



Reflection in and on action and practice in creative-production doctoral projects in art and design

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Having now supervised to completion nearly twenty PhD students and examined a similar number, I have experience of a relatively wide range of projects. Most of these can be best described as technological research projects. Technology and design share a common concern for generating artefacts that are intended to transform the world from what it is to something better: both are concerned with intervention, innovation and change. Design research that is intended to effect change (which is the kind of design research that I am concerned with here) is closer, in my opinion, to technological research than it is to scientific or humanities research. From my experience, technology research projects share a number of common features (see Table 1). First, the product of the research is usually an artefact of some kind. For example, it might be the design of a robot arm that can pick up an egg without breaking it. Second, the resultant artefact is one that either didn't exist before or is an enhanced variant of an existent product. Third, the need for the new or variant product is justified (e.g., there is a need for robots that can pick up eggs): that is to say that a solution to a problem is needed. Fourth, it can be demonstrated that the solution resolves the problem, thereby satisfying need. Fifth, the solution to the identified problem is of general interest to the domain (e.g., robot designers, manufacturers and users). Sixth that the outcome of the research is useful. Seventh, that the knowledge embodied in the artefact (e.g., how to pick up an egg without crushing it) can be described separate from it (thus offering the potential for reuse). Eighth, that knowledge embodied in the artefact is applicable to other contexts (e.g., picking up a glass) and, ninth, transferable to the construction of other artefacts (e.g., a different kind of robot). Tenth, that the beyond-the-single-case applicable and transferable knowledge embodied in the artefact is more important than the artefact, which is merely a demonstration of its existence.

artefact is produced
artefact is new or improved
artefact is the solution to a known problem
artefact demonstrates a solution to problem
the problem recognised as such by to others
artefact (solution) is useful
knowledge reified in artefact can be described
this knowledge is widely applicable and widely transferable
knowledge reified in the artefact is more important than the artefact

Table 1 Norms of Technology Research Projects

In my experience, most students' and supervisors' interests can be accommodated in design research projects, which like technological projects, exhibit the features identified in Table 1. What characterises this type of project, whether technological or design, is that it is focussed on problem solving. Nevertheless, I have encountered, supervised and examined students whose projects, while being concerned with the production of artefacts, exhibit few of the other features identified in Table 1. What characterises this latter kind of project is that its is focussed on creative production. In the remainder of this paper, I will explore these differences and how they are reflected in problems of process, form and presentation. Finally, I shall explore ways of doing and documenting that I believe offer a way forward - at least for me.

Creative-production Projects and Problem-solving Projects Norms

Having supervised many students in what I have characterised as problem-solving projects, when working with a new student my natural tendency is to try and frame the student's project in such a way that it offers the potential to exhibit the features listed in Table 1. As noted above, in some cases I have found that the proposed work could not be straitjacketed into this mould. Here, I shall call these creative-production projects.

Typically, the candidate researchers, whether artists or designers, are experienced practitioners who want to engage in research that will contribute directly to their on-going practice. Furthermore, they wish to conduct the research through art- or design-making, or, put another way, they do not wish to suspend their creative work or allow it to become separate from, or sub-ordinate to, the research activity. This in itself is not a problem, as moulding a through-practice research project that meets the criteria listed in Table 1 is straightforward. Problems seem to arise when the candidates' primary interest is in producing artefacts, i.e., in creative production, and when their practice is closely associated with their self-identification as creators. For these candidates, the artefacts arising from the research cannot simply be conceived as by-products or exemplification of "know-how". Instead, they are objects of value in their own right. Typically, the candidates involved are artists or studio/craft designers, focused on producing work that will stand up in the public domain (e.g., be worthy of exhibition). For them, doctoral study is mainly seen as an opportunity to develop as creators and to produce more satisfactory work.

In problem-solving research projects, judgement as to whether an artefact is novel or an improvement on an existent product depends on the identification of weaknesses in existing products or needs that are not yet fulfilled by any product: in other words, on the identification of a problem. With some PhD candidates it proves virtually impossible to identify a problem as such. For example, one of my research students, a photographer, was interested in producing work that dealt with the subject of breast cancer. Among other reasons for undertaking the work, it was his hope that photography could contribute to awareness and understanding of how breast cancer affects the sufferer, the family, etc. However, the primary purpose of the project was not to test photography's contribution to understanding but to produce photographs dealing with the subject of breast cancer, or rather to discover, or learn, how to produce them. Hence, while the programme could have been framed as a hypothesis testing project this would have been of little practical interest to the candidate. Nor was the work concerned with generating a new or improved artefact whose novelty or enhancement could be recognised in the fact that it provided a solution to a known problem. A number of photographers had already dealt with breast cancer in their work, so new work could only add to this body of work. However, had this project been the first to deal with the topic, this, of itself, would not have provided a justification for undertaking the work. There would have been no value in undertaking the work if the only reason for doing it was the fact that it had not been done before. Nor would the fact that it had been done before have been a reason for not doing it. The justification for undertaking the work was that the photographer was motivated to undertake it. Similarly, the student would have had little interest in taking identified "weaknesses" in the work of other photographers as his starting point, as the resolution of those "weaknesses" would not necessarily have related at all to his underlying interest in undertaking the work. It was what the photographer learnt, realised, or found that mattered. The work would be original in the sense of not being derivative or imitative, but not necessarily in the sense of new-to-the-world or an improvement on existing works, or of satisfying an identified need.

