilities about the UV-protection of wood by nanoparticles.

Historical colour scheme of rondo-cubist facades in Bratislava

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Colour scheme of rondo-cubist architecture passes and passed changes that in many cases disrupted its architectural expression. Cultural and historical values of this specific architecture facade, occurring only on the area of the first Czechoslovak Republic are disappearing. Rondo-cubist architecture is the architecture of very short time period that is interesting from the historical and social point of view. This style is the expression of the spirit of the period in which it was originated and the colour scheme of facades played an important role in it. Its impact is evident on a number of buildings in Bratislava.

Rondo-cubist architecture has long been overlooked by theoreticians of architecture and art. Therefore, this issue is poorly understood, although it is relatively well preserved to achieve quality research. Rondo-cubist architecture has not undergone by morphological changing of facades, as is customary in historical architecture, so it will be possible during research in most buildings based on authentic morphology of facades. On most buildings are still authentic plasters, although often covered with new paint colour.

Despite the undoubted importance of rondo-cubist architecture and its colour scheme, only little attention has been paid to it. At present, when choosing a colour scheme of historic facades often lacks the understanding of historical practices. Therefore, we consider it important to exactly document founded information on colour scheme in research and so preserve information on authentic surface finish for further restoration of facades.

The research is devoted to the philosophical starting points and socio-cultural knowledge of contemporary literature, archive research of original documentation and laboratory research samples. These will aim to document the historical colour schemes and further serve as a basis for façade restoration.

The aim of the paper is to familiarize with ongoing research and its partial results.

Colour Coordinates

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Coloured light changes perception, our feelings, and the way we can observe reality. In 1810 Johann Wolfgang Goethe published *Theory of Colours*, which he considered his most important work. He contentiously characterized colour as arising from the dynamic interplay of light and darkness through the mediation of a turbid medium. Goethe was the first to systematically study the physiological effects of colour, and his observations on the effect of opposite colours led him to the symmetric arrangement of his colour wheel, *'for the colours diametrically opposed to each other... are those which reciprocally evoke each other in the eye'*. In his time, the theory was widely adopted by the art world; now it is forgotten.

Farbenlehre, the five-volume work by Johann Wolfgang Goethe was - according to the author - the most important of his works and the result of ten years of experimenting with the light spectrum. He analysed the process of colour perception, the influence of colour on the psyche and the importance of the optical apparatus in perception, as based on his observation, and rated all the phenomena of colours in accordance with their effects on us. Coloured light changes our perception, influences our feelings and the way we see reality. His wonderful, poetic, exalted descriptions of light in *The Theory of Colour* greatly differ from cold scientific terminology. After a short period of fascination with Goethe's theory, especially among the artists of his time, the theory had been forgotten.

The *Farbenlehre* by Johann Wolfgang Goethe published in 1810 contains detailed descriptions of phenomena such as coloured shadows, refraction, and chromatic aberration. Based on experiments with turbid media, Goethe characterized colour as arising from the dynamic interplay of darkness and light. *When the eye sees a colour it is immediately excited and it is its nature, spontaneously and of necessity, at once to produce another, which with the original colour, comprehends the whole chromatic scale.* In his time, the theory was widely adopted by the art world; now it is forgotten. Nowadays, his theory has become an inspiration for artistic installations that use traditional technique, multimedia facilities, video projection and interactive programs.

Goethe's experiments involving the water prism and black-and-white optical forms have inspired naN group to create the project *#FF00FF* and *Colour Coordinates* using optical effects created by processing image with water, air, crystal and glass.

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Bauhaus colour theory in the Moholy-Nagy Visual Modules, an educational innovation project

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"Moholy-Nagy Visual Modules – visual language of the 21th century in Hungarian art and design education" in a four-year, longitudinal school experiment aimed at reviving an important part of our cultural legacy, and integrate the pedagogical ideas of the Hungarian masters of the Bauhaus, Laszlo Moholy-Nagy, George Kepes and Marcel Breuer in a competence based, contemporary arts-oriented, modular curriculum. School experiments are performed in 19 institutions by 26 teachers in six sociocultural regions in Hungary and include development and of 6-17-year-olds in colour perception and interpretation, visual communication, spatial skills and divergent thinking through innovating the school discipline called Visual Culture.

