Printmaking for Graphic Design Students in the Age of the Digital Screen: An Art, a Craft or a Creative Intersection

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Abstract
This article discusses the research, exploration, practice and positive impact on student learning outcomes of a 'Blended Learning' initiative printmaking project course that was introduced into a digital platform-based graphic design program. Printmaking is the transference of an artwork via various means onto the surface of a substrate, mainly paper, involving media, technologies and crafts that are distinctly different to the digital platform. The pedagogical learning methods involved practice led-research where students explored various printmaking forms whilst developing creative works in these mediums. This practicum initiative for design students that do not have traditional art practices within their program structure was important as it furthers their education whilst developing a number of important personal qualities, particularly those of initiative, perseverance and self- reliance. Importantly, these traditional skills broadened their interplay and understanding between visual arts, the craft of printmaking with conventional and digital technical skills, resulting in a dynamic body of work for their portfolio. The course and following offerings included the conversion of their handcrafted work onto a digital platform into actual design outcomes, thus providing a clear link between the handcrafting and digital technology. Graphic design students completing the printmaking course embraced the opportunity to draw methods from cross‐disciplinary pursuits to compliment and extend their knowledge and to support fresh, contemporary ideas in which to contribute to their various major design studies.
Keywords: Printmaking, handcraft, pedagogy, graphic design, digital, computer

1. Introduction
The inspiration for introducing the printmaking course came from an invitation for graphic design students from local printmakers, to participate in the *Regional Marks* exhibition to be hosted by the University of the Sunshine Coast Gallery, Queensland, Australia. This exhibition was to commemorate the 50th birthday of the Print Council of Australia by showcasing innovative, traditional and contemporary practices and the work by established and emerging printmakers from the Sunshine Coast and broader regions. The project course focused on handcrafted media, with the opportunity to publicly display their coursework creative works either for exhibition or their final year portfolios.

During the exhibition period, and with the first offering of the practice based course, the students attended seminars and workshops run by local artists as well as artists' talks. The workshops permitted students to explore non-digital creative expression and exchange visual ideas through learning new skills with mixed media techniques such as hand printing and traditional printing techniques, with self-expression as the principal goal to be achieved. For instance, during this project a local printmaker ran two workshops on the intaglio printmaking process for the students. The artist provided copper plates, engraving tools, ink, artist print paper and a small press for the workshops, including all the various sundry materials required such as protective gloves, newspaper, wipes and tarlatan. *Tarlatan* is a thin, starched plain-weave, open-mesh cotton fabric (muslin) used in the etching process to gently wipe away ink on the plate ideal for maximum ink retention. Students' participation in this workshop allowed them access to an experienced artist and thus a unique opportunity to extend their dialogue beyond the familiar about art, design and the printmaking process. In the workshops, students began to develop their first creative coursework project for exhibition display. They also were able to discuss with the audience their process and experience in a special area in the gallery that had been made available to showcase their final works.

1.1 Relevance of printmaking to digital platform-based graphic designers
Printmaking is one of the oldest techniques that enabled the duplication of images, having a long history that pre-dates by centuries the current digital age (Higgins 2015: 8). Originally used to reproduce religious texts and manuscripts, over time printmaking achieved a broader function associated with social and technological change. Helen Higgins notes:

> As repeatable images, from the beginning [printmaking] functioned as tools of communication and education, whether by conveying information (scientific, historical, geographic and otherwise); disseminating knowledge of an artist's oeuvre in the era before photographic reproduction; or serving as a means of artistic, moral or religious education (2015).

In the digital age the relevance of printmaking is perhaps less clear. On the Baren(1) Forum, a global 'not

for profit' educational organization woodblock printmaking site, Kim Kaschimer Medina (2003) raised this question: 'I am most concerned with whether or not printmaking should be taught at all ... to students K-12 and university levels. Why should students learn about printmaking, especially in this age of technology?' All the responses posted on the site to this question affirmed the importance of continuing to teach traditional printing methods, for augmenting student learning in the arts as well as for being a challenging and rewarding reproductive creative process that fosters creative self-expression through engaging with unfamiliar materials.