In such a situation, what one is dealing with is a topic of interest (e.g., breast cancer) and creative objectives (e.g., work dealing with breast cancer) that resist, throughout the programme of work, reduction to single problem and its solution. Furthermore, the selection of topic and goal are made on the basis of personal rather than collective judgement. ² This is not to suggest that the selection is self-indulgent. Of course, it can be, but, while individually unique, every person has much in common with others, sharing with them a social space. As such, what interests one person is likely to be of interest to others. Nevertheless, although artefacts are produced, their novelty, shared interest and usefulness may not be easily demonstrated or assessed.

Another problem with this kind of work (which we will explore in more detail later) is that the project's topic of interest and goal may change as the work progresses. This occurs for a number of reasons: first, the student is usually exploring manifold interests and goals and the priorities given to them may change as the work progresses; second, new issues and goals may emerge in response to the work in progress. In my experience, something similar occurs in problem-solving projects and comprises what might be called the problem finding phase of a project. Normally, however, there comes a point in such a project when a problem is found, defined and followed through to the realisation of a solution. In contrast, in projects where the work is progressed through the creation of and interaction with artefacts, issues, goals, and priorities may change throughout the project resulting in a stream of outcomes, thereby never settling on a specific problem or yielding a "final" solution. Perhaps the main reason for this is that the artefact matters as an object of experience. If it is not "working" in this sense then something has to be done about it.

While in a typical problem-solving project the "know-how" exemplified in the artefacts is of central interest because it can be reused, in creative-production projects there is no general interest or utility in this "know-how". For example, even if one knew how to, why should one want to reproduce the photographs produced by a particular artist or the ceramics of a particular ceramist. For the same reason, there is no obvious merit to this knowledge being widely applicable and transferable (however, later I shall argue that it does provide examples, images, understandings that others may adopt for, or adapt to, their own purposes). Furthermore, as noted above, the artefacts are not exemplars of the project outcomes, they are the project outcomes. Table 2 illustrates how creative production projects relate to the norms of problem-solving projects.

artefact is produced
artefact may not be a new or improved version of an earlier artefact
artefact is not a solution to a known problem
artefact doesn't demonstrate a solution to a problem
the topic of interest and creative objectives may not be of obvious relevance to others
artefact may have no obvious use
there may be no value abstracting knowledge for reuse
"knowledge" reified in the artefact is unlikely to widely applicable or transferable
the artefact is more important than any "knowledge" reified in it

Table 2 Relating Creative-production to the Norms of Problem-solving Research

Although I stress what seem to me to be fundamental differences between creative-production and problem-solving projects, its important to recognise that this is not a black-and-white distinction. A creative-production project may comprise some problem solving and, indeed, it may involve cultural theory, cultural history and scientific research, inter alia. Where this is the case, it is important that the outcomes of this activity are reported. Nevertheless, it is inappropriate to view the contribution to knowledge made through these activities as the primary goal of the activity, or for the fact of this knowledge or these activities to be used to obfuscate, i.e., to claim that one is the same as the other. In a creative-production project this knowledge is a by-product of the process rather than its primary objective. One reason for seeking to distinguish this form of project from the problem-solving form is to establish a framework of ideas and concepts that will prevent the former from becoming subsumed under the latter, which has a longer doctoral tradition and well-established norms.

Assessing Problem-solving Research Projects

The outcomes of a problem-solving research programme can be tested against the norms identified in Table 1. For example, we can ask, has the research student:

Demonstrated that there is a problem to be solved?

Shown that the solution to the problem will result in a new or improved artefact?

Shown that the problem is one that the World would like to see solved?

Demonstrated the usefulness of the solution?

Demonstrated that the knowledge exemplified in the solution can be abstracted (i.e., described and/or formalised)?

Considered the general applicability and transferability of this knowledge?

Proved this knowledge (i.e., demonstrated that the problem has been eradicated or ameliorated by the solution)?

However, it is important to note that a student would not be awarded a PhD for merely producing a new or improved artefact, even if all of the above questions had been answered positively. The PhD candidate would have to show that they arrived at the problem and its solution in a self-conscious and reasoned way. In other words, if the decision-making involved in framing a problem and arriving at its solution were not evident, then the work would not be satisfactory. This is why a problem-solving project is presented as an "argument", which is usually, in fact, a post hoc justification for the decisions that were made. So, we can add one further and crucial test to those listed above: Has the research student demonstrated that he or she is a self-conscious and systematic problem-setter and -solver?

In my experience, there is no generally agreed methodology for this demonstration. The primary research methodology is problem-solving itself, which often, in practice, cannot be fully explicated. There are, of course, methods, techniques and tools that can assist the researcher, but in many cases, the problem finding and solving processes retain an element of the black arts. Consequently, the student is not required to describe in detail the problem-setting and problem-solving processes. Rather, the student is expected to provide a persuasive case for the worthiness of research problem, the rationality of the steps taken to solve it and their execution. In short, although there is no overarching methodology there is an overarching ethic of self-conscious, informed and systematic problem selection and solution.

