The role of drawing in the graphic design process

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The role of drawing in the graphic design process has not hitherto been subjected to detailed investigation and characterization. A research programme based on interviews with designers, the observation of drawing practices and the analysis of designers' drawings has been conducted with the aim of clarifying the ways in which drawing is employed. Designers were observed to use drawing throughout the analysis and development of design solutions, beginning with the initial briefing session, and furthermore, drawing was found to be used for conducting managerial procedures, for fostering creative behaviour and for various forms of communication by members of the design team. A representative model for the graphic design process is discussed.

Keywords: drawing, graphic design, design process

Graphic designers need to develop the ability to use drawing to support a wide range of tasks. Drawing is a tool helping them to perform managerial tasks, achieve creative output and control production. It is also the key to making essential communications about designerly issues with a variety of people including clients and other members of the design team. Yet discussions with both graphic design practitioners and educators can reveal confusion about the role of drawing and, in some cases, a denial of its importance.

Abraham Games has written

For many years I have made a practice of keeping all progressive sketches which go to the making of a final design. Occasionally they leave their portfolio for an airing at lectures, but mostly remain hidden from view like the bulk of an iceberg, while the final design, like the peak, is displayed for all to see.

An in-depth study has been carried out to explore the bulk of this 'iceberg' of designerly activity and to provide a detailed characterization of the part that drawing plays in the professional life of graphic designers. The findings not only confirm the importance of the use of drawing in many of the tasks that graphic designers perform but have more general implications for the study of designerly practice and design processes. This paper discusses some of the main findings from the study.

While many excellent manuals and monographs identify and explore much of the specific nature of the graphic design discipline, the characterization of all the particular ways in which graphic designers use drawing has hitherto been somewhat neglected in the literature. Examples of good graphic design in production are widely available through the many annuals and specialist journals that deal with the subject, but examples of the preparatory stages of these solutions are very rarely seen. For the most part, the drawn stages, the 'progressive sketches' that Games refers to, still 'remain hidden from view'.

The research method adopted by the present author in this study of drawing in the graphic design process has been to combine the collection of designers' views about...
their drawing activities with observation of these activities and analysis of the drawings produced. Included were in-depth interviews with 50 experienced designers supplemented by shorter, focused interviews with 20 junior designers, extensive periods of observation of those studio practices that involve drawing activity, and the collection and analysis of well over 200 designers' drawings produced in the preparation of design solutions for a wide range of jobs and representing the full range of design procedures from initial briefing to production.

Given that the primary intention of this investigation was to characterize the part that drawing plays in the professional life of graphic designers, it was essential to take a broad enough view of the design process to include all the pieces of work, or tasks, that designers perform which are in any way supported by drawing. Thus, in addition to what have traditionally been categorized as the 'stages' in the graphic design process, i.e. analysis, synthesis and evaluation, tasks involved in the preparation for a design job (i.e. those involved in the procedures of accepting briefing and collecting reference material), and tasks involved in controlling production (i.e. those involved in the procedures of commissioning artwork and preparing for production) have also been included. This approach proved extremely valuable. Not only was it found that characteristic kinds of drawing activity occurred uniquely in these additional procedures, there was also clear evidence that the formulation of ideas and creative decision-making was occurring.

Moreover, since it was a characterization of the role of drawing that formed the main topic of study and not just the drawing activities of graphic designers, a broad view was, of necessity, taken of drawing usage. Graphic designers were found to use the drawings of both other designers and commissioned specialists in their work and the capacity to conceptualize, describe, commission and evaluate drawn images was seen to be very important. Therefore the need for the development of such cognitive as well as practical abilities formed part of the study.

THE USE OF DRAWING IN THE GRAPHIC DESIGN PROCESS

The graphic designers interviewed were asked to describe their use of drawing during the procedures of accepting and passing on briefing, collecting reference material, the analysis of a design problem and development of first ideas, the synthesis and development of design solutions, the presentation, evaluation and revision of design solutions, the commissioning of artwork and the preparation for production.

