IDEATION AND SPECIFICATION: DRAWING FOR CREATIVITY AND CONTROL

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Based on a new targeted investigation forming the latest stage of a long-term study to investigate the role of drawing in design, this paper focuses on the use of drawing, primarily paper-based drawing, both at the beginning and at the end of the design process, more particularly drawing for creative ideation, and drawing to control production through specification. By exploring the different ways in which experienced professional textile and visual communication designers employ drawing, it has been possible to identify and observe very different uses of paper-based drawing, and to reach conclusions about their continuing relevance. There are concerns that the increasing reliance on digital systems is undermining the acquisition of fundamental drawing abilities by design students, with consequences for their creative potential. While none of the designers in the investigation underestimated the advantages brought about by digital technology, most nevertheless expressed concern about the lack of development of drawing competency in student designers, due to an early adoption of this technology to the exclusion of traditional drawing methods. Against this background, it is crucial that academics are able to respond to what has been a sustained period of change in design and manufacture, and take stock of the enduring advantages that traditional drawing methods can still provide.
INTRODUCTION AND BACKGROUND

This paper focuses on the role of drawing, primarily paper-based drawing, both at the beginning and at the end of the design process, more particularly drawing for the stimulation of ideas and drawing to control production. By exploring the different ways in which experienced professional designers employ drawing to support creative thinking for ideation and to maintain control over their designs into the production or manufacturing stages through specification, it is possible to identify and observe very different uses of paper-based drawing and to identify crucial aspects of designers’ drawing knowledge. It is also possible to reach some conclusions about the continuing relevance of paper-based drawing, and to consider the acquisition of the skills necessary to underpin such usage, in the modern digital design studio. As a basis for this paper, the author has examined and compared findings from a long-term study investigating the role of drawing in design, and has concentrated particularly on findings from the most recent and final phase of this study (detailed below). Two quite different areas of design were selected for this comparison, namely visual communication and textile design, including in the former category animation, graphic and website design, and in the latter knitted, printed and woven textiles.

In comparison to visual communication, the extent to which traditional drawing methods are still used in textile design is remarkable. Watkins (1991: p iv), writing about textile designers in the early 1990s, indicates that ‘CAD has the potential to be a design medium as well as a tool for production but is often viewed with distrust by designers through lack of experience and training’. Much more recently, Bowles and Isaac (2009) still acknowledge that textile designers may be not as confident as graphic designers in the use of digital media. However, recent investigation has shown that textile design students are now for the most part determined to maximize their understanding and use of digital systems, but concerns are being expressed, particularly among some textile academics, that increasing reliance on this technology undermines the acquisition of fundamental drawing abilities for students, with consequences for their creative potential and communication skills. While, as Ballie (2012) indicates, educators must be alert to the ways young textile designers are now required to integrate new technology within their practice in order to identify new opportunities for textile design, it is important that the development of drawing ability is also supported.

The use of digital technology has undoubtedly caused changes to the design process that have still to be fully understood (Oxman, 2006; Odling-Smee, 2002) and approaches that merge digital capabilities with more traditional drawing practices are being explored (Wands, 2001; Hastings, 2010; Faure Walker, 2010). Yet, while increasingly sophisticated digital systems can effectively facilitate various aspects of design practice, many designers remain more at ease drawing on paper for particular stages of the design process. Even in today’s design studios, paper-based methods are still used to enhance design thinking, and the role of drawing in ideation is generally acknowledged to be most effectively
accomplished by traditional, paper-based drawing methods (Rosenberg, 2008; Tan and Melles, 2010). Indeed, of the several hundred designers and educators included in the author’s long-term study, the great majority acknowledged that they still draw both to develop and share ideas. On the other hand, the part played by paper-based specification drawings is apparently less significant in many areas of design where specification is an integral part of the computer aided design and manufacturing process. However, examples of such drawings, particularly the specifications of some knitwear designers, demonstrate an interesting range of intellectual activity.