Earlier, it may have occurred to you that the problem-solving research norms are characteristic of technological and design problem-solving in general. This being the case, what makes one everyday design or engineering, say, and the other research? One part of the answer to this is that not all of the norms need to be satisfied in everyday practice, e.g., a problem may not be worth solving; neither is it necessary for the problem-solver to pass all the tests identified above. The additional requirements imposed on the student in the context of a doctoral programme take the activity beyond everyday problem solving.

The Norms of Creative-production Projects

While a creative-production project may not exhibit the norms of a problem-solving project, this does not mean that norms cannot be identified, quite the contrary. First, whilst one may not wish to describe creative outcomes as new, in the sense of having no precedent or being an improvement on a precedent, one can describe work as being original, i.e., not derivative or imitative of others' work. Second, while the "problem" and "solution" may be inappropriate descriptors, the work can be described as a response to a set of on-going issues, concerns and interests expressed through one or more artefacts. Third, while these issues, etc., may not be understood as framing a problem and although they may originate in a highly personalised way, they are usually rooted in the cultural context, i.e., they reflect culture. Furthermore, these issues, concerns and interests should be manifested through the creative-productions, i.e., the artefacts produced. Fourth, whether useful or not, the important attribute of the artefact is that it should contribute to human experience. The main difficulty comes in talking about knowledge; which I am coming to believe is inappropriate in this context. Instead, as implied above, the criterion to be met is

that the work makes a contribution to human experience. This being the case, the creative production, as an object of experience, is more important than any knowledge embodied in it.

artefacts are produced
artefacts are original in a cultural context
artefacts are a response to issues, concerns and interests
artefacts manifests these issues, concerns and interests
the issues, concerns and interests reflect cultural preoccupations
artefacts contribute to human experience
artefacts are more important than any knowledge embodied in them.

Table 3 Norms of Creative-production Research Projects

Using these norms, Table 3, a creative-production research programme can be tested by asking, for example, has the student:

Described the issues, concerns and interests stimulating the work, i.e., something that will contribute to human experience?

Shown that the response to these stimulants is likely to be original?

Shown that the issues, concerns and interests reflect cultural preoccupations?

Shown the relationship between the artefact and those issues, concerns, and interests?

Presented original, high-quality and engaging artefacts that contribute to human experience?

Communicated knowledge, learning or insight resulting from the programme of work?

Shown themselves to be a self-conscious, systematic and reflective creative artist or designer?

The Underlying PhD Process in a Problem-solving Project

Hence, specific norms projects (against which outcomes can be assessed) can be established for creative-production which differ in a number of respects to the norms and tests of problem-solving projects. The question is how do these differences impact on the PhD process and the nature of "argument" in a creative-production project? In the search for an answer to this question, I will first consider the nature of the underlying the problem-solving PhD process.

If one were to take a typical problem-solving PhD thesis as representative of the problem-solving process then it would appear highly rational, deliberate and clinical. However, this is rarely how the researcher experiences the project, especially when the work is highly original. Typically, the experience for much of the programme of study is one of false starts, readjustment, redefinition and uncertainty, inter alia. Indeed, in my experience, the problem-solving PhD process is much closer to that characterised in Schön's theory of reflective practice (1983).

In everyday action, Schön (ibid.) argues, our knowledge is ordinarily tacit, implicit in our patterns of action and in our feel for the stuff with which we are dealing - our knowing is in

action. Similarly, the professional depends on tacit knowing-in-action. On the other hand, we often think about what we are doing. Usually reflection on knowing-in-action goes together with reflection on the stuff at hand. As the professional tries to make sense of it, he also reflects on the understandings which have been implicit in his action, understanding which he surfaces, criticises, restructures, and embodies in further action. According to Schön it is this entire process of reflection-in-action which is central to the "art" by which practitioners deal with situations of uncertainty, instability, uniqueness, and value conflict. In my view, the process by which the problem-solving researcher arrives at research outcomes is very similar.

Reflection-in-action has a characteristic structure. Typically, the practitioner finds that problem cannot be solved as it has been initially set, so the framing of the problem must be surfaced and criticised, and the problem reframed: a way of shaping the situation to a new frame must be found. The reframed problem becomes the basis for experimentation to discover what consequences and implications follow from it, and the situation is made to fit the frame through moves that adapt the situation to the frame. But moves generate unintended changes that give new meaning to the situation: the situation talks back and the problem is reframed. New discoveries call for new reflection-in-action. The process spirals through stages of appreciation, action, and reappreciation, whereby the unique and uncertain situation comes to be understood through the attempt to change it, and changed through the attempt to understand it.

Schön (1983) asks further questions of this process. If the practitioner conducts a reframing experiment how is it evaluated? Accepting the uniqueness of a situation, how is the accumulated experience of practice made use of? If reflection-in-action is a kind of experiment, in what sense is such on-the-spot experimentation rigorous. Given that the characteristic research stance is that of objectivity, control, and distance, how might the stance of the practitioner be described?

The answer to the first question is that evaluation is grounded in a frame experiment's ability to keep things moving and the practitioner's appreciate systems, i.e., that knowledge which the practitioner draws on to establish whether changes and unintended changes are liked or disliked. Schön views the practitioner's experience as a repertoire of "examples, images, understandings, and actions". According to Schön, when a practitioner makes sense of a situation that is perceived to be unique, she sees it as something already present in her repertoire. "Seeing this situation as that one, one may also do in this situation as in that one", continues Schön (1983:139). It is this capacity that allows practitioner to bring past experience to bear on new cases.

