

The margins of art practice bordering on industrial development

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Abstract

One popular view of artists, spread by the media over many years, is of aesthetes with no commercial acumen and a distinct lack of time management! I daresay this popular view has also found resonance with many who work in an industrial context. Examples of this are manifold, from Tony Hancock's 1962 film the 'Rebel' to more recent commentary on Tracey Emin's unmade bed. The truth about artists is actually much closer to one of self-motivated individuals with good self-discipline and a wide-ranging approach to problem solving. This preconception in itself is not the fault of industry; even when dealing with design, the 2005 DTI Paper on Creativity, Design and Business performance states: "Over half of UK firms say design has no role or only a limited role to play in their business"¹. Why would they want to deal with artists?

So how does a Fine Art printmaking department qualify itself within the arena of developing industrial research projects? Partnerships forged between the Centre for Fine Print Research (CFPR) and industry, now constitute approximately a third of the research work we undertake. These partnerships have grown over the last ten years as the reputation of the Centre has increased. I am specifically referring to collaboration between artists and industry, which develops either new industrial product, or a process that assists the creative development of new markets and profit. There currently exist many Arts and Business and Arts and Science initiatives, which tend to favour the artist and arts practice, what I would like to cover here is the other way round where there are benefits to both parties, (Knowledge Exchange), but weighted more to the industrial benefits and outcomes.

The CFPR specialises in the interface between arts and industry. Our experience of early printing technology and its 19th Century developments give us a fundamental overview of current print technologies and practises, allowing us to take a lateral approach that offers innovative solutions. For example we have run 4 successful KTP's (Knowledge Transfer Partnerships) winning the best 'transfer of technology' award in 2003. Over the years we have undertaken a series of collaborations with big business as well as Small to Medium Enterprise's (SME's). For example with Hewlett Packard our collaborations extend from colour science, through wide format printing to dissemination of research projects with schools.

This paper will highlight this approach and explain how a creative background can offer direct benefits to industry.

What have Artist Printmakers got apart from the aforementioned self-motivation to offer the print industry (in its broadest context) that it does not already possess? The answer surprisingly is an historic overview of process. Printmaking as a discipline undertaken by artists uses historic

processes, because their basic simplicity allows the artist to make prints individually by hand one at a time whilst retaining a wide ranging ability to control the process through the craft skill of the printer. If you start with the premise that all printmaking processes were at some point in the past, commercial processes of their time, you can follow a thread. Therefore commercial print processes are all predicated in printmaking history. For example, lithography, to the Artist printer is the same process developed by Alloys Senefelder in 1796 of grease drawn on a slab of limestone. Whilst contemporary lithography is a computer to plate half tone process capable of printing many thousands of prints per hour, it is still based on the rejection of water by grease. The grease attracts ink whilst the water rejects it. It is therefore not difficult for the artist to follow the development of this process from the limestone slab through to the current four-colour print that prints your Sunday Times magazine.

The other commercial processes familiar to printmakers are equally relevant such as:

Etching – The process of using Acid to bite a metal plate in order to retain ink which through a further process called Photogravure becomes commercial roto-gravure; this is the process that prints your chocolate bar wrapper and postage stamps.

Relief print (lino cuts to most people) directly develops to flexography, which prints your cereal packet, cheese wrapper or the giant printed carton your refrigerator or television comes packed in.



Fig 1. Traditional lithographic stone ready for printing.

Screenprint (a stencil process) mops up much of the rest of commercial print. From the cup you drink from, the element that heats your kettle, through to the biomedical sensor that measures sugar content in your blood, all are screenprinted.

This historical context offers two things; one is a fundamental understanding of the basic processes -a fact that should never be underestimated when talking to industry. Secondly it offers core knowledge of how print processes interact with each other and which elements are cross-referential to the other print processes.

To explain, if one thinks of a tree with all of the basic printmaking processes as the trunk, then as each process developed commercially they became branches. As each branch develops its own specific needs they became smaller branches. As considerations of speed and commercial pressures take over these smaller branches develop into specific twigs. Now they are highly specialised and it is at this point that each of the twigs have little or no comprehension of any of the other branches and twigs' methods and needs.

The Academic Artist printmaker therefore can form an important alliance based on that fundamental overview with industry, this alliance is only built with time and care, no business likes an academic upstart telling him he is not doing his job properly and that he, the academic can do it better! However from the artist's viewpoint this has led us to assimilate and develop new methods of making print using both old and new technology.

