



## **The Impact of Colour on Urban Space Quality**

Andrea Urland  
Slovak University of Technology  
Slovak Republic

## **Introduction**

This paper examines selected aspects of the complex relationship between colour and built environment. Urban space, and the impact of applied colour schemes on the perceived quality of the urban space form core of interest.

By studying the exterior colour schemes of existing built environments, it aims at making the attempt to bring more knowledge to urban design by pointing out the conditioning factors of the perceived quality of urban spaces through colour-related indicators. Understanding the conditioning factors of emotional impacts and responses is seen as a potential for improvement through conscious modifications of colour schemes. Such knowledge is essential also for any simulation if it is to be meaningful for studying or visualizing urban spaces.

The paper offers first results of on-going mainly experimental research focused on professional colour communication and specification, colour preferences, social attitudes and responses to urban spaces in existing environments. The analyses aim at expanding the knowledge and thus possibilities and tools allowing positive influence on urban spaces and broader townscapes in the process of transformation of historic and more recent urban areas under current development pressures.

## **The challenge of colour communication and specification**

In order to study the impact of colour on urban space quality colour needs to be visually assessed and specified to allow any serious analysis and search for conditioning factors of certain phenomena. Colour specification and communication in complex polychromatic outdoor situations remain, despite ongoing research, a challenge.

In order to verify what we see, understand and mean when communicating about colour as architects, a simple experiment was carried out with students of architecture. Its aim was to find out which level of colour specification they are able to achieve as untrained subjects in the matter, to make them conscious of the limitations of certain levels of colour specification and to make them aware of the challenges of precise colour specification.

Students of the fourth semester who had had no previous colour science training were asked to respond to two questions in two subsequent working phases:

specify in the most precise way you can, the colour you see on the specimen  
make a sample of the colour based on the given specification.

The experiment was carried out with 44 subjects in three groups using four specimen colours. These colours were isolated, creating thus a simplified situation.

### **Discussion of Question No.1.**

All subjects used verbal specification of the specimen colours. The following descriptions were referred to:

- elementary hues
- the production of the colour (how it was obtained)
- the effects of the colour, such as temperature (“warm impression”), sensations, emotions (e.g. “pleasant”, “calming”, “aggressive”) and dynamics (“monotonous”, “uninteresting”)

referring to comparative to certain well-known typical objects, products, evoked colours, etc. (“as a vanilla pudding with some white colour mixed to it”, “colour of humid sand or mud”)

- “hues” and “lightness” (“a colour between white and yellow, very light yellow...”)
- “hues”, “lightness” and “saturation / (chromaticness” (“light beige-yellow hue”)
- “hues” and “saturation / chromaticness” (“saturated skyblue”) and combinations (“warm red colour, saturated nuance, rather evident, but not disturbing or aggressive”)

**Table No.1 - Overview of the responses to Question No.1**

Colour No.1 (very pale yellow with low chromaticness):

Total: 11 subjects

hue specification	lightness	saturation	comparison to objects	temperature statements	production	effects/ sensations
11 7 used more hues 4 used 1 hue name	11 (6 more precisely "very 1.")	0	10 human skin old paper	1	0	0

Colour No. 2 (dark red, highly chromatic, lower lightness)

Total: 11 subjects

hue specification	lightness	saturation	comparison to objects	temperature statements	production	effects/ sensations
10 7 used more hues 3 used 1 hue	2	2	2 red wine	3	2	5 pleasant, fresh, etc.

Colour No. 3 (dark turquoise, highly chromatic, middle lightness)

Total: 12 subjects

hue specification	lightness	saturation	comparison to objects	temperature statements	production	effects/ sensations
11 all used two or more hue names	4 1 spec.	2 both (no hue)	5 ocean, depth, trains	2	2	5 calming, neutral

Colour No. 4 (dark ochre, highly chromatic, lower lightness)

Total: 10 subjects

hue specification	lightness	saturation	comparison to objects	temperature statements	production	effects/ sensations
9 4 used more hues 5 used 1 hue name	3 (6 more precisely “very 1.”)	0	6 wet sand, brick, autumn	3	1	2



**Figure 1:** Example of one of the colour sample gamuts – for Specimen No.1

Results: Of the 44 subjects 93% used hue names in their colour specification, 45% used lightness indications, 9% used saturation/chromaticness indications, 2% used lightness and saturation (but without hue), 52% used comparisons to express the colour better, 27% described the effects, the sensations produced by the colour, 20% described the colour temperature specifically, 11% used description of production / the mixtures of hues.