Schön (ibid.) defines several types of experiment in practice. Exploratory experiment is when an action is undertaken only to see what follows, without accompanying predictions or expectations. A move-testing experiment is when an action is undertaken in order to produce an intended change. Such a move can be affirmed or negated. A hypothesis-testing experiment succeeds when it effects an intended discrimination among competing hypothesis. He argues that experiment in practice is different from research in a number of ways. First, the practitioner is interested in transforming the situation from what it is to something better. Second, when a practitioner reflects-in-action, experimentation is at once exploratory, move-testing, and hypothesis testing. The three functions are fulfilled by the very same actions. Third, in hypothesis-testing the practitioner is in imperative mode, "Let it be the case that X...", and shapes the situation so that X becomes true. Phenomena is changed to make the hypothesis fit. Fourth, the practitioner violates the canon of controlled experiment, which calls for objectivity and distance. The practitioner's

relation to the situation is transactional. The situation is shaped, but in conversation with it, so that his own models and appreciations are also shaped by the situation. Fifth, the practitioner/experimenter need discriminate among contending hypothesis only to the point where moves are affirmed or yield new appreciations of the situation. In the practice context the experimental logic is one of affirmation not confirmation. The sequence initiated by the negation of a move terminates when a new theory leads to a new move that is affirmed. Sixth, hypotheses must lend themselves to embodiment in a move. Only hypotheses that can immediately translate into action are of interest.

However, although this process might resemble the experience of undertaking a problem-solving PhD the student would not be encouraged to write it up; indeed, the student would be actively discouraged from doing so. I doubt that there is a problem-solving PhD project supervisor who, when encountered by a student with writing-up problems, has not responded by saying, "You need to distinguish doing the PhD from writing it up". And what does this mean? Well, in the first place, the problem finding phase of the project is rarely written up (i.e., the cycle of problem framing, action, consequence, and reframing). The experienced supervisor knows that, with guidance, there will come a point when the student will frame a problem that will become the primary research focus. In the thesis, the student is expected to justify the existence of the problem rather than to explain how it was found. Hence, the problem is usually presented as if it were the natural consequence of rational analysis of past work in the field. The experienced supervisor also knows that the research problem, once set, will change as the work progresses and may only be properly defined in the writing up of the thesis. Here again, the student would be discouraged from describing this process. Similarly, the student will be discouraged from reporting much of the problem-solving process, the often-faltering steps from problem identification to solution. Instead, the student will be encouraged to focus on describing the "know how" reified in the solution (i.e., the destination rather than the journey) and on demonstrating, rationally and empirically, that this knowledge solves the research problem. In so far as the problem-solving process is described, this will tend to take the form of a means-end analysis: that is to say, a technical procedure, a "calculus of decision" (Schön, 1983:47), to be measured by its effectiveness in achieving pre-established goals.

One reason for leaving out this material is that its inclusion makes the thesis both very difficult to write and to read. However, the most important reason is that it doesn't usually matter how the problem was arrived at or how the solution was found. What matters is the existence of a valid problem, the demonstration of its solution and the abstraction of the reusable "know how" embodied in it. All the same, because the writing up of a problem-solving doctorate may comprise a significant element of post hoc rationalisation, students often find writing up a difficult process, even feeling that they are being dishonest. Nevertheless, notwithstanding the potential for actual dishonesty, what matters from the supervisor and the examiner's point of view is that the thesis is in a form which can be challenged using tests such as those presented in Section 4. While challenging the thesis may sometimes reveal dishonesty, considerable trust is placed in the basic honesty and professionalism of all of those involved in the PhD programme.

Reflective Practice and Creative Production

Clearly, although Schön (1983) presents a theory of practice that is very different to Simon (1969), practice is nevertheless conceived in terms of problems and solutions. Furthermore, Schön's scientific language of theory of action, logic, experimentation, hypothesis and experimental rigour is at odds with my sense of creative-production. While I do not have adequate alternatives to put in their place, I would emphasise that I do not

see creative production in these terms. Nevertheless, in my experience, the things onto which these words are attached, the process and its characteristics, seem to capture much of that which I have also observed in the actions of my creative-production project students.

For example, Schön's (1983) theory stresses the role of tacit knowledge in competent practice, i.e., knowing-in-action and -in-practice. Second, he puts store on problem setting as something that recurs throughout the process in response to difficulty or uncertainty encountered during a task. Dialectic occurs between the situation and the practitioner's conception of the task in hand which stimulates a parallel dialectic between problem setting and problem solving. Third, reflection is the primary conceptual tool for handling the unexpected. Fourth, creative action is a way of keeping things moving. Then there is the notion that past experience provides examples, images, understandings and actions, rather than generalised theories, methods, techniques or tools. Sixth, there is the recognition that the creator's interest is in transforming the situation (i.e., psychological, emotional and created) to something better (e.g., equilibrium between intention and realisation). Seventh, there is idea that action seeks to shape the situation to intentions, rather than to test understanding. Eighth, there is the recognition that the process is subjective. Ninth, there is the insight that the creator seeks affirmation, not confirmation, of the appropriateness of a course of action. Then there is the idea that only those things that lend themselves to embodiment in creative action are worth exploring. Finally, Schön shows that the practitioner's response to the situation demands a certain kind of rigour; there are appropriate and inappropriate ways of responding (see Section 8 for further discussion of this point).