From the descriptions of their work, it was clear that while specific procedures may be separately identified, they are nevertheless very closely interrelated and that, in practice, it is very difficult to separate completely certain procedures from others. For example, the analysis of a design problem is intrinsically linked to the formulation of ideas, and the synthesis or bringing together of various elements of a design solution is invariably accompanied by some form of evaluation and adjustments to or developments in the solution. Therefore, these linked procedures have been discussed together.

Accepting and passing on briefing

When a designer or design team commences the consideration of design solutions, a sound understanding must have been achieved both of the client's requirements and of the particular nature of the design problem to be undertaken. Therefore, the way designers accept briefing must be effective. Similarly, because in many cases only representatives of the design team attend briefing sessions, passing on of information received during briefing must also be effective. While the interview respondents indicated that, in general, they do not make very extensive use of drawing during the procedures of accepting and of passing on briefing, nevertheless some important uses were described.

In fact over 50% of the respondents described ways in which they may use drawing during briefings and meetings with clients. These included the making of visual notes as reminders of information passed on at the meeting, or to remind themselves of any ideas stimulated by the discussion or any decisions on design solutions made at the meeting. Respondents indicated that during a client's briefing their use of drawing is greatly influenced by a number of factors, particularly the nature of the occasion of the briefing (i.e. its relative formality or informality) and the designer's relationship with the client. Although some designers said that when they were with clients drawing is occasionally used for an exchange of ideas, the majority stressed that they exercised caution in these circumstances unless a good working relationship had previously been established with the particular client.

It was only in cases where designers felt they had a well-developed relationship of trust with a client that there was a much less self-conscious use of drawing to explore ideas together. Indeed a number of respondents indicated that they would actually prefer to be able to use drawing in a relaxed way to check their understanding and initial ideas. Some said they find it easier to talk and draw at the same time, and to use drawing to explain an idea to a client. Figure 1 shows an example of the type of quickly produced schematic which designers described using for this purpose (drawn here below a clients' own drawings produced to try to explain their requirements).

The importance of a designer's capacity to use drawing effectively was found to be particularly crucial when passing on the information gained during briefing sessions to other members of the design team. Figure 2 shows drawing produced when this sort of passing on of information and decision-making occurs. Senior designers in particular need to have developed an appropriate strategy for using drawing for passing on briefing to a junior member of the design team. Over-prescriptive drawings that indicated not only broad policy towards the development of the design solution but also gave clear...
Figure 1. Drawings produced to check understanding of the brief with the client (CYB, 1989)

directives about visual style could be seen to pre-empt the creative contribution of the junior. Complaints were recorded from senior designers about lack of initiative on the part of the junior and from the juniors about the frustration caused by the lack of opportunity for creative input and these were, in some cases, found to be linked to the use of over-prescriptive drawings.

Collecting visual reference material

Less than half of the designers interviewed said that they regularly used drawing when collecting visual reference material, most preferring to use photography or their collection of magazine clippings or books. Many found that shortage of time meant that this stage in the production of a design had to be dealt with very quickly, so reference material had to be readily available. The majority of the respondents expressed the belief that it was essential to have a well-developed knowledge of visual style, thereby allowing them to propose and consider a variety of appropriate solutions to specific jobs without the collection of reference material. Many thought that an accurate knowledge of historical styles was also essential.

This type of cognitive ability was described as necessary when confirming the relevance and accuracy of visual images, and is in agreement with Garner’s findings on establishing ‘a relationship between graphic ability and cognitive development’. The keeping of sketch books and note books was found by several respondents to be a means of developing this essential kind of visual background knowledge. Some designers recalled instances of actually drawing from observation, but more usually they employed tracing or copying from a reference source in order to collect visual information. However, because of time constraints, such practice was found to be greatly restricted, designers tending to rely on their understanding and knowledge of form developed through experience.

Most respondents stressed that not only their own use of drawing in the support of designerly activity but also the experience of observing and working with the drawings of others played a part in developing their visual literacy, perception and visual memory. Thus, it is through working in an environment in which drawings are produced as well as through their own drawing experiences that designers develop the type of visual understanding and knowledge that can be brought into use as required.

