APPLIED RESEARCH

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Even though the conditions that have initially framed the field of design have changed significantly and designers now work in a post-industrial, rather than industrial society, designers are still perceived as people who 'make' rather than people who 'think'. Contemporary designers now work with complex political, environmental, and social issues where the focus is not simply on doing and acting, but also on thinking about action and its consequences. That is why designers have to first understand the complexities of their own practice before they can begin addressing issues related to other practices. In addition to this, designers should no longer see their practice as deterministic, monolithic, or fixed. Practices do change over time; sometimes this is led by new ideas about the practice, and sometimes by the introduction of new technologies within the practice (Crouch and Pearce, 2012: 35–7).

All designers, regardless of their area of specialization, engage in creative exploration in the process of designing. The main difference between design that is simply design and design that is a form of applied research can be found in the goals and the outcomes of each. Designers who are conducting research through their creative practice try to address a larger set of questions, alongside a design brief. Their work is experimental, interrogative, and inquisitive, and critical self-reflection is a necessary component of this kind of work (Burdick, 2003: 82). However, as design begins to emerge as a discipline in its own right, old ways of working will need to change; design needs to be 'demystified'. This means that designers must be able to provide a logical rationale behind their creative process (Swann, 2002: 51). In addition, this kind of research can also help you to engage better with the process of 'problem framing' and 'solution finding' (Crouch and Pearce, 2012: 143).

7.1 WHAT IS APPLIED RESEARCH?

Applied research is a type of research that enables practitioners to reflect on and evaluate their own work. This type of research approach can be found in a number of different disciplines, including design. In the case of design, this research approach has been primarily adopted from the field of art. This is no wonder, given that the contemporary design profession originally grew out of an applied arts tradition by bringing artistic skills and commercial practices together.

The works of many prominent twentieth-century designers have been based on an intuitive mode of operation often found in fine arts. Even though this was a quite typical way of working in the field of design, many designers found it difficult to articulate their creative process to the broader public. Given that design is an outer-directed occupation and designers are essentially service providers (unlike art, which is often inner-directed), the need to communicate the design process to the clients became increasingly important. As a result, in

the second half of the twentieth century rational methods for making design decisions began to emerge. Between the 1960s and 1970s, a considerable amount of design thinking and writing was introduced and this had an enormous impact on the concept of the method and practice of design. With time, the field of design has been exposed to additional influences by a range of other disciplines such as architecture and engineering. For example, industrial designers coming from engineering backgrounds began to introduce a 'scientific method' in the design problem-solving process. Regardless of this, design in practice continues to be intertwined with a great deal of uncertainty, ambiguity, and intuition, as well as inspired guesswork, holistic thinking, and self-expressiveness (Swann, 2002: 50–51).

But there are some benefits to this approach too. One research study that compared the ways in which designers (in this case architects) and scientists work to address the same problem suggests that designers are predisposed to use 'solution-finding' strategies, while scientists tend to be 'problem-focused' in their approach. What this means is that designers seek a solution to a problem by synthesis: they suggest a variety of possible solutions until they find one that is good or satisfactory. Scientists, on the other hand, seek a solution on the basis of analysis: they look for underlying rules that would enable them to generate an optimum solution (Swann, 2002: 53).

If we accept that design is primarily a problem-solving activity, it can be argued that applied research, as a thought process, closely mirrors design. That is why some experts argue that design is synonymous with applied research, or at least it should be (see Swann, 2002; also Crouch and Pearce, 2012: 146). Nevertheless, research of any kind needs to be systematic and deliberate in its nature, but this is not always the case when it comes to design practice (Crouch and Pearce, 2012: 146). Design practice, as Swann (2002) points out, can be generated without research (in a conventional sense) and design may be performed without the designer being involved in any kind of research. In many cases (and depending on the nature of the project), research in things such as material technology, production, or marketing has already been done, creative direction and art direction have been defined, and the designer is asked to synthesize this information into a solution (Swann, 2002: 53–4).