However, because a creative-production project is not concerned with and does not reduce to a problem and its solution it is not possible to separate formative processes from outcomes and to specify a "calculus of decisions" (i.e., that relates means to ends). The relationship between issues, concerns and interests and outcomes in a creative-production project is one that changes throughout the entire process. Thus, unlike a problem-solving project, where we can largely ignore the actual problem setting and solution processes, I am of the view that description of the creative-production process should be the principle means by which students demonstrate that they are self-conscious, systematic and reflective creators. In the following sections, I will argue that Schön's (1983) theory of design as reflective practice provides us with concepts which help to characterise creative production, e.g., to identify what should be attended to in the process, its form and documentation.

The Importance of Reflection in Creative Production

Schön (1983) describes how practice is an exploration in which the practitioner seeks to come to terms with a given creative task. This exploration involves the formulation and testing of ways of proceeding. Generally, all thinking in this activity is directed toward action. Occasionally, when ways of proceeding don't work or when they produce unintended consequences, the practitioner is forced to reflect on implicit knowledge and strategies. At such points, the practitioner steps out of action momentarily and past action and outcomes become objects of conscious attention. When a practitioner reflects on knowing-in-practice they reflect on knowledge and ways of working automated over an extended period (cf., Figure 1, reflection-in-action and -practice, RIAP). Practice is made up of projects lasting days, weeks or months. Whenever work is suspended, at the end of the day, at weekends, during project suspensions and upon project completion, the opportunity exists to reflect on the current project, the approach taken to it, and on its

relation to past projects. (cf., Figure 1, reflection on action and practice, ROAP). In contrast to reflection-in-action and -practice, reflection on action and practice is not driven by the unexpected per se but by the desire to learn from experience: it is a discipline rather than a necessity for further action.

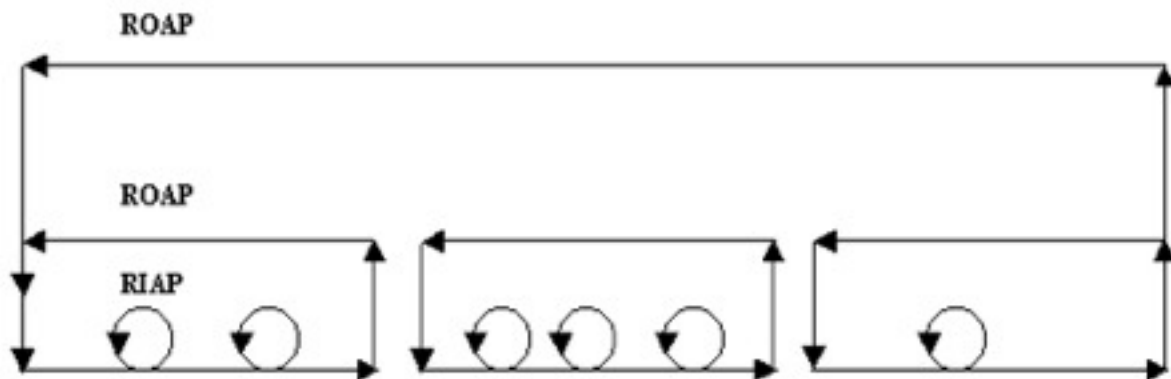


Figure 1 Reflection in and on design episodes and projects

According to Schön (1983) reflection is central both to the practitioner's ability to successfully complete projects and to their professional development. However, such reflection is unremarkable to and unmarked by the practitioner. Hence, the importance of such events or how they have changed the practitioner may not be consciously registered. As noted earlier, Schön sees reflection as the primary cognitive mechanism for dealing with the unexpected and, through the resolution of the unexpected, for learning. There is, then, an argument for suggesting that the practitioner could benefit if reflection was recorded and then reported more systematically.

Table 4 shows the full range of outcomes arising from on-the-spot experimentation, i.e., those meeting the practitioner's expectations or not, together with the desirability of intended and unintended consequences.

	Consequences in relation to intention	Desirability of all perceived consequences intended or unintended
1	Surprise	Undesirable
2	Surprise	Desirable or neutral
3	No surprise	Desirable or neutral
4	No surprise	Undesirable

Table 4 The outcomes of on-the-spot-experimentation (from Schön, 1983: 153)

In the first case, the move is disaffirmed and the practitioner's theory of action is refuted; here the practitioner is obliged to reconsider its relevance and appropriateness. In the

second case, although the theory of action is refuted, since the result is desirable there is no obligation, in the logic of reflective practice, for the practitioner to surface and reflect on the underlying theory of action. In the third case, the move is simply affirmed and design can continue without any need for reflection. Finally, in the fourth case, although the theory of action has produced the expected result the outcome is undesirable. This will necessitate reflection, not so much about the truth of the theory but its scope of relevance, thus promoting a search aimed at extending the theory of action to cover the observed case. Consequently, only outcomes 1 and 4 demand reflection-in-action and -practice, but demand it they do and to ignore such demand is a failure of rigour in on-the-spot experimentation.