The comparison of the free, intuitive, sketchy drawing for ideation with the precision and clarity of specification drawings provides clear evidence of the flexibility and adaptability of paper-based drawing. Moreover, crucial to the understanding of drawing usage is the fact that these forms of drawing are essentially both, albeit somewhat different, modes of communication. This is to say, through drawing a designer largely (but not exclusively) communicates with him or herself in the initial ideation process but with other members of the extended design team such as production technicians towards the end of the design process. This may be succinctly summarized by quoting one of the designers interviewed in the long-term study who, when asked why he drew, replied ‘I draw for myself and others’. Drawing for oneself and drawing for others demonstrably have very different forms (being free and wide-ranging in the former and constrained and precise in the latter) and so, inevitably, necessitate different skills.

Evidently, many designers still rely on their drawing ability. ‘I have found it impossible to get away from paper, pencil and ink. These are my media of choice’ was the comment of an animator interviewed in the recent investigation. However, the introduction of computer-based technology to the design studio has meant that the use of drawing has changed significantly since the late 1980s when the long-term study began and, as the technology becomes more sophisticated and designers more inventive and innovative in its application, the relationship between paper and screen-based drawing can be seen to undergo regular readjustment. Designers must be adaptable to cope with these changes and alert to new potential, but drawing ability is still crucial to design thinking and communication and its development must not be neglected.

THE LONG-TERM STUDY

In the mid-1980s an extensive research project was conducted by the author to investigate and characterize the role of drawing in the design process (Schenk 1991). The choice of graphic design as the primary focus for this project proved fortunate, as the results of the research indicated that drawing was used extensively in every phase of the design process and it was possible, based on these results, to construct a detailed model of drawing activity. However, even as the project was nearing completion, it became evident that the pervasive introduction of computers into the design studio was having a profound effect on
the role of drawing and, when the initial research project was completed, the decision was taken to extend the investigation to monitor changes in designerly practice with particular reference to the effects of digital technology on drawing. During the ensuing long-term research program, conducted at regular intervals during the intervening period and subsequently referred to as the ‘long-term study’, investigation was broadened to include other design specializations including the ‘new’ visual communication specializations which proliferated as a result of the opportunities provided by the new technology, like interactive media design and digital animation, and additional disciplines such as product and textile design have also been included.

Although the focus and aims of the long-term study have evolved since its inception, consistency in the methods of research has been maintained by various means. The analysis of the detailed and extensive findings accrued led to the development of a regularly-updated taxonomic system (Schenk 2007), which was devised to present the analysis of findings in a succinct form and thus aid comparability in the conduct of the ongoing research. Various linked themes or topics have been addressed throughout the study and, in addition to the main aims of characterizing the role of drawing in the design process and monitoring the impact of technological development, other associated research topics, including the identification of the drawing abilities required to use drawing effectively in design, and the educational provision necessary to foster such drawing abilities, have also been explored.

The methods of research employed throughout the study included the conduct of focused and structured interviews with designers and design educators, and interviewing such respondents provided a very effective way of eliciting both their personal approach to drawing and their experience of working for industry or in education. Using a semi-structured technique employing both open-ended questions and fixed alternative and scaled responses (Cohen and Manion 1985), an interview can combine consistent investigation of predetermined topics with the opportunity to explore new lines of enquiry (Gray and Malins, 2004). While the author was responsible for conducting and recording all the interviews, thus maintaining a continuity of approach and maximizing reflexivity, opportunity to discuss findings with design educators and practitioners, and to elicit their opinion on the results of analysis, was regularly sought throughout the long-term study to avoid bias. Interview scripts comprised sections eliciting data on professional training and experience; the use of drawing in the design process; the ways, if any, in which the respondents felt the use of drawing had changed in the design industry; and the development of drawing ability on design courses. These topics were amplified during further discussion with respondents to explore any new themes that emerged as the long-term study progressed. Observation of designers’ drawing activity within their working environment also provided an effective means of identifying drawing practices and usage. Similarly, the identification of the type of drawing produce for the completion of particular tasks, particularly with the designer present, yielded still further information. Furthermore,
and particularly useful in the analysis that underpins this paper, a comparison of drawings produced for the same general purpose, but at different times during the nearly thirty-year span of the long-term study, could be especially illuminating.

