Projective Artistic Design Making and Thinking: the Artification of Design Research

Stephen A.R. Scrivener
Chelsea College of Art and Design, London, UK, s.scrivener@chelsae.arts.ac.uk

Su Zheng
szheng21@yahoo.co.uk

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Stephen A. R. Scrivener & Su Zheng

Abstract
Artification concerns the introduction of artistic ways of thinking and doing into non-art domains, such as business, typically because the host domain recognizes that art has something of value to offer that it does not. However, it is by no means easy to establish exactly what it is that the art actually does offer. In this paper, we approach this question by examining problems encountered in what might be called the "researchification" of artistic design. Following an historical and experiential account of the problematic conjunction of artistic design and research, we conclude that the projective making and thinking strategies of artistic design offer something of value not only to the artification of research but to artification in general.

Key Words
artistic problem-solving, projective making and thinking, research, surprise

1. Introduction

Ossi Naukkarinen uses the word artification to refer to "situations and processes in which something that is not regarded as art in the traditional sense of the word is changed into something art-like or into something that takes influences from artistic ways of thinking and acting. It refers to processes where art becomes mixed with something else and this something else adopts some features of art."[1] One feature of this definition is that two disciplines or practices come together because one sees advantages in utilizing the potential that it recognizes in the other. In this paper, we explore the conjunction of the practices of artistic design and research. In contrast to artification, however, this conjunction was not one of acceptance but of resistance: artistic designers found the "researchification" of artistic design problematical.

We shall examine the origins and nature of this problematical situation before describing in detail one successful artistic research project that demonstrates how knowledge and understanding can be achieved through artistic methods. Additionally, we argue that the project reveals the projective dimension of artistic design thinking and making that, when introduced into research, can be seen as an element of artification.

Finally, we address Naukkarinen's observation that advocates of artification see art as providing "something other than what there already is in the area or activity to be artified."[2] In the closing sections of the text, we offer reasons why projective artistic making and thinking can be understood as one kind of "something else" that art has to offer to other professional fields.

2. The artification of research

In their introduction to this special issue of *Contemporary Aesthetics*, Naukkarinen and Yuriko Saito quickly establish its focus: "situations and processes in which something that is not regarded as art in the traditional sense of the word is changing into something art-like or something that takes its influences form artistic ways of thinking and practicing." In this paper, we focus on what might be described as the artification of design research. However, in contrast to much of the literature discussed by Naukkarinen, where specific fields, such as business, appear to be strategically introducing artistic practices into their own practices, here we will explore the conjunction of practices from the opposite direction by examining what happens when art in the academy has reasons for conjoining the practice of research with the practice of art. We might say that we will address the *researchification* of art. What we hope to show, however, is that the challenge of unravelling certain puzzles that have emerged through our exploration will yield insight into certain characteristics of the work of art and works of art[3] that are recognized, perhaps tacitly, as strategically useful by those fields that are open to artification. In short, by understanding why art is problematized by research, we can gain an appreciation of what art has to offer to other fields of inquiry and production.

It is perhaps not surprising to find that creativity is often at the center of artification. Naukkarinen notes that the intention of artification often appears to be "to make companies more creative." Naukkarinen enumerates a large number of features of art that are seen by advocates of artification as being "something other than what there already is in the area or activity to be artified." Of these many possible additions that art can make to another field, a number are reflected in our findings and can be summarized as an ability to act without water-proof evidence in situations demanding improvisation, where projective ways of making could be substituted for methodological rigor.

One final point to note before proceeding is that our paper focuses on design, not art. However, we would argue that while art and design might have different functions, different ends, different sociologies, and so on, each exhibits the characteristics that we hope to illuminate below. In what follows, when referring to design that is seen as sharing features with art, we will use the term artistic design.

3. From design to design research

It is important to our story to appreciate that up to the late twentieth century, design education in the United Kingdom developed along two lines, one rooted in the analytical and physical sciences and emerging out of engineering and technology, and one aligned with the humanities and arising out of art. This difference between foundations, which also drove a distance between their educational and productive trajectories, was reinforced by the institutional structure of education and research. Prior to 1992, art-led design was mostly located within independent colleges or polytechnic departments of art and design, the latter in most cases resulting from the merger of pre-existing art and design college with polytechnics. In contrast, engineering- and technology-led design was mostly located in polytechnics and universities in non-artistic design departments. As a consequence, engineering- and technology-led design has a

tradition quite different from that of art-led or artistic design.