I am suggesting that if we are to give greater attention to the process of creative production, then this should focus on the recording and reporting of these moments of reflection, including intended and unintended consequences and responses to them. The systematic recording of making and reflection-in-action and -practice would play a crucial role in supporting the practitioner's reflections on action and practice and in making the whole creative-production project more accessible, both to the researcher and those to whom the project is communicated.

While systematic, relevant and practical methods of recording need to be developed for creative production, useful schemes can be appropriated from other research realms. In the appropriation and application of such techniques to describe and interpret activity, a balance will have to be struck between rigour and action. I am proposing to introduce an additional layer of activity into creative-production. This layer is in the service of action, i.e., it is intended to inform and enhance action. Consequently, it must not become so burdensome that action is impeded or stopped. Rigour in reflection-in-action and -practice must be the maidservant of effective action, yielding to action's inherent structural integrity.

Reflection on Action and Practice

The record of creative-production is the starting point for its documentation. At the very least, this should record reflection (i.e., reflection-in-action and -practice). This will provide the material for reflection on action and practice. As noted above, this latter process is more a matter of discipline than necessity. Given a record of creative production, reflection on action and practice amounts to reflection on a description of creative-production. Given that it is likely to be rich, elaborate and extensive, how should reflection on the description of creative-production be approached? The answer, I propose, is that the focus should be on moments of reflection-in-action and -practice. Each surprise during working, together with its associated frame, refuted theory of action, surfaced tacit knowledge, revised theory of action, revised frame and subsequent action, should be reflected on both with regard to its contribution to the project and its implications for future action and practice. Like reflection-in-action and -practice, the designer's reflection on action and practice will need to be evidenced.

The Shape of a Creative-production Project

A creative-production project will be grounded in a practitioner's current practice and realised in future projects. Consequently, it should begin with reflection on past practice and appreciative system. This will generate issues for further investigation, goals for future practice and a reappraisal of appreciate system (e.g., a designer might choose to put a higher value on sustainability or user involvement in the design process, while a painter might choose to explore narrative in static imagery). This reappraisal is likely to stimulate a

search for information and knowledge relevant to the identified issues, goals and appreciation.

Only superficially does this resemble the preparation stage of more typical forms of research. First, the goal isn't to draw a boundary separating what is inside and outside the focus of study as a starting point for identifying an unanswered question that lends itself to expression in a single problem or hypothesis that through solution or confirmation will make an original contribution to knowledge. Instead, in creative-production, multiple issues and goals may be appropriate and it should be acknowledged that these may change, grow, and be given different emphasis as the work proceeds. While the literature review in traditional research puts emphasis on the logic of problem or hypothesis selection, preparation for creative-production sets out to provide a valid rationale that affirms the direction of making, at the moment that making commences. Second, while information and knowledge should be systematic and rigorous, because issues and goals are manifold this process will be necessarily broad in scope and lacking in depth. Furthermore, knowledge acquisition and information gathering activity will be stimulated when progress becomes difficult. Thus, breadth and depth of relevant knowledge and information is likely to widen, deepen and accrue with work.

Following the initial preparation stage, further opportunities to reflect in and on action and practice will arise at the completion of work episodes. Here the artist or designer should reflect back on the issues, goals and appreciation surfaced in the preparation stage, and subsequent stages. At the end of the project there should be a final reflective stage. Here, the researcher should reflect both on the project as a whole in relation to the issues explored, the work produced, development in appreciative system, and the reflection on action and practice itself. Pre-, within- and post- project reflections will provide the primary material for communicating and sharing experience with peers, together with descriptive records of the work and decisions made.

Reporting a Creative-production Project

Research can be normally described as a process that narrows down to the consideration or testing of one or a few primary research propositions. Hence, it makes sense to begin the thesis by setting out all the knowledge relevant (and irrelevant) to the project to bound the research question. Having established the question or problem, one can proceed to describe the method of testing or solution, the application of this method, the results, and, finally, the discussion of the results - which may involve some examination of theory and knowledge additional to that set out in the review. As noted earlier, this thesis format will not work for creative production project: multiple and changing issues are explored, theory and knowledge is accrued, and different strategies employed to further the work.

Given the underlying structure of the creative-production PhD described above, I am suggesting that a creative-production project report 3 would more properly take a form something like that show in Figure 2.

Main body
<ul style="list-style-type: none"> • Pre-project reflection on practice (including identification of issues, concerns and interests to be worked with in the project) • Review of theory, knowledge and information (relevant to identified issues, concerns and interests) • Reframing of issues, concerns and interests (in response to material found in the review) <p>Cycles of:</p> <ul style="list-style-type: none"> • summary of a work episode (i.e., to place subsequent description into context, e.g., when it occurred, what the objectives were, who was involved, how long it lasted, what the outcomes were, etc.) • reflection on the work episode (i.e., focussing on moments of reflection-in-action and practice, supported by records of working) • Post-project reflection on action and practice (i.e., on the project as a whole) • Reflection on reflection on action and practice (i.e., critical reflection on one's work-focussed reflection)
Appendices
<ul style="list-style-type: none"> • Accumulated theory and knowledge • Description (records) of designing • Analysis of reflection-in-action and -practice

Figure 2 Suggested Basic Structure of a Creative-production Project Report

From Figure 2, it is clear that greater emphasis is placed on the process and in particular, how the process changes as the work progresses. This cyclic process of reflection draws upon theory, knowledge, records of designing and analysis of reflection-in-action and -practice as appropriate, and hence this material will be described in the context of this process, rather than separate from it. At the end of productive project work, all the work should be reflected on. Here, the focus should be on reporting the learning acquired through the project, together a description of one's current position as an artist or designer. The final reflective cycle is concerned with an analysis of how one approached the project (see Section 12 for further discussion).