The sort of work we undertake can be loosely grouped, for the purposes of this talk, into the following areas: Pure Research (funded by bodies such as the Arts and Humanities Research Council) and Applied or Industrial Research – (funded by commissions, bodies such as Technology Strategy Board - through KTP - and direct funding by industry)

Here I will take time to say that we don't only do this work because it is well funded, but in the current educational climate it is also good politics to do this work. Our wider academic standing is high due to the calibre of industrial funding we attract. We also undertake what we call 'projects' which are a mix of research dissemination and public relations. We often produce exhibitions or publications relating to arts practice, these are either self-generating, sponsored or internally funded. Finally there is our own individual art practice and research and as common with most art practice, often not funded at all!

It may also help if these groupings are viewed in the following terms, a research question, a context for the question, a methodology of how to carry it out, and an outcome or result. The pure research poses the question and gives a methodology in order to carry out the research. The industrial liaison gives a broader context for the research and the projects are the result or outcome of the research.

The best example to illustrate our diversity and what we can do for industry is to demonstrate a number of case studies, starting with our relationship with Hewlett Packard (HP). CFPR collaborates on a range of projects with HP, so why UWE and why HP?

First and foremost we understand print technologies separate from and alongside digital technology and our thinking is based upon this broad understanding. Perhaps surprisingly, few people have a broad grasp of the breadth of the print industry and the range of processes available. However we also understand colour science, both from a computational science approach and the creative view of the end user. Very importantly we understand business, timescales, delivery deadlines and costing.

But most importantly we are artists! To quote John Mayer, ex-HP Senior Research Fellow and former head of the print division of HP Labs, "we fund you, as you are not MIT. We fund computer departments and arts schools, but you are neither, you understand practical process."

One of the aspects that appear at first, to be peripheral to a high tech digital company are the 19th Century processes, photogravure and collotype. Capable of printing in multiple colours, these processes were always the benchmark for the highest quality printing, until very recent digital developments. To take collotype as an example, there are two or three collotype printers left in the world, apart from the CFPR, the last Collotype printer in the UK was in the town of Wootton Under Edge, In Gloucestershire, that closed in Nineteen Eighty Two.

The Collotype process, printed from a glass plate, relies on the hyroscopic nature of bichromated gelatine. Bichromated gelatine hardens in direct relation to the amount of light it receives, which also makes it more or less attractive to water in direct relation to the amount of light it has received.

When exposed through a photographic negative and washed with water the result is a plate that will retain water to differing amounts and therefore reject ink in direct relation to the water retention.

A beautiful and delicate process, collotype died out due to its need for high craft skills. Merely by breathing on the corner of a plate you can change the colour. This is quite unlike lithography, which either accepts or rejects ink and became the dominant process, as it required much less skill from the printer.



Fig 2. Glass collotype plate being rolled with ink by hand

Why then is this knowledge important to HP? - Simply because we create standards against which HP can test the quality of their product. Without the wider knowledge of collotype and other processes, your standards are set by commercial print process and the results of your direct competitors in the field. Therefore one only needs to make small incremental changes to make an improvement. By contrast, comparing yourself to the best there has ever been, albeit in some very small niche areas, creates for you a very different standard to try and achieve.

Initially we came to HP in 2000 through their European Art and Science Philanthropy Fund. This fund was set up to undertake a series of projects between, Universities, Museums, Art Galleries and HP; primarily to promote HP's imaging and printing divisions. The group included, the Louvre Paris, the National Gallery London, the photographic archive Fratelli Alinari, Florence, the universities of Strasbourg, Milan, Southampton and (as a late entrant) UWE, Bristol.

Under the scheme HP donated equipment in the form of Wide Format printers, Cameras, and PC's. Importantly the equipment was backed up by access to HP Research Labs and the product development teams. This created a dialogue that remains ten years later. One of the very first projects we undertook was the International Digital Miniature Print Portfolio. Wide format Printing equipment (Here this means ink jet printing equipment capable of printing wider than 24 inches) had developed to a level where rapid adoption was beginning to take place within the creative arts, but very little real data as to how users interfaced with equipment outside of the limited reprographic use the products were originally developed for.