Within the engineering- and technology-driven field of design education, a tradition of design research developed that sought to emulate the knowledge production achievements of the physical sciences. "A desire to scientize design can be traced back to ideas in the twentieth-century modern movement of design," Nigel Cross observed.[4] Design Science is the extension of scientific design to include the systematic knowledge of design processes and methodology in addition to the scientific underpinnings of the artifact, which is developed and refined through design research projects, such as those described by Nigan Bayazit.[5]

4. Practice-led design research

While design research developed in engineering and technology departments in the university, it rarely penetrated the art and design schools in the polytechnic and independent colleges. Indeed, these institutions were not required or provided with income to undertake research under United Kingdom science policy. However, in 1992, this binary divide was removed and polytechnics were converted into universities. Additionally, the UK academic art and design world became entitled to research funding, distributed via the Research Assessment Exercise and the Arts and Humanities Research Council.

However, although research became a priority, the nature of that research was by no means decided, and this uncertainty stimulated an extended debate concerned with shaping research to accommodate art and artistic design values. Research practices in a wide range of academic fields were examined and found wanting. What they lacked can be seen as encapsulated in the notion of practice-based or practice-led research, which Carole Gray defined as

> firstly, research which is initiated in practice, where questions, problems, challenges are identified and formed by the needs of practice and practitioners; and secondly... the research strategy is carried out through practice, predominantly methodologies and specific methods familiar to us as practitioners in the visual arts.[6]

The debate within which this text is situated seeks to provide a substantive role for art and design production and products in research, and, by so doing, points to problems in determining the relation between the practice of research and the practices of art and design production.[7]

To summarize, most knowledge fields have established practices focused on the production of new knowledge and understanding, that is, research. Engineering and technology design has also established such practices, which draw upon the rational and empirical traditions of the analytical and physical sciences. The research practices of many of these fields might be said to have been inspected as potential sites of artification by members of the fields of art and artistic design and found to be uninviting. With this as our background, we can now progress to a more concrete exploration of problems that arose when artists and artistic designers were invited to engage with a particular design research practice, problem-solving design research.

5. Problem-solving design research

Problem-solving design research usually begins with problematic situations in the world that point to a problematic situation in designing. The problem is then critiqued in order to understand how we might expand design to encompass its solution. The critique then leads to a proposal for a revised or new method of designing. For example, it might be observed that Web sites are often unusable. Investigation might reveal a lack of effective usability evaluation methods for Web site evaluation and redesign, thus encouraging research to develop, test, and validate a new or enhanced way of designing (represented by the red dot in Figure 1), in order to overcome the limitations of current methods (represented by the lower, black circle in Figure 1). Testing is achieved by applying the method to design or redesign an artifact (Figure 1, green dot), which is then tested to ensure that it ameliorates or eradicates the observed problem, thereby confirming the value of the new way of designing. However, since a new or revised method has been produced, we don't just have a single solution: the method predicts a set of solutions.
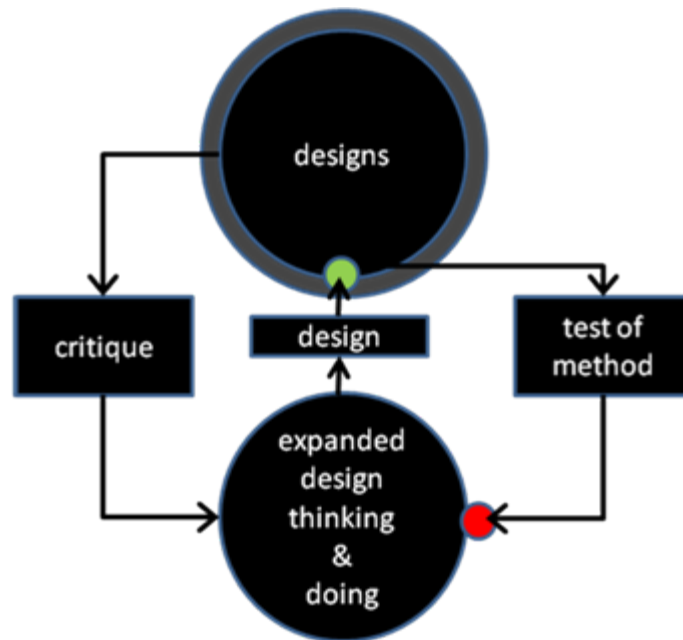

Figure 1. The typical problem-solving design research process

The validated method stands as the contribution to knowledge, and it is pretty easy to see how this kind of problem-solving design research process satisfies the conditions of research.[8] Up to the present, much design research might be classed as problem solving.