One response on the Baren Forum website particularly resonated with the graphic design students who were enrolled in the printmaking course. This response states:

> The stronger argument for teaching printmaking is the contribution it makes to the ability of students to learn and understand new skills. Printmaking enables students to experience an indirect method of working. When making a block, the artist has to predict how changes in the block will change the final print. The exact effect is not known until the block is printed. Based on the new information from the print, the artist revises the block and prints again. This is the 'scientific method' embodied in an expressive art. It also models a good life skill – your actions have a direct effect on outcomes and you can achieve success by modifying your actions based on previous experience (Kreiger 2003).

This response also resonates with my own experience. As a graphic design student in the 1970s and 1980s, I was fortunate to be able to be involved with the fine arts printmaking area at my college. Becoming engaged in printmaking was a personal interest of mine, and also provided for me an alternative to graphic design processes. At that time, graphic design was a hands-on method involving little technological automation and also considered to be a form of traditional handcraft. Handcrafting has in recent years been taken more seriously for its capacity for communication in design. For instance, well-known New York designer, Stefan Sagmeister of Sagmeister and Walsh commented that his handcrafted work 'has been at the vanguard of a humanistic approach to design for more than 15 years'. He suggests that, 'a more human, handmade, subjective, natural approach is the more effective way to communicate' (Creative Blog Staff 2013). Further:

> His iconic 1999 poster for an AGIA lecture, for which he carved the textual details into his own body, could not be a more visceral rejection of mechanized design processes. Building, making and shaping components of the graphic end product by hand is something Sagmeister has explored throughout his career (Creative Blog Staff 2013).

However, with the massive growth of the digital evolution/revolution has seen a growing dependency by graphic design students on digital software as the single means of designing and producing the end product. A relatively new university, the University of the Sunshine Coast does not offer printmaking and other hand image-creating techniques in their programs, in part due to space and funding limitations, even though these techniques have traditionally been a major part of the design and fine-art study. Hamilton (2003: 69) confirms that educational establishments are facing these many restraining factors removing printmaking from their curriculum. Fortunately, established universities and colleges, do continue to provide integrated learning modules that embrace a multifaceted design education for students studying art and design as well as dedicated artist spaces in which to practice. Many students may have previously experienced some hands-on print process at primary and secondary school. However, the reliance on digital platforms to the exclusion of other image-making techniques in graphic design inhibits fresh 'design thinking' arising from students' deficiency in compositional analysis, drawing and other hand and print skills that produce methodological problem solving, and pushing the boundaries of image generation. Paul Hamilton (2003) emphasizes:

> Graphic design students are heavily dependent on computers, as part of their creative repertoire. Working with print can be alien to a lot of them, alien in the sense that the practice is more hands on. The practical elements enable a more holistic approach to the design and learning processes, allowing the lecturer to give historical references, explaining terms, which have been derived from traditional practice.

Tracey Schwartz (2003), a member of the Baren Forum, fears that 'that [in] taking the "art" out of graphic design, we are creating a generation of computer software experts instead of producing creative artisans'. For instance, the advent of modern technology and the computerization of graphic design have fostered a reliance on digital output where the designer can simply remove any imperfection. However, it may be argued from a purist design perspective that these 'imperfections' actually add to the compositions and final output, providing texture and depth, feeling more 'human' and more visually appealing:

> Contrasting handcraft techniques with computer graphics software 'unsettles' rote graphic design practices. The meaning that lies in the physical act of making, the materials that are used and the contexts with which particular handcrafts are associated can support, as well as carry, visual rhetoric in design works (Van Kampen, 2014).

1.1.1 The printmaking course and the learning process

The printmaking course ran over three semesters, with some modifications made to the second semester offering, i.e. the purchase of an XCut Xpress press, a small portable A4 size printing and cutting press. This addition of a

small press led to the successful printing for students of dry-point intaglio. In all semesters, the students have appreciated the hands-on printmaking approach, and were confident that these experiences were enhancing their creative approach to design. This was especially apparent for first semester students as they stood proudly in front of their work hanging in the University Art Gallery for the 50-year celebration of Print, the *Regional Marks* exhibition:

> It was great to see our works displayed in the gallery I have never done intaglio before and only did linocut print in school. The classes were so inspiring to want to do more printmaking instead of all technology based design. It was good to get off the computer and do real hands on artwork that can be used in producing graphic design concepts (USC student conversation 2016).

