LANDSCAPE REVIEW

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LANDSCAPE REVIEW
An Oceania Journal of Landscape Architecture

CONTRIBUTIONS

The editor welcomes contributions, and an author's template can be found under the Submissions link on the website.

The aim of *Landscape Review* is to showcase the relationship between research and professional practice in the field of landscape architecture. It offers a forum for scholarly writing and critique on a wide range of topics that particularly impact Oceania and, more broadly, the rest of the world.

We encourage articles that further develop research ideas and findings from previously published peer-reviewed sources, critiques or reflections, to analyse and synthesise them for impact within professional practice and/or academic research.

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CONTENTS

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Production *Tanya Tremewan, Christchurch* and *Jenny Heine, Wellington*

Cover image *Gill Lawson, Christchurch (Hagley Park, Christchurch)*

LANDSCAPE REVIEW

Foreword

GILL LAWSON

What is outstanding and what is ordinary? In this issue of *Landscape Review*, we showcase research–practice partnerships with papers that examine landscape performance through post-occupancy evaluations of built projects.

Katherine Melcher from the University of Georgia in the United States begins by exploring how knowledge is integrated into a project and frames procedural knowledge processes. This is the second part of her work on building collective know-how in landscape architecture; *Landscape Review* published part 1 in November 2023.

Megan Barnes from the Landscape Architecture Foundation in Washington, DC provides insights from the United States into how to evaluate and quantify the benefits of built landscapes, along with the implications of doing so, using a landscape performance approach set up by the Landscape Architecture Foundation.

Linda Corkery from the Landscape Foundation of Australia in Sydney introduces a new research–practice landscape performance model that the Landscape Foundation of Australia developed from the American model. She explains how the Australian Landscape Performance Case Studies Program differs from the US-based Case Study Investigation Program and how feedback will be collected after its first year of operation.

Bridget Keane from the University of Melbourne, Peter Grant from Tract Consultants and Claire Martin from OCULUS in Melbourne explain their approach in evaluating the performance of the Bendigo Hospital project. They present a structured reflection that incorporates the perspectives of the researcher–student–practitioner team in the project.

Sidh Sintusingha from the University of Melbourne and Emma Stevens from Tract Consultants in Melbourne explain their approach and lessons learnt in evaluating the performance of the Phillip Island Nature Park project. They present reflections on the value of the process and learnings for landscape architecture academia (the 'research fellow' and 'research assistant') and practitioners (the 'firm liaison').

Guanyu (Hanley) Chen, Jacky Bowring and Shannon Davis from Lincoln University in Canterbury, Aotearoa New Zealand argue for landscape performance studies that will help to avoid a 'market' saturated with low-investment projects based on low-value landscape architectural work – projects described as 'lemons'. The analogy serves to provide a new perspective on the landscape architecture 'market' and highlights the potential of landscape performance evaluation to enhance disciplinary rigour.

Ken Taylor from the Australian National University in Canberra reviews *Community Green: Rediscovering the Enclosed Spaces of the Garden Suburb Tradition* by David Nicols and Robert Freestone. He sees this publication as timely while densification is increasing in our towns and cities worldwide. The book is a plea to politicians and planners to recognise the critical importance of green spaces in combatting urban sprawl in our landscapes.

Martin Bryant from the University of Technology Sydney reviews *Landscape Fieldwork: How engaging the World Can Change Design* by Gareth Doherty. He posits parallels between the pronghorn-hunter's fieldwork in the film *No Country for Old Men* and that of Doherty, a landscape architect who has just published a warm, rich and gripping memoir of his landscape fieldwork undertaken in Ireland, Netherlands, Bahrain, the Bahamas and Brazil.

My thanks again to our authors and international reviewers. We hope that these papers, like those in previous issues, will inspire other authors to have their say.

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KEY WORDS

landscape architecture publication; landscape architecture discourse; landscape architecture divide; landscape architecture knowledge

A proposed model of how landscape architecture knowledge develops through interactions between individual practice, studio or practice settings, and the profession and discipline – the knowledge formation process (image by author, 2024).

LANDSCAPE REVIEW

Building collective know-how: Part 2: A framework and recommendations

KATHERINE MELCHER

Procedural knowledge is central to landscape architecture. By gaining a better understanding of how this knowledge is formed, it is possible to strengthen its use within the profession. Based on knowledge creation theories found in professional practice literature, this paper proposes a framework for knowledge formation processes. The framework includes a process model consisting of three stages: knowledge construction, peer review and knowledge use. It also identifies mechanisms, such as metaphors, maxims and models, that act as 'carriers for theoretical ideas' in building procedural knowledge. Building a procedural knowledge 'toolkit' – a repertoire of multiple concepts, models and frames used with the profession – could strengthen procedural knowledge in landscape architecture. Knowing the appropriate tools and selecting them for each situation is an important part of practical wisdom.

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Introduction

How does one design? Landscape architecture, like most professional practices, takes knowledge from multiple sources, including past education, current best practices and the immediate context of the project at hand. How all that substantive knowledge is integrated into a design project is frequently called procedural knowledge. As I argued in part 1 of this inquiry, designing is the core activity of landscape architecture, and building procedural knowledge is key to growing the knowledge of the profession and improving its impact on the world; yet procedural knowledge is taken for granted, overlooked and underdeveloped in the discipline (Melcher, 2023).

Most procedural knowledge is passed on through one-to-one interactions in studio instruction or on-the-job training. Procedural knowledge can be shared more broadly through written reflections by practitioners (for example, Eckbo, 1950; Halprin, 1970; Hester, 2006; McHarg, 1969; Steiner, 2000), systematic case studies (Francis, 2001) and conference presentations. Some of this know-how is consolidated into textbooks, such as Michael Murphy's (2016) *Landscape Architecture Theory*.

Still, the construction of shared professional knowledge out of practical experiences remains piecemeal, haphazard and ad hoc. Individual case reports frequently fail to add up to a coherent body of knowledge; and, at the same time, they are considered too personal and subjective to fit into traditional scientific criteria for generalisability (Berger, Corkery and Moore, 2003; Deming and Palmer, 2005; Swaffield 2017). With a better understanding of how procedural knowledge is developed, shared and validated, we can better evaluate its rigour and start to consider it a legitimate form of disciplinary knowledge.

Approach

This paper proposes a framework to explain how procedural knowledge is formed in professional practice. This framework was developed from knowledge creation theories within professional practice disciplines such as education, health care and business (Eraut, 1994; Higgs, Fish and Rothwell, 2004; Kolb, 1976; Nonaka and Takeuchi, 1995; Schön, 1983). It consists of a model of the knowledge formation process and a description of some of the key mechanisms that help this knowledge develop.

KEY WORDS
landscape architecture theory; epistemology; reflective practice; professional knowledge; phronesis

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The aim of this framework is to move beyond the assumption that all procedural knowledge must remain tacit. By providing a language of shared concepts, I hope that this framework can help landscape architects examine procedural knowledge more closely, better identify how it is formed and, ultimately, work to strengthen it across the profession and discipline as a whole.

Knowledge creation theories

Theorists from several different fields have proposed models for how knowledge is developed out of professional practice. These knowledge creation theories include theories of reflective practice (Schön, 1983), tacit knowledge (Polanyi, 1967), practice knowledge (Higgs et al, 2004), professional knowledge (Eraut, 1994) and practical wisdom (Flyvbjerg, Landman and Schram, 2012; Kinsella and Pitman, 2012). In the review of this literature, I found three models that illustrate parts of the knowledge creation process: Kolb (1976), Nonaka and Takeuchi (1995) and Higgs and colleagues (2004).

David Kolb's (1976) model of experiential learning envisions knowledge creation as a four-stage cycle. The four stages are: concrete experiences; observations and reflections; the formulation of abstract concepts and generalisations; and then testing the implications in new situations (figure 1).

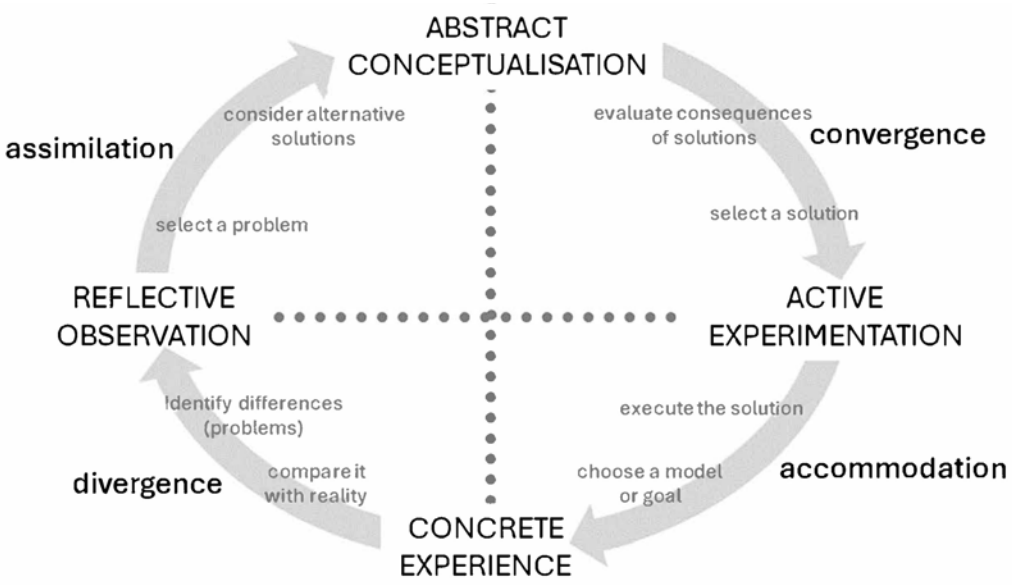

Figure 1. Kolb's (1976) experiential learning model (adapted by author, 2024).

Kolb's model depicts how knowledge develops out of practical experience, but it does not address how that individual experiential knowledge becomes shared knowledge. Through their SECI model, researchers Ikujiro Nonaka and Hirotaka Takeuchi (1995) hypothesise how knowledge moves from individuals and small groups into organisational systems. The SECI model describes how organisational knowledge creation cycles through four phases (figure 2).