The European Framework of Visual Literacy (Schönau and Wagner Eds., 2016) suggest a socially oriented competence development approach, similar to the pragmatic and polyaesthetic model of the Basic Course of the Bauhaus. This foundation course integrated theory and application through an experience-based model in a "polyaesthetic" model involving only art, architecture and design, but also music, creative movement and literature. This approach is realised through structural, thematic and cultural integration in our project: elements and principles of design, colour theory and application are taught in synergy with languages of sister arts. Colour is a major part of curricula in all grade levels.

Examples presented here from Bauhaus theory that influences contemporary art education practice will include the educational interpretation of Paul Klee's experiments with colour saturation and values and their effects on viewers; teachings of Josef Albers about the interrelationships between composition and colour and the symbolic meaning of colour schemes; Wassily Kandinsky's projects for his students about the emotional value of colour patterns and their juxtaposition with lines to create dynamism; and Johannes Itten's 12-colour wheel and the explanation of the aesthetic effects of contrasts that connects music and visual arts in the multisensory experience of synaesthesia.

Assessment of colour perception and interpretation involves digital tasks available in an interactive, diagnostic testing environment presented at this conference in the poster of A. Tóth and A. Kárpáti. Creative individual works and project tasks will be shown in this presentation to illustrate the relevance of Bauhaus pedagogy in contemporary art education practice.

Using Colors at the Roman Villas of Balaton Upland

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The Roman legions appeared in Transdanubia at the beginning of the 1st century A. D.: they developed a border region from this area, Pannonia province, and they organized its independent administration. The economic boom of Severus-era brought economical recovery into the life of the province in the 3rd century, which also led the high growth of the number of villas. The villas were cultivation and stock-raising adapted farm units. Some uniformity can be observed in the external appearance of the villas: the basic criteria is a main building with bathroom, or a bath in a separated building (the so-called pars urbana), outbuildings (pars rustica), and land (fundus or latinfundium) belonged to them.

The villa as an agricultural unit is not able to identify as an architectural element, so the villas are divided into two main types based on the floor plan of the main building. The first type is the smaller porticus villa (linear or row-type), where a corridor could be related to the main facade). This type was rarely in Pannonia. The second type is the bigger peristylium villa (Hall-type), where a central atrium was surrounded by rooms. This type built with sophisticated architectural elements on Italian model.

The biggest known group of villas of Pannonia was at the Balaton Upland (however archaeological researches identified several villas around Pápa). The varied terrain features, the volcanic mountains and the areas rich in streams, wells and raw materials provided the basic conditions of human settlements.

The amount of available stone materials at the Lake Balaton gave the possibility of large-scale construction projects, building roads and water management works, and the stone was one of the main building material of villas. The decorative elements of villas (e.g. ornamental columns of porticus or peristylium, door and window frames) were usually carved from red sandstone (mines were probably at Balatonalmádi, Vörösberény, Hill Bakony). Popular materials were also the grey basalt (from Hill Badacsony) as well as the white sandstone (from Öskü-Bántapuszta).

The Romans used the local stones also for decorating the rooms with wall-paintings and mosaic floors according to Italian pattern books and symbols. The motifs of multi-period wall-paintings in Baláca were made on red, yellow-purple, black, red-black and white base: one of the red bases contained bauxite (maybe from Vörösberény). The yellow colored paint could won from grey and yellow clay, which are often in Transdanubia. The stones for green colors could be found at Úrkút.

Oral contributions

On Notes on Colour in Irish Building Regulations

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Research on regulations and guidelines on colour in architecture has been undertaken in order to deepen the theoretical knowledge of the phenomenon of colour planning in the built environment. The better understanding of the whole mechanism of colour planning may also help to improve guidelines on colour in the future.