The final phase of the study was initiated to complete the research program by taking stock of current practice, and to determine to what extent the use of drawing, which typified designerly practice when the long-term study began, is still evident today. Investigation was mainly focused on communication and textile designers and the majority of the research was carried out over a three year period. Interviews and observations were conducted in various academic and commercial studio environments ranging from a major London-based consultancy to small-scale independent design groups. While the majority of participants in the long-term study were selected from industry or higher education based on their experience and expertise, student groups were also included where relevant. The opportunity to discuss their drawings with a group of final year textile design students gave useful ancillary information in the final phase, providing an interesting corollary to the views of textile design academics. The comments quoted verbatim in the text are from respondents in the final phase of the study and compare the views of over thirty textile designers and academics of various levels of seniority, including ten students, together with the views of over twenty communication designers. The foresight of some of these designers in saving their working drawings, and their generosity in allowing them to be used for the purposes of research, has proved very helpful and several examples of these drawings accompany this paper. Findings from earlier phases of the long-term study have also proved relevant for comparison purposes, particularly those from an in-depth enquiry into drawing on the design curriculum, when the opinion of 40 senior design academics were elicited (Schenk, 2005).

**DRAWING FOR ONESELF: IDEATION**

While various types of drawing are employed by designers, the term ‘sketch’ is invariably used to describe the type of free, quick drawing most associated with ideation or design thinking. Ferguson (1992) identifies three kinds of sketch, the thinking sketch, the prescriptive sketch and the talking sketch, further clarifying the talking sketch as ‘a shared graphical setting which enables discussion’. In thus defining the dual role of drawing as being, on the one hand, to aid visual thinking and, on the other, to communicate with others, Ferguson also refers to ‘the prescriptive sketch’, which is an appropriate description of drawing for specification. Rosenberg (2008) talks about a range of ‘drawing processes, where one thinks with and through drawing to make discoveries, find new possibilities that give course to ideas, and help fashion their eventual form.’ Through a process of discussion, reasoning and revisiting design visualizations, complexity can be unraveled and drawing can be seen to play a part in each of these intellectual tasks.
For key parts of the development of a design solution, particularly for ideation and conceptualization, all the designers included both in the long-term study and the recent investigation confirmed their use of drawing, primarily paper-based drawing. ‘Everything starts with drawing because it’s so instant and sketches are disposable’ indicated one web designer who emphasized the value of using traditional drawing methods, particularly in the development of ideas, as drawing digitally can be limiting and time consuming. Indeed, there are many broad similarities in the use of paper-based drawing in the ideation stages of the design process for visual communication and textile designers. Both stress the significance of the briefing sessions with the client and achieving a good level of agreement with the client’s needs. Given that many ideas are stimulated by the briefing, it is important to observe how drawing is employed at these sessions where designers essentially draw for themselves and usually tend to keep their rapid, sketchy drawings private so as to ensure that they themselves appear professional.

Maintaining a controlled approach during the early meetings is also important for textile designers working for big industrial clients. This stage is primarily based on the presentation of early concepts for new collections, and can include written notes and found images, or even the designer’s own photographs, brought together on mood-boards. This visual selection is used to set the design process in motion, with some sketches being produced to support and inform discussion. One designer for industry-based jacquard weave production, when describing her cautious and essentially private use of drawing during briefing, explained how she employs a combination of ‘written notes and thumbnail sketches’. Both visual communication designers and textile designers agreed that in informal briefing sessions, especially with clients well-known to the designer, or where the designer is a confident draughtsman, some design solutions will be talked through and confirmed by the use of quick, informal and rudimentary sketches.

Once convinced that they understood the client’s requirements, again both groups of designers describe gathering visual reference material to inform their initial concepts and then, with the aide of this material, they use drawing with increasing definition and refinement to translate early ideas. In the case of the textile designer, this translation of initial ideas may be to explore the visual potential in designs or to consider technical feasibility, ‘to work out what is knittable’ as a designer for fashion knitwear described it. In the case of the website designer this may be, to ‘see how it looks on the screen’. A knitwear designer talked about ‘taking initial drawings and producing many further variations to explore aspects of particular interest in more depth’. Two such developments are shown in Figures 1 and 2 where the conventional shape of the garment is treated like a canvas for experimental composition, in an approach to the decorative qualities of knitwear design that is shared by two different designers, one working in the mid-1980s before digital drawing packages were available and the other designing much more recently, but still opting for the flexibility of paper-based drawing.
FIGURE 1 IDEAS FOR THE COMPOSITION OF A KNITTED PATTERN, MID 1980S

FIGURE 2 IDEAS FOR THE COMPOSITION OF A KNITTED PATTERN, MID 2000S
It is important that designers feel relaxed and not under pressure to draw skilfully at this stage and Goldsmidt (2003) provides a cogent assessment of the ‘expertise’ needed for ideation.