1. *Socialisation (S).* In this first phase, individuals share experiential knowledge through direct one-to-one communication. The knowledge remains largely tacit.
2. *Externalisation (E).* In the next phase, this tacit knowledge is expressed through dialogue and reflection; it becomes conceptual knowledge.
3. *Combination (C).* In the third phase, ideas from different individuals, groups or situations are arranged into an organisational framework (using models or narratives), which becomes systemic knowledge.
4. *Internalisation (I).* To close the loop in the last phase, this system-wide knowledge is shared with individuals. Through practical actions, individuals internalise this knowledge into their daily professional practice.

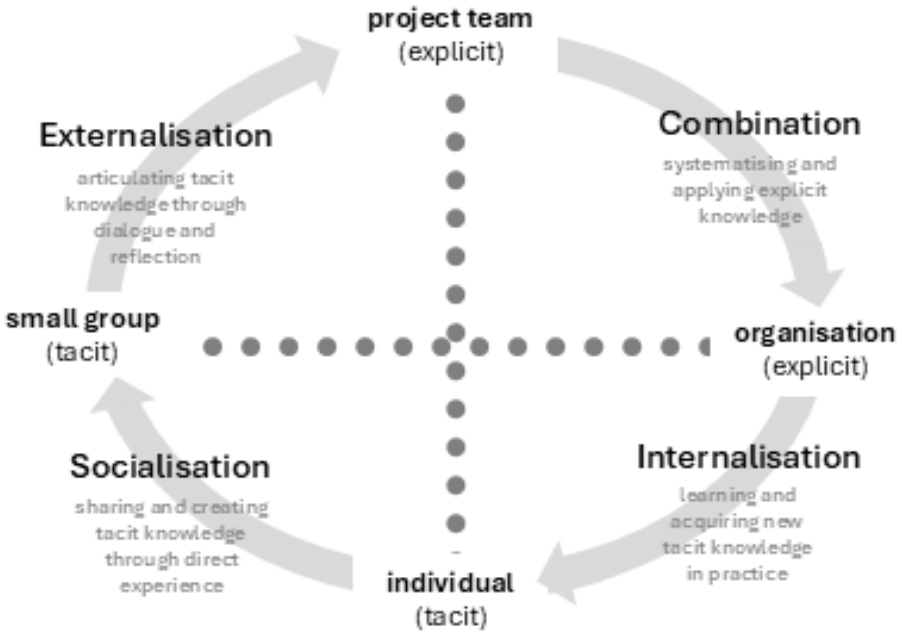

Figure 2. The SECI spiral model (Takeuchi, 2006, adapted by author, 2024).

The SECI model addresses knowledge creation within an organisation, such as a business or agency. However, it does not address how knowledge is created at the more abstract and diffuse level of disciplines and professions. Based on their experience within the health professions, Higgs and colleagues (2004) propose a model (figure 3) that illustrates how knowledge develops from individual practice into generalisable knowledge through 'a loosely sequenced series of activities which can be included in the process of making sense of the world' (p 97). Its five phases are: (1) becoming aware, sense-making and formulating ideas; (2) cross-checking and critiquing; (3) verifying; (4) articulating; and (5) disseminating and peer reviewing.

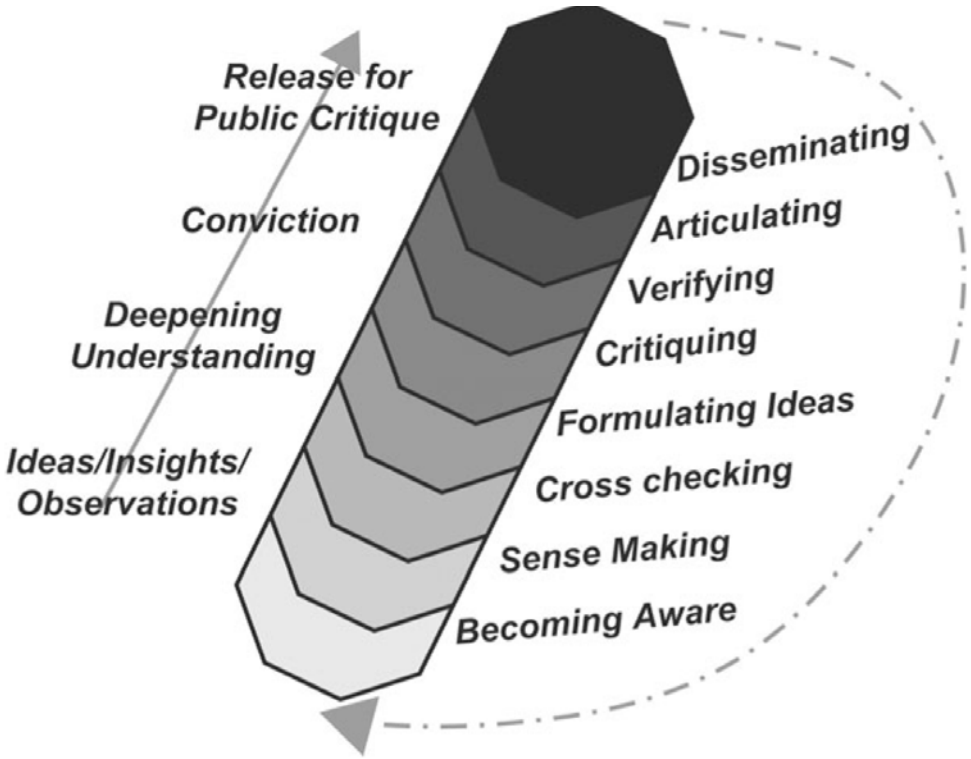

Figure 3. Appreciating practice knowledge (with permission from Higgs, 2012).

The following knowledge formation model was developed by combining these three models with descriptions of professional practice knowledge from Michael Eraut (1994) and Donald Schön (1983). Specifically, Eraut (1994) provides a useful description of how knowledge is transformed through its use in professional practice settings. In addition, Schön's concepts of reflection and framing are two key activities within the knowledge formation process.

A knowledge formation model

Four key assumptions from these theories provide the basis of the knowledge formation model described below and illustrated in figure 4.

1. Professional knowledge has multiple forms and sources. It can be developed through practice or research or some combination of both (Eraut, 1994; Schön, 1983).
2. Professional knowledge is constructed through a process of observation, abstraction and evaluation (Eraut, 1994; Kolb, 1976; Nonaka and Takeuchi, 1995). Collectively, these actions make up the process of reflection (Schön, 1983).
3. Knowledge develops through a cyclical movement of ideas from particular experiences to generalised ideas and back again (Eraut, 1994; Kolb, 1976; Nonaka and Takeuchi, 1995).
4. The cyclical or spiralling nature of knowledge development can also be used to describe the movement of ideas from individuals to groups to larger social structures such as disciplines and professions (Eraut, 1994; Higgs et al, 2004; Nonaka and Takeuchi, 1995).

Figure 4. A proposed model of the knowledge formation process (image by author, 2024).

Similar to Kolb's model, this model is based on two axes. The vertical pole runs from the particular/concrete context of practice (bottom) to the generalised/abstract disciplinary knowledge (top). The horizontal pole runs from knowledge construction/reflection (left) to knowledge use/experimentation (right).

The model also includes three knowledge generators displayed as interacting levels: individual practitioners, organisations such as firms and universities, and the profession and discipline as a whole. Knowledge is generated at the individual level when practitioners select from multiple forms of knowledge, put those ideas into practice and reflect on the results (Kolb, 1976; Schön, 1983). Organisational knowledge generation comes out of workplaces where learning-by-doing is shared through direct interaction, studio culture and organisational policies (Nonaka and Takeuchi, 1995). Finally, the profession and

discipline generate knowledge by defining what counts as landscape architecture's body of knowledge, disseminating knowledge through presentations, conferences and publications, and reinforcing it through accreditation and licensing procedures (Deming and Swaffield, 2011; Eraut, 1994; Higgs et al, 2004). Conceptualising how knowledge moves between these generators is key to building shared procedural knowledge.

The model presents three general stages of activity.

1. *Knowledge construction*. Knowledge emerges out of particular, concrete situations, such as practice, and includes 'acquiring, accessing accumulating, codifying, and storing knowledge' (Nonaka and Takeuchi, 2021, p 3).
2. *Peer review*. Knowledge is evaluated by a peer group. Knowledge that remains within individual practice, as tacit and intuitive know-how, does not have to pass through this stage.
3. *Knowledge use*. Abstracted or more generalised knowledge gets translated into new practice situations, including 'putting it to use, disseminating it, and converting it into action' (Nonaka and Takeuchi, 2021, p 3).

Stage 1: Knowledge construction

In the first stage, knowledge emerging from a concrete experience is reflected on and transformed into more abstract and generalisable concepts (Higgs et al, 2004; Kolb, 1976; Schön, 1983). By reflecting in and on practice, professionals turn their experience into knowledge. Although the term 'reflection' might be interpreted to be an internal, subjective experience, the best reflections include feedback from others involved in the project, such as clients, contractors and end users. According to Higgs and colleagues (2004), knowledge-building reflection involves becoming aware, sense-making and formulating ideas. To make sense out of these reflections, it helps to connect them to one's previous knowledge, which can include past experiences, personal hypotheses, professional models and disciplinary theories. It also helps to research similar cases and bring in additional outside knowledge at this point.

Connecting reflections to other knowledge also involves critical thinking, judging how compatible the new experience is with existing frames of knowledge. As Higgs and colleagues (2004) explain:

> In seeking to make sense of a new idea, an insight, an observed pattern or inconsistency, practitioners often explore their existing knowledge base. Does the new idea sit well with what I already know? … How can I connect my findings or activities across a number of cases …? … Self-questioning and reflection play a major role here in appreciating the subtleties of a situation and developing understandings and explanations. (p 99)

Connecting to existing knowledge involves conceptualisation, where experience is simplified and useful elements are distilled. It also involves developing the concepts, models, 'definitions, explanations, illustrations, examples and arguments' that make up the theory of the field (Higgs et al, 2004, p 102). As such, conceptualisation that goes beyond individual experience requires the use of a shared theoretical language.