Analysis and first ideas

In general, the interviewees’ comments clearly indicated that the use of drawing is a very significant aid to the analytical and first ideas procedures of a designer’s work. It helps designers to assemble their first thoughts and a fluid free-ranging drawing style can enable a designer to explore a greater number of ideas quickly, with economy of effort. As Tovey has indicated ‘The existence of drawing permits the designer to consider several alternative design ideas simultaneously.’ Figure 3 shows a worksheet that demonstrates this rapid generation of a number of ideas. One design director referred to this phase as ‘the thinking bit’ and likened the quick, spontaneous kind of drawing used as being almost like handwriting, or like ‘a musician’s score’. Another designer described how he needs to draw while he is thinking, ‘keeping the hands occupied while the brain is working’. Yet another said, ‘Your hand is part of your brain. It’s as though your brain is drawing.’

Some respondents described how they use a combination of words and rough visual notes to work out and test ideas on paper. From observation of studio practice it was also clear that designers use this sort of rapid, notational drawing freely and frequently, not only at the commencement of work on a job but at any subsequent point when new elements are introduced or revision is required.

Senior designers confirmed that it is during the initial analysis of a job, namely when the approach to a design problem is being developed, that they do the majority of their drawing. The pressure of other duties frequently obliges them to leave the more time-consuming and
Figure 2. Drawing produced to pass on the briefing to the design team (CYB, 1989)
Figure 3. Early idea sheets (Dave Crow, 1987)
detailed kinds of drawing associated with the synthesis and development of a design solution to more junior staff. However, the drawing done in these early stages is essentially, as one creative director said, 'drawing you do for yourself'.

Synthesis and development

From the descriptions given by the majority of designers interviewed, it was clear that a greater degree of drawing skill in the conventional sense becomes necessary for the performance of tasks involved in the more detailed synthesis and development of design solutions than for the earlier phases of the design process. As a creative director for a large design consultancy commented 'Drawing is the key to relating all the elements together.'

At this point, drawing is no longer used only as a quick notation for ideas but also for combining and modifying visual elements, and for exploring subtle variations in composition and form. The designer's need to resolve a visual idea in more detail in order to make decisions about its appropriateness prompts a change in the pace and style of drawing activity and, during the course of synthesis and development, a shift of attention from concept to format can be seen to take place. Figure 4 shows a drawing for the design of a poster where the details of each aspect of the layout are being considered. It is also quite common for designers to start to work 'same-size', in more permanent media than those used during analysis and idea formulation, and to introduce colour during these procedures.

Some respondents, particularly those involved in editorial design, pointed out that it is only when they are able to combine the various visual elements of a design, like photographs and display typography, that they feel they can begin to make really significant decisions about layout or format. Several described the sense of control they experienced with the introduction of these 'real elements', and their combination and juxtaposition through a mixture of drawing, cutting and collage was described. One magazine designer said that he was only really able to start planning a layout when all the elements were assembled before him. 'You have to work with the real thing.' He described moving the elements about on a full-size page grid and assembling them in the manner of a collage.

Presentation and evaluation

The various procedures associated with evaluation also involve designers in essential drawing activity. In addition to their own personal evaluations of design solutions, which they confirmed as taking place throughout the design process, respondents described the use of drawing for in-house presentations, i.e. presentations among members of the design team, and for presentations made to clients.

It was interesting to note that presentation and evaluation are not necessarily accompanied by the production of new drawings. In fact, designers were frequently found to re-use earlier drawings. For example, drawings done as a means of developing ideas may be kept and later employed as a means for reminding the designer, or design team, of the approaches to a design solution that have already been considered. The re-use of drawings was frequently mentioned as occurring during designers' own individual evaluations of their work, and indeed was also found to occur during in-house presentations. It was less common for client presentation.

However, drawings are also produced specifically for presentation purposes, with respondents indicating that, in many instances, some degree of special preparation will have taken place before evaluation can occur. Indeed, the majority of respondents described the visual presentation of an idea, so that it can be properly evaluated, as one of the tasks within the graphic design process where the use of drawing is most vital. Figure 5 shows skilful freehand indications of lettering and typographic style for label designs. These drawings are in fact only two of many produced for a client presentation by the design team of a large consultancy.

