

Chapter 21

Visual heuristics for colour design

Fiona McLachlan, University of Edinburgh

Introduction

This chapter considers the particular role of paint and painting in the development of visual methodologies for architectural research. It will draw on ongoing research by the author together with art historians at the Haus der Farbe, Zurich, specifically relating to colour in twentieth-century and contemporary architectural design. It will reflect on the emergent visual methods developed, placing them in relation to our understanding of visual images more generally in humanities research.

Colour theory has developed, and was communicated historically, through a wide range of visual methods. The two-dimensional colour wheel by Johann Wolfgang von Goethe (Goethe 1809) and three-dimensional ‘solids’ of Philipp Otto Runge’s, ‘Farbenkugel’ (Runge 1810: 24) are examples of numerous similar devices produced in the search for natural laws to explain and communicate observed phenomena. Often paint was the most readily available medium for illustration, and its immediate connection to colour made it an obvious choice for such research. The above abstractions to diagrammatic, geometrical forms are clearly simplistic, yet such models continue to be used in contemporary literature as a means to illustrate observed relationships between hues, and as tools for the navigation of colour systems. These visual representations clearly fail to communicate the complex metaphysical sensation of colour, experienced as a combination of physio-psychological experience, and individually nuanced by social and cultural values. As a product of light, colour is also ethereal, illusory and ambiguous. Although colour theory is readily available to architects, it does not appear to have had much traction in practice and is largely absent in the formal curriculum architectural education (Jasper 2014). The purpose of the author’s continuing research is therefore to consider how architects might develop a more informed use of colour, by offering a critical analysis of existing design practices and through

investigation of specific buildings. The production of abstracted painted images as an integral part of the research methodology is suggested as a form of visual heuristic device. It will be argued that the paintings provide the site for a discursive and designerly analysis, the incubation of knowledge and a synthesis between disciplines. The development of visual methodologies plays a productive part in the constructed interpretation of the findings, and as also a means through which research findings can be disseminated to a range of audiences. Three distinctive types of painting have been established, and are used to structure the analysis, namely: visual indexes, two-dimensional building portraits and three-dimensional visualizations.

Visual indexes

The extraordinary hand-painted grids in Boogert's *Traité des couleurs servant à la peinture à l'eau* (1692) represent his detailed investigation of watercolour as a medium, and serve as one of the earliest known diagrammatic portrayals of colour research. The method used was a regular grid and a systematic graphic documentation of modulated tones. We are accustomed to equating colour choice with small swatches or colour chips presented in grid form. The artist Gerhard Richter has played on this familiarity through his series of colour chart paintings started in the mid-1960s (McLachlan 2012: 147). Le Corbusier's 'Claviers de Couleur' for the Salubra wall paper company (1931 and 1959) had a different purpose (Rüegg 1988). His aim was to define and present a range of wallpaper colours collated into themes. The customer would have a heightened sense of security by using a deliberately restricted set of factory-produced colours. A framing device adds to the idea of utility in the catalogue. Although this was essentially a commercial product, it drew on his previous research on a range of colours defined as 'constructive' through his studies with Amedée Ozenfant and from his own paintings. Although he painted throughout his life, he kept a distance between the subject matter of his paintings and his architecture. The canvas gave him space to experiment in colour and form (Gans 2003).

In early stages of the author's research, a triptych painting *Investigations in the Professional Palette* (McLachlan 2008) (Figure 1) was used as an agent to reflect on, and gain a better understanding of, the use of colour within architectural design practice. At one level this device served to record and index colours specified by the author's architectural practice over a sustained period of nearly thirty years and, as such, aimed to reveal the tacit knowledge of the researcher. The use of an abstract grid equalized the extent of the colours, removed them from context, material and surface texture in an attempt to consider the colour palette of the practice's work.

Yet this gridded abstraction is not arbitrary, it was composed as an object in its own right, as well as a visual representation of a raw data collection exercise. It also provides a tool whereby the colours – the results of an investigation through a series of decoration schedules embedded in the practice’s job files – are displayed collectively, and in an immediately accessible manner.