Stage 2: Peer review

While individuals can put their tacit knowledge directly back into practice, collective knowledge needs to be reviewed, evaluated and accepted by a peer group. Through this review procedure, knowledge achieves rigour (Higgs et al, 2004). This stage involves sharing the knowledge, undergoing peer review and disseminating results.

Sharing knowledge can take many forms. It can be presented in formal venues such as journals, other publications, conference presentations and award submissions; or more informally through conversations, meetings, social media postings and the like. But to be well received, the ideas need to be articulated 'clearly, sensibly and in a form and language meaningful to the knowledge-using community' (Higgs et al, 2004, p 102).

Academic disciplines have clear criteria and procedures for peer review (for landscape architecture, see Deming and Swaffield, 2011). Professions and organisations also have methods for judging rigour, even if they are less explicit. In a policy context, Eraut (1994) observes, validity is determined by a small group of experts drawing from a combination of research, reports and their own judgement. With further dissemination, validity continues to be judged via critique throughout the profession, discipline or organisation. Therefore, facilitating dialogue surrounding the sharing and evaluation of ideas contributes to a practice of continually checking the validity of procedural knowledge (Eraut, 1994; Nonaka and Takeuchi, 1995).

Stage 3: Knowledge use

The knowledge used in practice comes from many sources: public, collegial and personal (Eraut, 1994). This knowledge also comes in different forms, such as theories and concepts, practical principles and specific propositions. It comes from both inside and outside the profession, and it can be transferred in different ways (through publications, direct instruction or experience, for example) (ibid).

Knowledge coming out of peer-reviewed research is often viewed as the most complete form of knowledge. But Eraut (1994) points out that 'the process of using knowledge transforms that knowledge' (p 21). He suggests that how one uses knowledge influences what that knowledge becomes. Eraut outlines four ways knowledge is put into use.

1. *Replication* happens when a practitioner recalls the exact steps learned and executes them without any changes.
2. *Application* is the use of a set of principles or rules to guide action in a new (yet relatively similar) situation.
3. *Interpretation* takes the general meaning of a concept and uses that understanding to inform one's actions.
4. *Association* is a 'semi-conscious, intuitive, mode of knowledge use … that … often involves metaphors or images' (ibid, p 49). These metaphors or images can be used to frame a situation in a manner that provides new insights and helps deliberate between alternative actions.

According to Eraut, the first two modes of use (replication and application) are technical skills, while the latter two (interpretation and association) are distinctly found in professional practice. Interpretation and association are valuable methods for deliberation and decision-making; they are at play in 'an intuitive capacity to digest and distil previous experience and to select from it those ideas or procedures that seem fitting or appropriate' (Eraut, 1985, p 125). This capacity is otherwise known as 'that mysterious quality we call "professional judgment," practical wisdom, or *phronesis'* (Eraut, 1994, p 49).

Knowledge formation does not end with its practical use. According to Eraut, the acts of interpretation and association do not only integrate knowledge into practice; they also can form new knowledge out of practical experience. Through interpretative use of knowledge, 'An individual's understanding of a concept is expanded, perhaps even altered by each new example of its use' (ibid, p 29). This leads Eraut to claim that 'The interpretative use of an idea in a new context is itself a minor act of knowledge creation, perhaps more original than one of the more derivative types of academic paper' (ibid, p 54). This new understanding can then be 'used interpretively to modify theory' (ibid, p 29). Similarly, Eraut continues, the associative use of knowledge can 'spark' creative theoretical insights (ibid). Interpretive and associative thinking creates a bridge between practice and theory, where theory is used to interpret practice, and then practice is interpreted in a manner that forms theory and generates new knowledge for the profession.

Mechanisms for building professional knowledge

Professional knowledge develops by moving through knowledge construction, peer review and knowledge use. But how does knowledge move from individual experience into shared organisational, disciplinary or professional knowledge? In other words, how does knowledge from a particular practice become a more generalised part of the profession's knowledge base?

Almost all of the theorists cited in this paper observe that communicative tools, such as metaphors, images, stories and models, play a critical role in knowledge formation (Eraut, 1994; Higgs et al, 2004; Lawson, 2005; Nonaka and Takeuchi, 1995; Schön, 1983; Sennett, 2008). These tools share what Schön calls an 'optimal fuzziness', which is a 'thematic character which enables practitioners to use it in their own reflection-in-action' (Schön, 1983, p 319). They are not precise factual descriptions; they do not predict or explain phenomena in a straightforward manner. While the fuzziness or the 'discrepancies and gaps' (Nonaka and Takeuchi, 1995, p 64) in these tools may be frustrating when trying to use them to replicate or apply knowledge, the fuzzy quality is surprisingly useful in interpretive and associative modes of use. Practitioners can use these concepts 'as springboards for making sense of new situations' (Schön, 1983, p 317), and for 'build[ing] and test[ing] their own on-the-spot theories of action' (ibid, p 319).

Through this optimal fuzziness, these tools help to build knowledge in three primary ways.

1. As expressive language tools, they can help practitioners convert tacit and embodied know-how into a shared language. Expressive language can also deepen reflections, inspire new associations and thereby create new insights.
2. As combinatory mechanisms, they can connect experiences to existing knowledge and help practitioners find commonalities between their experiences.
3. As framing tools, they provide suggestive guides rather than determinate rules. They also can help a practitioner frame a situation to better deliberate over possible approaches.

Expressive language

Expressive forms of communication such as metaphors, maxims, images, models and diagrams can help practitioners articulate their inner, tacit knowledge. In writing about craft-based knowledge, Richard Sennett (2008) comments that craftspeople share their knowledge via expressive instructions, such as 'language's powers of sympathetic illustration, narrative, and metaphor' (p 184). Similarly, Nonaka and Takeuchi (1995) comment that 'metaphors, analogies, concepts, hypotheses, or models' are often used to externalise tacit knowledge (p 64).

Expressive language can simplify ideas and make them easier for a person to retain. Eraut (1994) uses the image of a carpenter's tape measure as an example; it can capture and communicate a structural principle (it can bend along one axis but not on the other) without getting into technical details. Additionally, figurative language and images can help people from a diversity of perspectives and experiences quickly grasp the essence of a situation (Nonaka and Takeuchi, 1995).

Expressive language is common in landscape architecture theory. Lawrence Halprin (2002) uses the metaphor of a musical score to explain designing as 'symbolizations of processes which extend over time' (p 43). Practitioners might not be able to recite Halprin's design process step by step, but his metaphor of a score is retained in the collective knowledge base.

Joan Nassauer's (1995) maxim 'cues to care' is another example of expressive language in landscape architectural theory. Based on empirical research into visual landscape preferences, the phrase not only explains the outcomes of her research; it also provides a simple maxim that is easy to remember and interpret for use in new situations. Even if a practitioner does not recall their methods or findings, they can recall the maxim and reflect on whether or not it applies to their design situation.

Beyond making a concept more memorable and relatable, metaphors and other expressive communication tools can add symbolic value or deeper meaning to practical actions. Sennett (2008) comments that metaphorical language can act as an invitation to 'contemplate consciously and intensely the processes' (p 192). From a similar perspective, Nonaka and Takeuchi (2011) state that metaphors help 'convey messages in ways that capture the imagination' (p 65). Associative language can inspire reflection, exploration and creativity in practice.

Combinatory mechanisms

Expressive language not only helps people articulate experiential knowledge; it also can help them to attach their own knowledge to other sources of knowledge (Nonaka and Takeuchi, 1995). Shared concepts or mental models can help practitioners combine their own experiences or attach their experience to the experiences of others. As combinatory mechanisms, they 'help promote "reflection" and interaction between individuals' (ibid, p 64). By providing a point of comparison, these concepts and models help practitioners express and reflect on their own experiences. They can then use those mechanisms to communicate generalisable lessons from a collection of particular and concrete experiences.

These models are adapted and refined as they pass through peer review processes of sharing, evaluation and discussion. Eventually, if they are shared widely enough, they become part of the profession's knowledge base. These discipline-wide methods and theories become, then, concepts that provide guidance for practitioners in future scenarios.

One of the most well-used combinatory mechanisms in the design fields, including landscape architecture, is the design process model – diagrams of the phases of design (Lawson, 2005; Murphy, 2016). Process models and other combinatory mechanisms are useful for teaching beginner designers how to design. They can function as loose instructions, indicating a starting point and general sequence of actions. But as design expertise grows, designers are likely to improvise and deviate from these staged process models (Dreyfus, Athanasiou and Dreyfus, 1986; Lawson, 2004; Mangiante, 2021).

One model cannot capture all design approaches that exist in practice. As Lawson (2005) points out, 'The extent to which these ideas actually help you to understand design better is probably more to do with your personal cognitive style, interests and preferences rather than due to some absolute correctness in the model' (p 303). Perhaps the greatest utility of process models is not in describing or prescribing a design process, but in acting as a combinatory mechanism. They can provide a shared language so that designers can describe their own processes, compare them with those of others and enter a larger conversation about what design processes are. They help 'create a framework within which debate about design can take place' (ibid, p 290). Proposing a process model can be viewed as an invitation to others to discuss and debate what it captures, what is missing and what could be changed.

Frames and placements

Because one cannot predict with certainty which knowledge will be useful in future situations, procedural knowledge is best developed as a plurality – a repertoire of models and concepts from which a practitioner can select (Buchanan, 1992; Schön, 1983). To guide this selection, practitioners use what Schön calls frames and Buchanan calls placements. A placement 'gives a context or orientation to thinking' (Buchanan, 1992, p 13) and provides a structure for viewing a situation.