The objective of the Miniature Print Portfolio was to encourage collaboration on a variety of levels – between artist practitioners, higher education art students and schools; and the result was the development of new collaborative ventures. In addition to Hewlett Packard - St Cuthberts Mill, Inveresk Paper and UWE also sponsored the portfolio. However underlying the project, the research dimension was to ascertain how and in what ways individuals interfaced with the technology. 80 artists from around the world participated. Each artist sent us a file with an image no bigger than three inches by four inches and we printed 80 sets of prints so that each artist had a complete set as reward for participating, this meant that CFPR printed a total of 6,400 prints. What we learnt was that there were 80 different ways of approaching the technology and 80 different solutions to a problem! As each of the files had been created remotely using whatever technology was to hand, we had no idea of the lack of technology interface that would occur. We solved the immediate problems with a number of 'work around' solutions, to produce an excellent exhibition of prints, but in real terms did not face the problems head on. The artists certainly had no clue of the problems we were facing.

Our next project, known as 'The Perpetual Portfolio' - on the surface an artists residency programme, tackled the problems head on. Eighteen artists were chosen, from a number who applied or were invited and undertook a one-week residency to make a large format digital print

with assistance from the research centre. An edition of fifteen prints were created: 5 owned by the artist, 3 by UWE 2 by HP and the remaining 5 sold to raise funds to extend the programme. The artists were delighted with the ability to make a print and own part of the edition, and both HP and our-selves were delighted with the sets of large scale prints we both owned are were able to exhibit. However this was only part of the project, the real intention was to document the process that each artist undertook in order to make their print, as I have explained, when prints were created remotely we had no control over the process. With this project we still did not control the process if we could help it, but rather assisted the artists in whatever methods they used in order to create the print. The primary objective for us was to prove to HP that users interfaced with technology in a very different way, to the way it had been developed. It meant that at the end of the project we had 18 documented case studies of how artists worked, the results were very revealing to HP and certainly informed several aspects of their approach to current technology in wide format printing.

Further collaboration led to HP awarding funding for a two-year post-doctoral researcher, to create software plug-in to allow us to undertake some specific research into colour. They also funded an extension of the Perpetual Portfolio in Argentina where four hundred and fifty artists applied to make a large format digital print

with assistance from CFPR at the National Museum of Printing Buenos Aires. Three Artists were chosen and a two-day master class and series of talks were held in the museum during an exhibition of the UK Perpetual Portfolio. Ten years on, we are still conducting strictly confidential research with HP.

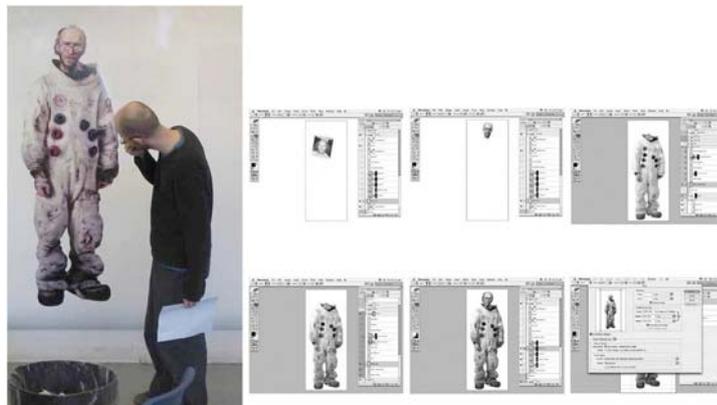


Fig. 3. The Artist Martin Constable viewing his Perpetual portfolio print with some of the process documentation

Another good example of how a project can lead to an unexpected result from what appears to be a relatively straightforward collaboration is demonstrated by a Knowledge Transfer Partnership with the Welsh ink manufacturing company Cranfield Colours Ltd. Cranfield make specialist ink for the print industry but a small part of their business was to make printing ink for artists. This ten to fifteen percent of their business was not only more profitable than the specialist ink for industry, but was also less affected by fluctuations in the marketplace, as many of the customers for these artists inks were colleges and universities who would order a consistent supply of ink annually. However they never met their customers as the inks were distributed through third party vendors. The project was initially about developing healthier ink for the user, formulated as traditional ink that cleaned up with soap and water, rather than more harmful solvents such as white spirit. A secondary element was to develop a methodology for testing these products that more closely matched the needs and methods of use by artists. Part of this element was an attempt to match the terminology of artists to the industrial terminology used by the company chemists. This methodology would serve a twofold purpose – one, to assist the development of new product and two, to respond more accurately to customer

complaints by having a better understanding of the context within which these products were used.