For designers who see themselves as technicians this way of working is quite sufficient. They see design as a 'trade' – a skilled job that requires manual skills and special training. For designers who see design as a 'career' – a profession that involves prolonged training and formal qualifications – design is a process that involves lifelong learning and ongoing self-development. These designers seek to establish an original way of thinking and they try to be innovative in their work. For them, applied research is an integral part of their work because this allows them to continually challenge themselves and the conventions of their profession.

Regardless of this, many designers would argue that they already do 'research' as a necessary part of their everyday practice. As Swann (2002: 56) correctly points out, design seldom takes place as a single flash of inspiration and the process usually involves several cycles of review, amendments, adaptation, and refinement before it is finalized. This process, however, is not equal to research. Therefore, it is important here to make a clear distinction between applied research and pure practice. Applied research aims to generate culturally novel apprehensions that are not just novel to the designer or to the client, but are novel to the field of design as well – the emphasis here is on the process. Pure practitioners, on the other hand, strive to improve

and refine what they are doing and aspire to do their work faster, better, or more efficiently. The emphasis here is on the technical skills. While in the first instance applied research and practice might appear to be similar, the differences between the two are considerable (see Candy, 2006b).

There are two main areas of study when it comes to applied design research: practice-based research, where a creative artefact is the basis of the investigation; and practice-led research, where the research leads primarily to the new understandings about the design practice itself (see Candy, 2006a).

7.1.1 PRACTICE-BASED RESEARCH

According to Linda Candy, practice-based research is as an 'original investigation undertaken in order to gain new knowledge partly by means of practice and the outcomes of that practice' (2006a, para. 2). While the claims of originality and contribution to knowledge may be demonstrated through artifacts, as Candy argues, the significance and the context of these claims should be described in words, as only then can a comprehensive understanding of the investigation be gained. This is even more important in an academic environment, especially during practice-based doctoral submissions. In this case the creative outcome must be accompanied by a substantial textual contextualization. In addition to this, Candy (2006a) argues that this critical appraisal or analysis not only clarifies the basis of the claim of originality of the work and places the work within a broader body of knowledge, but it also allows the reviewers to establish whether the appropriate scholarly requirements were met.

7.1.2 PRACTICE-LED RESEARCH

Along the same lines, Candy goes on to describe practice-led research as a process that 'is concerned with the nature of practice and leads to new knowledge that has operational significance for that practice' (2006a, para. 4). Here, the artifact is not at the main focus of the research. The purpose behind this type of research is the advancement of knowledge about the practice, or the advancement of knowledge within practice. Contrary to practice-based research, this type of research may be solely described in text and inclusion of a creative outcome is not necessary – but artifacts may be included in order to better exemplify the practice in question if that is deemed necessary or appropriate.

7.2 ACTION RESEARCH

Action research is the most popular type of applied research. This type of research is an examination of the way in which practitioners reflect on their actions during and following their

work (Schon, 1983). As such, action research can be described as an inquisitive process that leads to improvement and reform (Hopkins and Ahtaridou, 2006: 276). Action research can be easily integrated within the practice of design (Swann, 2002: 50), and can be a powerful tool for initiating change in the design profession (Crouch and Pearce, 2012: 143).

For example, as a designer, you can use action research as a way to improve your practical judgement in a real-world scenario. The validity of the theories that are generated by action research are not necessarily 'scientific', but nevertheless, the knowledge generated through this kind of research can help you to perform better in your professional environment (Burns, 2000: 443). Also, if you are able to coherently explain what are you doing and why, you will be better positioned to understand the significance of your work within your field. This, in return, can add more credibility to your work (McNiff and Whitehead, 2012: 14).

7.2.1 CONDUCTING ACTION RESEARCH

Action research is research about improving practice (McNiff and Whitehead, 2012: 14). This is a form of enquiry that enables practitioners to investigate and evaluate their own work. Unlike other types of research, action research does not necessarily need to begin with a clearly defined hypothesis or a research question. All you need is a general idea that something in your existing practice can be improved, and you can refine things from there (Hopkins and Ahtaridou, 2006: 282). When beginning the action research process, according to Jean McNiff and Jack Whitehead (2012: 7), you should ask yourself the following questions:

- What am I doing?
- Do I need to improve anything?
- If so, what?
- How do I improve it?
- Why should I improve it?