Frames can also help practitioners sort through their repertoires and select the most appropriate tools; they help 'determine their strategies of attention and thereby set the directions in which they will try to change the situation, the values which will shape their practice' (Schön, 1983, p 309). As Lawson (2005) explains:

> This selective focus enables the design to handle the massive complexity and the inevitable contradictions in design by giving structure and direction to thinking while simultaneously temporarily suspending some issues. (p 292)

A frame could be the adoption of a particular school of thought, or it could be the use of a metaphor like 'balancing act' to explain one's role (Schön, 1983, p 310). Frames in landscape architecture theory include Crewe and Forsyth's (2003) landSCAPES typology, which sets out six distinct approaches to landscape architecture, each with specific values, project types, methods and objectives. Hester's (2002) 'design against, for, with, and by people' (p 53) could also be considered a framing mechanism for different forms of practice. More recently, Melcher's (2022) description of three definitions of aesthetics provides three frames through which designers can view their aesthetic intentions.

Framing facilitates the deliberation involved in professional judgement. If a practitioner is aware of the framing process, they can '"try on" a way of framing the practice role, getting a feeling for it and for the consequences and implications of its adoption' (Schön, 1983, p 315). Additionally, frames can be a source of creative problem-solving in design. Applying a different frame to a new situation 'can generate a new perception of that situation and, hence, a new possibility to be tested' (Buchanan, 1992, p 13). Both Lawson (2005) and Buchanan (1992) comment that the skill and creativity of a designer often come from their ability to select and apply different frames to new situations.

Because 'the construction of a role frame is superordinate to and longer lasting than the setting of particular problem' and frames can 'pass from one situation to the next' (Schön, 1983, p 310), they also make important contributions to the generalised procedural knowledge of a profession. Frame analysis – which involves identifying and studying the different frames employed in practice – is an area of research that could contribute significantly to professional knowledge (Goffman, 1974; Tversky and Kahneman, 1981).

These tools of expressive language – metaphors, maxims, models and the like – act as 'carriers for theoretical ideas' when building procedural knowledge (Eraut, 1994, pp 49–50). They move ideas from individual practice into collective knowledge. They help practical know-how become generalisable and help practitioners select from a repertoire of generalised concepts while in practice. Their 'optimal fuzziness' helps explain tacit knowledge, connect ideas across experiences, provide suggestive guidance for future practice and help the practice processes of deliberation and reflection.

No one tool or set of tools is appropriate for all practices. This suggests that building procedural knowledge is about more than data collection and analysis. In particular, it is about developing a repertoire of these theories, models and concepts. This repertoire can serve as a toolkit of sorts from which a practitioner can select the best frames and concepts for expressing, combining and creating ideas related to practice. Additionally, the purpose of procedural theory differs from other existing categories of theory, such as: predictive/instrumental, interpretive or critical (Swaffield, 2006); or resistant, explanatory or normative (Herrington, 2013). Although procedural theory can contain elements of each of these, its key purpose is suggestive in nature. It is less about prediction, finding meaning or critically questioning the status quo; and more about suggesting procedures and concepts that might be useful to others.

Implications

The expressive language tools are common in landscape architecture theory. They are used to convey substantive knowledge coming out of research (Nassauer, 1995) and procedural knowledge developed through research (Crewe and Forsyth, 2003), as well as procedural knowledge formed through reflective practice (Halprin, 2002; Hester, 2002). Knowledge creation theory can help us identify these mechanisms, but how can this identification help us build shared knowledge out of individual cases?

The case study dilemma

Case study methods work well in complex situations of practice because they provide rich, contextual details. Because they are of such high quality, case studies are a key source of knowledge in professional fields (Eraut, 1994; Flyvbjerg, 2001; Francis, 2001; Schön, 1983; Swaffield, 2017). Francis (2001) goes so far as to claim that case studies in landscape

architecture 'provide the primary form of education innovation, and testing for the profession' and 'also serve as the collective record of the advancement and development of new knowledge in landscape architecture' (p 15).

But many case studies include detailed descriptions without additional reflection on theoretical knowledge gained from them (Berger et al, 2003; Deming and Palmer, 2005; Thering and Chanse, 2011). Deming and Palmer (2005) call this the 'case study dilemma': how can a vast and diverse collection of cases 'have relevance beyond the individual events or situations being investigated' (Swaffield, 2017, p 107)? How can they become 'idea[s] useful for action' (Schön, 1983, p 318) for other practitioners?

When cases studies do not connect to greater patterns or themes or to a broader theoretical context, much of the knowledge within them does not transfer (Berger et al, 2003; Deming and Palmer, 2005). As Berger and colleagues (2003) comment on cases of studio instruction, 'Unless there is a theoretical construction or deconstruction of the process of the studio it is difficult to engage the reader' (p 2). At the same time, it is often left up to the reader to identify the themes, patterns and conclusions relevant to professional practice (for an example, see Deming and Palmer, 2005, p vi). Even if the reader has the time, inclination and conceptual tools to undertake this endeavour, their conclusions will mostly likely remain tacit and private.

Using conceptual tools such as metaphors, maxims and models more explicitly and more frequently within case study reports can better connect cases to the larger body of knowledge in the field. Recognising the various conceptual tools that are frequently invoked in practice can help develop a shared language for case study reporting. Research into the language of landscape architecture, such as the studies by Bowring (1997) and Napawan and colleagues (2023), can help practitioners to identify (and question) these tools. Connecting specific cases to these conceptual tools can make the learning gained from these cases more relevant to other practitioners. Conversely, using cases to reflect on the usefulness of these tools in differing contexts can help with refining them for future use and contributing to the broader knowledge base.

The question of validity

Even if conceptual tools are more explicitly identified and used within case studies, their fuzziness still begs the question of whether they have sufficient rigour and validity. Rigour can be defined broadly as:

> both an intention (to seek truth) and an approach (including providing transparency of method to facilitate critique, being systematic and thorough to test truth with open-mindedness in the pursuit of clarity and truthfulness). (Higgs et al, 2004, pp 100–101)

But criteria for rigour vary by discipline. Because of variations in what counts as rigour, peer critique becomes important as a way of 'validating knowledge by exposing it to the professional community' (ibid, p 101). Because landscape architecture knowledge comes from multiple disciplinary traditions, rigour is especially challenging to pin down, making the quality of peer review even more important (Bowring, 1999).

A profession and discipline can rely on peer review processes to judge the rigour of knowledge construction, and Deming and Swaffield (2011) have outlined key criteria for how to judge rigour in peer review. But the question of validity remains. What counts as valid procedural knowledge? The value of procedural knowledge lies in its usefulness. As Eraut (1994) comments, for the practitioner, 'nothing is valid until one has tried it and, by implication, adapted it for oneself' (p 32). The value of knowledge for practice is judged by how well it helps the practitioner achieve their goals. More generally, validity criteria for procedural knowledge can be summarised in Eraut's words, as 'what knowledge helps inform "wise judgment under conditions of considerable uncertainty"' (ibid, p 17).

It is challenging to predict what knowledge will become valuable in practice because the usefulness of knowledge depends on its mode and context of use and the inclinations of the practitioner (Eraut, 1985; Lawson, 2005). Lawson (2005) comments that the

usefulness of a mental model 'is probably more to do with … personal cognitive style, interests and preferences rather than due to some absolute correctness in the model' (pp 302–303). Eraut (1994) agrees: 'Functional relevance often relies less on presumed validity than on ability and willingness of people to use it – mainly determined by individual professionals and their work-context' (p 43).

Peter Downton (2023) suggests that research and practice make up a Janus figure, with research looking backward and practice looking forward. The same could be said for the validity of traditional academic research and the validity of procedural knowledge. To judge the validity of academic research, one looks backward, evaluating the researcher's questions, methods and procedures. But to judge the validity of procedural knowledge, one must look forward, speculating as to what might be useful in future situations of practice. There is no one point in the knowledge formation cycle where one can claim that procedural knowledge is fully verified and complete. Procedural theory is always in the process of being made and remade. Dynamic, continual debate and critique are of critical importance in keeping procedural theory relevant and valid. Discussions and evaluations (formal and informal) of conceptual tools should occur at all stages in the knowledge formation process, not just at the peer review stage.

Building procedural knowledge in landscape architecture: Recommendations

Even though procedural knowledge is constructed with fuzzy tools that one can never grasp with full certainty, we can strengthen explicit procedural knowledge in landscape architecture by paying attention to the processes of design and the language we use to describe and share those processes. Developing a repertoire, or toolkit, of commonly used models and concepts can help practitioners and researchers construct, vet and use our shared knowledge base.

General recommendations

1. In research and discussions of practice, landscape architects could focus more on describing design processes and practices rather than primarily on projects and outcomes.
2. When studying design processes, a primary focus should be on identifying the expressive language used to build procedural knowledge. Even though these tools often escape the attention of research, they are valuable for sharing and comparing practical know-how. They are also valuable tools for teaching landscape architecture.
3. The validity of these tools could be judged by asking, 'What knowledge helps inform "wise judgment under conditions of considerable uncertainty"'? (Eraut, 1994, p 17). Additionally, tracing a concept's use in differing situations over time can contribute to an estimation of its future validity.
4. At the same time, it is important to acknowledge that there are many ways to solve a design problem, and these tools are never finalised forms of knowledge. All conclusions are only suggestions for future practice.

For reflective practitioners

1. Practitioners should be explicit about the conceptual models, frames and other tools they use to explain their practice. When sharing their experiences, they should use these tools to connect their personal knowledge to existing knowledge in the field.
2. Practitioners can also reflect on the utility of existing procedural knowledge. How useful are existing maxims, models or frames? Can they be adapted to better fit specific conditions of practice? Are there better alternatives?

For research into practice

1. Researchers can study how ideas are passed from one practitioner to another. As Eraut (1994) recommends:

   > one way to develop the knowledge base of a profession would be to study [the] generalisation process, to make it more explicit so that it can be criticised and refined, and to give close attention to specifying the conditions under which any given practical principle or generalisation was held to apply. (p 121)

2. Researchers can contribute to the repertoire of conceptual tools by identifying and consolidating those already used in practice and theory. One possible method is to conduct 'frame analyses' as exemplified by the research of Crewe and Forsyth (2003). Another is to use 'genealogy', tracing how concepts are developed and refined over time, through theory or practice, or both (Foucault, 1977; Sherratt, 2006).
3. Researchers and reviewers should acknowledge and recognise that, as a suggestive form of theory, all propositions developed within procedural theory require additional validation through practice.