Another interesting use of drawing linked to presentation and evaluation is for the revision of design solutions during evaluative procedures. Figure 6 shows a drawing produced for client presentation that has been amended during the presentation with scribbles of ideas for revisions. These revisions are stylistically very similar to the drawings produced during analysis and idea generation, and indicate a return to a similarly free and speedily-produced drawing type which facilitates the consideration of new ideas.

All the respondents indicated that evaluation involved progressively more 'formal' procedures and it was the view of many that this frequently resulted in the means of presentation, including the use of drawing, becoming correspondingly more formal. Most agreed that in the early stages of evaluation drawings are the main areas of presentation and that they play a very significant part throughout the later stages, although alternative methods, such as photography, computer-generated proofs and even short print runs, are also used.

Whereas the majority of the designers interviewed indicated that they would prefer to show clients only drawings where some care had been taken with presentation, so that the quality and potential of a design solution could be shown, many also admitted that where it was necessary to imitate final print quality for a client who has little visual imagination, the craft techniques necessary to do this are exacting and time-consuming. Indeed, it was not uncommon during the course of the interviews to hear designers say that, where possible, they avoid taking work to a high degree of finish for the 'client's presentation' and they gave one of three reasons for this. Some claimed that it can be virtually impossible to give a true representation of a design solution without actually taking it into print, others that in a small organization with few designers the necessary range of drawing skills may not be available, while most said that it is very
Figure 4. Developments in composition and form (Stephen Raw, 1988)
expensive to spend studio hours on the time-consuming rendering of a design solution. To quote one designer, 'the shortest time between doing a job and getting paid is a rough'. Figure 7 shows the one drawing produced for the presentation of a design for a book cover when limited funding was available.

Preparing for and controlling production

Characteristic uses of drawing were identified in the procedures involved in controlling production. Many respondents indicated that by the time a design was ready to go into the ‘production phase’, even though most of

the creative decisions have been taken, the quality of the final result depended greatly on the ability of the designer (or design team) to maintain control over the various aspects of production and that, in some instances, drawing was used for maintaining such control.

Thus, an important and widespread use of drawing was noted in the commissioning of the specialists, such as illustrators, photographers and model makers, whose skills are harnessed in the production of various elements of the design during the production stage, if not already brought in earlier. It was clear that specialists must be briefed differently depending on their particular expertise. For example, model makers need to be given information about three-dimensional structures, and so

Figure 5. Indications of display typography (CYB, 1985) labels 7cm – 9cm. Originals in colour

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Figure 6. Client presentation drawings with revisions (CYB, 1986)

Figure 7. Drawing for client presentation (Stephen Raw, 1988)
some sort of perspective drawing may be needed as part of a designer's instructions in these circumstances. It is, in fact, often necessary to get the model maker to produce the working drawings from a designer's rough sketches before a final production method can be agreed. Again, in the case of lettering artists, it was found that the briefing given can vary from the very free to the very precise, that is to say the letter-forms may be either just loosely indicated or almost entirely resolved by the designer before a lettering artist is brought in.

Some interviewees, for example one packaging designer who requires a predictable result to contribute to a well-researched solution, described the production of a carefully rendered visual of both the layout and style of the illustration that is to be commissioned, which is then given to the illustrator in addition to the verbal briefing. However, when respondents were in a position to commission more experimental work, they said they preferred to give illustrators a relatively free hand, trusting to their professionalism and respecting their creativity. In a small proportion of design organizations, the designers interviewed said they preferred the illustration to be completed in-house, ideally by the designer who had developed the ideas, a policy that obviously demands the recruitment of designers with a particularly high standard of drawing ability. However, the majority of respondents indicated that it was usual practice to buy-in illustration, and that it is essential therefore that a designer has sufficient knowledge and working experience to commission an illustrator who can produce a predictable result to order.

Different policies for the production of camera ready art work and paste-up were noted according to the type of organization. In the larger organizations, an in-house artwork section was generally found to take over all production, or computer-aided drawing facilities were available to designers who wished to use them. Over two thirds of the designers interviewed thought that the most efficient production of artwork required specialist skills, continually practised and said that they themselves only use drawing for either refining or controlling the production of artwork. It was generally felt that a different kind of drawing ability was needed for artwork, and that it was a poor use of the time of a creative person to be involved in drawing-up and pasting-up camera-ready copy. However, even in these cases it was clear that the designer's capacity to use drawing appropriately in the production of specifications was important and in some smaller organizations, or in freelance practice, designers were sometimes required to produce artwork themselves.