The most important thing to remember here is that action research should be based around a problem, dilemma, or ambiguity from the situation in which practitioners may find themselves. Also, there are three things that need to be considered when conducting action research:

- The subject matter should be situated in a social practice that needs to be changed.
- This is a participatory activity where researchers collaborate among themselves or with the relevant stakeholders.
- The project proceeds through a cyclic spiral of planning, acting, observing, and reflecting in a systematic and documented way (see Figure 7.1).

This report should include commentary and interpretation of the whole action and research process. In return, this may lead to identification of a new problem (or problems) that may trigger a new cycle of planning, acting, observing, and reflecting (Swann, 2002: 55).

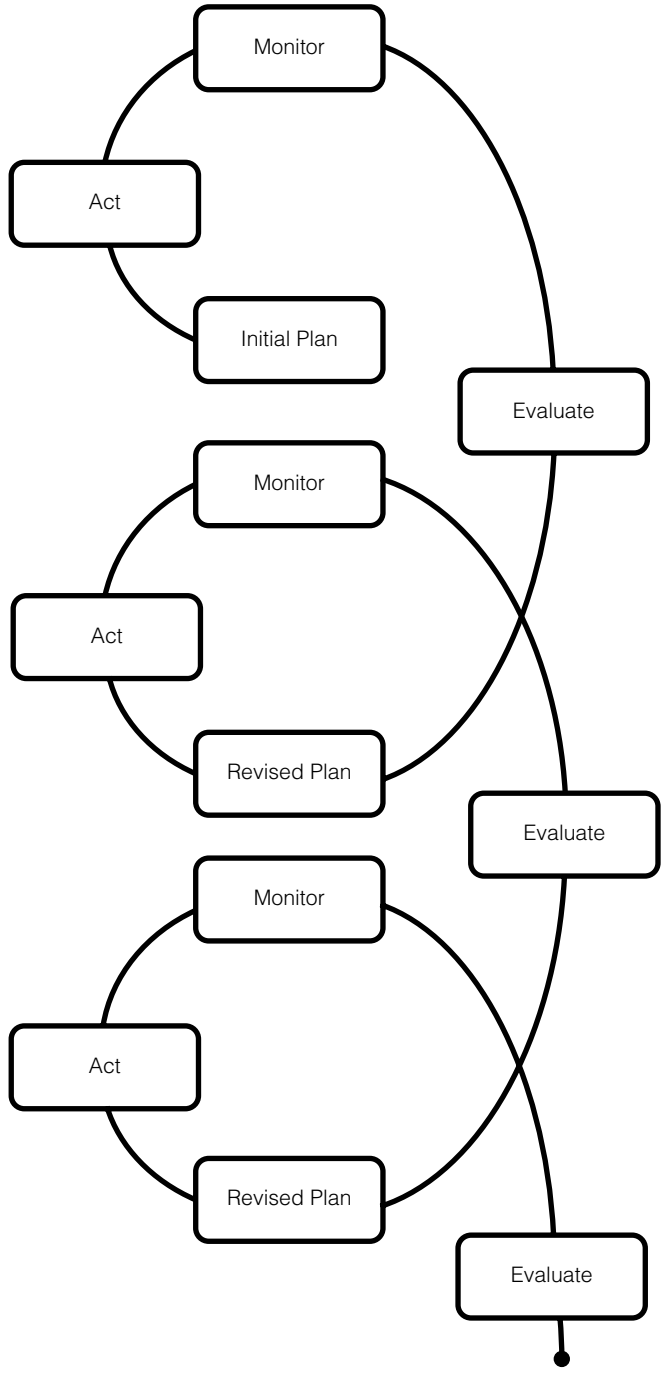

Figure 7.1 The process of applied research

Ultimately, the purpose of this type of research is to help you improve your own practice and by doing so to set new standards in the field. But in order for you to do so, you will need to demonstrate two things: how are you trying to improve what you are doing – which includes thinking about your work and learning how to do your work better; and how to influence others to do the same thing (McNiff and Whitehead, 2012: 7).