In the first two semesters, the theme for the creative works to be produced was about creating awareness for nurturing our natural world, which holds the key to our future living environment. Specifically, students were asked to create images that expressed an issue that concerned them within an environmental theme, using various handcrafted printing mediums. For first semester students, their intaglio and linocut works were to be showcased at the *Regional Marks* exhibition, as they would meet the submission deadline.

Figure 1: Student linocut work hanging in the University of the Sunshine Coast Gallery as a part of the 50 year of print celebration ©.

Figure 2: Students' dry point intaglio work exhibited in the University of the Sunshine Coast Gallery as a part of the 50 year of print celebration ©.

The intaglio process, meaning to engrave, is where recessed marks are filled with printing ink and transferred using a press onto dampened watercolour artists' paper. The paper is then impressed with the ink and embossed with the drawn etching from the metal plate. There are various techniques used for the intaglio process. The most common is an etching method where acid is used to create depth from the needle marks and engraving; the drypoint process is a non-toxic approach. Engraving onto the copper plate with a *burin* produces metal spirals that are then removed before applying ink with fine sandpaper. According to Hebe D'Arcy and Ann Vernon-Morris (2008) '… it was the availability of paper that prompted the emergence of intaglio printing as an art medium in its own right in the fifteenth century. Previous to this, there had been a tradition of metal engraving, however the focus was not on the transference of images to paper, but on the decoration of three-dimensional objects'. Sixteenth Century artists such as Albrecht Durer and Rembrandt embraced intaglio techniques due to its flexibility and reproductive attributes and in the process helped in establishing this technique as a respectable art form. The intaglio process was the pre-cursor to Gutenberg's mechanical printing press, which enabled the first mass printing of the Bible influencing and laying the foundation of our modern knowledge-based economy.

The intaglio workshops in this course used the dry point method, as this is non-toxic and thus better suited to a classroom environment than acid-etching. This workshop was both the students' and the teacher's first attempt at using a drypoint etching tool. Using a *burin* students engraved marks onto a copper plate. We found it was not an easy process although after much practice we managed to work through how much pressure to use, and how much ink to remove using newspaper and Tarlatan to ensure a successful print. We used a small printing press supplied by a local artist for the workshops and through this managed to obtain successful prints. When using the *burin* students found it easy to freeform their drawing onto the copper and acrylic plates, either using reference material or drawing something with which they were already familiar with, mindful that the etched drawing are a mirror image of what would be printed on the paper. However, in the second workshop, at first the prints were not as successful due to the use of an acrylic material for the plate. This material was harder to scratch out an image, and because it is a clear plastic it was difficult to judge the depth of the marks needed.

We all learned that it is preferable to use copper plates, even though they are more expensive than the acrylic sheet. Although, using the clear acrylic students could draw and map out their concept onto paper and trace. Eventually with exploration and practice we found ways to create successful printed images, as the acrylic sheet was an affordable option for students than copper plates.

Knowing how to draw played an important role in determining how successful the students' printed images were as confident works of art. Janet McKenzie (2004) remarked on printmaking as a form of drawing:

> Recent research on drawing has acknowledged that print techniques such as linocuts, woodcuts, lithography and drypoint intaglio printing can be appraised as forms of drawing. The graphic impulse of prints assumed a more public role in the 20th century with the employment of affordable processes such as linocut. In Germany in particular, the dedication and fervor of expressionism enabled printmaking to flourish, sharing, as it did, the immediacy of the drawn line and the capacity for the production of multiple images.