6. Artistic design research

Scrivener[9] has described how his extensive experience in shaping and delivering problem-solving design research projects proved inconsistent with the interests of artistic designers. As noted earlier, problem-solving design research focuses primarily on critique, design method, and testing. Typically, designing is involved only to produce an artifact using the proposed method so as to test its efficacy; thus, designing and design products play a relatively minor part in the overall research process. However, artistic researchers, who might be described as

practice-based, practice- or art-led, tend to be resistant to a process that diminishes the role of designing and design products, that is, the work of and works of design, in research. Indeed, the adjectives "practice-based," "practice-led," and "creative-production" can be understood as signifying a tacit understanding of the potential of the work and works of design as a means of generating and communicating new understanding. However, if the use of these adjectives is to signify more than just an attachment to habit, then we need to articulate more clearly the potential of a research process that is led by the work of and works of design, and what is actually meant by "led" in this context. In the following section, we will describe, analyze, and interpret a particular artistic design research project to throw light on what it means for a research project to be led by the work and works of design; or, put another way, to be *artified*.

7. Narrating a creative-production design research project

7.1 *the project*

The research project that we describe below concerned the design of interactive exhibits that support children's learning. The first achievement of this project was the production of a working design prototype, called "Eye-jump."[10] At first sight, Eye-jump looks like a normal skipping rope. However, when it is used, rotated light emitting diodes embedded in the transparent rope are illuminated by display technology housed in the skipping rope handles.

a) The Eye-jump before skipping commences

b) Skipping reveals a lion image

Figure 2. The Eye-jump prototype shown when a) static and b) rotated at display velocity

This technology can be programmed to display images in a manner rather like the cathode ray tube, where pixels are individually illuminated in sweeping raster lines from the top to the bottom of the screen. Persistence of vision means that we

see a stable spatial and temporal image, rather than pixels written out over time. In the case of Eye-jump, the surface of the screen is the part visible to the viewer of the sphere created as the rope sweeps over the skipper's head and under his or her feet in constant rotation. As the rope rotates, the rope diodes are changed to display the next line of the image, until the whole image has been presented. This cycle is repeated for as long as the skipper maintains the conditions for display. For children and adults, the behavior of this apparently familiar plaything, the skipping rope, is surprising, and this surprise represents a rupture in our understanding of the world, which encourages curiosity and experimentation in order to adjust our understanding to accommodate the surprising event.

To the researcher, the invention of Eye-jump also represented a surprise, an unfamiliar but desirable product that needed to be understood through its cognitive and behavioral effects and the potential it offered for the design of related products. The work of understanding, which, for the most part, happened after the creation of Eye-jump, led to a conceptual framework called the Creativity Surprise Model (CSM), which established a motivational relationship between a surprise event and the generation of creative thinking. The model, which was supported by the evaluation of the Eye-jump prototype by 118 primary school children, also functions as a conceptual framework for designers of interactive museum exhibits that stimulate creativity in children.

In the following section, we examine the process that produced these doctoral project results through an interview between the supervisor, Scrivener, and the student, Zheng.[11]

7.2 *narrating the research process*

Stephen Scrivener (SS)：Can you say something about how your project developed?

Su Zheng (SZ)：The initial schedule included literature reviews of museology and the application of interactive media in museums, and observational studies in museums. All of these were designed to identify problems with current design approaches. The intention was to develop a new way of designing to enhance children's learning in the museum setting. However, this approach to research presented a number of challenges, as the experience of undertaking the initial research led to a loss of direction due to the sheer quantity of new information that did not seem to connect together. Therefore, the problem to be solved proved very difficult to identify. As a result, the initial research then shifted focus to the problems with the interactive exhibits themselves, which appeared to be mainly those of technological failures and non-intuitive interfaces. The challenge then became to consider how they could be improved or fixed. Several design ideas were generated but the results were not satisfactory, primarily because merely making improvements to the user interface was not satisfying to me as a designer.

SS：Can you say why you found the prospect of resolving or refining existing problematic situations unsatisfactory?

SZ：As a designer, the ultimate excitement is to create something new, to introduce a new perspective on an object or

habitual behavior. Hopefully you can make a contribution towards transforming the way we think about our world.[12] Hence, in my case, making modest refinements that produce small improvements to existing interactive exhibits did not provide sufficient motivation to drive the research forward. In my opinion, designers need to be emotional and passionate in order to create designs that achieve such a connection. Emotional commitment should be embraced and regarded as a valuable asset for the designer.[13]

SS: How then did you steer the research in a direction that connected more strongly with your personal motivation as a designer?

SZ: In order to re-direct the study, a question came to mind: What are the options if I discard the current design research approach? The question led to a set of design objectivities based on an appreciation of surprising design: I should produce a design that exemplifies an original idea and provides a unique experience; is fun and playful; is intuitive for children to use; and motivates children's learning. These were the only foundational objectives that I set myself. The intention was to leave enough space and freedom to explore design opportunities.