7.2.2 DATA COLLECTION

Data collection in action research in design is closely related to the design process itself. Considering that design is an outward-directed activity, in terms that it is others who often feel the consequences of the designers' actions, action research can often be participatory in nature when it comes to data collection. Therefore, participatory action research in design should engage various stakeholders who might be affected by the proposed solution (Crouch and Pearce, 2012: 151).

There are two ways of looking at this. If you are conducting a practice-led research and you are examining how your practice operates, then you may need to engage your co-workers to actively participate in the research process. In the case of individual practice, you can still engage any relevant stakeholders with whom you have any relevant interactions. If you are conducting practice-based research and you are examining how you can improve the design solution on which you are working, then you will also need to engage the broader public and your core audience. This is also called 'co-design', which stands for collaborative design.

As design develops as a discipline, the tasks that designers face are becoming increasingly complex. In many cases, complex problems, also referred to in the design community as 'wicked problems', cannot be addressed without some kind of research and collaboration with other people. Co-design was first introduced in architectural design, where cooperative and collaborative work by architects and end-users led to a new kind of designed environment that was distinct from the previous practice of rigid town planning. Co-design empowers the end user to actively participate in the design process. Working in this way, architects were able to bring a human dimension into the built environments, and have allowed the residents to influence the design rather than having the design directing the residents. While the nature of the design work is client-based and designers already try to incorporate the needs of the clients in their designs, co-design allows for this client–designer relationship to develop on a deeper and more intense level. This way of working is reminiscent of the era before the industrialization, where crafts people would have a close working relationship with the end users as they were producing tailor-made solutions rather than mass-produced products. In addition to this, co-design adds another dimension to the design process. Rather than just designing products (whether visual or tangible), designers will also have the opportunity to design systems that can address and facilitate a number of concerns, ranging from procurement and transport of raw materials, to production, distribution, marketing, and sales, as well as any associated environmental and social issues (Crouch and Pearce, 2012: 27–9).

Swann (2002: 56–7) supports the idea that design should be an inclusive process and argues that designers need to be accountable for what they do. This way of working also ensures that the research is relevant, democratic, and is there to meet people's needs (Crouch and Pearce, 2012: 151). That is why most definitions of action research incorporate three key elements. Action research should be participatory in character; it needs to have a democratic impulse; and it should contribute both to social science and to social change (Meyer, 2000: 178).

- **Participatory Research**: In a group practice where a number of people work together, joint participation is mandatory. All participants need to perceive the need to change and must be willing to play an active part in both the research and the change process. The distinction between 'researcher' and 'researched' in action research, as Meyer puts it, may not be so apparent, as is the case with other types of research. The way the research is conducted needs to be continually negotiated with the participants, and everyone will need to agree on what is the best way to go forward. Group participation in this kind of research is especially important, because this type of research leads to change and change can be threatening and obtrusive to everyone involved. In order for conflicts to be prevented, or at least minimized, a mutual trust must be obtained and a sense of teamwork needs to prevail (Meyer, 2000: 178).
- **Democratic Research**: In action research all participants should be seen as equals. The researcher works as a facilitator of change, consulting the participants on the action process and on the evaluation of that process. Throughout the study the findings are being fed back to the participants for validation so that informed decisions can be made about the next stage of the study (Meyer, 2000: 178).
- **Social Contribution**: Regardless of the field of study, there is always an underlying gap between theory and practice. Action research is seen as one way of dealing with this because it can generate findings that are meaningful and useful to practitioners. However, it has to be noted that generalizations made from action research differ from those made on the basis of more conventional forms of research. For example, the researcher will need to describe the work in rich contextual detail and will need to include the participants' perspectives and responses as new data in the final report. Any biases, such as the researcher's personal views, values, and beliefs, will need to be made explicit and evident. A good strategy to deal with this is by making self-reflective field notes during the research process. This process can initiate social or organizational change, but its success should not be judged in terms of how big the change was. Instead, as Meyer (2000: 180) points out, success can be viewed in relation to what has been learnt from the experience of undertaking the work.

