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Designers' experience and use of colour information

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ABSTRACT

To effectively encourage and guide designers to make a use of colours in real-world products, it is necessary to know how designers currently use colour information while dealing with actual colours for such products. Email interviews, online surveys and colour application/modification experiments were carried out with 27 designers with different levels of design experience. In an initial phase four phenomena that designers heavily rely on for colour information application in real-world design, when they have little other information about design tasks, were discovered: personal factors, previous design experience, basic knowledge about colour and design, and common sense. The overall positive/negative perception of colour information, colour information formats and sources that designers used and their preferences, the quality and accessibility of colour information was also investigated during a secondary colour modification task. This preliminary study was conducted as a part of ongoing research for the development of a colour communication and design tool for designers.

Keywords: *Colour information, Designers, Real-world colour application*

INTRODUCTION

Colours are widely used in most design areas. Ideas are subject to visualisation by designers and then expressed through compositions which are composed of shapes supplemented by colour schemes (Wong 1997). Designers are motivated by images and colours (Lofthouse 2006). For them, colour is usually, not only the most important but, the fundamental design element to convey information regardless of the designers' domain area (Lee et al. 2017).

Various scholars (Fricke 1996, Liikkanen and Perttula 2009, Ozkan and Dogan 2013, Vallet et al. 2013, Goldschmidt and Rodgers 2013, Deininger et al. 2017) have made efforts to discover the distinctive characteristics of design ability by level of design experience from different design areas such as engineering design, architecture design, textile design, eco design, and cognitive science and so on. However, we do not actually know how different designers deal with colour information or utilise their design knowledge and experience in order to apply colours in real-world information contexts. As design outcomes can be regarded as the final decisions made by designers (Ahmed et al. 2003), it is expected that an investigation of designers' decisions during actual colour

application/modification or colour information use would reveal what further information and resources need to be provided to them in order to change their colour use behaviour.

This research therefore addresses the following questions:

- How do designers deal with colours if they have limited knowledge about actual information users and product formats on which colours need to be used?
- Where do designers search for further colour information?
- How do designers perceive colour information that they seek during the colour tasks?
- What is the level of overall satisfaction among designers about the quality of the colour information that they find and use?

This study has been conducted as a preliminary piece of research in order to subsequently change designers colour-using behaviour by offering a designer-friendly colour-communication tool at the end of a wider colour communication and design project. The study involves 27 designers, comprising 9 designers from each of 3 groups: expert designers (with 9.5 years of work experience), novice designers (with 2.5 years of work experience), and student designers (with no work experience).

METHODS

The main purpose of the study is to investigate the actual experience of designers of colour information use, and real world application/modification of colour by designers. However, it is primarily the former aspect of the research that is analysed and described in this paper.

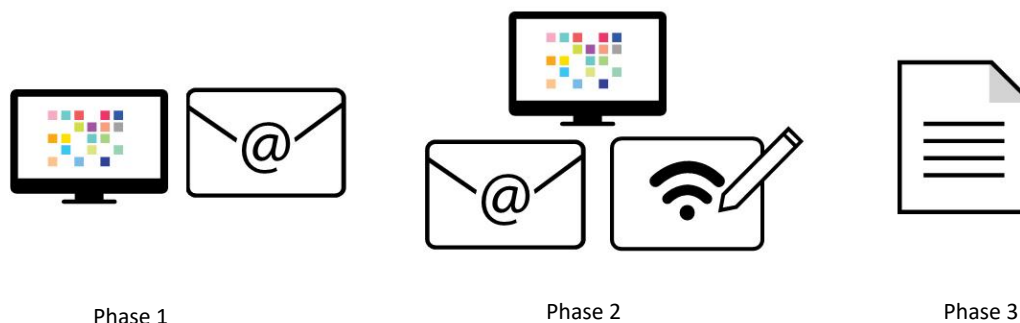


Figure 1: Overall experimental process of this research.

The whole process of the study of designers involves three stages (Figure 1). It is comprised of an initial phase (colour application experiments and individual email interviews), secondary phase (colour modification experiments, secondary individual email interviews, and online survey) and a third phase (a self-reflection report). During the task in the initial phase, little information was offered to design participants in order to explore the usual way they use colour information and colour application behaviour. For the secondary colour modification experiments, participants were offered user information for consideration, to be taken into account also in the secondary interviews and online survey. During this stage, user data (in this context information about age-related cataracts and their effect among older people) was shown to designers. This data comprised an image with a question in order to inspire design participants to think about the users' position and

ask them to search for relevant colour information to address the difficulties that users faced. In the final phase, designers were asked to compare previous tasks by writing reflections in order to find out how they deal with data on colour and colour information.