In Figure 2, the elements described above are presented as comprising the main body of the report, meaning that this material is essential to a third party wishing to make sense of the project. In contrast, the appendices contain material which, while underpinning that reported in the main body, need not be read. Here, I'm suggesting that there might be a need for an appendix which presents knowledge and theory accumulated throughout the project.

A creative-production project is commenced in the context of relevant theory and knowledge. There is, for example, the practitioner's personal knowledge base: the repertoire of personal ideas, beliefs, and appreciation, etc., derived from actual experience and shared theory and knowledge acquired during education and from books, journals and

the like. It is this personal knowledge base that contributes to the practitioner's framing of the issues, concerns and interests at the outset of the project. If, as is likely to be the case, personal knowledge is insufficient for immediate creative production, then a search will be initiated for relevant theory and knowledge which will be written up in the primary review (second element, Figure 2)

When reflection-in-action and -practice force the practitioner to reconsider the theory and knowledge informing the work in progress, it is likely, first, that the designer will search his personal knowledge base and, second, external sources of knowledge and theory when his personal resources prove inadequate. These secondary searches should be written up as part of the action-reflection cycle.

While reflection may be the primary mechanism for drawing on known-to-the-practitioner theory and knowledge and for initiating the search for new (to-the-practitioner) theory and knowledge the latter may be brought into the process by a quite different route. In general, practitioners are not simply focused on practice: they look at and read about the work of others, they read professional and (sometimes) academic journals and monitor social, cultural and scientific development. In other words, they try to keep up with the times, to have a grasp on the state-of-the-art in a range of human affairs. This activity, which runs parallel to practice, may uncover new theory and knowledge that is recognised as relevant to the task in hand and which functions in ways comparable to that "earmarked" through reflection. That is to say, when the practitioner's progress is blocked it may contribute to a reframing of the situation that clears the way ahead. It may also act to transform the practitioner's theory of action, which may promote new frames and moves during a task. Where this background information gathering can be seen to have contributed directly to making, it too should feature when reporting action-reflection cycles. Given that it is only necessary, and possibly meaningful, to report that information contributing to the affirmation of a move, it is highly likely that accumulating wisdom will be drawn upon in an ad hoc and partial manner. It may therefore be necessary to document separately the true breadth and depth of theory and knowledge acquired during the project. However, since the role of this theory and knowledge is only meaningful in context of the actions to which it contributed, then emphasis should be on reporting it in order of use, not acquisition. For this reason, I'm suggesting that it may be helpful to report the acquisition of theory and knowledge during the project in a separate appendix.

Rigour and Reflexivity

We have described above the consequences of on-the-spot experimentation and their implications for the practitioner's subsequent actions, e.g., when a move is unsuccessful and yields undesired consequences requiring reflection back on how the task has been framed and the associated theory of action. Rigour in on-the-spot experimentation demands that these events are acknowledged and handled.

Another aspect of rigour relates to the stance of the inquirer. According to Schön (1983) the inquirer must impose an order of his own rather than falling into his transaction with the situation. At the same time as trying to shape the situation, the inquirer must be open to the situation's talk-back. Also, he must depend on relative constant elements that he may bring to a situation otherwise in flux: an overarching theory, an appreciative system, and a stance of reflection-in-practice.

A third aspect of rigour relates to the researcher's engagement and contribution to the activity of study. Reflexivity is the name employed in qualitative research for the cyclic

process whereby the way we describe a phenomenon changes the way it operates for us, which in turn changes our perception, which changes our description of it, and so on. The term is used both to describe the process and the researcher's attempts to acknowledge its effects and impact on her research. Tindall (1994) argues that in this latter sense, reflexivity is possible the most distinctive feature of qualitative research. She goes on to say that, "It is an attempt to make explicit the process by which the material and analysis are produced" (1994: 149). In essence it is an on-going and disciplined self-reflection in which the research topic and process, together with the experience of doing the research, are critically evaluated. Like qualitative researcher, the artist and designer is central to the sense that is made and is engaged in a process in which reflexivity dominates. Hence, reflexivity must be seen as a central feature of research-in-design.

The Value of Research-in-design and Doctoral Degrees

Why bother to undertake a doctoral education in creative-production? This can be answered in a number of untested ways. First, the process should yield more reflective practitioners: the assumption being that reflective practitioners will produce better results than their unreflective peers will. Second, these benefits will be reflected in innovative artefacts and the explication of overarching theory, appreciative system and the norms used to evaluate the unintended and unexpected. While it is not assumed that this will lead to generalisations, the communicable outcomes of the activity will provide, "examples, images, understandings" (Schön, 1983:138) and strategies for action that other practitioners may employ to extend their own repertoires.