Essentially, this is an eclectic and flexible type of research that can incorporate parts of other research methods when necessary. That is why there are a number of different approaches to action research. At one end of the spectrum, action research is seen as an individualistic or a person-centric activity, and on the other, action research is a participatory activity – a cooperative research that brings a range of people together in a collaborative manner.

7.2.3 DATA ANALYSIS

In the case of action research, both data collection and data analysis are intertwined with the design process. Therefore, the research process mirrors the design process. According to Cal Swann (2002: 53), there is a broad consensus in the field which has determined six basic steps that guide the design process:

Step 1: Problem identification

Step 2: Analysis of the problem

Step 3: Synthesis of possible solutions

Step 4: Execution of a design solution

Step 5: Production of the design

Step 6: Evaluation and revision of the process

While the design process presented in this way shows an empirical process, Swann (2002: 53) also points out that this process is not necessarily linear (see Figure 7.2). According to him, the process is iterative and this involves a constant review of the problem, repeated analysis, and synthesis of the revised solutions.

7.2.4 PREPARING A REPORT

Action research can be generally presented in a traditional thesis format or as a case study, and we should not have a problem with a written articulation of design. These are accessible formats that are capable of being read both by designers and by people outside the domain of design (Swann, 2002: 51; Crouch and Pearce, 2012: 147).

This type of systematic documentation of the design/research process can pose a challenge to most design practitioners who are not trained to work in this way, and do not have the will to change their working practices. This, according to Swann (2002: 58), is a failing that has been perpetuated in the practice of design for many years. While at the same time the design profession complains about the lack of understanding and appreciation of the social, cultural, and economic benefits of design to the community, little has been done for those benefits to be articulated and validated. For most part in the media, design is presented in superficial and sensationalist terms rather than intellectual. If design would like to mature as a profession, as Swann points out, then designers will need to be more self-critical and more systematic in providing evidence of the process of creation from beginning to end. This can only be done through methodologies that allow for objective evaluation and review (2002: 59).

In an emerging discipline such as design, a thesis format can help designers to achieve higher credibility and external validation. A thesis, of course, does not exclude the supplement of a