The design process was guided by the belief that many good ideas are inspired by events and interactions with the ordinary objects that we encounter in our everyday lives. These objects provide experiences that are genuinely meaningful and resonate directly with the general public. This belief was reinforced by an exhibit I saw at ARS Electronica, Linz, Austria, called "Tool's Life", which helped me to appreciate the potential of surprise and surprising artifacts.

Figure 3. Interacting with "Tool's Life"

SS: All of this suggests that you redirected your attention to emphasize designing as a way of asking and responding to questions, and that at this stage you had developed a commitment to the potential of making the familiar unfamiliar, so as to produce surprising artifacts?

SZ: Yes, a creative idea doesn't have to be complicated or technologically advanced. It can be delivered by a humble everyday object that people take for granted. In the case of the exhibit above (Figure 3), narratives were created through knifes and forks on a dining table. The new interpretation of the relationship between these everyday objects motivates the user to explore them further.

A "wow" factor or surprising event can be simply interpreted as something that people have not seen before and that runs contrary to what they believe or expect will occur. This appreciation directed the research towards the phenomenon of surprise, with the additional expectation that inspiration could

also be gained from studying another master of surprise: the magician and illusionist. The prospect of discovering "what might be" by combining the techniques of magic with appropriate digital technology was compelling.

SS: So you were undertaking observations and exploring relevant theory, but this was directed to moving the design process forward rather than seeking to obtain a systematic understanding of a given problem and the knowledge domains relevant to it?

SZ: Yes, and at this point in the research a discovery was made while experimenting with the techniques of magic, *i.e.*, the persistence of vision. A few ideas were generated, which were based on this phenomenon: an image was projected on a fan, a vibrating string, a waving rod and a ribbon.

a) the string concept   b) the rod concept   c) the ribbon concept

Figure 4. Experimental design idea

However, there were problems with each of these ideas as they presented health and safety risks for children. Furthermore, they lacked an intuitive connection to familiar experience. Eventually, following a series of dead ends, the idea of using a simple skipping rope as a visual display was identified for further development as it most elegantly satisfied the original design criteria.

SS: But how does the idea of a skipping rope satisfy the criterion of motivating children's learning?

SZ: The skipping rope does not at first sight appear to have a strong, if any, connection with children's learning. However, the proposition was made that if an ordinary object could suddenly produce a wow factor (surprise), then there was a strong possibility that it could help children change the way they think about how things work because their relationship to everyday experience would have changed dramatically. To discover new possibilities in a familiar object is likely to be a positive learning process because it stimulates inquiry that results in new knowledge of the object itself and its structural relationship to everything else. With these thoughts in mind, the Eye-jump concept—the skipping rope that functions as an image display—was selected for further development.

SS: You talk about believing that Eye-jump could function as an aid to learning, but isn't it a risky strategy to draw on beliefs that you may not be able to provide any reasons for holding?

SZ: Although I could not offer a deductive or inductive argument for the conclusion that Eye-jump would help children's learning, I had a strong hunch that it at least could provide a new perspective for children's learning processes.

SS: So the major personal achievement at this point was that you had developed a novel design concept, which you had some grounds for believing had the potential to stimulate children's learning. How did you go about confirming the anticipated cognitive value of the device and understanding how that value could be explained?

SZ: The idea of backing up my claims for the value of the Eye-jump device was daunting, given that I had not yet uncovered any theories that might support my claim, which also implied an interdisciplinary perspective, *i.e.*, physics, developmental psychology, museum studies, and interactive media design. It was at this point that I began to focus much more on "why" questions. This questioning, sometimes presented by supervisors and others, proved very helpful in articulating the fields of inquiry that should be examined with a view to uncovering knowledge that would be helpful in refining an explanation. They identified exegetic elements that needed to be supported by understanding, *e.g.*, child development, museology, and educational research. Initially, questions could only be answered as propositions, but following examination and interpretation of prior knowledge, answers could be supported with reasons grounded in this understanding. The attempt to understand and explain the potential of the Eye-jump device required connections to be made between seemingly unrelated theories.

SS: In other words, although you had engaged with much of this material at the early stages of the research in a broad and superficial manner, it was only after the design had been produced that a focused search was undertaken. Furthermore, was this task undertaken primarily as a means of explaining the value of the device beyond that of a child's novelty toy?

SZ: Yes.

