Colour, painting and computing

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ABSTRACT

Exploring digital colour and analogue colour through the physical and perceptual experience of making paintings. In my recent work I use *Chromafile*, a software program that simulates paint colour on the computer monitor in the creation of combined painted and digitally printed pictures. Chromafile relates virtual to material colour to set new pictorial problems by sharing a pictorial language through a common colour palette. My aim is to create paintings using original and specific research; the practical solutions and experimental data could have broad relevance wherever there is an established or potential use of digital printing, or where varied printed substrates are part of the output.

1. INTRODUCTION

For the past year I have had an Arts and Humanities Research Board Grant to examine the relationship between analogue and digital colour using new colour software, digital printing and hand painting within the same picture. This is a project that introduces colour and computer research into my studio practice to formulate new paintings and extend my pictorial practice.

2. COLOUR AND COMPUTING

Colour and computing was a shared project with Dr. Ferdy Carabott. We investigated the possibility of using the computer to explore colour ideas for pigment dyeing, printing and hand painting, processes that I use in my own work or when teaching textile design students. Understanding material colour (paints, dyes) and virtual colour became our key research problem with a view to making a practical contribution to the fine arts and textile research and practice (Lewis 1996, Carabott and Lewis 2001, Carabott, Lewis and Piehl 2002).

The difference between material and virtual colour was an unforeseen obstacle to our initial enterprise, we found predicting paint colour mixtures on the computer was impossible.[1] Extensive research led to an understanding of the difference between analogue and digital colour and importantly a method for reconfiguring the computer colour system (additive), to simulate pigment mixing (subtractive). The result of our efforts was a new colour palette: *Chromafile,* that works in Photoshop and other imaging systems.

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[1] Dr. Ferdy Carabott is a photographer and computer imager, I had no previous computer experience.

3. A METHOD FOR SIMULATING PAINT COLOURS
ON THE COMPUTER MONITOR

When yellow and blue are combined as pigments their mid-colour is a green, on the computer monitor the mid-colour between yellow and blue is grey. An important insight was to relate straight-line gradients between colours in Photoshop, to stepped, mixtures between pigment colours. We mixed colour scales between eleven hues plus black and white and using Spectrophotometer readings were able to plot their LAB positions, LAB is the conventional colour space for Photoshop. The paint colour pathways were curves, each one distinct to the particular set of parent colours. We were able to relate the paint colour pathways to the straight line gradients for the same sets of colours. The straight line gradient was then reconfigured to match the corresponding paint colour gradient. Taking a middle slice through LAB space produces an approximate colour circle, in this, the straight line gradient from yellow to blue can be compared to the paint mixture gradient which curves into green territory. In essence we bent the straight line gradient in Photoshop to follow the paint mixture with respect to hue and value.

A characteristic of paint is that a mixture between complimentary or opposing colours (red-green, orange-blue, yellow-violet, etc.) produces a mid-colour that is darker than the two parent colours; for computer gradients there is no deviation. Mixing black or white with various hues produces a change of colour as well as the intended value change, these factors were built into our paint colour gradient profile. Eventually we created sixteen step gradients for the eleven hues and black and white, a total palette of over 1000 colours, plus a gradient tool that could generate new colour mixtures. While the gradient tool uses conventional RGB straight gradients it is possible to produce colours that are close to the paint mixture by following paint mixing practices. Straight line gradients can be navigated by stages through LAB colour space to follow the curved pathway of the paint mixtures.[2]

4. A VIRTUAL COLOUR COURSE

Working with the ITRDU Unit at the University of the Arts, London I have used the Chromafile palette as the basis of a virtual version of the studio colour course I teach, the paint colour palette is used to access a body of knowledge and experience derived from Chevreul, Itten, Albers and Aach.[3] The Virtual Colour Course has progressed the Chromafile project and has been of practical help in supplementing the experience of students in my greatly expanded studio classes. Both software programs: Chromafile and the Virtual Colour Course have been used with my recent painting project.

5. COLOUR AND PAINTING

My paintings, which are essentially abstract and focused on colour relationships, had developed to the stage in 2001, that I began painting on left-over backing cloths from textile print tables.[4] Backing cloths are coloured with random fragments of images and patterns that are the residue of several, separate, unrelated printing sessions. For the finished picture the backing cloth serves as the physical support and perceptual context for hand painting.

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[2] This procedure is illustrated in a file: About Chromafile from www.chromafile.com.
[3] I worked as Herb Aach's colour research assistant at Queens College, CUNY, 1970-1971, he was a painter and the American translator of Goethe's *Colour theory*, Van Nostrand Reinhold, 1971.
[4] I teach on the BA Textile Design Course at Central St. Martins and the backing cloths came from the Print Workshop.