Now, let me give a short explanation of industrial testing methods and the reasons for change. Currently the primary industrial test is to do what is known as a draw down (this consists of drawing a square bladed palette knife of ink across the surface of a commercial piece of paper and then undertaking spectrographic analysis of the resultant film). In commercial terms this is a perfectly valid test and offers a good range of results to the chemist. However when this test is applied to an artist using etching ink it offers no significant information necessary to formulate an ink to the requirements of the artist. Firstly the artist will heat the ink before use, therefore changing its viscosity (thickness or length in artists vocabulary). Then he/she will force this ink into a copper plate with a rag, correctly known as scrim, this can oxidise the colour and change its physical appearance drastically. Then he/she will wipe the plate clean by hand, thus adding grease to the surface film. Finally the artist does not even print it on a dry smooth piece of paper but insists on printing it onto a piece of wet hairy stuff made from cotton linters, known to artists as mould made printmaking paper, not the usual cellulose wood pulp that creates cheap copy paper. You begin to see the problems!

Before we could even deal with these differences we needed to create a common language. What Cranfield called 'viscosity' artists used words such as 'buttery' or 'thin', likewise 'tack' was described as 'short' or 'sticky', both parties are using correct terms within their respective fields, but cannot communicate across the different disciplines.

The Director of Cranfield, Michael Craine, summarises the problem with an anecdote of an employee trying to book a hotel room in France. There was a price difference between a room with a bath and a room with a shower. The employee enquired what is the difference between the bath and the shower. The hotel proprietor replied "in the shower you stand up, in the bath you sit down."

To tackle these problems we needed a very hands on solution, which both made sense to the factory employees and gave them confidence in the product they were manufacturing, in order for them to respond favourably to any complaints or questions. The solution was to develop a manual of terms, teach all of the factory employees real, hands on experience of the basics of each of the processes they were making ink for. Then the company installed small presses in the factory to undertake real term tests alongside the factory tests, until they had gained real confidence in why they were making the product. Cranfield's market share of artists ink market has increased substantially and the water washable ink called 'Safewash' has widened their global market and sells well in the USA.

So, What do we as artists and researchers get from a project? In this particular case it has resulted in the reformulation of ink for the collotype process, greatly assisting an AHRC research project that without this industrial liaison would never have been possible. Other outcomes have been assistance with developing ink for use by artists in developing countries that can be made to a professional standard using locally available materials and I wrote a book on ink for artists!

The above projects are in some senses relatively mainstream with a visual arts environment and this continues, for example we have recently completed a 'Medal of Dishonour' for the 'Pop artist' Richard Hamilton, which is currently on show in the British Museum. This medal, cast in silver, made use of the centre's 3D rapid prototyping technologies.

More unusually we are increasingly being asked to undertake technology transfer with companies who are not print related, but for whom the addition of printing to their product adds real value. For example we are currently undertaking a KTP with a company who make high performance, contamination control floor coverings and mats. They approached us to install digital wide format print technology, so they could print company logos and advertising onto the mats as an integral part of the production process. This KTP project has recently expanded as the company has realised there are simpler ways of manufacturing their flooring based upon technologies already extant in the printing industry, a radical departure for the company.

Additionally we currently have a project of physically printing in 3D scans of broken bones for the NHS to enable surgeons to visualize, in real terms, multiple fractures and how best to repair them.

In conclusion, the intention was to demonstrate that a creative approach to problem solving has direct benefits to industry. Whilst the visual arts, in its traditional forms has its own culture and defined economic benefits, interdisciplinary applied research has distinct benefits to all involved. Without undertaking this industrial research, which gives outcomes that are easily defined as benefiting the wider economy, it can be hard to justify to a wider audience the financial benefits of visual arts research. These case studies I hope demonstrate directly the cultural and financial benefits of working across boundaries that are increasingly becoming more blurred as technology develops. Conversely most of this work relies on an understanding of a practice led craft skill approach to problem solving. In an era of rapidly expanding technology we must not forget the value of physical hands on problem solving.

References

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