8. Describing the Eye-jump project process

It is evident from this account of the Eye-jump project process that we are not dealing with a problem-solving project as described in section 5, above. In the first place, the process is not driven by the identification or elaboration of a problem observed in a given situation or class of situation, as is the case in the example provided in section 5. Here the task appears to be driven by a set of loosely related ideas selected under the operation of a personal belief system and for their ability to engage the researcher's motivation, commitment, and emotional engagement. Also evident in the narrative is a resistance to being narrowed down to a particular problem for analysis, interpretation and resolution (Figure 5, below). We can also see that, perhaps due to personal beliefs, interests, and motivations, the researcher's preference was to move this rather loose nexus of interests and concerns forward through a process of design ideation and assessment. In this particular project, the Eye-jump concept emerged at a relatively early stage in the process (represented in Figure 5 by the red dot) and its novelty was recognized by all concerned.
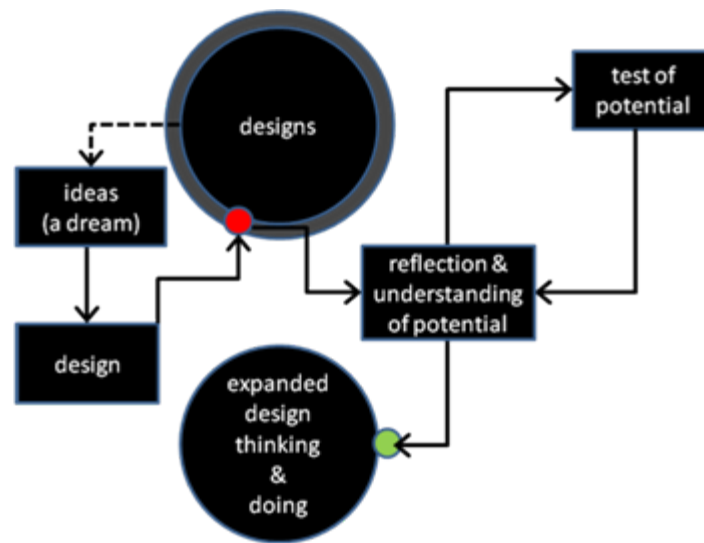
Figure 5. The Eye-jump project research process

However, what was not clear at this point was what constituted this novelty and how it addressed the initial intention of the research, which was "to develop a new way of designing to enhance children's learning in the museum setting." In other words, and consistent with Scrivener's[14] proposition that artistic design research is directed toward the production of novel apprehension, the Eye-jump concept presented a surprising artifact that remained to be fully understood.

The process of understanding was driven by a demand for explanation of why and how this novel artifact fulfilled the research ambition of the project. (See in Figure 5, above, "reflecting and understanding of potential.") Finding such explanations required intense engagement, with prior understanding in a number of different fields, all of which are implicit in the research aim and criteria outlined above in section 7. However, in contrast to the function of the literature review in most conventional research approaches, including problem-solving design research, this was not done in order to identify a question or problem worthy of subsequent research but to account for a novel design solution.

This accounting for the surprising artifact enabled a theory to be constructed that drew upon prior understanding of cognitive surprise, cognitive development, learning, and creativity. The behavioral and cognitive affects and effects of engagement with the device were then experimentally tested, and the theory was used to produce a framework of principles and criteria that other designers might employ to construct surprising artifacts. Overall, the process contributed to an expanded understanding of design thinking and making. What remains to be considered are the specifically artistic features of this process as compared to problem-solving design research. This is what we will now turn to in the following section.

9. Comparing the problem-solving and Eye-jump processes

The first point to note is that both the typical problem-solving process and the process characterized by the Eye-jump are directed toward realizing desirable change in the designed world. However, problem-solving design research begins with an undesirable situation in the designed world that prompts

reflection, such as, "Why does this design not do what it ought to do?" That is to say, the process begins with the recognition that there is something to be known. In contrast, the Eye-jump story begins with making and thinking that is not attached to a specific instance of uncertainty and reflection. Rather, the initial making and thinking in the Eye-jump process created a surprising and desirable artefactual situation. Additionally, in the problem-solving process, a theory explaining how to enhance the undesirable situation is postulated, and only when this is in mind does the process of making begin. In the Eye-jump project, a theory explaining the potential application of the surprising situation was proposed after the situation had been realized. Finally, in the problem-solving process, a theory of the problem is transformed into a theory of its solution, which is then affirmed through the testing of a new design, whereas in the Eye-jump project it was the potential of the surprising situation that was uncovered and evaluated. However, overall, both processes appear to achieve the same outcome, that is, a new way of designing. So do these differences matter?