There was a small but significant group of respondents who said they prefer, indeed insist on doing certain types of artwork themselves. Some described the need to solve many of the detailed but important problems of layout at the artwork stage, where it is possible to get the proportions of a composition absolutely right. Some described the production of artwork as being simply the final stage when most of their creative decisions are made, working like artists on pieces that become artwork thereby preserving the freshness of their visual style and ideas.

**DESIGNERLY PRACTICE AND THE DESIGN PROCESS**

The study of drawing activity within the graphic design process has proved an effective vehicle for gaining insights into important aspects of designerly behaviour. The detailed characterization of drawing usage has enabled the development of a taxonomy which will form the basis for further characterization of types of drawing production, drawing activity and required drawing abilities.

In addition, this study has enabled various more general inferences about designerly behaviour to be made, in particular on the role of drawing in the range of communications made by the design team, its use in the support and stimulation of creative behaviour and the nature of the design process itself. These will be considered below.

**The design team and their use of drawing**

In a very real sense drawing can be seen as part of the language through which designers conduct various aspects of their business, over and above its use in purely creative terms. In the performance of organizational tasks graphic designers were found to use drawing to communicate ideas during meetings with marketing personnel and account executives and with specialists responsible for aspects of production. Moreover, some of the designers interviewed described themselves as interacting with the client through the use of drawing, to query information given during briefing sessions, to demonstrate both the advantages or the disadvantages of proposed solutions, to convince, even to educate, the client so as to enable them to see the advantages of proposed solutions and also, when necessary, to employ drawing in such a way that the client can be persuaded to accept the designer's preferred approach.

Again, it has been found that the proper use of drawing can determine not only the quality of the design solutions produced by the design team but also the efficiency and cost-effectiveness of their production. By using drawing in appropriate ways, the design team can control the organization and timing of a job. They can also avoid ineffective and therefore time-wasting approaches to design solutions. That is to say, solutions can be evaluated by means of drawings before wasteful investment has been made in time-consuming production procedures. Intelligent and appropriate drawing usage can indeed be seen to support designerly thinking, and be part of an attitude of mind, permeating business in an essentially designerly way.

In addition, many of the senior designers interviewed described using drawing in what may be said to be
managerial tasks through which they exercised control over other members of the design team. They described drawing as part of the process of passing to junior designers both the form of design solutions in various stages of development and their instructions for further development. The use of drawing in the performance of this type of managerial task is not addressed by the theorists, but it would appear from observations made during the present study to form a sufficiently important part of the professional life of many graphic designers to merit further investigation.

Moreover, in yet another important respect drawing has been found to be an essential form of support for the design team. It was observed that the work leading up to presentations to clients had a major effect on the operation of the design studio. The designers worked more as a team than at other times, often external help being 'drafted in' from designers who previously had little to do with the job in question. Senior designers would tend to be more specific in their briefing to junior designers, and juniors in turn accepted advice without expecting to make their own creative contribution. Much of the use of drawing that accompanied these preparations for presentation was noticeably in a different 'gear' than that made at other times. There was more activity, longer time was spent drawing without a break and the drawing activity itself tended to be slower and more careful. Some respondents indicated a preparedness to assist in the presentation of the ideas of other designers, acknowledging that each designer has a different range of abilities and not all possess the required patience and craft skills that presentation techniques demand. Both case study observations and the descriptions of respondents confirm that this unofficial system of sharing the responsibility for various aspects of a job, especially for presentation, is fairly widespread.

### The role of drawing in supporting innovation

The use of drawing in the support of creative effort has also been fully confirmed by the study. It has been found to be essential to the way in which both the design team and individual designers stimulate and develop creative responses and to the development of the 'empathy' between members of the design team.