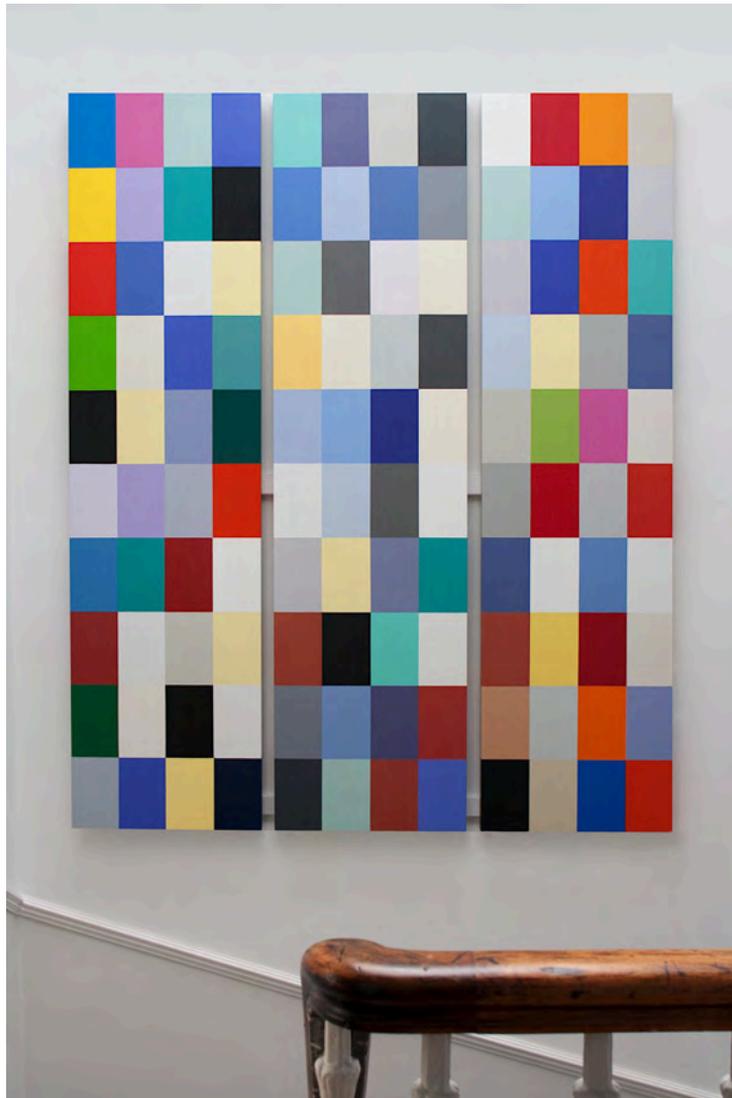


Figure 1: McLachlan, F. *Investigations in the Professional Palette*, 2008. Satinwood paint on plywood. [Photo credit: Rachel Travers, University of Edinburgh]

Additionally, the painting acts as an instrument to consider the semiotics of colour. Further layers of meaning were developed during its design and production, and because of its physical presence, it became a device for self-reflection and analysis when subjected to a prolonged and acute gaze. It was designed through an iterative process, and ordered chronologically from left to right. It revealed responses to typology within the practice's architecture, and, in the painting itself, the interaction of strong or muted boundaries between colours. A similarly grid-based installation *Shoulder to Shoulder* (Figure 2), made specifically for an exhibition of a completed research project in Edinburgh (*Colour Strategies in Architecture* 2015), was intended to provide an immersive, sensory experience, inviting the audience to participate by drawing their own conclusions, connections and observations on the interaction and juxtaposition of colour. Here the medium of the painting was very immediate and directly accessible. Gregory Stanczak (2007: 3) suggested that images are 'no longer appendages to the research' or a means through which to communicate findings, but rather that they can be integral to the generation of the research itself. The author's 'index' paintings are therefore *both* the research *and* the visual device through which the research is disseminated.



Figure 2: McLachlan, F. *Shoulder to Shoulder*, 2015. Acrylic paint on card on MDF.

Transactions in production – Observation, analysis and synthesis

Researchers at the Haus der Farbe have developed a predominantly visual methodology to document and analyse colour in the built environment. In one project, the research team ‘captured’ the external façade colour of over 40,000 buildings in Zurich, by visual comparison of the observed colour on site to samples from a range of colour systems (e.g. RAL, NCS). The research team then hand-mixed acrylic paint in the studio to create the equivalent of a data set of large swatches (Rehsteiner et al. 2010). There are a range of digital apps and scientific measuring tools that could do this task and produce a digital palette in seconds, so what did the paint and painting process offer that is not true of other more easily replicated and ‘clean’ media? The method is essentially experiential and wholly qualitative. It relies on a group of individuals making a judgement on the overall sensation of colour on each building on a given day, time of year and weather condition. Hence the use of the ‘seeing eye’ is present from the earliest stages of the research. This technique is open to the vagaries of lived experience, because there are many variables at play, not least in the physiology of the observer, and the specific quality of light, shadow and material reflectance. But methods of measurement appropriate to a laboratory are not experiential (at least, not overtly) and cannot replicate the contingent nature of colour perception in the ‘real world’, which this method aims to expose.