When we confront an undesirable artefactual situation, we are aware of something that fails to meet our desire. In other words, there is a cognitive interest, goal, or aim that the situation fails to live up to. This gap between the world as it is and the world as we desire it to be is registered negatively; it stands as the mark of the fact that the artefactual world is less than our ideas tell us it should be. Whatever we do to close this gap amounts to the satisfaction of ideas that we already possess; it is a matter of making our ideas work as we want them to. Under these circumstances, our design acts are constrained within the bounds of our present ideas. It is this kind of situation that is perhaps reflected in Zheng's discontent that "merely making improvements to the user interface was not satisfying to me as a designer."

As we have seen in the process described in section 8, the search for problems, whether through empirical observation or the critical analysis of prior understanding, is eschewed. Instead, the researcher focused on design ideation guided by a set of unarticulated associations. The result was the creation of an artifact that most people recognize as pleasingly surprising. If we consider a successful outcome of the problem-solving design research process, then we would expect it to register satisfaction, even pleasure, in the viewer or user. However, we would argue that it would not register surprise. Rather, the artifact will be experienced as familiar, even obvious; something that we knew was possible even if we weren't aware of this understanding prior to the experience. Cognitive surprise, on the other hand, is accompanied by confusion and uncertainty because we find ourselves in the midst of an experience that is outside of our immediate comprehension. When cognitive surprise is registered as desirable or pleasurable, we can say that the experience stands as the mark of the fact that the artefactual world is more than our ideas tell us it ought to be. In short, our ideas have to catch up with our experience.

This implies that, in order to create desirable and surprising artifacts, it is necessary to develop techniques that detach the maker from familiar ideas and the habits of design thinking and making that are guided by those ideas. The ties between prior knowledge and experience need to be loosened in both thinking

and making in order for them to have a projective character. It is the will and capacity to develop means that produce surprising and desirable artifacts that we understand as artistic. In section 3 we argued that problem-solving research sits more comfortably with engineering design as a mode of research than it does with artistic design research. We can now postulate that this uneasy fit arises out of the latter's inclination toward projective making and thinking, which benefits from a strong element of creative intuition. Hence, the coupling of the notion of artistic design with that of research may be understood as the artification of design research.

10. Artified design research, and artification in general

We have described, then, how the introduction of projective artistic design making and thinking can be understood as artifying research. In this section, we want to consider the relevance of this mode of innovation to non-research practices and the kinds of knowledge domains discussed in the artification literature. What we hope to show is that artistic design, when understood as projective in the sense elaborated here, cannot be interpreted through the two highly influential theories of professional practice: Herbert Simon's sciences of the artificial and Donald Schön's reflective practice. While the work of these two scholars contributes to the ideas and methods at work today in the professions, we hope to show that projective practice offers something beyond them.

If technology- and engineering-led design found inspiration for the development of models of scientific and rational design and design research in the writing of Herbert Simon,[15] then artistic designers found encouragement in Donald Schön's theory of reflective practice.[16] Schön begins *The Reflective Practitioner: How Professionals Think in Action* by observing that "The professions have become essential to the very functioning of our society….We look to professionals for the definition and solution of our problems, and it is through them that we strive for social progress."[17] Nevertheless, Schön goes on to argue that at the same time that they recognized their indispensability, the professions experienced a crisis of confidence that hinged "centrally on the question of professional knowledge. Is professional knowledge adequate to fulfill the espoused purposes of the professions? Is it sufficient to meet the societal demands which the professions have helped to create?"[18] From the literature on artification, it would appear that it is the professions that are turning to art and design for inspiration, perhaps in the belief that these domains have something to offer that will help them to meet societal demands and maintain confidence in professional competence.

Schön was critical of the professions' ability to solve the observed crisis because "We are bound to an epistemology of practice which leaves us at a loss to explain, or even to describe, the competences to which we now give overriding importance."[19] The epistemology he refers to here is that of technical rationality, "the view of professional knowledge which has most powerfully shaped both our thinking about the professions and the institutional relations of research, education, and practice – professional activity consists in instrumental problem solving made rigorous by the application of scientific theory and technique."[20]

Given that the crisis of confidence experienced by the professions was first described by Simon, it is reasonable to assume that the education of professionals was subsequently brought under a stronger regime of technical rationality, in which knowledge is understood as structured according to a hierarchy of the basic, the applied, and the situational. The engineering or problem-solving design research model described earlier adheres to a technical rationalist epistemology of professional knowledge, and, as we have seen, such thinking cannot account for the process described in sections 7 through 9. This being the case, we are left to consider the possibility that by using Schon's theory of reflective practice, the response to this crisis of professional confidence might be seen as a something else than what there is already in the area or activity to be artified.