RESULTS AND DISCUSSION

In the initial design task, the participants were asked to apply colours on pre-formatted proposed design artefacts (using Adobe Illustrator). After this their colour-information use behaviour was investigated through email interviews. In total, more than two-thirds of designers (19 out of 27) did not try to search for any information for colours during the initial colour task.

Table 1 summarises designers' responses regarding their own colour information resources for the initial colour application task (phase 1) if they did not use any external or additional resources. The responses can be categorized into four types: personal factors, previous experience of projects or design, basic knowledge of colour and design, and finally common sense. All designers are likely to depend on personal factors such as instinct, design sensibilities, preferences, and feelings.

Level of designer	Number of mentions	Categories of colour information source (examples in quotation)
Experienced designers	5	Personal factor "Instinct" "Personal choice based solely on the designs" "Design sensibilities (personal)" "Personal colour sensibility and colour preference"
	4	Experience "Previous experience" "Accumulated design data from design project" "Similar design experience from a past design project"
	2	Knowledge "Basic (general) knowledge of the design and colour"
Novice designers	4	Personal factor "Personal instinct" "Personal drawing experience"
	3	Knowledge "Basic knowledge about colour match, association"
	1	Common sense "Common sense"
Student designers	8	Personal factor "Instinct" "Previous experience" "Personal experience and feeling" "Personal preference"
	4	Knowledge "Design knowledge (colour and layout)"
	1	Common sense "Common sense"

Table 1: Colour information resource factors by designer groups from phase 1.

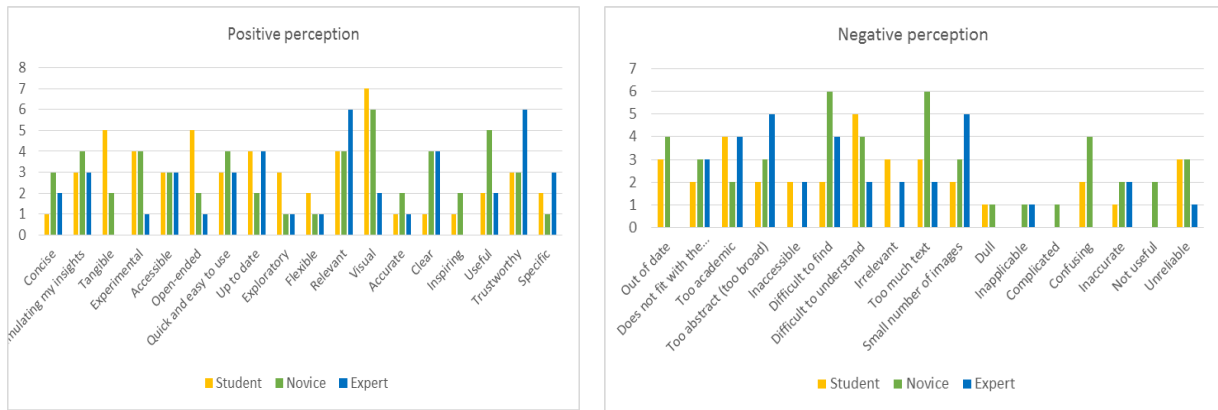


Figure 2: Overall positive and negative perception of colour information found during the colour information use and colour application task.

Figure 2 illustrates overall positive and negative perceptions of colour information provision they looked for by the three groups of designers during the colour modification task (phase 2).

In terms of positive values, the most frequently selected word was ‘visual’ by the student and novice designers, although it was not highly selected by those in the expert group. This suggests that student and novice designers searched for (or preferred to use) visual information such as images, colours, or pictures during the task more than the expert designer group. The words that only expert designers selected frequently were ‘specific’, ‘trustworthy’, ‘relevant’. This is probably due to their higher level of personal confidence in their own task-related information searching abilities.

In terms of negative perceptions, the most frequently selected terms by all groups were ‘difficult to find’ (12 out of 27), ‘difficult to understand/too much text’ (each 11 out of 27), ‘small numbers of images/too academic/too abstract’ (each 10 out of 27). These are the negative perceptions of colour information that designers highlight when seeking such information.



Figure 3: Preferred information formats, formats used, and sources during colour information searches (phase 2).