The process of hand-mixing the medium itself requires the researcher to be analytical. Each colour has to be considered and generated through an empirical method, reviewed, and adjusted by eye in relation to the source. The physical process of making gives time to inquire, to think and to develop a deeper understanding of tonal variations that are only apparent through the action of mixing the paint. New knowledge, for example subtle nuances in the overall palette, emerges through this physical action. As colour is always contingent on light and material surface, there can never be complete certainty in any reproduction. This is equally true of digital or printed images, but this experiential method of recording colour by observation and hand mixing may offer a more appropriate and explanatory means through which such research is conducted and communicated.

In considering what it is to ‘make’ a painting within the context of research, there are different perspectives to ponder. The study of painting as an inquiry process takes into account more than the physical and formal practices of creating images on surfaces. Not only is the artist involved in a ‘doing’ performance, but this also results in an image that is a site for further interpretation by viewers and an object that is part of visual culture

(Sullivan in Knowles and Cole 2008: 240)

The same observational and forensic method of data collection was used in a later collaborative and interdisciplinary project leading to a book, *Colour Strategies in Architecture* (McLachlan et al. 2015). In this case, the research team (based in Berlin, Edinburgh and Zurich) included art historians, a colour designer and an architect. This research drew on these established visual methods, and developed new techniques to analyse and present the findings, which are considered below in more detail.

Composite images – Building portraits

While swatches derived from building facades and interiors provide raw data, they give no information on the specific situation – the extent, juxtaposition and location of each observed colour as evidenced on the buildings themselves. In this case, the researchers' aim was to develop a means through which these relationships could be explored and presented. The development of visual, heuristic devices has been proposed as an effective methodology in support of a transactional relationship between academic research and architectural practice (McLachlan and McLachlan 2014: 255). In this case, the collaged 'building portraits' simultaneously depict a presentation of the original data, and a constructed interpretation of research findings, designed to disseminate the new knowledge to a range of audiences.

A collage technique is commonly used to juxtapose remotely sourced images, textures and media to convey meaning, for example in Richard Hamilton's 'Just what is it that makes today's homes so different, so appealing' (1956). The technique itself offers a mode of inquiry and a 'conceptualising approach' (Butler-Kisber in Knowles and Cole 2008: 270) to help develop a response to a research question through drafts and re-drafts in a similar honing to the production of text. In the case of the Colour Strategies project, an abstract portrait of each building was assembled using the painted swatches, and is therefore similarly rich in data. Each coded colour contains information about the original building from which it was sourced. The collage affords an immediate representation of this assembly, with each element layered to denote hierarchy, proportional extent and location (Figure 3). The collage method also enabled the interdisciplinary research team to explore the overall characteristics of the palette and various relationships within it, and so incorporated a layering of tacit knowledge (regarding colour use, geographical and cultural differences, for example) in the research findings. Josef Albers' seminal publication, *Interaction of Color*, used a predominantly visual methodology to introduce the viewer to contingency and doubt. Through the exercises, colour is plainly observed as an unreliable, plastic sensation,



Figure 3: Hand-painted colour portrait based on building study of Hans Scharoun's Reading room, Staatsbibliothek, Berlin. Collage, acrylic paint on card. Copyright: Haus der Farbe, Fiona McLachlan and Marcella Wenger-di Gabrielle. [Photo by Urs Sigenthaler]

wholly relative to its context. His preferred medium was to collage coloured paper, which was considered as a more reliable tool for students than paint (Albers [1963] 2006: 6, 7).

Visualizations – Spatial painting

The third method for discussion here (following the two-dimensional indexes and building portraits) proved to be the most challenging. The aim was to develop a means through which to investigate and communicate the strategic role of colour within architectural space.