   For my new work I have replaced the backing cloths with digitally printed, unprimed canvases of my own computer designed compositions.[5] From the outset my aim was to use the Chromafile palette to create digital prints that explicitly reflected and expressed my painting process. I began with mixed media compositions using found materials, photographs, fabrics and hand painting that I scanned and imported into Photoshop. Certain limited physical changes are made using computer tools but my main focus is applying Chromafile colours to the hand painted areas. Using a scale of greys to distinguish and separate the hand painted shapes, I am able to apply colour in a direct and automatic way, better able to relate each new colour and colour decision to the whole composition. The combination of hand painted marks and Chromafile colour produces my version of *direct* painting: colours are placed side by side, edge to edge to build the picture rather than used to glaze or overlay colours onto pre-existing images.

6. COMPUTING AND PAINTING

When designing the digital canvases I use a few easy-to-use Photoshop tools that either correspond to painting as with the paint colour palette, or offer new approaches to established pictorial problems.

   The most basic tool is *Paint Bucket* with which I apply colours, sampled from the swatch pallet or from the *Gradient Mixer*, to different grey shapes and marks. Varying the *Tolerance* option with the *Paint Bucket* means the colours either fill a shape or over-run boundaries where the Value differences between shapes are closer than the *Tolerance* percentage recognises. The total composition can change radically depending on the tolerance of the colour fill; it offers control and "accidents" as colours can flood shapes and find unforeseen contours. This corresponds to significant oppositions in my own painting, practice where colours can be applied with a brush, as a monoprint or poured.

   With the *Transform* and *Distort* option I can reframe a composition, by changing a vertical frame to a horizontal or square, or by combining different compositions into a single frame. A series of paintings where a single composition can be presented in different formats and dimensions is a new possibility despite the idea being so explicit in modern painting. The *Rubber Stamp* tool is used to remove edges after I have *Cut* and *Pasted* different compositions together; the tool samples part of the composition and repeats it as an area or brushed mark that will over-ride the original image. Parts of a composition can be relocated and rearranged as visually integrated marks or shapes. The painting parallels are obvious; however these effects that are very simple for the computer but are perceptually dramatic and significant in a painting, anything that can apply colour becomes a painting tool.

7. PAINTING AND DIGITAL PRINTING

When I begin work in the studio the painting is already well advanced, however the digital design is not a prescription for subsequent actions. Hand painted marks are applied as figures against the digitally printed (back)ground, which in turn contains images, shapes and colours that also create complex figure-ground relationships. Paint is applied to isolated, primed shapes or in certain works, as monoprinting directly across the printed fabric. The painted areas are masked off as squares, circles or ellipses, then submitted to a process that emphasises the tactile, liquid and material character of the paint. With only tentative hand painted studies and my previous work as an overall guide, initial studio results are mixed, so

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[5] The canvases were printed at the Textile Futures Workshop, London College of Fashion on a Mimaki tx 1600 printer to a max. width of 48 inches.

fresh thinking, new ideas and strategies are needed at each stage. The completed works combine painted and printed colour, the processes are distinct but they connect visually, the Chromafile colours can appear closer to the paint than to the scanned images and forms.

8. A NEW PICTORIAL SPACE

The introduction of the computer has made dramatic changes to my customary studio practice and to the look, meaning and scope of the paintings. At this relatively early stage of the project the potential for a combined working process has been clearly established but the areas for action and the different pictorial problems have not yet produced a clear or consistent line of development or a definable aesthetic character to the work. My "art" approach broadly is characterised by experiment, trial and reflection until new forms and satisfying relationships emerge. This process provides "research data" in the form of pictorial and material experiments, including mistakes and accidents that could have relevance beyond painting. This interests me as an artist, teacher and researcher; previous to this project my only use of computers was restricted to designing visual experiments, diagrams and colour samples to support the colour research for the Chromafile and the Virtual Colour Course.

Digital printing is exact and achieved quickly; change, experiment and improvisation are possible when preparing the computer artwork or by subsequent hand painting, direct printing or fabric manipulation. The potential is evident: the strength and intensity of digital colour matches the power, even character of paint, while the connecting and opposing of techniques and images produces an ambiguity and continuity to pictorial space. Definitive aesthetic solutions are yet to be achieved and judged, but what I have instigated at this time is a dynamic form of painting that significantly extends my visual expression.

ACKNOWLEDGMENTS

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