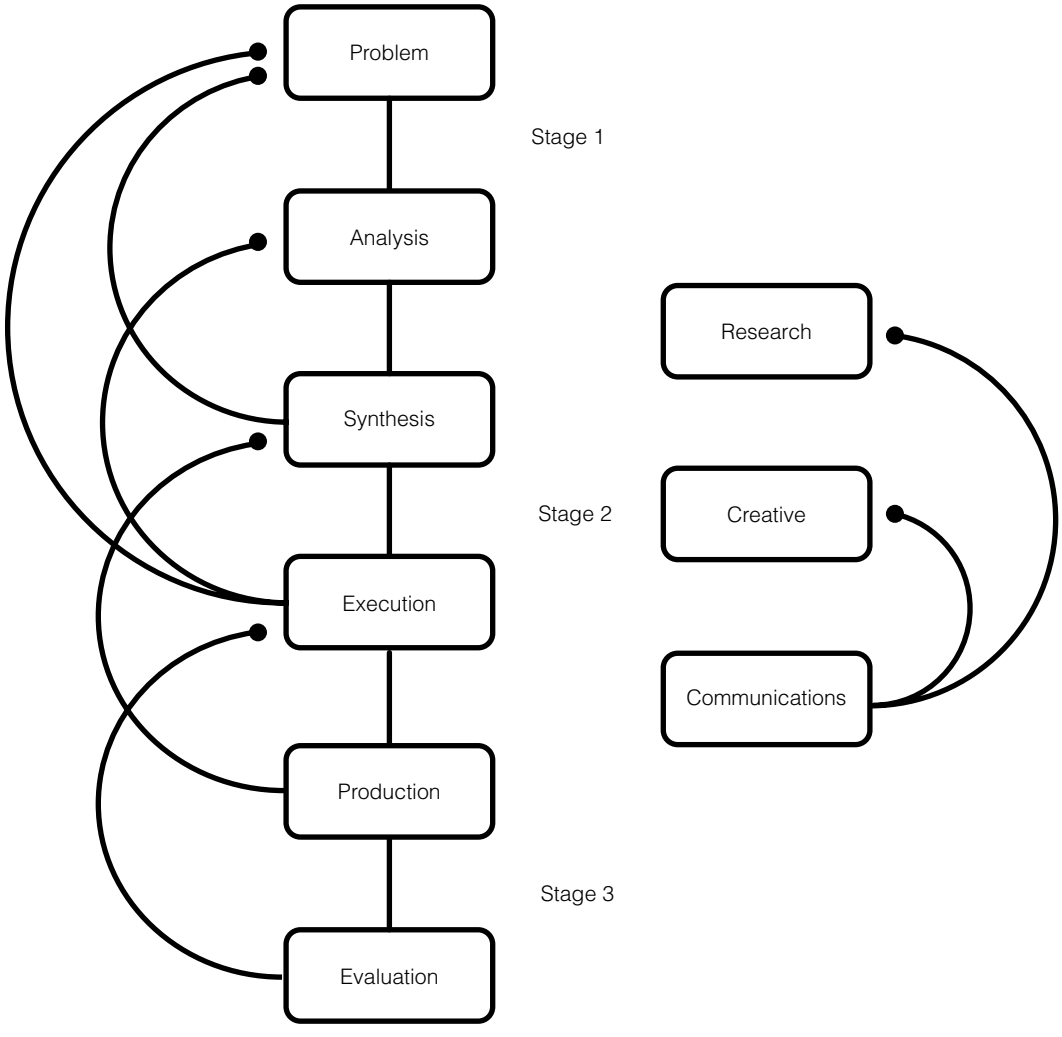

Figure 7.2 Illustration of Swann's diagram explaining action research and the practice of design

design project, or an artifact; and in the case of practice-based research, the artifact is the essential component of the presentation. The problem is not the work itself, but the theoretical component that needs to accompany their work. Designers are often unwilling to include a written report that supports their work. Many are more comfortable working in visual or tangible media, and written reports are often seem very literary based and unnecessary (Swann, 2002: 52).

The visual, or the physical, form can represent a valid form of knowledge, but this form can sometimes be difficult to be understood by audiences other than designers. Visual literacy, as Swann (2002: 51) argues, is the same as verbal, written, or audio literacy in a sense that it also

requires practice and intelligence informed by the history and the concepts embedded in the form. New design forms, visual and tangible, are never truly original – they are always based on developments of existing forms and cultural contexts. In this way, as it has often been argued, trained observers can draw on familiar historical or conceptual references when evaluating a practical work. This is true in the sense that a trained eye can immediately 'read' the design, whereas others who do not share the same background will not be able to (2002: 51–2). The issue of whether designers are capable of explaining their research in purely visual or tangible terms continues to spark debates among academics and practitioners, and as Swann points out, there is a fierce defence of the idea that the artifact is sufficient evidence of its purpose and existence (2002: 52). This argument, however, can be refuted with some historical examples. For example, we can see the Egyptian pyramids and we understand their purpose, but we still do not fully understand how they were built, even though we have had centuries to study them. We can also see the Easter Island statues and we can understand how they were made, but we still do not know enough about them, nor do we know how they were transported to their locations. Even though our civilization is technologically far more advanced than those of the ancient Egyptians and the Rapa Nui people, we still cannot understand how they managed to do what they did – simply because there is no written explanation left behind. With this in mind, I believe that these two examples suffice to highlight the importance of documenting one's practical work in a written format.