Although both Simon's and Schön's scholarship in this field sought to provide a solution to the crisis of professional confidence, Simon kept faith with technical rationality, whereas Schön was highly critical of its limitations. In everyday action, he argued, 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. Nevertheless, we often think about what we are doing, and usually reflection on knowing-in-action goes together with reflection on the stuff at hand. When the professional reflects on knowing-in-action, he reflects on the understanding that has been implicit in his action; understanding that he surfaces, criticizes, 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 sometimes deal well with situations of uncertainty, instability, uniqueness, and value conflict."[21]

In the *Reflective Practioner*, Schön articulated the gap between how we think about and theorize practitioner competence and the realities of practice. According to Schön, in practice, professionals function as reflective practitioners rather than as rational problem solvers. Since its publication in 1983, many professions have taken and built upon the ideas articulated in *The Reflective Practitioner* to invigorate professional education, training, and practice. If it is reasonable to suppose that the domains to be artified now comprise skilled problem solvers and reflective practitioners, then this suggests that reflective practice is not the key "something else" that is sought from art. Hence, if we are to show that projective making and thinking is one kind of "something else" that non-art fields are seeking, we need to provide grounds for believing that this mode of practice cannot be interpreted as reflective practice.

Schön's primary insights were that, in practice, ends are not known and cannot be known in advance because every practice situation is unique and practitioners draw heavily on tacit knowledge and appreciations acquired over years of practice to deal with the uniqueness of each new task. In short, Schön took the practice situation as given and focused first on how the practitioner comes to understand the uniqueness of a particular situation through the surfacing and theorizing of the failure of practitioner knowledge and, second, how that knowledge is expanded to satisfy the demands of the situation at hand.

Therefore, whether we are talking about rational problem solving

or reflective practice, at some point we are confronted by a particular situation that we find undesirable and our goal is to eradicate or ameliorate that dissatisfaction. What the two approaches offer are different ways of dealing with situational problems and different ways of marshaling prior skills, knowledge, and understanding so as to resolve them. However, does Schön's theory of reflective practice explain how we can step out of the artefactual world as it presents itself to us, and out of our habitual practices of production and thought, to create possible artefactual worlds that register desirable surprise?

Schön argued that two variables, consequences in relation to intention and desirability of all perceived consequences, intended or unintended, combine to constitute four conditions for reflection: undesirable surprise; desirable or neutral surprise; no surprise that is desirable or neutral; and no surprise that is undesirable. Both undesirable conditions demand reflection, whereas the desirable conditions can be passed over without reflection, regardless of whether or not they are accompanied by surprise. Schön explained the response to desirable surprise as follows:

> In the second case [desirable surprise], the inquirer's expectation is disappointed but the consequences taken as a whole are considered desirable. The associated theory is refuted but the move is affirmed…. According to the logic of affirmation, the move has succeeded…she [the inquirer] need not reflect on it….[22]

In the theory of reflective practice, the logic of affirmation has priority over that of confirmation. "In the practice context, priority is placed on the interest in change and therefore on the logic of affirmation."[23] What this means is that as long as a move is judged desirable, it is affirmed regardless of whether or not the element of surprise is present. In short, all actions are viewed as determined by and measured against intentions, which are viewed as being largely tacit until reflection brings them to the surface. In short, reflective practice is bounded by prior knowledge and present conditions; prior habits may be adjusted, but only so far as is necessary to accommodate the occurrence of undesirable outcomes of design moves intended to resolve the given situation. Consequently, Schön's theory of reflective practice does not appear to explain how we can step out of the artefactual world as it presents itself to us, and out of our habitual practices of production and thought, so as to create possible artefactual worlds that register desirable surprise. Both problem-solving design and reflective practice tend to reduce ambition to questions such as, "How can the world be made to be better than it currently is?" In contrast, projective thinking and making supports questions of the form "What kind of world can be made?"

Since the turn of the nineteenth century, artistic designers and artists have devised a host of methods designed to disrupt familiar ways of working and thinking artistically, which include new conceptual and material techniques of production, and the appropriation of non-art materials, objects, practices, and theories, in the constant re-negotiation of what we understand as the work and works of art. One such strategy is the appropriation of, or relocation into, research practices from related or distant fields, as was the case for Zheng, whose practice was disrupted

by the need to negotiate the methods and means of a problem-solving approach to design research. Such practices loosen the connection between the practitioner and his or her habitual modes of doing and thinking; it is perhaps these practices that non-art fields recognize and that we have sought to illustrate through our account of the artification of research as one kind of "something else" that artified domains didn't have before artification.

Stephen A. R. Scrivener
s.scrivener@chelsea.arts.ac.uk

Stephen A. R. Scrivener is Professor of Design as Chelsea College of Art and Design, London, UK. Having for many years worked on the conceptual and technical development of computer-mediated design technology, since the early 1990s his work has focused on the theory and practice of practice-based art and design research.