Following the intaglio workshops students practiced the linocut method. The linocut technique allowed students to broaden their creative experience from the challenges of the small intaglio blocks to a large-scale format. This is a method that simply is what its name implies – carving into linoleum. First used by the German Expressionists in the early 20th century the linocut process is a variant of the woodcut technique. However, instead of soft timber, a 'linoleum' sheet composed of renewable resources, primarily cork and linseed oil linoleum is used, sometimes mounted on a wooden block for additional support. Linoleum used by artists is considerably softer than the linoleum used for kitchen floors. Once the image has been drawn in reverse onto the linoleum surface the artist uses a variety of gauges and cutting tools to chisel or carve away those areas of the image that are to remain clear of colour, which allows the white of the paper to show through on the print. The linoleum sheet is then inked with a brayer (rollers used by relief printmakers to apply ink to blocks or plates) and then impressed onto dampened or dry paper or fabric. This process can be repeated, by cutting away more of the design and then overprinting with other colours. Famous artists that used linocut printing were M.C. Escher (Escher was also a well-known graphic designer) and Henri Matisse. It was important for students to learn how to use the carving tools and print a few tests on cartridge paper in order to see where areas of the block would need further adjustments before printing on art paper. Subsequent imperfections, mainly from uneven pressure and ink application, became a part of the charm of the print. Students preferred to use the tradition linoleum than the new more expensive Ezy cut blocks which they found to be very soft with their limited carving experience they were cutting too much away and printing was not as successful as the cheaper linoleum.
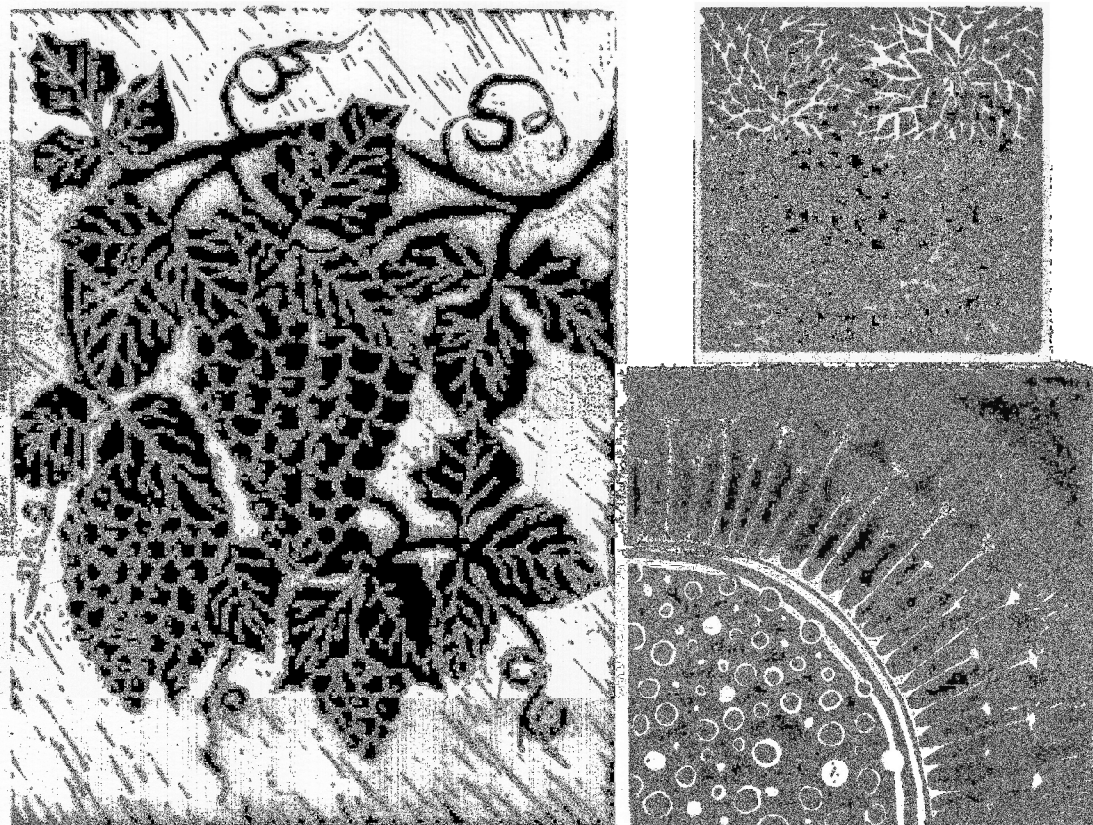