Graphic designers operate within a commercial environment where it is required that a design not only be innovative but also appropriate and relevant. As Davies and Talbot point out, 'Everybody has ideas. Essentially the designer's job is about generating bright ideas and then implementing these in some form of physical manifestation acceptable to others.' This means that designers need to maintain an awareness of a wide range of non-visual criteria while they are designing. Although right side of the brain activity has become associated with the development of drawing ability, what are commonly termed the 'whole brain' theories of creative activity have been found to be more applicable in interpreting some of the findings of the study. In other words as Rickards has indicated, both right and left brain modes of information processing are of importance for certain types of creative behaviour like designing.

Thus, many respondents described methods of producing a combination of written notes and drawn images, thereby maintaining a degree of critical evaluation alongside spontaneous ideation, a kind of dual processing, with words and images working in tandem. One designer describing his use of drawing when initially planning his approach to a job said, 'Putting it down makes one realize what one has overlooked. Working ideas out on paper, noticing the possibilities in chance effects and the testing and rejecting of ideas goes on constantly.' Figure 8 shows a worksheet that demonstrates this rapid generation of a number of ideas through words and images.

As indicated above, the importance of the role of drawing was described by respondents in the development of the visual memory they need to call on as they begin to search for ideas. These comments may also be seen to have a wider significance in the study of designerly activity in that they accord with established thinking about creative behaviour. The importance of this use of memories of 'stores or analogies' and the importance of the ability to 'make connections or associative bonds between clusters of memory traces' has been well recognized and the role of drawing as an aid in processing the synthesis of new concepts through the juxtaposition and combination of remembered images by visualization has already been established.

The stimulation of creative behaviour is also generally held to involve fostering the appropriate climate of relaxed attention. It was found that many designers appeared to be very casual in their initial uses of drawing in a job and exhibited a reluctance to impose any sort of judgmental criteria on the drawings produced, thereby implicitly fostering a non-judgmental climate to support creative thinking.

Jones describes the aim of brainstorming as being to 'stimulate a group of people to produce many ideas quickly.' Although the study provided no evidence that graphic designers engage in formal brainstorming sessions as such, some of their drawing activity, particularly in the early stages of a job when several members of the design team meet to talk and draw together, fulfill many of the criteria advocated for brainstorming sessions. The numerous quick 'doodles' they produce may be seen as a type of check-listing of ideas, with drawing being used in a playful way to aid the overcoming of 'blocks' to creativity.

Adams describes the choice of an appropriate 'problem-solving language' as an important aspect of selecting a mental strategy to work on a problem and overcome blocks to creativity. However, this must be a language in which the thinker is competent. McKim indicates that if visual problem-solvers suffer from the frustrations of being visually illiterate their creativity is impeded. Although not all the respondents thought that a wide range of drawing ability was essential for graphic designers, all thought it was useful, and the majority thought that a fluid and confident use of drawing was essential in the stimulation of ideas.
Figure 8. Worksheet from a notebook (David Crow, 1988)
The nature of the graphic design process

The major emphasis of the numerous investigations into the nature of the design process has tended to be concentrated on disciplines other than graphic design. By focusing on an exploration of the role of drawing in the work of the graphic designer, it has been possible not only to examine the role of drawing as an intrinsic element in the development of the creative process but also to gain insight into the nature of that process itself.

As Cross had indicated, during the late 1970s and early 1980s various thinkers offered profound re-statements about the nature of design. Hillier, Musgrove and O'Sullivan provided the paradigmatic shift in design processes, replacing the analysis/synthesis/evaluation model with one of conjecture-analysis. This model better recognized the designerly approach of prestructuring problems... by a knowledge of solution types.

Although the findings from the present study indicate that the graphic design process contains procedures of analysis, synthesis and evaluation, it is clearly not the three-stage linear process as described in some early theoretical models but involves many 'feed-back loops' as exemplified by Lawson. Indeed, it is clear that many procedures are repeated throughout the graphic design process. For example, 'evaluation' was found to take place from the earliest stages of the development of a design solution. Moreover, it is often impossible to separate the performance of individual procedures and so, for example, when 'evaluation' was observed, it was invariably accompanied by 'revision'. Nevertheless, it may be said that there is a broadly predictable pattern of predominating procedures. For example, it has been observed that synthesis and development generally occur before evaluation and revision. It is also very clear that the designer's attention tends to concentrate on a particular range of procedures at any given time. It may therefore be said that there are phases in the graphic design process that reflect the conduct of a range of associated procedures.

