Screen Printed Colour As A Theoretical Model For The Development Of Inkjet Technology

Project details:
The objective of this research project was to develop inkjet technology and related new methods for artists through an historical analysis of screenprinting. Whilst inkjet can print fine detail and near continuous tone photographic quality images, it lacked potential as an artist's tool. In the 1960s and 70s screenprinting was revolutionary in its method of applying layer upon layer of tints and translucent colour to build a picture. This project undertook a historical and technical analysis of 1960s and 70s screenprints from the Department of Prints and Drawings, Tate Britain in order to contribute to developments in inkjet technology.

For artists who mix paint on a palette, they define colour by hue, tint and shade, which are: (hue) pure colour, (tint) a pure colour that is mixed with white and (shade) a pure colour that is mixed with black. The primaries used in inkjet technology – cyan, magenta, yellow and black – could not reproduce all the colours visible on the computer screen and by looking at a digital image on a monitor it was difficult to accurately predict how it would appear on paper. This project investigated how a tint or translucent colour can be accurately rendered in inkjet. How can a suitable method be developed in which colour differences and colour predictions be minimised. And how issues relating to colour mixing, perception, layering, translucency and opacity addressed through more traditional print processes, such as lithography and screenprinting, can inform printed digital colour.

All printed colour is subtractive, which means, when colour is applied to the surface of the paper it subtracts from the whiteness of the paper. Therefore how can an inkjet machine produce a tint? A tint, if described in inkjet technology speak, can be termed an absence of colour. The whiteness of the paper is therefore a necessary colour component. Artists working in the late 60s and 70s were very aware of the colour. Similarly, artists such as Robyn Denny and Peter Sedgley were interested in colour perception and, for example, how colour appeared when juxtaposed with a colour of the same hue. Colours that have the same brightness (or value) result in chromatic aberrations, in which colour seems to vibrate. For example, the print series entitled Looking Glass by Peter Sedgley investigates colour intensity and chromatic aberrations. Instead of using a regular halftone he used a spray that splattered the ink more randomly. The most successful print, in terms of colour mixing and obtaining the balance between the colour gradation of the ring and the impact of the background, contains a brilliant green background and four dark yellows ranging from mid raw sienna to yellow ochre. The sprayed yellow ring is a composite of 4-5 layers, which in some cases have been printed more than once as opaque and translucent of the same colour to obtain a fine graduation of tone and to build up a density of colour.

Similarly, works by Robyn Denny: Paradise Suite and Suite 66, were able to capitalise on being able to print flat, even colour, that had sharp edges and clean lines. He was able to mix and print subtle tones and furthermore through the layering process of screenprinting he was able to use translucent layers to further saturate a colour. He also created a surface tension by printing thin colours that soaked into the paper, to create a matt surface and over layering translucent layers to create satin areas.

Other artists such as Patrick Caulfield and William Scott used the addition of white to print colours. Caulfield's interest in white enabled him to be able to print subtle variations of one colour. Whilst there is an assumption that the addition of white can dampen a colour, the use of a small amount of white can increase the visual intensity of colour and colour combinations. Furthermore Scott used white or tints as the penultimate layer in order to increase the contrast between very coloured backgrounds and flattened simplistic objects.

The notion of building up a printed surface using translucent layers; the juxtaposition of solid, flat, bright colours over and under translucent colour; and a process through which an artist could faithfully render drawn and brush marks was a technique particular to lithography. However the process of screenprinting in the 60s quickly became a new vehicle for expression, which was largely due to transparent drafting of films on which an artist could draw, paint and scratch into the surface that could be photographically transferred onto a silkscreen; that could also transcribe print photographic images using a halftone; accurate stencils; and high pigment quality thin inks that enabled the artists to print thin, translucent layers of ink, which could be under printed or overprinted with other colours to obtain colour mixing. Chris Prater of the Kelpra Studio and artists such as Eduardo Paolozzi and Richard Hamilton, did much to change the profile of the screenprint, as Hamilton explained, 'the new directness of photographic techniques, through half tone silkscreen for example, has made a new contribution to the media of painting'. (Charles Newton, 1979 Photography in Printmaking).

Comparisons can be made between litho and the screenprinted image in the 60s and 70s and today between screenprint and inkjet. Due to the increasing use of digital technology, wideformat printing has taken over from screenprinting for short-run printing and images that have a heavy photographic content. However the qualities of screenprinting – such as multilayering, surface quality, variation in screening, and a much greater control over colour, opacity and translucency means that when compared to wideformat inkjet printers, inkjet technology still

has a long way to go. Digital inkjet printing when compared to screenprinting has the advantage of photographic detail and resolution.

Objectives:
1.   To undertake a technical and historical analysis of screenprints produced between 1960 and 1980
2.   To identify a series of prints to be used for colour measurements as examples of as the use of tints, use of translucent colour, use of gamut colours
3.   To undertake an investigation of colour spaces and workflow methods for artists to minimise colour differences
4.   To undertake a study into the feasibility of combining screenprinted opaque, translucent layers and multi-laying in inkjet colour