For organisations (firms, agencies and educational programmes)

1. Firms, offices and educational programmes are key sources of the conceptual tools used to communicate procedural knowledge. By identifying, documenting and sharing the ways they externalise tacit knowledge, these organisations could help build a collective repertoire of frequently used models, concepts and frames.

For the profession and the discipline

1. Both the profession and the discipline can work together to develop the repertoire mentioned above. Gathering these concepts and models can provide a reference for teaching, building knowledge from case studies, and other endeavours.
2. Additionally, the profession and discipline should have conversations about what is missing from the current repertoire of explicit procedural knowledge. Does the profession already have adequate shared frames of reference? Do more explicit frames need to be articulated in order to better discuss design processes? What aspects of practical experience do not yet have adequate concepts or models?
3. The discipline could develop peer review criteria for procedural knowledge that require the explicit use of reflection, theorisation and framing. Even though validity is realised through individual practice, requiring transparent reporting and explicit explanation of frames and concepts could make case study reports more relevant to future use.
4. The profession could develop programmes and events that foster a sharing of procedural knowledge across individuals and organisations. Eraut (1994) suggests that continuing education programmes can serve this function by providing 'appropriate opportunities for mid-career professional education, whereby professionals can … reflect on their experience, make it more explicit through having to share it, interpret it and recognize it as a basis for future learning' (p 21).

Conclusions

These recommendations for building more explicit procedural knowledge within landscape architecture support the argument that landscape architecture needs the 'development of a more robust theoretical language within the discipline' (Swaffield, 2006, p 16). The more explicit we are in identifying and using the concepts and models that serve as 'carriers of theoretical ideas' (Eraut, 1994, pp 49–50), the stronger our procedural knowledge will be.

In proposing a framework for understanding the formation of procedural knowledge, I hope the conceptual tools used to build this knowledge will no longer be overlooked or

undervalued. If the identification and use of these tools, along with the discussion surrounding them, become more robust within landscape architecture, our procedural knowledge will become stronger.

This presentation of procedural knowledge is also made up from the fuzzy tools of models, concepts and metaphors. Therefore, it is also suggestive in nature. It should be overlaid with and compared to other experience and knowledge. Its validity needs to be judged through use. Does it help explain the knowledge we use while designing and the knowledge we gain from designing? Will it help frame and deepen discussions about procedural knowledge? Will it spark additional models or insights?

About the author

Katherine Melcher is a professor at the University of Georgia's College of Environment and Design in the United States of America. Her research interests span landscape architecture theory and design as social action, with a special focus on participatory design and community-built places. She co-edited *Community-Built: Art, Construction, Preservation, and Place*, published by Routledge in 2017.

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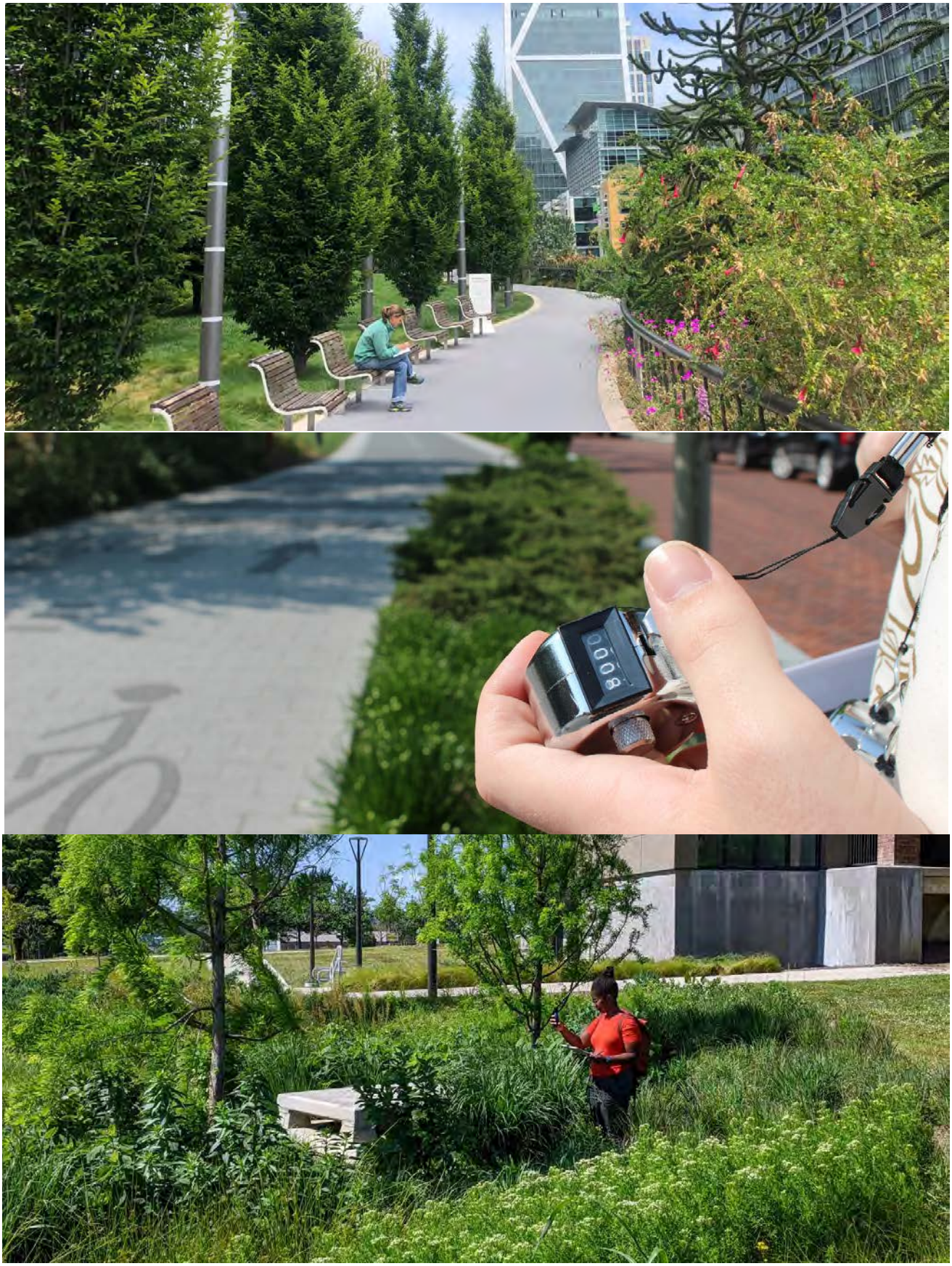

Participants in the Landscape Architecture Foundation's Case Study Investigation Program perform field evaluations of landscape performance for exemplary built projects (with permission from Landscape Architecture Foundation, created – top to bottom – 2021, 2023, 2022).

LANDSCAPE
REVIEW

Landscape performance in practice: Insights and recommendations

MEGAN BARNES

Over the past decade-plus, landscape performance has gained significant traction and grown in influence and implementation within the landscape architecture discipline. However, measuring, calculating and estimating the benefits of landscapes — not to mention incorporating landscape performance throughout a design process – can be challenging, especially for practitioners and firms working to tight timelines and budgets. This paper examines the current state of landscape performance in practice, drawing on a series of roundtable conversations between eight practitioners at US-based design firms that are integrating landscape performance into their practice. As well as discussing the definition of 'landscape performance', it provides examples of specific landscape performance activities. In concluding, the paper identifies challenges and opportunities and offers broad recommendations for strengthening the integration of landscape performance into design practice.

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Introduction

Landscape performance can be defined as a measure of the effectiveness with which landscape solutions fulfil their intended purpose and contribute to sustainability. It is a key tool for advocating for the value of sustainable landscape solutions and the work of landscape architects and designers of the built environment. It often involves the assessment of progress toward environmental, social and economic goals based on measurable outcomes.

Measurable landscape performance outcomes encompass a wide range of environmental, social and economic benefits of well-designed landscapes, including flood protection, habitat creation, air quality improvement, carbon sequestration and avoidance, mental wellness, increased safety, construction cost savings, increased revenues – and much more (Landscape Architecture Foundation, 2011). To evaluate and quantify the benefits of built landscapes, a landscape performance approach draws from the body of knowledge of many different disciplines – ranging from landscape architecture to horticulture, engineering, biology, social sciences, economics and others. However, measuring, calculating and estimating the benefits of landscapes — not to mention incorporating landscape performance throughout a design process — can be challenging, especially for firms working in a client-based practice model with tight timelines and budgets.

Launched in 2010, the Landscape Architecture Foundation's (LAF's) Landscape Performance Series (LPS) is an online portal and set of initiatives that bring together information and research about the measurable benefits of landscapes from academia, professional practice and industry. Then in 2011 LAF created its Case Study Investigation (CSI) Program to support faculty–student research teams in their work with leading practitioners to document the impacts of exemplary landscape projects, which the LPS captures as case study briefs. A major goal of CSI and the LPS is to move the landscape architecture discipline toward designing projects with specific performance objectives, documenting project goals and design intent, and routinely collecting performance data.

In 2020, at the 10-year anniversary of the Landscape Performance Series, LAF conducted a survey of email contacts to learn how practitioners were using the LPS (Landscape Architecture Foundation, 2020). While the survey showed significant progress, the mechanics of integrating landscape performance into the professional practice of landscape architecture remained somewhat unclear. So, in 2023, LAF convened a group of

practitioners for a series of online roundtable conversations to better understand how design firms are integrating landscape performance into their work.

This paper uses the term a 'landscape performance approach' several times. This term refers to an approach to a project, multiple projects or an entire practice based in the concept of landscape performance. It could include any of the following activities:

- using performance data to make the case for a project, a particular design approach, and/or the value of the work of a landscape architect within a project team
- identifying and documenting specific performance goals and objectives during the design phase
- collecting baseline data and conducting a post-occupancy evaluation
- applying lessons learned from a previous project's performance to a current project
- using performance data to combat value engineering
- communicating landscape performance to clients, communities and beyond
- using performance data to inform ongoing project maintenance and incremental adjustments.