‘The inventive process does not require wider skills: not necessarily a larger vocabulary or unlimited graphic techniques. Rather, what is required is an ability to use the representational act to reason with on the fly.’ p 72

The informality of the type of drawing activity which support ideation is confirmed by both discipline groups in the present study and they describe the production of similar types of drawings, e.g. ‘scribbly initial ideas on cheap A4 paper or in a notebook’ as one printed textile designer put it. The mode of drawing itself is quite quick and intuitive as ideas are processed on paper to see if they are workable. This essentially constitutes designers drawing for their own purposes, without the constraints of having to communicate with others. Figure 3 shows a page from a graphic designer’s notebook produced in 1988, which serves as an informal and accessible aid to explore design ideas and compositional and stylistic development. However, while conventional drawing skills may not be needed, complex intellectual exercises must be supported and so a wide range of abilities are actually acquired. For example, it is necessary to be able to draw quickly and freely and with sufficient understanding of form and style to ‘see what is inside one’s own head and put it down on paper’. Figure 4 shows the drawing of another graphic designer working more recently and engaged in the planning of an interactive web-page. While evidently fully conversant with the possibilities of employing a digital alternative, this designer chose to benefit from the freedom and speed of paper-based drawing. Figures 5 and 6 also show the work of two graphic designers, one working in the early 1990s at the beginning of the digital era, and another twenty years later, each using traditional drawing methods to seek visual solutions to complex issues. Here, Figure 5 demonstrates an example of drawing by means of which over thirty ideas and variations on a logotype are explored with speed, efficiency and an economy of means, while Figure 6 indicates a similarly simple, paper-based approach to the exploration of the complex stylistic criteria of letterform designs for the jackets of a set of books by the same author, but evocative of different historical periods.
FIGURE 3 IDEAS FOR CD PACKAGING, LATE 1980S
FIGURE 4 IDEAS FOR WEB-PAGE DESIGN, 2011

FIGURE 5 EARLY DRAWINGS FOR LOGOTYPE DEVELOPMENT, EARLY 1990S
Selby (2008), in explaining what happens between being briefed and completing the work, describes the design process as ‘a journey of discovery that may or may not be replicated’ and indeed, in the process of interpreting the client’s intentions the designer must also, at the same time, bear in mind the limitations and potential of final production while endeavoring to achieve an original solution. However, as a senior academic in the textiles area indicated, ‘expressive drawing as a creative tool for fabric and garment development is often left behind in the early stages of a knitted textile designers’ education’, and similar anxieties have been expressed by other academics included in the long-term study as a result of the increased shift towards digital systems (Schenk 2005). However, another concern expressed by the same respondent was that ‘digital design drawing is based on the premise of what is already known and established as knittable. The digital environment does not give the same scope to communicate innovation, and the traditional skill of design drawing offers greater freedom to challenge these known conventions.’ While none of the designers in the present investigation underestimated the advantages brought about by digital technology to the design profession, equally, and without exception, they nevertheless expressed their concern about the lack of development of drawing competency in student and novice designers due to an early and comprehensive adoption of this technology to the exclusion of traditional drawing methods.

**DRAWING FOR OTHERS: SPECIFICATION**

Whereas it is relatively straightforward to make the case for the continuing importance of educating design students on the significance of paper-based drawing for ideation, it might at first appear as less convincing to argue a case for encouraging them to learn to draw for specification. However, it is herein proposed that such an initiative may be worthy of
consideration by the academic design community. In order to draw an accurate specification for a design it is necessary to understand two sets of criteria and, furthermore, to know how these criteria relate to each other. A designer must have a very clear understanding of every element of the design in question and also understand how it will be employed in the process of conversion into the final product. Essentially envisaging this conversion is an intellectual task at the heart of design, and paper-based specification drawing requires complete understanding of every aspect of this task. Students working exclusively in the digital domain can achieve apparently viable design outcomes that are not actually achievable in practice. The technology can put a gloss on a design solution that is, in effect, not entirely resolved.