There are a number of examples of contemporary architects who use painted images as part of a practice-based design development as a means of analysis, synthesis and in presentation. Will Also used painting as a form of retreat to allow a free flow of consciousness without the necessity of reason or justification and found the very fluidity of the medium is liberating (Porter 2011). Early paintings by Zaha Hadid in *Planetary Architecture Two*, for example, can be seen as exploratory, experimental

and designerly investigations. In the accompanying commentary, Alvin Boyarski (in Hadid and Frampton 1983) suggests ‘... your drawings and paintings seem to transcend the subject matter. They appear to be some form of research’. Hadid’s paintings in contrast to those by Alsop, and indeed Le Corbusier’s, were always directly related to the projection of the project itself (Hadid and Margolius 2003: 17). The power of the paintings resides not only in the skill of their execution, but also in the use of constructed images, made possible through the medium of painting. The paintings provide extreme viewpoints, depicting anti-gravitational, floating shapes in compositions that could not be achieved in model form, especially before widespread computer usage. The use of strong visual images was clearly influenced by the practices of her tutors and contemporaries – most notably the paintings of two of the women founders of OMA: Zoe Zenghelis and Madelon Vriesendorp, where Hadid later worked. Vriesendorp’s paintings became ‘the thought diagrams’ for *Delirious New York* (Koolhaas 1978), even though some preceded the text (Jencks 2008: 19). The directness, humour and surreal juxtapositions of the images made them highly memorable. They became a powerful iconography – emblematic for the work of their emerging practice. The paintings are an expression of a ‘free-floating imagination’ (Koolhaas et al. 2008: 262). The visual methodology therefore became critical in communicating provocative and multi-layered meaning.

Hadid’s use of colour was often highly intuitive and abstract, using red, blue and yellow backgrounds with turquoise and terracotta planes – studies wrought through consideration of Kasimir Malevich’s ‘Tektoniks’. Hadid’s paintings, some executed by a team, explore, experiment and test design ideas, and can be considered to have contributed to the generation of new knowledge and ultimately to the production of new types of fluid architectural space. By this definition, the paintings can be seen as evidence of a visual design research methodology. Some have a clear narrative, while others remain exploratory. There is also an artistic quality, in that the paintings were not entirely planned in a methodological manner, and the final effect was not necessarily predicted. Hadid (Boyarski and Hadid 1983) notes that the paintings changed the way they thought about the architecture in terms of materials and colour. Within art there is a discourse that would suggest the relationship between painter and painting is at times conversational, and that the painting begins to dictate – to fight back in some way (Mooney 2015: 10). Hadid’s paintings defined the design research problem and acted to synthesize a range of factors. The paintings are discursive, providing a means of articulating ideas to interdisciplinary audiences, as well as being tools through which a self-reflexive practice was developed. In this respect, they appear to combine research and artistic production. But to what extent can these activities be considered as examples of visual methodology within practice-based design research? According to Boradkar, a professor of industrial design (2011: 166):

VISUAL HEURISTICS FOR COLOUR DESIGN

Visual Research in design can [...] serve two roles – it can help us in making sense of the material world in which we live and also help us in understanding the creative process of design thinking.

In the *Colour Strategies in Architecture* research, swatches of observed and researched colour were assembled into a collaged and composite ‘visualization’, based on the work of the architects studied. The composition of each image was the result of an interdisciplinary discursive process that centred on the production



Figure 4: Hushed Tonalities. Hand-painted collaged visualization based on studies of buildings by Reiach & Hall Architects, Edinburgh, 2014. Light, shadow, soft tones and the influence of landscape are the key elements of this strategy. Copyright: Haus der Farbe, Fiona McLachlan and Marcella Wenger-di Gabrielle. [Photo by Urs Sigenthaler]

and development of a three-dimensional visual representation of the strategic use of colour, demonstrated in an imagined space. The aim was to convey meaning through the choice of spatial configuration and the projection. Taking one particular case, 'Hushed Tonalities', the projection used is part-perspective, part elevation (Figure 4). The colour of the paint in the image not only represents the actual documented data of the observed colours from the building sites, it was used in the constructed visualization to try to understand a particular phenomenon of how these colours are experienced by the body moving through space. Both image and meaning were developed through discussion, the initial study drawings providing the opportunity to tease out previously unseen characteristics and relationships both in colour and architectural form. In terms of research method, the initial drawings were diagnostic and analytical. They could also be considered as evidence of an immersive process that involved diverse methods, including looking, reflecting and adjusting, and undertaken in parallel with the development of a written text. The psychologist Clark Moustakas considers a heuristic methodology to have validity, provided that the researchers constantly seek to appraise and verify the significance of the experience or phenomenon under investigation. Thus an individual experience, drawing on and revealing tacit knowledge, can be reasonably extrapolated to one that may be considered as more widely felt (Moustakas 1990: 33). The visualization can be considered as design research, in that it is situated in a built example. It offers a systematic and critical analysis of how specific spaces work on an experiential level, and provides new insights into the original design process of the architect.