It is evident, that hues were the most easy or natural to be identified (used in all except 3 cases), lightness was an issue mainly with specimen No.1 (the lightest), whilst saturation was made reference to only in the case of specimen No. 2 and 3 (by 4 subjects only). In the case of specimen No. 1, 3 and 4, comparisons to known objects or materials were used for describing the colour better (as it did not correspond to a simple elementary hue). Sensations and feelings were evoked by specimen No.2 and 3, being evidently the more inspiring colours.

## Discussion of Question No. 2 (in NCS System)

Table No.2 – Overview of subjects' responses

Group	Specimen No. 1 S 0510 - Y05R	Specimen No. 2 S 2070 - R05B	Specimen No. 3 S 5040 - B30G	Specimen No. 3 S 5040 - B30G
No. I 2. r. 7. kr.	S 0510 - G60Y S 0510 - G75Y S 1005 - Y80R	S 3055 - R05B S 2070 - R05B S 3050 - R05B S3060 - R	S 3050 - B S 4050 - B15G S 5040 - B20G S 5040 - B45G	S 3030 - Y30R S3040 - Y40R S 5040 - Y45R
No. II 2.r.4.kr.	S 2020-Y40R S 0520-G75Y	S 3040-R S 2070-R05B S 4045-R10B	S 2040-B10G S 3040-B20G S 3040-B40G S 4050-B40G S 4050-B50G	S 2030-Y05R S 4020-Y45R S 3540-Y35R S 5040-Y70R
No. III 2.r.2 kr.	S 0502-Y S 0510-G55Y S 0510-Y05R S 1010-Y50R	S 2040-R10B S 4040-R05B S 5530-R S 4040-Y80R	S 2040-B10G S 3040-B20G S 3040-B40G S 4050-B40G S 4050-B50G	S 2030-Y05R S 4020-Y45R S 3540-Y35R S 5040-Y70R
Average	S 0810-G71Y (4x) -Y43R (4x) -Y (1x)	S 3249-R06B (7x) -R (3x) -Y80R (1x)	S 3844-B30G (10x) -B (1x)	S 3430-Y38R (10x)
Most signif. diff.	hue (2 quadrants)	sat./chromaticness (40)	blackness (20)	sat./chromaticness (40) blackness (30)
Highest agreem.	blackness	hue	sat./chromaticness hue	hue

As to the sample reproduction of the colours described verbally, the following can be noted:

- Specimen No.1: out of the total of 10 subjects, 40% used more than one colour to illustrate it
- Specimen No.2: out of the total of 11 subjects, 36% used more than one colour sample
- Specimen No.3: out of the total of 11 subjects, 9% used more than one colour sample
- Specimen No.4: out of the total of 10 subjects, 20% used more than one colour sample

Results: The overview has shown, that specimen no.3. was the easiest to produce in one sample, best expressed in verbal description or allowed easy mixing in tempera colours, whilst specimen no. 1 was the most difficult to “pin-point”, allowing more interpretations than one and therefore also making use of comparative descriptions to objects by almost all subjects. Most significant differences depend on the colour itself – hue for specimen no.1, chromaticness for specimen no.2 and 4 and blackness for specimen no.3. Hue was judged with the highest agreement of the subjects for specimen no.2, 3 and 4.

### **Selected colour phenomena – what conditions their perceived impact?**

Most urban environments in Slovakia have had no professional colour planning and are from many points of view considered as lacking human parameters also for this reason.

Both historic urban spaces as more recent ones, mainly in housing areas of the 70s, 80s and 90s of the 20th century have been taken as study areas for mapping the currently most frequently occurring colour phenomena. The following had been selected for the purpose of this study: the perceived “eye-striking” “aggressive”, and “faded-looking” effects, as well as areas of “writers” activities as negative perceptions on one hand, and “harmony” as a positive perception on the other.

The examples of groups of facades of urban spaces mapped in various Slovak towns have been analysed in terms of the main façade colours. The main colours in the surrounding environment were also taken into consideration.