The importance of controlling the production process is emphasized by both visual communication and textile designers, but it tends to be handled rather differently in each profession. Visual communicators use specification drawings to brief the specialists who contribute to the final design, for example illustrators, photographers and web-designers. Therefore, the eloquence of their drawn communication is of paramount importance in achieving the particular qualities of the work they commission. Figure 7 shows a graphic designer’s detailed and accurate specification, drawn to accompany a briefing session with a web-designer. Interestingly, while sharing some of the simplicity of execution of the drawing in Figure 4, the speculative nature of the former is replaced by specificity in the latter.

FIGURE 7 SPECIFICATION FOR WEB-PAGE DESIGN, 2012
For a number of reasons, drawings produced for the purpose of specification are rarely seen. Unlike other forms of designers’ drawings, they are not valued per se and copies are rarely kept by designers themselves. Original drawings of course are by necessity given to the production specialist or technicians for whom they are intended. However, it is apparent from the recent investigation, that paper-based drawing for specification can be an important part of the design process. For example, textile designers, particularly those in constructed textiles, may still draw to control production. They stress the importance of producing accurate, detailed, drawn specifications, as indicated in Figure 8, where the details of both garment and pattern are shown, in order to ensure that the production process is as efficient and effective as possible. Indeed, there are dangers inherent in not doing so in an industry largely reliant on freelance designers who may not be on hand at the time of production. When describing her specification drawings, one knitwear designer defined them as being ‘as precise as I can make them and in proportion. I will draw a specification using ruler and eye to draw as exact as possible a design, front and back.’

FIGURE 8 SPECIFICATION FOR A KNITWEAR GARMENT

Some senior academics, convinced of the importance of drawing for specification, had retained copies of earlier work carried out while in industry, and examples of the drawings of knitwear designers proved to be particularly interesting in this regard. These drawings help to clarify the complexities of both three dimensional form and two dimensional pattern, and therefore, perform a number of functions simultaneously. As such, they
constitute complex intellectual exercises demonstrating the designer’s capacity to define their abstract design concepts within the restrictions of manufacture. Moreover, they are created for the use of technicians, namely for those responsible for the control of production. Hence, it is precisely in such specification drawings that the role of drawing as part of the ‘dialogue with others’ can be seen in both cogent and unique forms. One knitwear designer described a detailed system of drawing for specification which includes ‘diagrammatic drawings of garment specification for communicating accurately the overall silhouette of the garment and its proportions, or the balance and proportion of pattern within a fabric’ as can be seen in Figure 9, and ‘converting ideas into stitch for stitch graphs’ as can be seen in Figure 10. In addition to garment specification, the importance of producing dedicated drawings as specification for the sales team, manufacturer’s specification and production specification were also described, thus indicating the need to communicate to each such group of people in their own terms.
Weave designers also describe the need to achieve a high degree of control. For example, one weaver described how technical drawings may be used to work out both the design and construction of textile designs, that is to say ‘to work out the draft, to plan initial weft ideas, to write out designs and peg plans on point paper, and to write out warp and weft plans’. Another described the preparation of the detailed mapping of the conversion of a design into a digital weave process drawn onto graph paper through ‘drawings in the form of weave structures, ... to show how the warp and weft threads in a weave will interlace’, as Figure 11 demonstrates. Students of weave and printed textiles are encouraged to plan ahead to assist themselves in making the best use of their limited time in the workshop and in preparing for production of their design work. Notebooks are made up of their own drawings, produced to help them envisage the potential of the production process, as is demonstrated in Figures 12 and 13. While not being specification drawings as such, these drawings provide interesting examples of the development of the kind of designerly knowhow that anticipates issues related to production.
FIGURE 11 SPECIFICATION FOR JACQUARD WEAVE PRODUCTION, 2011

FIGURE 12 NOTES TO PLAN FOR WEAVE PRODUCTION, 2011
DISCUSSION AND CONCLUSIONS

Nussbaum (2009) underlines the significance of the rise of the ‘Gen Y’, the age group of today’s student and novice designers. Their formative years have been contemporary with the spread of new digital cultures and, as Nussbaum states, ‘they live on digital platforms that are ever changing. They inhabit a participatory media that gives them the tools to create, share and re-appropriate content.’ It should also be noted that their understanding of design has been formed in an era where drawing studies have been under threat on both the school and design course curricula. For earlier generations of visual communication and textile designers, drawing would have played a significant part in their intellectual development, whereas this is often now no longer the case. Recent interviews and discussions with textile students reveal that they maintain an interest in drawing and see drawing ability as an advantage but much confusion also exists, particularly regarding the scope of drawing in contemporary design, and they are unsure about how to maximize the opportunities that drawing facilitates.