Dissemination and the site of the audience

Gillian Rose, a cultural geographer, counselled on the limitations of such constructional interpretation in relation to critical visual methodology, namely that 'visual images do not exist in a vacuum' (Rose 2001: 37). One must therefore be aware of the method of production and the social norms through which images will be viewed and understood. Rose (2001: 16) suggests that three 'sites' have been accepted at which the meanings of visual images are made, namely: site of production (including the artist and technology), the site of the image itself, and the site of the audience. So, how can painting as a medium contribute to the communication and dissemination of architectural research?

An image is controlled by the position of the viewer and the viewpoint. It is composed through the disposition of its content, by adjacencies and relationships of the objects or directly in the case of a painting, through fields of colour. In addition, because an image can never be 'innocent', it communicates at a subconscious

level through ‘socially constructed codes of recognition’ (Rose 2001: 32). As a means of communicating a visual analysis of an architectural composition, a painting may, in some respects, be more readily accessible than an architectural drawing. The social expectations present in observing an artistic composition may evoke a more direct response than the codified information inherent in an architect’s drawing. Additionally, Kress and van Leeuwen (1990: 224) argue that conventional architectural line drawings, drawn for other purposes such as construction, make it ‘harder to put the semiotic in the foreground’.

If this logic is followed, then paintings may have the capacity to convey meaning in a form with which audiences are more readily willing to engage, because they tap into certain conventions expected of art. Any composition will be selective in what is chosen to foreground to the audience, and what is omitted. In the visualization illustrated, based on buildings in central Scotland by Reiach and Hall Architects, the aim was to communicate a colour strategy that is largely material based, deliberately subdued in tone and enlivened by the play of light, shadow and the colour of the landscape (Figure 4). Although at first the painting may appear literally descriptive, it is abstracted and is not representative of a specific space. To elicit a feeling of spaciousness, a high perspectival viewpoint was taken to give the impression of suspension in space. The white upper wall wraps across the top of the painting to further suggest a large open space, and a feeling of low northern light and shadow was introduced within the composition by tonal shifts on the floor. The placing of each colour in this instance was intended to convey a restful, calm space, with a passive viewer. Conventions of painting composition, vector lines, figure and ground can therefore be applied to such a visualization to aid in the intended communication.

A second example, based on buildings in Zurich by Knapkiewicz and Fickert, uses a plan projection to place visual emphasis on the façade surface onto which colour has been applied – as a form of mask in support of an illusion to reduce the apparent scale of the building. The visualization presented a means through which the analysis of the strategic role of colour could be determined through an expansive discussion within the research team. Once established, the choice of projection evolved, through a series of studies, from perspective to isometric. The final plan projection was selected in order to emphasize that the role of the colour in this strategy is as a second layer or surface application, which inscribes the building with an additional layer of meaning – in this case a deceptive one (Figure 5).

The use of colour within a painting can provide meaning by cultural association and the provenance of specific hues, and also by characteristics afforded by the specific technique, for example, to add light and shadow, or imply depth through tonal value, or intensity through the level of saturation. Unlike the free choice of colour as a mode of representation in art, these visualizations are highly restricted, as the only colours permissible in the research method are those found on the



Figure 5: 'Second Layer' visualization, based on studies of the buildings of Knapkiewicz and Fickert. Hand-painted collage, acrylic paint on card. Copyright: Haus der Farbe, Fiona McLachlan and Marcella Wenger-di Gabrielle. Photo: Urs Sigenthaler.

buildings themselves. The meaning of the composition is not therefore to convey the meaning of colour by societal association within the painting itself but rather to communicate the researchers' constructed interpretation of the meaning of the colour within the original architectural projects.

The medium of the production of an analogue painting is counter to the now ubiquitous photo-realistic computer-generated visualizations of contemporary practice. It is clearly hand crafted, and carries with it the tacit knowledge and subjective, social construction of the authors. We can further consider the effect of the material production as an essential part of the making and communication of

meaning. For example, Kress and van Leeuwen (1990: 215) discuss the extent to which brush strokes convey the hand of the human making the image. They suggest that the *inscription* of the surface is more focussed in abstract art and colour field painting, whereas *representation* is more significant in conventionally pictorial paintings. In our case, there was an awareness that this level of detail would be important. As a part of establishing a repeatable methodology, the three research teams studios in Berlin, Zurich and Edinburgh used exactly the same type of brush, the same make of paint and the same technique of rolling the paint on the surface, followed by vertical brush strokes. The expression of these fine brush strokes was consciously ordered in the subsequent collages – vertically on the abstract ‘building portraits’ and horizontally on conceptual spatial ‘visualizations’. Only in the case of the portraits of three Berlin underground stations was a horizontal brush stroke employed to signify the way in which the colour is experienced from a moving train. This fine-grained semiotic expression is lost in the reproduction of the paintings in book form (just as is the case in any artwork), and so can be considered as secondary to the research methodology but nevertheless stands as evidence of the handcrafted mode of production and is clearly evident in the exhibited original paintings.