Su Zheng
szheng21@yahoo.co.uk

Su Zheng is currently working in the creative media industry and is currently attached to Phoenix TV Ltd (Europe sector), London, UK. Her extensive research experience and practical creative skills guide and inform her experimental approach to production in the field of mass media.

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Endnotes

[1] Ossi Naukkarinen, "Variations in Artification," *Contemporary Aesthetics* (Special Volume 4, 2012), Introduction.

[2] *Ibid*., section 3.

[3] In this essay, we mean the expressions 'the work of art' and 'works of art' to stand for the labor, 'the work of art,' and products, 'works of art,' recognizing that the use of such terms as 'labor' and 'products' and their synonyms might be problematical for some readers. In contrast, it is our view that the term 'work' is more receptive to the manifold ways of thinking about the production, presentation, and reception of art.

[4] Nigel Cross, "Designerly Ways of knowing: Design Discipline Versus Design Science," *Design Issues* 17, no. 3 (2001), 49-55; ref. on 49.

[5] Nigan Bayazit, "Investigating Design: A Review of Forty Years of Design Research," *Design Issues* 20, no. 1 (2004), 16-29.

[6] Carole Gray, "Inquiry Through Practice: Developing Appropriate Research Strategies in Art and Design," in *No Guru, No Method*, ed. Pia Strandman (Helsinki: Helsinki University of Arts and Design, 1998), p. 83. For other texts dealing with the debate around practice-based research, see Henk Borgdorff, *The Debate on Research in the Arts* (Bergen: National Academy of the Arts Bergen, 2006); Estelle Barrett and Barbara Bolt, *Practice*

as Research: Approaches to Creative Enquiry (London: I.B. Taurus and Co. Ltd., 2007); Graeme Sullivan, *Art Practice as Research: Inquiry in Visual Arts* (Los Angeles: Sage, 2010); Michael Biggs and Henrik Karlsson, *The Routledge Companion to Research in the Arts* (Abingdon, Oxon: Routledge, 2010).

[7]Stephen A.R. Scrivener, "Characterising Creative-Production Doctoral Projects in Art and Design," *International Journal of Design Sciences and Technology* 10, no. 2 (2002), 25-44.

[8] Scrivener has defined research as "1) a systematic investigation, 2) conducted intentionally, 3) to acquire new knowledge, understanding, insights, etc. that is 4) justified and 5) communicated 6) about a subject." Stephen A. R. Scrivener, "The Roles of Art and Design Process and Object in Research," in *Reflections and Connections: On the Relationship Between Creative Production and Academic Research*, eds. Nithikul Nimkulrat, and Tim O'Riley (Helsinki: University of Art and Design Helsinki, 2009), p. 69.

[9] Scrivener (2002), 25-44.

[10] The Eye-jump concept is currently protected by patent.

[11] In hindsight, we recognize that our task of understanding the process reported here would have been greatly assisted by more systematic recording. By presenting the description in the style of an interview, our aim is to acknowledge the retrospective sense-making and even the constructed nature of the report, thereby recognizing the bounded rationality of the account. See Herbert A Simon, *Models of Man: Social and Rational* (New York: John Wiley and Sons, Inc., 1957).

[12] Caroline Hummels and Joep Frens, "Designing for the Unknown: A Design Process for the Future Generation of Highly Interactive Systems and Products," in *New Perspectives in Design Education: Proceedings of the Engineering and Product Design Education Conference,* Volume 1, eds. Anna Clarke, Mike Evatt, Peter Hogarth, Joaquim Lloveras and Luis Pons (Barcelona: Design Society, 2008), 204-209.

[13] Jon Kolko, "Information Architecture and Design Strategy: The Importance of Synthesis During the Process of Design," In *The Industrial Designers Society of America Conference Proceedings* [book on-line] (Dulles, USA: Industrial Designers Society of America, 2007); http://www.idsa.org/images/pdfs/2007_NES/A23-Kolko-InfoArchDesignStrategy.pdf, accessed June 16, 2011.

[14] Scrivener, "Characterising Creative-Production."

[15] Herbert A. Simon, *The Sciences of the Artificial* (Cambridge, Massachusetts: MIT Press, 1969).

[16] Donald. Schön, *The Reflective Practitioner* [originally published 1983] (Aldershot, Hants: Ashgate Publishing Ltd., 1991).

[17] *Ibid.*, pp. 3-4.

[18] *Ibid.*, p. 13.

[19] *Ibid*., p. 20.

[20] *Ibid.*, p. 21.

[21] *Ibid.*, p. 50.

[22] *Ibid.*, pp. 155-156.

[23] *Ibid.*, p. 155.