Approach

LAF's Landscape Performance in Practice Roundtables consisted of a series of LAF-facilitated, informal roundtable conversations among a small group of landscape architecture practitioners. Practitioners from eight firms were invited to participate via email based on their leadership and/or early adoption of landscape performance in practice (see 'About the author and collaborators' for a list of participants). Criteria for selection were based on LAF's knowledge of people and firms in this space, which it had developed through its focus on landscape performance for over a decade. This method of selection is a limitation of this research as certainly additional firms and people that integrate landscape performance into their practice could have been included. However, this selection method allowed for highly targeted discussions, and the roundtable format is most effective with small numbers of participants to encourage deep engagement.

Roundtables involved both guided and open discussion and were held monthly online from February through August 2023. Discussions were framed around the following topic areas: participants' understanding of the term 'landscape performance', perceptions of how widespread (or not) landscape performance is and its importance to professional practice, what motivates participants to incorporate it in their practice and specific mechanisms they use for this, limitations to implementing landscape performance in practice and potential solutions to them, and resources and approaches they would recommend to others. Participants read several journal articles related to landscape performance topics to guide discussion. The discussion also naturally led to larger conversations about research in professional practice, and those findings are presented in an upcoming article for the US-based *Landscape Journal* (in publication).

Online meetings were recorded, which I then reviewed to extract and summarise the findings. In this paper, key themes and takeaways from the conversations shed light on the current state of landscape performance in practice among a group of leading practitioners. While I describe general trends, this does not necessarily mean that all group members endorse all of them.

Findings or insights

Varied definitions

The roundtable practitioners generally felt that the term 'landscape performance' was not clearly defined and that its meanings for practice differed. When they were asked to define the term, their responses varied (emphasis added):

> Understanding if the design is effective. **Going beyond intuition** to understand if the project is doing what the designer intended and delivering the outcome that was envisioned.
>
> The quantified impacts within our project work … **A tool to frame conversations** with clients, communities, stakeholders, etc … and align project goals with metrics. We are then able to identify **project-specific metrics** to help guide the design and measurable results.
>
> I don't have a good definition and find the term pretty **ambiguous**. I tend to relate performance to **post-occupancy evaluation**.

One key point that was discussed at length is that the concept of landscape performance may have been too closely modelled on the concept of building performance, when the two concepts are not comparable because buildings are closed systems while landscapes are open and constantly changing. As a result, before anything is even constructed, architects and engineers can estimate and understand building performance with a relatively high level of accuracy, whereas most often this is not possible for landscapes. The group suggested that perhaps landscape performance needed different grounding and theory that was more distinct from other disciplines to reflect the dynamic nature of landscape systems.

Significant discussion revolved around conflicting ideas of landscape performance that are either complementary or antithetical to ideas of aesthetics and art – which are an essential aspect of the work of landscape architects. A useful analogy explored by the group likened landscape performance to an athletic performance. Each has some key metrics that illustrate the technical aspects of the performance but do not capture the whole or take away from the artistry and skill involved. Such metrics might be respectively, for example, water savings, temperature reduction and improved health outcomes; or shoe size, batting average and number of tickets sold. But beyond those metrics, in both, the larger product – visiting a beautiful park or attending an all-star game – is greater than the sum of its parts. Landscape performance metrics could be thought of as 'stats' that support a larger artistic product.

Additionally, the benefits that well-designed landscapes provide can go far beyond what most people outside the discipline of landscape architecture would consider to be 'landscape'; the group felt that perhaps using the term limits the public's understanding of the capabilities of landscape solutions and the work of landscape architects. With clients, participants observed it was sometimes more impactful to use terms like 'value', 'impact' or 'nature-based solutions' as an alternative to landscape performance, although each of those terms has its own associations that may not be appropriate for all situations.

Why landscape performance?

According to group discussions, the motivations for taking a landscape performance approach can include:

- learning and improving practice
- creating new knowledge for the discipline
- marketing and bringing more work to landscape architects
- communicating value and return on investment to clients, communities and project teams
- speaking to those outside the discipline about the benefits of landscape solutions
- showing measurable progress on bigger issues; for example, well-designed landscapes can support climate goals, but performance metrics allow designers to convey specifically how their projects contribute to solutions.

Generally the aspect of landscape performance that resonated most with roundtable participants was its role in creating new knowledge and improving practice. However, the group also felt that some of the motivations for landscape performance reinforce inherent tensions or areas of conflict for the discipline. Table 1 outlines some of these potential tensions or conflicts.

Table 1. Areas of potential conflict inherent in landscape performance

Focus or aim	Potentially conflicting focus or aim
'Selling' work to clients	Being curious and self-critical, with the desire to create positive environmental or social outcomes even if the client does not specifically request them
Implementing the values, intentions and aims of the firm and/or client	Focusing on the process, function and real-world outcomes of the landscape
Capturing and conveying the benefits and value of an individual firm's project work	Understanding how landscape supports environmental and societal needs more broadly
Using performance data for communication and marketing, which can make conveying nuances difficult	Using research methodologies that carry their own limitations
Recognising landscape performance as integral to professional work	Working within typical fee and project structures that force landscape performance to be categorised as 'extra'

Integration in practice

Generally roundtable participants recognised that landscape performance is very important to incorporate in their practice, but they felt it was challenging to do so (see 'Challenges and opportunities' below). No practitioners reported integrating landscape performance into all their projects, and only one described integrating it into their firm's practice in a methodical way. Participants pursued landscape performance activities intentionally but mostly in an ad hoc, opportunistic manner. Activities they mentioned, from the most common to least common, were:

- participating in LAF's CSI Program to do post-occupancy evaluation for one or more projects in partnership with academics, and applying findings to future projects
- using the resources in the LPS to collect baseline data for certain projects or make the case for a specific approach or design decision
- working directly with university faculty and students to do baseline or post-occupancy evaluations
- engaging with allied disciplines to pursue research studies that yield insights on landscape performance
- engaging in activities related to landscape performance, like baseline data collection and post-occupancy evaluation, based on the interest and curiosity of individual staff
- talking to clients about goals in a specific and structured way that gives clear direction for baseline data collection and post-occupancy evaluation
- building testing and validation into their design process, including by writing it into the scope of work for proposals
- pursuing SITES certification (US Green Building Council, 2024) for a project
- engaging in performance analyses that are not site-specific to generate findings that are applicable to many sites and a broader context
- engaging in site commissioning-based projects, which require verifying performance in real time
- training new staff with landscape performance protocols for 'blitz' data collection.

Challenges and opportunities

Often, the most impassioned dialogue around landscape performance in practice surrounds challenges, so it makes sense to describe the most common barriers that the group noted during its discussion. However, the group also discussed many ways to confront these barriers with creative approaches. Therefore, each challenge presented here is followed by the opportunity it offers.

1. **Limited resources**: As much as landscape performance should be integral to every project, it requires remuneration. Participants felt that pre- and post-occupancy evaluations in particular need a 'runway' of time before and after a project, which necessitates extra funding. A typical project is more likely to follow a 'helicopter' model, with a tight timeline and no runway. Even if it is possible to carve out some time before and after a project, the time scale needed for some types of performance evaluation is still much longer than the usual client and construction timelines.

   Opportunity: Participants felt that instead of pursuing a landscape performance approach on all projects, it may be sufficient to employ a philanthropic and partnership-based model that relies on external funding and collaboration with academics and beyond. If the right projects are evaluated and findings captured effectively, even a limited number of evaluations can generate replicable knowledge that does not rely on convincing clients to fund it or on absorbing it within a firm's overhead expenses.

   Innovative projects where firms are testing something new may be the most important to evaluate. Other opportunities for funding may be available for specific project types: major philanthropic funders are increasingly looking to fund community-led projects; landscape architects working closely with communities may be able to access grant funding to evaluate the impacts of a project on those communities. Partnering with academics who operate outside of project cycles and have different funding sources introduces a time scale that supports more rigorous, long-term evaluation.

2. **Lack of client support**: Participants reported that some clients are not open to landscape performance approaches. For example, clients may not be supportive of a firm collecting data on their project or they may not be responsive to the use of metrics to make the case for a design. Some clients hire landscape architects for their aesthetic capabilities and artistry only.

   Opportunity: Participants felt that institutional clients with long-term vision who are stewards of their properties (for example, university campuses and public gardens) are typically more interested in the environmental and social benefits that their properties can offer than developers, who may intend to sell a property in a shorter timeframe. Showing clients that assessing performance and adjusting for real-world conditions saves money and improves performance can be another way of gaining client support. The US General Services Administration (2017), a highly institutional government organisation, has been a leader in this approach through its promotion of site commissioning.

3. **Difficulty integrating into day-to-day practice**: Performance can only be consistently top-of-mind if it is a key feature of the tools used in the design process. Participants reported that digital landscape performance modelling and measurement tools are currently limited within the suite of tools used in professional offices (for example, AutoCAD, Rhino). Additionally, even when landscape performance evaluation is done, the knowledge gained is not always systematically applied to future projects.

   Opportunity: I note that some products and tools are increasingly beginning to include site and landscape performance modelling capabilities, most notably for carbon and temperature (for example, Autodesk, 2024), alongside modelling originally developed just for architectural applications. The broader question of how

landscape performance knowledge might be systematically applied within a typical firm's processes and systems may be of interest to researchers, as it certainly merits further exploration.

4. **The intangible value of design**: Landscape architects have always balanced art and design with scientific principles. Roundtable participants acknowledged the discipline's discomfort with metrics, which could possibly lead designers to perceive landscape performance as reducing their work to numbers, while they overlook its experiential and intangible value. One participant noted that landscape performance is not for everyone, as it sometimes requires removing one's 'designer hat'.

   Opportunity: Roundtable participants acknowledged that landscape performance is an addition to, rather than a replacement for, the less tangible and measurable aesthetic and experiential value generated by the work of landscape architects. The misconception of landscape performance as being in conflict with the more elevated aspects of a landscape architect's work can be addressed through education and dialogue.

5. **Questions of rigour and expertise**: Roundtable participants felt that landscape performance can be daunting to designers and other staff at firms who are not always trained in research methods. Even where funding and the will exist, as roundtable participants discussed, it can be difficult to hire staff with expertise in landscape performance. Conversely, the need to be seen as the expert can be limiting to performance evaluation: when clients hire designers, they assume the designers are the experts, so it can be difficult to explain to clients that a design firm might need to learn more.