Multiple readings in painting – Doubt, uncertainty, ambiguity

Philosopher Alejandro A. Vallega (2013: 470) considers Paul Klee’s specific interest in ‘polyphonic seeing’ in paintings. He suggests that the viewer is presented with layers of information, multiple readings of space within the painting, through colour, transparency and threaded forms. In architecture, colour and light yield similarly multiple readings, experienced as a dynamic shift in colour temperature as the angle of light changes in a temporal cycle. The movement of the body through space in the three-dimensional realm of architecture is inherently experiential and is challenging to present in a two-dimensional mode. Recent research on colour is beginning to establish post-positivist theoretical positions (O’Connor 2010). The sensory perception of the space is seen as wholly contingent, not only on physio-psychological factors, but also complex social and cultural meanings that may be unique to each individual at a given time and place. Mary Jo Hatch and Dvora Yanow, organizational ethnographers and interpretative methodologists, have drawn comparison between methodological models in painting and counterparts in theory. They suggest that figurative painting is ‘objective-realist’, and informed by the logic of positivism. Gestural painting, by comparison, is, they suggest, ‘a constructivist–interpretive position informed by late 19th to mid-20th century phenomenological, hermeneutic, pragmatist, symbolic interactionist,

ethno-methodological and (some) critical theoretical philosophies and theories, along with their later elaborations' (Hatch and Yarrow 2008: 29). Thus the specific form of visual representation chosen should be carefully considered alongside the research methodology. Using their analysis, the ontology of our collages lies somewhere between 'critical realism' and 'constructivism'. Paintings as visual research are epistemologically 'subjectivist' and the methodology used to produce them is a hybrid of post-positivism and hermeneutics. While another research topic might demand a different methodology this is appropriate to the intrinsically contingent, relative and metaphysical nature of colour.

The exploratory nature of architectural design development tends, by its iterative process, to produce many drawings that are temporal, overlaid and cast aside as the design is tested and evaluated through each drawing. Hadid's paintings were a device through which she diagnosed the questions and began to develop conceptual solutions. They were also used as tools in communication of the ideas and to anchor the essence of the proposal during later stages of development. Architects less frequently use paint for this purpose – perhaps because it is more time consuming than a sketch.

Although colour is often used in diagrams and analytical drawings to clarify conceptual components or codify elements, if the aim is to suggest contingency, then a painting also has the potential to be deliberately vague and open to interpretation. For example, Enric Miralles (1994) collaged leaves and twigs in the original competition entry for the Scottish Parliament so as to exploit the 'ambiguity of an ink blot'. Unlike other entries, which went out of their way to represent a clear 'built' proposal, the audience – a jury, half of whom were non-architects – were invited to transpose their own interpretation onto the enigmatic forms, stirred by powerfully symbolic statements of the importance of the land to the Scottish people. Miralles evidently understood the potential of the collage to communicate meaning very differently than the office's exquisite and precise technical drawings. Although a photograph may be presented to an audience as 'truth', Stanczak (2007: 79), a sociologist, argues that 'every image is manipulated, thus no image represents reality'. By comparison with photography, painting is immediately understood to be transparently subjective. Normally in the work of one author it is expected that a painting will be composed to stress one aspect over another, to guide the eye of the viewer across the surface, to suggest depth through tone and highlight, and to generate meaning. Similar to drawing, painting can act as an agent to facilitate dialogue during the analytical stages of research. In the *Colour Strategies in Architecture* project, the visual methodology also provided a means for discussion and an inductive and inter-disciplinary synthesis of the documented palettes in combination with other text-based sources and photographic images. Close observation of the

painted swatches laid out adjacent to one another allowed a consideration of overall tone, the influence of the period, and allowed an interpretation of the architects' strategy to emerge. The visual research method facilitated ordering and reordering, teasing out the role of the colour. Numerous iterations of the base drawings were required to be made in a designerly process while trying to understand, then to interpret, a particular phenomenon. Australian artist, author and theorist Graeme Sullivan offers a metaphor to explain the braided nature of visual systems in research, particularly relating to art practice through which design research can be unravelled and expanded into distinct threads. Where not relevant to the argument, the threads can be trimmed or traced through and subsequently rewoven into new knowledge that will contain the rich data in each original thread (Sullivan 2010: 103). The production of images is therefore a key stage in the way in which discoveries can be made and solutions to research problems emerge.