Therefore, it is crucial that academics are able to respond to what has been a sustained period of change in design and manufacture, and are able to take stock of the enduring advantages that traditional drawing methods may still provide. While this paper has concentrated on traditional paper-based methods, the relative merits of both paper and screen-based drawing systems should also be considered, so that it is possible to identify viable hybrid and convergent approaches which can contribute extensively to design
processes now, in the main, conducted in a digital environment. All the senior academics included in the recent study acknowledge the crucial benefits that technological development has brought, while, at the same time, recognizing the important role that drawing still plays. In the words of one senior academic in animation, ‘one of the huge benefits of digital technology is that you don’t have to expend the energy that used to be wasted on the ‘clean-up’ stages. More time can be spent on the creative elements.’ Similarly, a weaver acknowledged that ‘in jacquard woven production, digital technology has enabled designers to be more adventurous, as translating the drawn image into woven jacquard fabric is very much faster than traditional methods, giving the designer more designing time.’ Even to advocate maintaining a place on design courses to develop the skills necessary for paper-based drawing may be seen as conservative, even reactionary, to some academics and designers. However, for those wishing to develop a design curriculum that seeks to maintain a place for tried and tested traditional methods within the computer-dominated design industry, the benefits of both paper-based and digital forms must be balanced and integrated or, or as Faure Walker (2012) proposes it is necessary ‘to develop a seamless passage between the different palettes.’

A spontaneous yet competent use of both traditional and digital drawing methods can facilitate progression through the design process, from first ideas to the resolution of a design solution, and paper-based methods can still be seen to enhance design thinking. The role of drawing in ideation is still generally acknowledged to be most effectively accomplished by traditional (i.e. paper-based) drawing methods, and design students must be aided in developing the confidence to draw quickly, freely, yet knowingly, when endeavoring to deal with the difficult intellectual challenge of converting abstract concepts into the reality of production and manufacture. Furthermore, drawing is also important in sharing ideas, which means not only having the capacity to express visual concepts sufficiently well to convince others but also the ability to read the ideas of others in rudimentary drawings.

Even in the pre-digital era, few students had the experience of drawing for specification, and most of the professional designers interviewed in the long-term study claim that it is a skill they only acquired once they started work, where it became a necessity for controlling the activities of others and to achieve the results they envisaged. However, in the context of design education, it is important to consider the development of the intellectual skills that specification requires. As indicated earlier, when working exclusively on computers, it is possible for student and novice designers to make convincing presentations to clients for designs that have not actually been thoroughly resolved. It is also possible for limitations inherent in software applications to limit creative solutions. It may, therefore, be worth considering the introduction of drawing for specification to the undergraduate curriculum, so that the intellectual skills associated therewith are developed. Drawing for specification can be seen to both instruct and inform in equal measure, and represents a targeted, succinct and profoundly informed dialogue between representatives of very different sets
of expertise. Clarity of articulation is essential and detailed control is of the essence. Learning to specify through drawing could well provide valuable experience for students.

The comparison of the free, intuitive sketchy drawing for ideation with the precision and clarity of specification drawings provides clear evidence of not only the flexibility and adaptability of paper-based drawing but also demonstrates its unique role in design. In spite of the major changes in the design process due to technological development, it is still apparent that drawing remains a kind of ubiquitous device, i.e. an adaptable tool that the designers of today can use as necessary, much as did the designers in the pre-digital era. The long-term study has shown that experienced designers who understand the potential of drawing and demonstrate competency in its use know themselves to be advantaged. It is important that such an advantage remains available to our young designers in increasingly competitive commercial situations. Indeed, it remains imperative that they are given the opportunity to acquire traditional drawing abilities, alongside their acquisition of computer-based techniques, and their exploration of the new opportunities of convergent approaches. The drawing knowledge of the pre-Gen Y designer is still relevant today and, it is hoped, will remain available to the benefit of new practitioners.

REFERENCES