   Opportunity: Participants noted that the continuing education requirements often associated with professional licensing for landscape architects could be a key mechanism for training more practitioners in landscape performance basics. Designers should resist claiming to be able to measure everything and should understand that performance evaluation done in practice will not necessarily match academic standards, and nor does it need to. The group also touched on the significant value of having vetted examples, particularly through LAF's LPS case studies, which are industry-wide and cover varied geographies, firms and project types.

6. **Limitations of metrics and methods**: All methods and metrics have limitations. Roundtable participants noted that some tools are borrowed from other disciplines, and it is risky for landscape architects to use tools and methods in ways that differ greatly from how they were intended to be used.

   Opportunity: I note that academia has an essential role to play in testing and critiquing metrics and methods, through LAF's CSI Program and beyond. As long as academics remain involved, tools will continue to be refined and new metrics and methods identified. An important aspect of this work is engaging with other disciplines to fully understand and properly use their methods in the landscape architecture context.

7. **The role of maintenance**: A lot of performance happens after a designer 'hands over the keys' to a client. Participants noted that the ongoing performance of any landscape is limited by the contractual aspect and heavily affected by ongoing maintenance and stewardship.

   Opportunity: Participants felt that a landscape performance approach may be most appropriate for projects and clients where relationships are longer term and continue beyond a project timeline. For example, an ideal situation might be where a designer not only creates a maintenance plan but also continues to be involved in managing the site over time.

8. **The big picture**: The conversation touched on some larger issues without exploring them in detail. First, perceptions of which benefits are provided by a landscape vary based on whose perspective is represented: who determines what is 'high performing'

for any given landscape? This is particularly relevant for questions of generating economic value that may benefit one group over another, and the complexities of gentrification. A second big-picture consideration is the idea of vulnerability: experimentation and performance evaluation inherently include the possibility of discovering that projects are not functioning as intended, which can be daunting or even deeply concerning.

Opportunity: I note that dialogue surrounding these issues – either within a project team, or among project evaluators for those doing a post-occupancy evaluation – can be extremely fruitful at any stage of a project that takes a landscape performance approach. A firm that is focused on improving its practice over time should look at landscape performance as an opportunity, not a hindrance.

Implications

Landscape performance continues to evolve as it integrates across academia, practice and beyond. To date, the relatively small number of public or institutional projects undertaken by the firms participating in the roundtable conversations is not sufficient for the profession to make a significant impact in key priority areas like climate, biodiversity, equity and inclusion. Residential landscape architects and others working at scale could be even more important contributors to these larger goals with a performance-focused approach.

Academia already plays a role in the integration of landscape performance into practice by generating new knowledge, metrics and methods for evaluation; assessing real-world projects; and producing tools and methodologies that firms can use in-house. Academics are poised to play an even larger role as their reciprocal relationship with practice continues to grow and to be uniquely well-supported by landscape performance research.

Landscape performance, in both professional practice and academia, has significant room to grow at a global scale. Most participants in LAF's CSI Program come from within North America, while some come from Asia, Oceania and Africa (Landscape Architecture Foundation, 2024). More recent initiatives, like the Landscape Foundation of Australia's (2023) Landscape Performance Case Studies Program, are admirable efforts that promote a landscape performance framework in new areas of the globe.

Future research directions in landscape performance in general are limitless due to the broad nature of the concept. There is much more to learn about how our designed landscapes are performing and whether designers are achieving the outcomes that are expected and needed in a changing world. The roundtable conversations revealed several areas for further study that apply specifically to professional practice. How can landscape performance estimations and projections be better incorporated into the design tools used most commonly in professional practice? Which benefits and metrics are most important and needed in practice? How can partnerships between academia and practice be more effectively leveraged to further landscape performance in practice? How can performance findings from previous projects be more efficiently applied to future projects?

Ultimately the roundtable conversations revealed how far things have come in the decade-plus of LAF's work in landscape performance, as well as bountiful opportunities for increased integration of landscape performance in professional practice.[1]

[1] For more on landscape performance, consult LAF's Landscape Performance Series at https://www.landscapeperformance.org/ and the Case Study Investigation Program at https://www.lafoundation.org/.

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Barangaroo Reserve, Sydney Harbour (with permission from Noel Corkery, July 2019).

LANDSCAPE REVIEW

Connecting research with practice: Assessing landscape performance in the Australian context

LINDA CORKERY

Landscape architecture professionals are often required to provide 'evidence' of how their completed projects perform over time. However, few practitioners have the time or funds to carry out formal post-construction evaluations of their projects. Using a case study approach to methodically describe and assess landscape architecture projects is a way to systematically record project information and build a knowledge base about the design, construction and performance of the project. The work of Francis (2001) was foundational to the development of the Landscape Architecture Foundation's Case Study Investigation (CSI) Program, launched in 2010 with the aim of assessing landscape performance through the lens of sustainability. The recently established Landscape Foundation of Australia is adapting the CSI Program for the Australian context. This paper briefly traces the development of the case study method for documenting and assessing landscape performance, and how the Australian version is extending the original research-practice CSI model.

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Introduction

In current practice, landscape professionals are often required to provide 'evidence' of how their constructed projects perform over time. However, few practices can allocate the time and funds, or have the in-house expertise of data collection methods, to carry out formal post-construction evaluations of their projects. It is rare for a client to include project fees for post-occupancy evaluations (POEs), although this kind of research is useful to generate valid, defensible assessments. The benefits of evaluating landscape architecture projects lie in the prospect of achieving better outcomes for future projects and promoting the leading work of landscape architects who are designing sustainable solutions.

Over the past 25 years, the Landscape Architecture Foundation (LAF) in the United States has facilitated the development of a programme that funds research teams in which academics join with practitioners to assess the landscape performance of constructed projects. The goal of LAF's Landscape Performance Series (LPS) and the Case Study Investigation (CSI) Program is to generate quantitative evidence, using a variety of research methods and metrics, on how landscape architecture projects are contributing to more sustainable outcomes. The results are shared in Case Study Briefs that are catalogued on the LPS database. A similar research programme, modelled on LAF's CSI Program, has been initiated in 2024 with Australian academics and practitioners and is supported by the Landscape Foundation of Australia (LFA).

This paper briefly traces the development of the case study method for documenting landscape architecture projects and addresses POE as an effective methodology for assessing landscape performance. Finally, in view of the introduction of the CSI Program to Australia, the discussion turns to how this LAF model is being adapted to the Australian context.

KEY WORDS
case study; research; practice; post-occupancy evaluation; landscape performance

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Case studies for landscape architecture

The interest in creating a case study method for landscape architecture was initiated by the LAF in the United States. In 1997, LAF commissioned Professor Mark Francis to develop a methodology to 'improve the level of practice and scholarship in landscape architecture' (Francis, 2001, p 15). His work drew on the extensive scholarship of case study knowledge, particularly in the social sciences, to design a methodology that could be applied specifically to landscape architectural projects (Francis, 2019, p 5).

At the outset of his work, Francis (2001) offered this definition for a landscape architecture case study:

> A case study is a well-documented and systematic examination of the process, decision-making and outcomes of a project which is undertaken for the purpose of informing future practice, policy, theory, and/or education. (p 16)

Francis saw the case study approach as a relevant scholarly endeavour for academic researchers, as well as a process that would benefit professionals by building a knowledge base to underpin the design and construction of projects, and inform their ongoing management. Shortly after the publication of his final report, LAF engaged him to demonstrate the application of the case study approach through a series of monographs, titled the Land and Community Design Case Study book series.

Canadian academics Brown and Corry, writing in 2011 without reference to either Francis' original work or the LAF book series, commented that a 'culture of non-reporting' seemed to exist in the discipline and profession of landscape architecture:

> There are very few articles in scholarly literature that evaluate the effectiveness of completed projects. Built landscapes are seldom tested or monitored to see if they achieved their stated objectives, and thus are repeated with remarkable and embarrassing efficiency. (Brown and Corry, 2011, p 327)

In their view, there had been too many 'missed opportunities to further the documented evidence that could support better-informed design' (ibid). Brown and Corry thought landscape architectural practice needed to be based on facts rather than on design theories or beliefs, and that little factual information was available for design decision-making. They advocated for 'evidence-based landscape architecture', defining that as 'the deliberate and explicit use of scholarly evidence in making decisions about the use and shaping of land'. They further called on landscape architecture academics to generate more research and peer-reviewed publications to 'inform decision making and communicate it to practitioners in a way that can be readily applied' (ibid, pp 327–328).

What Brown and Corry were promoting, and what Deming and Swaffield also encouraged in their work, was the use of case studies as a research method. In their co-authored book, *Landscape Architectural Research*: *Inquiry, Strategy, Design*, Deming and Swaffield (2011) include a chapter on 'Research and practice' in which they note 'Professional practice constitutes a (mostly) untapped research capacity of enormous potential value for the discipline' (p 237). They encourage academics 'to more systematically connect the research activity of universities with professional practice, and to better connect scholarly practitioners with a wider research community and enterprise' (ibid). They echo Brown and Corry's call for evidence-based practice grounded in empirical data, and would have been aware of LAF's emerging CSI Program for research, as Deming worked closely with LAF in its development (Landscape Architecture Foundation, 2024, p 2).

Case studies continue to be considered an effective research method for analysing the complexity of designed and constructed landscapes. For example, Swaffield's (2017) later writing on case studies supports their use as research tools rather than primarily for education purposes or as project exemplars. He specifically points to the growing record of case studies compiled in LAF's LPS database. He contends that for academic researchers, this archive could 'open up rich lines of case-based research involving research through design, cases as possibilities, learning from mistakes, and identifying the most effective design strategies' (Swaffield, 2017, p 117).

