Abstract of thesis entitled

'QUANTITATIVE EVALUATION OF COLOUR EMOTIONS'

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ABSTRACT

During the colour perception process, an associated feeling or emotion is induced in our brains, and this kind of emotion is termed 'colour emotion'. The aims of this study were to investigate the colour emotions of human beings, evaluate the influence of the physical specifications of colour on colour emotions and quantify the colour emotions with the standard colour specifications, CIE L^*, C^* and h^0. Twelve opponent-word pairs were used to express certain emotions semantically. Due to the psychological nature, subjects of different cultural and traditional backgrounds are considered as influential factors of colour emotions, and, therefore, only the Hong Kong Chinese were invited to be the subjects in the visual assessments and mathematical models were derived for quantifying their colour emotions. With the establishment of these models, the designers can select colours for their products according to the evoked emotions and the communication between the designers or colour users and the colourists can be much improved by using numerical values. From the analysis, it was found that the influence of hue of colour on the colour emotion pairs used in this study was not so significant in general, with a comparatively large effect found only for the 'warm-cool' colour emotion, whereas the influence of chroma was found to be the

dominant parameter affecting 'warm-cool', 'vivid-sombre', 'gaudy-plain', 'striking-subdued', and 'dynamic-passive' colour emotions. Lightness of colour was found to be the dominant parameter affecting 'deep-pale', 'heavy-light', 'soft-hard', and 'strong-weak' colour emotions, whereas 'light-dark', 'transparent-turbid', and 'distinct-vague' colour emotions were found to be influenced by both lightness and chroma of colour.

Colour emotion is influenced by many factors, and typical examples of these factors are the gender, educational, national, cultural and traditional differences of the viewers. In this study, the influences of gender and cultural effects on colour emotions were analysed. In general, good correlations of colour emotions in male and female Hong Kong Chinese subjects were found. The best correlation was found in the 'deep-pale' colour emotion that very similar observations were obtained in the their perception. In the cross-cultural comparison of colour emotion, the visual assessment results of the Japanese, Thai and United Kingdom subjects obtained in their own regions correspondingly were compared with those of the Hong Kong Chinese subjects. The closest perception was found to be in the 'transparent-turbid' colour emotion. Better correlations were found in the colour

emotions of the Asians, whereas weaker correlation of colour emotion was found with the British.

The effect of assessment method on colour emotions was studied in this work. The 2-point method, which was used for the derivation of mathematical models and comparison of the effects of the influential factors, was done by the selection of either one opponent word in each pair, without any neutral point. For example, +1 point was assigned to the 'warm' selection while –1 point was assigned to the 'cool' selection, and the subject should select either one without 0 point. Since the 7-point method allows the subjects to give a neutral assessment, i.e., 0 point, and there are more subdivided grades for the subjects to select, this assessment method was also carried out in this study for the comparison of the results obtained from the 2-point method. Similar influences of the colorimetric attributes on the colour emotions were observed in the 7-point method as in the case of the 2-point method. It is recommended to carry out 7-point assessment method for further analysis because more selections were provided in this method so that better indication of colour emotions of subjects could be obtained.

In this study, colour planners were derived for representing the quantitative correlation of colour emotions and standard colour specifications. The extent of

change in each colour emotion pair caused by changing the lightness or chroma of a colour was clearly presented in the colour planners. Fashion, graphic, interior, web site or other designers can select suitable colours for inducing target colour emotions in the customers' or product-users' minds by means of these colour planners. In addition, a visualization of colours in the colour planner was achieved by establishing a computerized colour emotion display system which provides a means for the designers or colour users to select colours from the monitor. The designers or colour users can select the target colours from the displayed colour gamut, and the system will automatically show the standard colour specifications and colour emotions of the selected colours. This is the most convenient way to show the correlation of colour emotions and standard colour specifications.

Since one of the objectives of this study was to derive tools for designers to select suitable colours for their products, it was considered worthwhile to investigate the similarities and differences of colour emotions between designers and general public. Hence, designers were also invited to carry out the visual assessments. Their results showed that they had generally similar colour emotions to the ordinary subjects and some colours of large differences in colour emotions between them were pointed out in this study.

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