Conclusion

The increased acceptance of visual methods in academic research can provide a new territory for architectural scholarship as a means of inquiry, documentation, critical thinking, analysis and dissemination in support of a transactional relationship between academic research and architectural practice. These heuristic devices offer a new way of reading architecture through a hermeneutic process. As an example, the author's research in colour has provided the basis of the discussion of the particular affordances of painting as a medium. Three distinctive outputs have been established and were used to structure the analysis:

- Abstracted index – used to document findings directly and to demonstrate relationships and interactions, remote from context, scale, surface and typology
- Two-dimensional 'building portraits' – used to evaluate relationships between colours situated relative to their location on the building, the proportional extent of colour elements and the character of the palette
- Three-dimensional visualizations – semi-pictorial, using various painterly devices of composition and viewpoint to bring the viewer into the frame, to indicate sensory experience and the strategy employed

Thus the development of appropriate visual methodologies becomes a direct and productive method seeking to establish new knowledge and to disseminate it back into architectural design practice and to diverse audiences. While the representations may be recognizable to the architects concerned, the aim of the

visualizations was to find a method through which the strategic use of colour could be documented and be transferable to other future projects by other architects. Heuristic research as a method allows a form of inquiry, which is immersive, open ended and is essentially a process of self-reflection. If the act of painting is a conversation with oneself, then the potential is to unlock and synthesize tacit knowledge in an intuitive manner. This can be particularly appropriate to elucidate the nature of the particular experience or phenomena under investigation.

As a form of visual research, the chapter has argued that painting provides a space for free-flowing investigation and a basis for collective interpretation of the results. The abstraction from reality has been a significant element in the work discussed. For practice-based research, while drawings and digital renders project visualizations of unbuilt reality as closely as possible, painting can allow a retreat into a more ambiguous, less precise and contingent place to explore critical questions. Painting as a means of communicating architectural research has been shown to have the capacity to convey multiple layers of meaning with an audience in a way that can connect directly in a thought-provoking manner – through the detailed characteristics of the medium of production, through the composition of the image itself and through established cultural understandings of paintings. It has been argued that painting carries with it certain conventions and social expectations, which may make the research more accessible to a wider, untrained audience than the codified language of architectural drawing. The images therefore provide an interpretive space to invite a dialogue between the researcher, the painting and the audience.

The physical presence of a painting as a tangible product of research provides a lasting site for future reflection. In the case of the architectural research discussed, there is a direct correlation between the methodological use of paint as the mode of production, and the subject of the research – namely the experience of colour within architecture. The sensation of colour is immediate, both in the painting, and in the real-life examples under analysis. The hand-painted collages offer an innovative and sensorial way of reading and studying architecture, to place the viewer in direct dialogue with the colour and its strategic role. The process through which the painting emerges has in our case been hybrid, inductive and inter-subjective. It has provided a site for interaction and to make sense of design practices that may otherwise remain tacit. With regard to the particular visual methodologies employed, parallels can be drawn between the research method and consideration of the type of painting appropriate to each aspect of the research. They can be considered as constructivist and interpretivist visual modes of representation and are integral both to the research method and to its dissemination.