Figure 3: Student example linocut work 2017 ©

The students next experienced the camera-less non-silver photographic cyanotype process. Cyanotype was the first successful non-silver photographic printing process, invented by Sir John Herschel in 1842. It was used for the first photographically illustrated book by Anna Atkins (1799-1871), an English botanist and the very first female photographer, most noted for using cyanotype photography in her books on plant species. Cyanotype was also employed as a photocopying technique. This use of cyanotype printing was wiped out with the invention of dry, plain paper photocopying yet the word blueprint, having originated from the cyanotype process, is used with an expanded meaning today for architectural and building plans. It is interesting to note that, due to its chemical make-up, cyanotype was used in North Wales to overcome a problem of radioactivity resulting from the Chernobyl disaster. It appears that spreading Prussian blue onto the contaminated soil safeguarded the animals that were feeding on the grass (Ware 2014).

To make a print, a strong light source or the sun is required to expose the cyanotype. The process is similar to a photogram where objects or a printed transparency is placed onto paper coated with the photosensitive chemical on artist watercolour paper. The paper changes colour when it is exposed to UV rays. The print is then washed in water to stop exposure and then soaked in a solution of citrus acid to leach out the left over chemical. As students had never experienced this print method previously the cyanotype process became a bridge between digital and traditional darkroom techniques. Further it conveys an historical understanding of how artists printed the first images for reproduction. After much practice to get the timing right for exposure, students learnt to create simple clean compositions and developed an understanding of how light affects photosensitive materials.
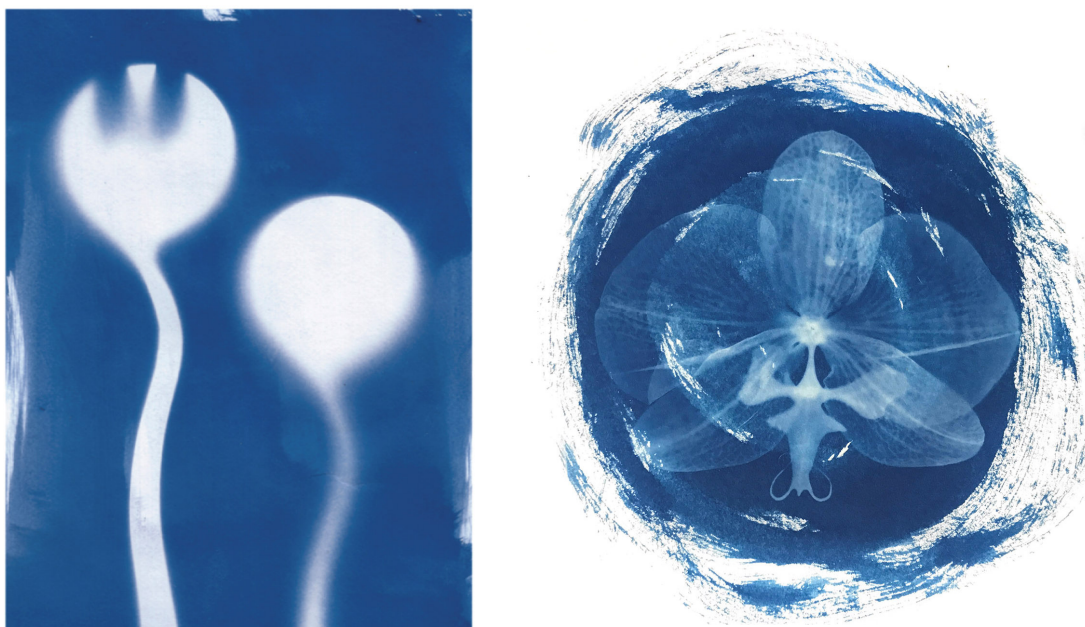