Moreover, when attention was directed specifically at the analytical procedures, the analysis/synthesis/evaluation model was again found to be unsatisfactory as a representation of the graphic design process. The reason for this is as follows. The analysis of a design problem could be seen to begin at the briefing. During the briefing sessions designers were observed to conduct an analysis of the design problem in various ways. They asked questions, they made notes both in words and images for immediate and later reference, and they sketched examples of possible solutions, or 'solution types', based on their experience. These sketches were produced, albeit schematically, both for their own use and, in some instances, to check the client's meaning and intention.

In two ways these observations may be said to favour the application of the conjecture-analysis model. They indicate that designing begins before any systematic analysis can have taken place and they show that some designers develop their understanding of the problem by analysing and evaluating solution types.

It is also clear that designers appear to be stimulated from an early stage into a particular approach to the solution of a graphic design problem. Darke describes design as a process of 'variety reduction', with potential solutions being reduced by external constraints and the designer's own cognitive structures, and she makes the proposition that a 'primary generator', i.e. an idea or group of related concepts, will form a starting point for the designer, a way into the problem, and a means of beginning the process of variety reduction. Hence, this may be seen to support Darke's elaboration of the model to one of generator-conjecture-analysis.

These various observations have important implications for the development of a more representative model of the graphic design process. Although it was clear that the majority of creative design activity takes place in the studio after the individual or design team have received the brief, the fact that designerly activity can be seen to occur before this point means that the briefing and any other preparatory procedures should be included in the model. Moreover, in some instances, designers make innovative developments during procedures carried out specifically to control production. Production procedures should therefore also be included. Therefore, the terms 'preparation' and 'production' have been adopted to describe the phases when these particular procedures occur and the term 'main creative phase' has been adopted to describe the phase when the majority of creative activity occurs. The relationship of phases and procedures is represented below.

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<tr>
<th>Preparation phase</th>
<th>accepting and passing on briefing</th>
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<td>collecting reference material</td>
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<td>Main creative phase</td>
<td>synthesis/development</td>
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<td></td>
<td>presentation/evaluation/revision</td>
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<tr>
<td>Production phase</td>
<td>commissioning artwork</td>
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<td>preparing for production</td>
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Thus, the graphic design process can be said to be made up of a series of phases, in each of which certain procedures, predominate, and by means of which the designer makes progressively more clearly defined conjectures about appropriate solutions, while rejecting inappropriate ones.

CONCLUSIONS

By investigating the role of drawing in the working practices of graphic designers, the present study has
clearly demonstrated that drawing is an intrinsic procedural device assisting graphic designers to carry out many of the tasks that they regularly perform. Moreover, it is also clear that this use of drawing is highly complex and requires the development of both intellectual and manipulative skills to maximize its effectiveness. In addition, it has been found that the importance of drawing is not just in the performance of designerly activities but in the types of communication that can be conducted and in the managerial tasks that it supports.

Drawing has been observed to be a vehicle for creative interchange in group sessions whereby the members of the design team both share and stimulate ideas. Many designers also use drawing to develop their visual literacy and fund of ‘stored analogy’ to support creative behaviour and, in tandem with the written language, to maintain a degree of critical evaluation alongside spontaneous ideation.

Through investigation of graphic designers use of drawing it has been found that designerly tasks are performed in both preparatory and production procedures. Therefore, a broader representation of the design process is proposed that includes these procedures. The findings of the study also indicate that an application of the ‘generator-conjecture-analysis’ model proposed by Hillier et al.\(^2\) and Darke\(^5\) is appropriate to the graphic design process.

ACKNOWLEDGEMENTS

The author would like to acknowledge the invaluable contribution of Dr John Langrish and Michael Yeomans (Manchester Polytechnic) and that of Richard Tilley, (formerly of CYB, now Tilley, Cato, Gobé, Desgrippes) without whose assistance the detailed verification of the findings would not have been possible. Practical and financial assistance was also received from the Faculty of Art and Design, Manchester Polytechnic.

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