As for preferred information sources expressed in phase 2 (Figure 3), all expert designers would prefer to use online information. One of the experienced designers said that “information online is the easiest to access from any location” during the email interview. However, in addition to this, other groups would like also to be able to obtain information from other people or printed materials. A novice designer answered that “as people take in information in different ways, ... through friends/co-workers or at a conference, generally people will be more interested and take it on board as it can be more interactive” It is clear that although all participants would want to use the internet regardless of their level of experience, it also needs to be acknowledged that information from other people or printed paper can be good resources.

When we compare the actual formats used for searching for colour information, more experienced designers tend to use relatively objective resources, such as news articles or academic publications. Less experienced designers tend to use personal subjective feelings or search for colour information in order to apply colours in real world information formats or find an existing physical design product or online images to extract colours and apply them.

Nevertheless, there is a common factor that all groups of designers use social media (for example, Youtube, Instagram, Pinterest, personal blogs) in order to look for colour information. The common characteristics of these sites are that they are supposed to have a visual focus with photos or videos, and be interactive. Designers may want to receive the colour data in this dynamic way.

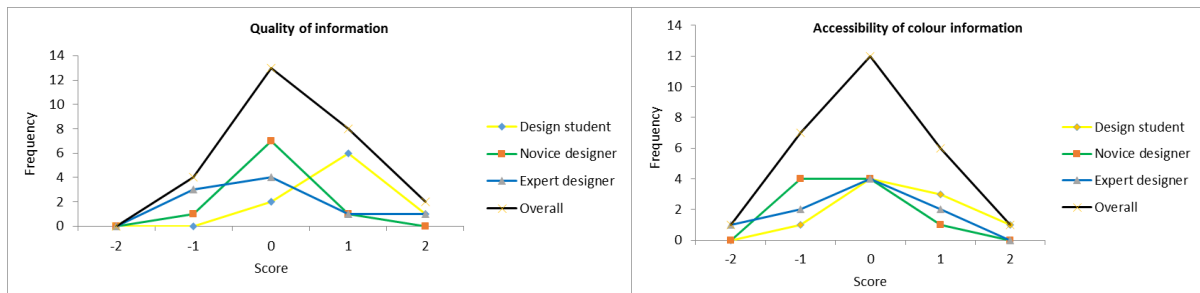


Figure 4: Overall satisfaction with the quality of information that designers found and used during the task (left); ease of finding information used for the colour application/modification test (right) in phase 2.

Figure 4 shows the overall satisfaction at the quality of information and ease of accessibility of the information during the colour application/modification task. A 5-point Likert Scale that ranged from very satisfied (2) to very disappointed (-2) was used to estimate their overall satisfaction. There is not a big difference between the overall quality of information (left) and ease of accessibility of the information (right) for the colour tasks. This data could be interpreted as showing that ease of accessibility is related to the overall satisfaction with the quality of the information.

Level of designer	Statements (quotation)
Student designers	"Finding reliable information was difficult" "Limited resources and knowledge about colours and users"
Novice designers	"Not enough information about colour perception and hard to tell whether the information found correlates to all individuals or not" "It is hard to find some visual examples"
Expert designers	"Research was not conclusive, and so it wasn't clear what the action should be" "The effect of cataracts on perception of colour was not covered in much detail by my chosen information sources. By comparison, the effect of cataracts on sharpness/blurriness was always covered in more detail and always accompanied by example images"

Table 2: Comments on difficulties while finding and using colour information during the colour design tasks.

Feedback on the colour information use during the colour design tasks from each group of designers is given in Table 2. The table summarises that poor information reliability, lack of colour information related to users, lack of visual examples (as designers are motivated by images and colours), unclear information for the effective use of colours are common difficulties.

CONCLUSIONS

To conclude, the colour information that is currently available for designers to search and use for actual colour design (colour application/modification tasks) may be unsuitable for them. Because of this, regardless of level of design experience, it appears that designers rely on subjective factors that were revealed: personal intuitive/insight/preference, colour and design knowledge, design experiences and common sense. The designers' positive/negative perception of information sources and formats for colour information was investigated in terms of designer group. The overall quality of present colour information was not rated highly by any groups of designers. This may be related to the accessibility of information about colour. From their feedback on the colour design task (phase 2), designers would want to know about reliability of information, and for information to be easy to access (easy to find), and to be concise, conclusive, and visual.

These findings during the colour information use and colour design tasks need to be considered to develop the designer friendly colour design and communication tool for further research. Also the quantitative colour data gathered during the colour application/modification tasks needs to be interpreted and compared to the qualitative responses from designers in the next stage of the study.

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