Figure 4: Image 1 and 2: Student example, Cyanotype work ©

The final print process for the project course was the monotype technique. Monoprinting is the process of drawing or painting on metal, glass or acrylic plates. It involves a process of adding or removing (subtractive) ink to essentially create a one-of-a-kind original artwork; mono is a Latin word which means one and type means kind. Most printing methods artists can produce multiple copies as can monoprinting. However, subsequent monoprint copies are known as a 'ghost print' as they rely on there being enough ink on the glass or acrylic and will be substantially lighter than the first print. Hebe D'Arcy Hughes and Ann Vernon-Morris (2008) explain there are three main types of monotype methods. One type is where the adding of paint or ink (additive) builds up pigment to create an image, also called the 'light-field' method. Another type is where the plate is entirely covered with pigment and a subtractive technique eliminates areas of paint or ink with various tools, such as paintbrushes, cotton buds, sticks or rags, also known as a 'dark-field' method. The third type is a combination of the first two.

For the following project courses two additional creative tasks were added. The first involved using the collagraph method. The collagraph is 'one of the most contemporary, experimental processes that evolved during the twentieth century. The term stems from Greek, "colla", derived from the verb "to glue"' (D'Arcy Hughes and Vernon-Morris 2008: 110). Using a strong cardboard base, students glued objects and materials in layers onto the cardboard. The cardboard first needed to be covered with PVC glue and then coated with three coats of varnish and left overnight to cure otherwise the cardboard would deteriorate quickly with the application of wet paint. The materials students chose to glue on their block included lace, plastic and paper cut into shapes, but mainly they preferred materials from nature such as flowers and leaves.

The collagraph process was found not to be as easy as shown on many You-tube tutorials, and we required three class tutorials to produce successful images. We found that Modpodge, although a popular glue, was unsuitable as it was very unstable. Other challenges included the height of the glued product: if the glued objects were too raised then only the highest object would print when pressed onto paper and the surrounding textures being recessed did not print. The purchase of a rolling pin to put pressure on glued objects with which to flatten the relief materials to the same raised level finally produced successful prints.
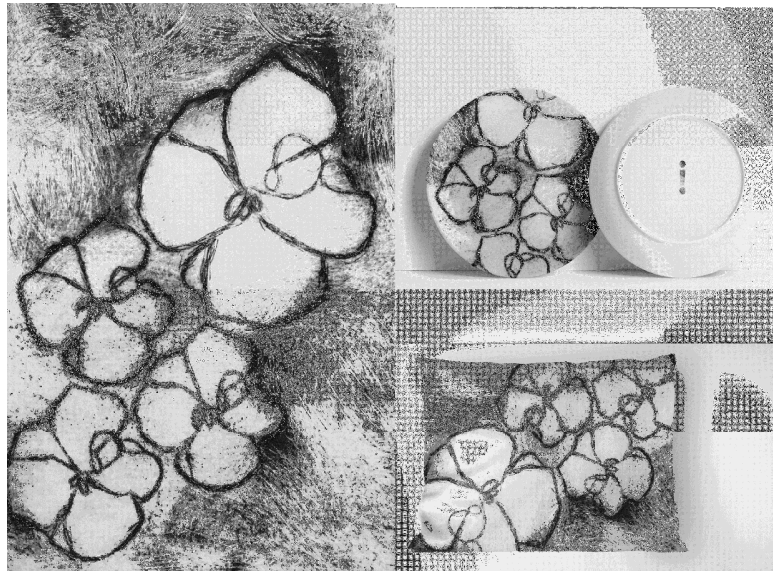

Figure 5: Student Collagraph: Student artwork of string created dynamic design products. ©

As an additional creative task students were asked to transpose their handmade designs to the computer; here they layered the printed designs onto prospective graphic design ideas for products such as, postcards, posters, packaging, tote bags, wine labels, mobile and laptop cases and advertising. To include this experience within the design curriculum offers a balance between traditional methods of art making such as drawing, painting, and printmaking alongside digital photography and computer graphic design. To showcase how students could include handmade print work into products for reproduction a selection of suitable templates were sourced. The work was then customized to the templates using the digital platform and industry software. As the students are skilled with the software the final task outcomes were very successful and they presented fresh works made with an energetic approach. Inspired by the challenge of hands-on tweaks and unpredictable results as well as the tactile qualities of different inks, paint and papers, the students have rediscovered traditional printing methods and crafts. This has enabled them to integrate the 'new' handmade and the digital process to produce a unique dynamic portfolio of work.