7.3 HALLMARKS OF GOOD APPLIED RESEARCH

Even though applied research is a practice-driven research and at times the focus is on the artefact, the research is still defined in terms of process rather than outputs. There are four main features that must be taken into account:

- Purpose
- Context
- Rationale
- Artifact (Optional)

As is the case with any other type of research, applied research is also driven by research questions or problems. These questions need to be defined in such a way a to seek to enhance the knowledge in the field, and in this way, the purpose of the research is being set. Then, the context of the research also needs to be addressed:

- Why it is important that these particular issues are addressed?
- What other research has been done in this area?
- What kind of contribution will this project make to the advancement of this area?

The researcher then has to specify the methods for addressing and answering the research question(s). It is important that the researcher knows how to seek the answers, but it is also important for the researcher to explain the rationale of why these proposed methods are the most appropriate means by which these answers are sought. Then, once the study is complete, the work needs to be presented either as a case study or as a more substantial written thesis. In practice-based research, where the artifact is the main object of the study, the work itself needs to be presented alongside textual analysis that demonstrates critical reflection. In practice-led research artifacts may also be included, but the main focus of the study must remain the practice itself and not the outcome of that practice (see Candy, 2006b).

7.4 CONCLUSION

As a designer, you may need to investigate how to advance and transform your own practice, or to learn how to improve the organizational culture within your practice and make your day-to-day operations more efficient. This is where applied research comes into focus. Applied research can allow you to have more control over how you work and can help you to consolidate your practice in ways that better reflect what is important to you. The best way to do that is through action research. Action research empowers practitioners to research themselves. This, according to some experts in the field, is somewhat different from other types of research where a professional researcher would do research on practitioners – but not everyone agrees (see McNiff and Whitehead, 2012: 8). Meyer, for example, argues that practitioners can choose to engage external researchers in order to help them 'identify problems, seek and implement practical solutions, and systematically monitor and reflect on the process and outcomes of change' (2000: 178).

Then again, unlike the other research approaches that were previously discussed, action research is not always independently validated and then applied to practice; action research is validated *through* practice (Burns, 2000: 443). Therefore, it can be argued that action research is conducted 'within practice' and as such it is distinct from research that is 'about practice' (Crouch and Pearce, 2012: 145). Nevertheless, as with any type of research, applied research needs to be done in such a way that it can be disseminated further.

Sharing practical experiences in the form of substantive discourse, as Swann (2002: 61) puts it, will help design to progress as a discipline. As more and more design graduates progress to postgraduate study and develop research capabilities alongside their creative professional skills, we will increasingly see how this progress is taking place. Both practice-based and practice-led research can provide a platform for a systematic investigative process that could be easily adopted by progressive designers interested in converting their practice into a broader intellectual and public discourse. This is necessary for any profession that wants to provide evidence of the quality of the services it provides. In addition, greater collaboration between the profession and academia can establish a better understanding of research in practice, and it can instigate a change in the field of design.

7.5 SUMMARY

In this chapter I have introduced the use of applied research in design. While applied research may share some similarities with the other three research approaches (qualitative, quantitative, and visual), this type of research is significantly different when it comes to purpose. While the other research approaches are outer-directed – in the sense that you can use them to gain an understanding of the external factors associated with the problem that you are trying to resolve – applied research is inner-directed. Its main purpose is to help you improve your own creative work and/or design practice.

There are two types of applied research that may be relevant to you: practice-based research, where the focus is on the artifact, and practice-led research, where the focus is on the design practice itself. In either case the research is still defined in terms of process rather than outputs. The best way for conducting applied research in design is through action research.

Action research is an eclectic and collaborative research process that draws on a variety of data collection methods such as interviews and observations (Meyer, 2000: 180). The process of data collection and data analysis here are cyclical in nature, and they closely follow the design process. In terms of reporting and dissemination, action research can be generally presented in a traditional written format that follows the same principles that I have introduced with the previous research approaches.