#### Discussion and results

Faded-looking complexes were perceived as uninteresting, old, grayish and dull. The situations analyzed so far show, that “faded-looking” built environments need not be old and weathered, on the contrary, most examples are from recently built or restored complexes. The present hues in most cases were yellow-red or yellow-blue combinations, but also blue-green ones. It seems that warm colours contribute more to this effect than cold ones. Surroundings do have an impact. The results indicate, that this effect is conditioned by rather low chromaticness (up to 30) with differences of the present colours of about 10 only, blackness content is very low and



**Figure 2:** Example of a faded-looking complex



**Figure 3:** Example of an aggressive colour scheme

differences lie between 5 to 10. Hues are either identical, or they lie in neighbouring quadrants of the NCS circle, only rarely opponent ones. Complexes evaluated as aggressively coloured resulted in having the following features in common: blackness content was absent or very low, it varied between 0 to 10 (rarely 20); chromaticness was very high, varying between 70 to 80 (even 90), whilst hues had no significant influence, all quadrants being represented.

Complexes evaluated as being of “eye-striking” colours yielded similar results: blackness content was extremely low, varying between 0 to 5 (10), chromaticness was very high, between 70 to 80 (90). The hues were prevailing from the yellow-red quadrant, but also other hues were represented.



Figure 4: Example of an eye-striking complex

Harmony is the most difficult to decode, although the principle of variety within a unity was confirmed as a conditioning factor in all cases. Positive evaluations were given to colour combinations with constant blackness content and hue, with varying chromaticness (the average difference being 25). In other cases the hue varied within the same quadrant, blackness content varied (between 0 and 30) and chromaticness stayed constant.

## Colour schemes of urban spaces – responses, evaluation and quality judgements

Previous studies have shown, that there is a significant agreement among subjects when judging the quality of urban spaces from the point of view of their colour schemes. It was possible to determine certain objective factors conditioning the subjective evaluations. They concerned mainly relationships between the colour variables. In this paper a further study is presented, which focused on selected phenomena.

Colour analyses have been conducted in two real urban spaces – the historical square in the town of Dolny Kubin and a housing complex Vinohrady of the 80s of the past century, in the town of Levice.

The questions given to a sample of residents, regular passers-by and occasional visitors aimed at finding out how they perceive the colour scheme of the space – what they like and dislike about it and what they would improve. The results of the analyses showed the following

For the historical square in Dolny Kubin:

colour schemes are evaluated in close connection with other aspects (especially function and usage, meaning general state of the buildings - maintenance and restoration of facades, used materials (claddings), the roads, road / pedestrian areas surfaces quality, benches, fountain, illumination improvements, etc.) a high interest of the local residents in the colour schemes of urban spaces and their desire for change, a greater variety, but harmonized (positive responses concerned newly restored facades, their colourfulness (freshness) , some hues, critical comments pointed out the broad spectrum of colours used, some of which are rather “strong” , with no coordination,



Figure 5: Example of a harmonious colour solution



Figure 6: The square in Dolny Kubin

and negative responses to certain hues (e.g. orange) a desire of the individual owners and shops/ services owners for putting these in stronger evidence, the courage to experiment with colour and use it for underlining their own building, strengthening its visual position to a dominating one by using colours big differences in chromaticness and blackness content of the used colours (within a rather low hues variation), the use of values which are not characteristic for architectural surfaces results in a fragmented appearance of the square, a visual chaos, the undermining of the dignity of the place and weakening of the legibility of the space itself.

For the housing complex Vinohrady in Levice:



**Figure 7:** *The housing complex Vinohrady in Levice*

the majority of the subjects disliked the original colour scheme of the buildings from the 80s, as most disliked resulted the uninteresting character, low colourfulness, too high positioning of the chromatic colours obviously too difficult to perceive from the pedestrian level there is desire for “happier”, more varied colour schemes, even on entire facades. The colour schemes of the two more recent buildings were in this context evaluated positively

## **Conclusions**

The results of the experiment on colour communication and specification has confirmed, that untrained persons communicate about colour on levels 1 – 2, rarely 3 of the Universal Colour Language of 6 levels of colour specification. Hue is the easiest and mostly concentrated on, more rarely do subjects take account of lightness and saturation / chromaticness, which are also more difficult to judge for untrained eyes.

In urban spaces it has become evident, that colour schemes are perceived in close connection with several other aspects. There are, nevertheless, clear likes and especially dislikes, emotional reactions which allow deeper study and suggest the need for professional colour coordination and planning in order to assure visually pleasant, logical, legible and well functioning environments strengthening their human parameters. There is an evident desire for more varied, colourful, “happier” urban environments, yet coordinated. It was possible to find some conditioning factors for the selected phenomena so often occurring in the present-day colour schemes in urban spaces.

## **References**

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