Figure 6: Student Example: Cyanotype digital design output ©

Over the two years students were introduced to the unique possibilities inherent in printmaking processes, with a focus on monotype, relief (linocut), intaglio techniques, also the collagraph, cyanotype and the

opportunity to integrate the handmade craft with the digital platform into graphic design outputs. In his article Paul Hamilton (2003) discusses the changes and pedagogical framework to determine and evaluate computer-aided learning in relation to the history and contemporary practice of printmaking in education for the future. He suggests that:

> … defining the format for the practice of printmaking in the higher education print studio of the future [is to review] the pedagogical and practical processes which are facing changes due to current financial, technological and physical pressures and establishing the significant part that computers play as a vehicle for expression and production in digital, hybrid and now, traditional printmaking.

A re-definition of historical craft processes requires new pedagogical debate on the rediscovery of handcraft printing methods for the consideration of students studying graphic design.

Whilst technology is driving pedagogic change in graphic design, there are two key challenges for educators in the creative arts. Maintaining the distinctiveness of the studio learning and teaching experience is paramount for creative practice with genuine practical outcomes. The printmaking process encourages students to further examine texture, line, tone, layering and exploration of various materials including paper, cloth, plastics and natural objects such as plants, flowers and leaves in which to create truly original work. Tactile making enables a more holistic approach to the design and learning processes. This includes teaching historical references, terms that are drawn from traditional practices. This informs and helps the student understand the processes of printing in the digital realm. Using self-exploration and creative thinking through the process of handcrafted methods of printmaking, links together interesting ideas and the technical know-how, enhanced by assistance and interaction with the digital platform. In short, 'realigning traditional technologies blending with the Digital' extends creative pedagogy outcomes through teaching imaginatively.

The overall content of the course theory and experiential practice should support the university priority to develop and provide strategic, innovative and distinctive curricula for students studying graphic design. The course is designed to combine the skills of handcrafts through integrating traditional creative printmaking practices within the digital, termed as 'realigning past technologies '. This fosters a resurgence of 'back to the drawing board' in teaching students the whole process of understanding tangible materials, combinations of processes and the creative touch, which makes the design process truly original. Significantly, visualizing by hand assists students to advance metaphorical thinking, flexibility and to arrive at different destinations within their design work:

> This course is great for getting you to think creatively and widen your skill set to produce unique and effective outcomes. The hand-made prints would easily translate into packaging design, patterned paper and fabrics, postcards and even other design options like interior design for our graduate portfolio. It's a great course to grow your skills as a designer and creative thinker and is also lovely to get away from the computer for a bit! (USC Student Feedback 2017).

1.1.2 Course journal

Assessment tasks included production of creative works using handcrafted printing methods, the transition of these through the digital realm onto products, and also the production of a substantial journal of their experiences. The journal included critical discussion on attendances at seminars and artists talks, their exploration, research and critical discussion about the final works they had produced across the various methods. From the students journals it was evident that 'design thinking' was an integral part of the process:

> I am intrigued by how making a mark on a piece of plastic appears when printed. I am also surprised at how the accidents appear on the prints that add and the satisfaction of completing a challenging work, the unique possibilities of expressiveness and exploring the relationship printmaking has to graphic design (USC student comment 2016).

The student journals indicated that they had enjoyed the printmaking class and wanted to learn and experience further handcraft techniques. Through their discussion and exploration they noted the key historical moments in the evolution of printmaking including the fundamental technological innovations that have impacted upon these practices. Students engaged with the subject through referencing and researching the work of others within the field of printmaking and design that helps augment their knowledge of a range of artists and designers' work. Through this investigation students demonstrate where this can perhaps influence their thinking, the development of ideas and exploration of techniques for reproduction.