The paper focuses on the methods colour is regulated in the architecture of the Republic of Ireland (Ireland serves an example and research on Irish guidelines is part of research on colour planning in Europe). Analysis of Irish building regulations and guidelines aims to examine the ways Irish councils try to provide and execute colour harmony in both towns and countryside.

The methodology used included analyses of written sources and interviews with public officials and architects. Written sources included building regulations, recommendations and reports published by the county councils. Communication was maintained with Irish associations and conservationists involved in the care of monuments and landscape, including An Taisce, the Heritage Council, the Irish Georgian Society.

Numerous documents provided by all the county councils in the four provinces were examined. As a result, numerous guidelines on colour were detected and analysed in different aspects: reasons for the introduction of specific colour strategies, ways of defining pallets of colours, materials suggested, ways of implementation. Profits and problems were discussed during interviews. Collected data provided information on the methods Irish councils use in order to coordinate colour in architecture, especially in the countryside.

The achieved results increase the theoretical knowledge of colour in urban planning. They may also provide suggestions for the development of future regulations and guidelines in Ireland, as well as in other European countries.

Key words: colour planning, harmony, urbanism, Ireland

The Impact of Color on Diaper Bag Design: A Case Study on Iranian Young Mothers

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Baby diaper bag is a practical product not only for carrying baby's accessories but also personal affairs of mothers. It is an import objet for young mothers and their exterior image in the society. Compared to the other types of bags, design of this kind of product is often forgotten. Usually it's seen as a product for babies and the role of mothers as the real consumers is hidden. One of the common approaches in design is user experience design. In this approach, the main goal is to achieve the satisfaction of users and increase their attention to the product, service, etc. which is designed to create a sensory experience. The purpose of this research is to reflect the wishes and needs of young mothers and increase a pleasant experience for them using baby diaper bag. In this regard, after the library research and market analysis, the basic information on future trends was collected. The qualitative data extracted from deep interviews with target group based on their emotions, feelings and needs is analyzed to the development of color, texture, form and size of the final product. The process of getting the user's point of view was based on user's participation in each step of design. The final product was evaluated and tested in three levels of sensory design: visceral, behavioral and analytical. The results of this research show that the immediate and long-term causes of a positive sense and optimal user experience in a product are not only the user's interest to the functional aspects of the product, but also the presence of user's feeling, thought and personality in the product. Colors give different characters in addition to the functional aspect of objects. That is a strong tool for self- expression which makes users more mysterious and seductive in a social context.

Keywords: Color, diaper bag, participatory design, sensory design, user experience.

Colour harmony in the urban environment: discussions and revisions

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Colour harmony has always been an important topic when discussing colour applications in urban environments. In most cases, it has been assumed as the primary consideration for urban colour planning. When seeking for the generation of colour harmony in the urban context, designers and planners refer to the laws of colour harmony brought up by colourists. From Goethe to Ostwald, each scholar has explored the rules to generate colour harmony from varied perspectives such as mechanism of vision, analogy to music, mathematical order and psychophysics. To sum up, their discussions of harmony mainly concern the properties of colour (Hue, Saturation and Brightness) and how compositions of colours work. The accuracy of these theories requires further research and discussions as some of them are contradictory or cannot to be proved in empirical study. However, theories of colour have been the main guidelines and sometimes the only resource to set the standard of colour harmony in urban environments. As a dynamic context, the urban environment is associated with different factors including geography, culture, society, politics, etc. Therefore, this paper argues that besides colour theory, there should be other criteria that can help to define the colour harmony in an urban context.

The previous colour studies have already indicated that different elements in an architectural environment may contribute to the understandings of colour harmony or the formation of colour harmony. For example, Lenclos and Lenclos (2004) found out the application of colour in environment was influenced by local geology, climate, culture, etc., which may lead to different colour harmony palettes in different areas; Nemcsics (1979) argues that the built environment is a three-dimensional setting in which the harmony of colour should also concern the functions and space sensations. Based on literature review, this paper demonstrates that there are other important elements and standards should be concerned to allow a holistic understanding of colour harmony in the urban environment and the potentials to create more reasonable colour harmony according to the urban context

Key words: Colour harmony, urban environment

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