REFERENCES

- Albers, J. ([1963] 2006), *Interaction of Color*, New Haven, CT and London: Yale University Press.
- (2013) *Interaction of Color* (digital app), New Haven, CT: Yale University Press, <http://yupnet.org/interactionofcolor/>. Accessed 7 Aug 2019.
- Boogert, A. (1692), *Traite des couleurs servant à la peinture à l'eau*, in the collection at Manuscrits de la Bibliothèque Méjanes, Aix-en-Provence, France, <http://www.e-corpus.org/notices/102464/gallery/>. Accessed 17 November 2015.
- Boradkar, P. (2011), 'Visual research methods in the design process', in E. Margolis and L. Pauwels (eds), *The Sage Handbook of Visual Research Methods*, London: SAGE Publications.
- Boyarski, A. and Hadid, Z. (1983), 'Alvin Boyarski interviews Zaha Hadid', in Z. Hadid, K. Frampton and Architectural Association, *Planetary Architecture two* (folio), London: Architectural Association.
- Gans, D. (2003), 'Still life after all: Paintings of Le Corbusier', *Architectural Design*, 73:3, pp. 24–30.
- Goethe, J. W. (1809), *Farbenkreis zur Symbolisierung des menschlichen Geistes und Seelenlebens*, Frankfurt a. M.: Freies Deutsches Hochstift, Frankfurter Goethe-Museum.
- Gray, C. and Malins, J. (2004), *Visualising Research: A Guide to the Research Process in Art and Design*, Farnham, Surrey: Ashgate.
- Hadid, Z. and Margolius, I. (2003), 'Paintings as architectural storyboards', *Architectural Design*, 73:3, pp. 14–23.
- Hatch, M. J. and Yanow, D. (2008), 'Methodology by metaphor: Ways of seeing in painting and research', *Organization Studies*, 29:01, pp. 23–44.
- Jasper, A. (2014), 'Colour theory', *Architectural Theory Review*, 19:2, pp. 119–23.
- Jencks, C. (2008), 'Madelon seeing through objects', in S. Basar and S. Trüby (eds), *The World of Madelon Vriesendorp: Paintings / Postcards / Objects / Games*, London: AA Publications, pp. 16–24.
- Knowles, J. G. and Cole, A. L. (eds) (2008), *Handbook of the Arts in Qualitative Research Perspectives, Methodologies, Examples, and Issues*, Thousand Oaks, CA: SAGE Publications.
- Koolhaas, R. (1978), *Delirious New York: A Retroactive Manifesto for Manhattan*, New York: Monacelli Press.
- Koolhaas, R. with Basar, S. and Trüby, S. (2008), 'Worrying kindness and ultimate wisdom', in S. Basar and S. Trüby (eds), *The World of Madelon Vriesendorp: Paintings / Postcards / Objects / Games*, London: AA Publications
- Kress, G. and van Leeuwen, T. (1990), *Reading Images*, Geelong, Victoria: Deakin University Press.
- McLachlan, E. and McLachlan, F. (2014), 'Colour and contingency: Theory into practice', *Architectural Theory Review*, 19, pp. 243–58.
- McLachlan, F. (2012), *Architectural Colour in the Professional Palette*, Oxon/New York: Routledge.

- McLachlan, F., Nesar, A. M., Sibillano, L., Wenger-Di Gabriele, M. and Wettstein, S. (2015), *Colour Strategies in Architecture*, Basel: Schwabe Verlag A.G.
- Miralles, E. (1994), quoted from lecture given at the Royal Incorporation of Architects of Scotland convention, Edinburgh, May 1994.
- Mooney, J. (2015), *Simply Painting*, exhibition catalogue, Inverness: Inverness Museum and Art Gallery.
- Moustakas, C. (1990), *Heuristic Research Design Methodology and Applications*, Thousand Oaks, CA: SAGE Publications.
- O'Connor, Z. (2010), 'Black-listed: Why colour theory has a bad name in 21st century design education', *Proceedings of ConnectED 2010 2nd International Conference on Design Education*, Sydney.
- Porter, T. (2011), *Will Alsop: The Noise*, Oxon: Routledge.
- Rehsteiner, J., Sibillano, L. and Wettstein, S. (2010), *Farbraum Stadt: Box ZRH*, Zurich: Kontrast Verlag.
- Rose, G. (2001), *Visual Methodologies: An Introduction to the Interpretation of Visual Materials*, London: SAGE Publications.
- Rüegg, A. (ed.) (1988), *Polychromie architecturale: les claviers de couleurs de Le Corbusier de 1931 et de 1959*, Basel: Birkhäuser (later edition 2006).
- Runge, P. (1810), *Farben-Kugel: Oder, Construction des Verhältnisses aller Mischungen der Farben zu einander, und ihrer vollständigen Affinität, mit angehängtem Versuch einer Ableitung der Harmonie in den Zusammenstellungen der Farben; nebst einer Abhandlung über die Bedeutung der Farben in der Natur*. Hamburg: Friedrich Perthes.
- Stanczak, G. C. (2007), *Visual Research Methods: Image, Society, and Representation*, Thousand Oaks, CA: SAGE Publications.
- Sullivan, G., (2010), *Art Practice as Research: Inquiry in Visual Arts*, Thousand Oaks, CA: SAGE Publications.
- Vallega, A. A. (2013), 'Paul Klee's originary painting', *Research in Phenomenology*, 43, pp. 462–74.