> As a task requirement we were asked to explore the printmaking process, how other artists practice the craft for each method and through this discovery found how to work through the challenges for each technique (USC student comment 2016).

The courses were designed to explore the printmaking processes combining technology as a vehicle for imaging ideas and image production, as well as to motivate and involve students in analytical thinking about visual perception.

> The more we practiced the easier it became. I always felt nervous before printing and it was hard

at the beginning coming up with ideas and composition certainly these challenges of having to think about how to transpose our ideas onto different surfaces (USC student comment 2016).

Assessment of the students' creative work and their journals noted overall demonstrated practical skills, enhanced critical analysis and a stronger understanding of problem solving, as evidenced by the amount of experimentation and trials they processed to final outcomes, and the value of the experimental trials for integration with the digital platform. Importantly, the classes created a new awareness that printmaking can bring to the graphic design application exposing a variety of fresh concepts and practice for product outcomes. This was a welcome result indicating achievement of the learning outcomes for the course.

By experiencing the various methods of printmaking within their graphic design degree students were encouraged to diversify their practice and to investigate how graphic designers could integrate analog handwork into their design tasks. They found there were intersections of various printmaking techniques that can be easily interpreted into various print media and product packaging. The method of printmaking by hand, combined with the materials used held rhetorical qualities that became for them the focus for new frames of reference, as Saskia van Kampen (2014) confirms in her Masters of Design dissertation:

> The combination of handcraft and digital techniques enables designers to interweave the disparate social, physical and material qualities of the two processes into their work. In this way the work engages in disciplinary and societal discourse.

Figure 7: A selection of two student handcraft printing examples transferred digitally to product templates: Tea tins and cosmetics ©

1.1.3 Concluding comments

Contemporary printmakers often use a combination of conventional and digital techniques as well as the use of digital printers and photographic equipment. Graphic design students in a digital world need also to be able to integrate form and information for the purposes of effective visual communication using a variety of printmaking mediums. The successful outcomes of this course highlight the relevance of handmade crafts today to graphics design students. When we merge graphic design, digital technologies and handcrafted printmaking it becomes for the student an opportunity to gain valuable experiences to engage them in critical thinking and innovative creative processes. Printmaking allows students to practice structured practical work that enhance their qualities of imagination as these methods further contribute to the development of graphic design skills. It broadens their understanding of and competence in the principles underlying visual and constructional design and problem solving beyond the computer. The outcomes of this exploratory cross-disciplinary research was exceptional with students producing an integrated dynamic portfolio adding new concepts and ideas for future employment amongst the graphic design rote computer system. The outcomes for the research suggest that future courses would benefit from further printmaking mediums such as, screen printing and photographic applications. Importantly, design students can forge new ways to integrate printmaking and digital methods, an intersection of processes to use at different stages of the design process, with one informing the other. They are able to develop their capacity where they have the opportunity to experience handcrafting methods as a part of their graphic design curriculum.

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Notes

Note 1. A Baren is a small round, smooth pad, either flat or slightly convex, used to press paper against an inked wood or linoleum block to lift an impression from the block.

Note 2. The University of the Sunshine Coast is a regional university situated seven kilometres inland from the Pacific Ocean and about 100 kilometers (62mi) north of Brisbane, the major city of the state of Queensland, Australia. As a new university funded by the Federal Government in 1999 space for a fine arts degree would have been a challenge, thus practical and theoretical studies in fine art is not a part of the art and design curriculum.

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Dr Debra Livingston lectured in photography and graphic design at the Queensland College of Art (QCA), Griffith University and Queensland University of Technology (QUT) until joining the University of the Sunshine Coast (USC) in 1999 as a lecturer in Digital Design and Photography. She exhibits her work locally, nationally and internationally, achieving awards for her graphic design, printmaking, photography and new photo-media imaging. Her artworks are in private and public collections. Dr Livingston was awarded an Australian Learning and Teaching Council citation in 2010 for outstanding contributions to student learning by generating scholarly activities that enhance and influence student learning to extend beyond the classroom, notably, for empowering design students by leading innovative and inspiring practicum experiences through integrating local, national and international professional industry practices into their lives and study.