It should be remembered that the PhD is a relatively modern phenomenon. In 1870 the PhD was exclusively a German phenomenon developed within the German scientific positivist school of thought, as a preparation for the scholastic life. After 1870, the PhD changed dramatically when adopted in the USA, where it took the form of a distinct cycle of formal education, differing only in terms of its level from those preceding it. In the USA the PhD quickly became a passport into teaching (as it is today in many disciplines in the UK) prompting some commentators to note that in practice it is now a qualification for teaching rather than research. Similarly, a doctorate in creative-production might be seen as appropriate training to teach others to become reflective artists and designers.

Conclusions

This paper is essentially a personal manifesto which sets out the ideas I hope to explore in working with future PhD students undertaking what I have called, for want of a better term, creative-production projects. I have written the paper from a personal perspective - my experience as a supervisor and examiner of PhD students. Much of this has been acquired through involvement in problem-solving projects. However, I have recognised that some students' interests, intentions, and ways of working, although concerned the creation of artefacts, cannot be moulded into a problem-solving project and that to do so would somehow be a failure of imagination. I have called this form of project creative-production, because it is inventive and imaginative, and realised through and in artefacts. Given the personal nature of this dilemma, what is problematic for me may not be so for others with a different research background. Even so, the on-going debate about the nature of research in art and design suggests that others are experiencing similar problems, and this has encouraged me to review my own uncertainties.

My approach has been to consider why the norms and tests of problem-solving research are not appropriate to creative-production, before framing what seem to me to be

appropriate ones. However, I have concluded that this in itself isn't sufficient: the relationship between the issues, concerns and interests explored and the artefacts produced is so tied up with act of making that this can only be revealed through description and reflection on the underlying creative-production process. I am persuaded that Schön's (1983) theory of reflective practice provides us with ways of thinking about the nature of the creative-production process, the way past experience (both personal and collective) is brought to bear on it, the assessment of action, rigour in creative-production, and the stance of the practitioner.

I have proposed that reflection should be central to the discipline of creative-production. This will involve recording creative production in a way that captures moments of reflection-in-action and -practice (i.e., material for reflection on action and practice). This emphasis on the underlying experience of creative production has implications both for the shape of the research programme and the form of its reporting, and I have sketched out patterns for each that I hope to work from in future projects.

Earlier, I considered what distinguished the problem-solving research project from everyday problem solving. Of course, the same question can be asked of creative-production, how is it different to everyday art and design making? Here, the former answer suffices: the additional requirements imposed on the student in the context of a doctoral programme take the activity beyond ordinary art and design making. But, is it right to call it research? Implicit in this question is the assumption that research is a well-defined concept that has a clear and unequivocal meaning to all disciplines that employ the term. However, what technologists do in research is different to what psychologists do, and what psychologists do is different to what anthropologists do, and so on. While recognising that the activities are different, we might wish to argue that each shares a set of underlying criteria which determine the shared meaning of the term research. However, attempts to frame these criteria (cf., Cross, 2000) usually end up producing general principles which seem equally applicable to a range of activities that would not be regarded as research. Alternatively, we could argue that the term research is not an absolute: that it is socially constructed and its meaning shifts depending on the community using the term. From this standpoint, both activity and meaning differ from one discipline to another.

I tend towards the latter persuasion and think, for example, that technology has become comfortable with using the term research to describe an activity which satisfies specific norms and tests and which, in being designed to meet these criteria, contributes systematically to the development of the discipline. The use of the term by one discipline is accepted by a second when the latter recognises that research is to the former as research is to it. This being the case, the answer to the question must start with the discipline using the term research. If it becomes accepted that creative-production is different to art and design making, that it contributes to their development, and that it is to them as research is to other disciplines, then we will stop asking the question and simply use the term without discomfort. Therefore, at this point in time I cannot answer the question. However, I am convinced that creative-production is different to art and design making, is distinguishable from bachelor and master education, and has a value, both to the student and to society. It is this conviction that sustains my interest in supervising and examining creative-production students.

Endnotes

1 Here I am taking a very broad view of what is meant by an artefact. For example, it could be a tool or technique for doing something, e.g., picking up fragile objects, or a tool, technique or method for designing such tools and techniques.

2 In a problem-solving project, one would normally be concerned that a topic of interest that was recognised by one's peers as being worth investigation. Usually, such topics can be found in the suggestions for future work reported in writings of one's peers.

3 Report or dissertation may be more appropriate than the term thesis, given the definition of the latter as "a proposition to be maintained or proved", which is often that ascribed to the PhD thesis rather than the more general definition of a thesis as "a dissertation, especially by a candidate for a degree" (cf., *The Concise Oxford Dictionary*, Oxford University Press, 1992).

References

Cross, N. (2000) Design as a discipline. In: Durling D, Friedman K (eds.) *Doctoral education in design: foundations for the future*. Staffordshire University Press, Staffordshire, pp 93-100

Schön, D.A. (1983) *The reflective practitioner: how professionals think in action*. Basic books, New York

Simon, H.A. (1969) *The sciences of the artificial*. MIT Press, Cambridge Massachusetts

Tindall, C. (1994) Issues of evaluation. In: Banister P, Burman E, Parker I, Taylor M (eds.) *Qualitative methods in psychology: a research guide*. Open University Press, Buckingham, pp 142-159.

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