Post-occupancy evaluation and landscape performance

The POE research methodology originated in the 1970s, when it focused on the assessment of completed buildings and interior spaces to determine how well they were meeting the needs of their occupants after a period of use (Chen, Bowring and Davis, 2023a). In

subsequent years, POE methods were adapted to enable evaluations of landscape architecture projects, particularly those designed for human use such as public plazas, parks, playgrounds and residential developments. POEs were considered appropriate for generating case studies of completed landscape and planning projects that should be more frequently used (Deming and Swaffield, 2011). Many of the early POEs on landscape architecture projects, however, were not conducted by landscape architects, as this approach was based in the social sciences, more familiar to researchers in areas such as human geography, environmental psychology, and sociology (Lenzholzer, van den Brink and Duchhart, 2017, p 55).

In their investigation of definitions and forms of POEs for landscape architecture projects, Chen and colleagues (2023a) expose ambiguities inherent in a broad research methodology that evolved from the assessment of building design. They examined 46 case studies to identify and compare definitions of POEs from different disciplinary perspectives and found that POEs had both a wide range of definitions and varied methods for carrying them out. It is important, they concluded, that academics and practitioners acknowledge POE as a dynamic and evolving concept, which means they need to keep up to date with changes to POE research methods (ibid, p 20).

An associated issue that Chen, Bowring and Davis (2021) investigated is what the barriers and enablers are to carrying out 'performance evaluation'. From their examination of 41 cases related to landscape architecture projects in New Zealand, they confirmed that positive reasons for doing landscape performance evaluations, particularly in relation to ascertaining how projects are meeting sustainability goals, are that these evaluations:

- generate verified knowledge and help expand the body of knowledge for the profession
- help practitioners understand how their project designs perform and function for their intended use, which can influence future design approaches
- can uncover problems that need to be addressed, such as site management regimes, repairs, or fine-tuning of the site design so that it is safe to use and has improved function
- provide rigorous information to help practitioners communicate more effectively about the value of their work to decision-makers and the general public (ibid, pp 140–141).

However, Chen and colleagues (2021) found two main issues make it more difficult for practices to carry out POEs to assess landscape performance: the possibility of receiving a negative review and the lack of funds to underwrite the process. In reporting on this study, the authors discuss how the LAF, as a not-for-profit organisation, presents a programme model to address both of these issues in two ways. First, it focuses on the 'benefits' to be revealed from assessing high-performing landscape architecture projects. Second, it provides funding to teams of experienced academic researchers who can work with practices in undertaking POEs (ibid, p 151). With LAF's CSI Program now well established, the LFA is introducing an adaptation of it in Australia. The following sections briefly outline some of the operational aspects of the two programmes.

LAF: Landscape Performance Series and Case Study Investigation Program

The US-based LAF, a not-for-profit organisation founded in 1966, works to expand the influence of landscape architects through its scholarship and fellowship awards programmes that promote and support landscape architects during their studies and in their professional careers (Landscape Architecture Foundation, nd-b). In 2010, at about the same time as the publications described above were being written, LAF was testing its new CSI Program. A team of LAF staff members worked with PWP Landscape Architects to assess the landscape performance of one of PWP's recent award-winning projects: the Sydney Olympic Millenium Parklands in Australia. The resulting case study brief and methods report were created using the new programme structure and processes to assemble the baseline project information, conduct the research, and apply the metrics

and calculations to produce a performance assessment. (For the results of that pilot, see Landscape Architecture Foundation, 2010.) In 2011, the CSI Program was again piloted in a summer programme with 10 academic–student research teams. The 2012 CSI Program paired academic teams with design practices and their projects, which is the structure that continues currently.

LAF defines the term 'landscape performance' as 'a measure of the effectiveness with which landscape solutions fulfil their intended purpose and contribute toward achieving sustainability' (Canfield, Yang and Whitlow, 2018, p 1). One focus is on presenting the research findings and metrics so they are accessible and can be understood by a wide range of decision-makers. In this way, the CSI Program seeks to 'bridge the knowledge gap in the design, development, and policy realms about the importance of landscape solutions' (Landscape Architecture Foundation, 2020, p 1).

The CSI research model is unique in that it pairs academic research teams with practitioners in a design practice to assess one of the practice's completed projects that is considered to be 'high performing'. The assessment is structured to identify and quantify the environmental, social and economic benefits of this project and to document it in a case study brief and a methods report. The academic team comprises a research fellow, who is a full-time academic, and a student research assistant, often a master's-level student. The research fellow receives a stipend to allocate to their research assistant who, in turn, receives research training throughout the process. The academic team coordinates with a representative from the design practice, who is often someone who has been a lead designer on the project.

In a CSI project, the initial deliverables provide the baseline for the analysis of the project. Together, the academic team and design practitioner identify the key physical aspects of the project's design and confirm the goals the project is intended to achieve. The practitioner provides detailed information and documentation on the project, such as site analysis, design drawings, reports, and 'before' and 'after' photos. They also outline the client's goals for the project, including specific benefits the project intended to deliver and the features included to realise those benefits. The designer articulates the project 'narrative' or story, and explains to the research team how their site design and specific features have evolved to convey the narrative.

With this comprehensive understanding of the project, the academic team determines which benefits to assess and what methods they will use to measure and validate the project's performance (figure 1). The selection of metrics and research methods to use in assessing a project's landscape performance is a significant decision point in the assessment process. The team also outlines the client's goals for the project, including specific benefits the project intended to deliver and the features included to realise those benefits. The designer articulates the project 'narrative' or story, and explains to the research team how their site design and specific features have evolved to convey that narrative. As Bowring (2020) notes:

> being critically aware of how the values have bene established and how they might be recognized is important. Treating a set of requirements as boxes to be ticked can overlook more holistic aspects of design quality, and even have unintended consequences. (p 128)

LAF's *Evaluating Landscape Performance* (Canfield et al, 2018) is a key reference at this point in the process. This guidebook was compiled to be a primer that readers from a range of backgrounds could use to assess the performance of constructed landscape projects. It presents a total of 33 benefit categories organised under one of the three sustainability areas: environmental, social or economic. Since its publication, 32 additional tools and calculators have been added to the LPS website in a benefits toolkit (figure 1). Examples of these tools are Pathfinder: Landscape Carbon Calculator, iNaturalist, i-Tree Streets and i-Tree Eco, the Gehl Institute's Public Life Diversity Toolkit. This resource will continue to expand over time as new tools are developed.

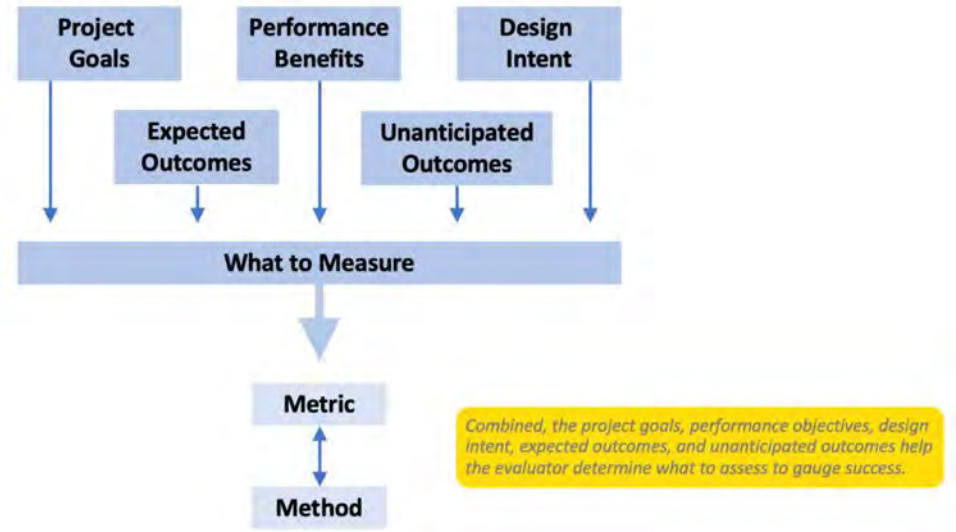

Figure 1. A number of factors contribute to a decision as to what aspects of the project to measure and which metrics and methods to use to calculate the benefits delivered by the project (with permission from Linden Crane).

Because this approach presents a series of key metrics for the sustainability outcomes of the project and documents how those metrics were arrived at, non-experts can replicate it on other projects with limited resources and short timeframes. The case study brief and methods report comprise a 'snapshot in time' in that they present the findings of two to three months of field research of the completed project – which, typically, happens two to five years post-construction. Before the documents are published on the LPS platform, experts in the field peer-review them to assess the validity and quality of work.

The CSI Program is now in its fourteenth year of operation. Close to 200 case study briefs and accompanying methods reports are catalogued on a fully searchable database of the LPS platform. This extensive resource is publicly accessible and is consulted by design practitioners, students, researchers and policy-makers to locate examples of sustainable landscape solutions that have been validated through the CSI process and provide evidence to support their claims of sustainability. Recognising its significance, the American Society of Landscape Architects (2015) presented LAF with an Award of Excellence in Communications for the LPS and an Honor Award in Research for the CSI Program. The jury's commendation for the LPS award states, 'It's a living document essential to our profession' (Landscape Architecture Foundation, 2015).

Between 2017 and 2022, five teams of Australian academics and student researchers participated in LAF's CSI Program, assessing eight projects. The 2021 cohort of CSI teams included an academic team from Lincoln University working with a New Zealand practice. University of New South Wales landscape architecture academics, including myself, undertook two of the 2020 CSI projects (table 1).

LFA: Landscape Performance Case Studies Program

Established in 2021, the Landscape Foundation of Australia is a not-for-profit organisation with the purpose of protecting, restoring and sustainably managing urban landscapes and natural environments of Australian cities and towns (Landscape Foundation of Australia, nd). Its three strategic priorities are:

- investing in knowledge-funding fellowships and research on landscape performance, and training to build capacities and skills
- enabling communities – working with community organisations and other not-for-profits, coordinating volunteer programmes and achieving local impact
- valuing nature – advocating for and influencing policy, such as in legislation and for instituting new accounting systems that incorporate natural asset management.

The first of these priorities is of particular relevance to this discussion.

Table 1. Australian projects undertaken in LAF's Case Studies Investigation Program

Year	Project	Research fellow(s)	Research assistant	Practice
2010	Sydney Olympic Millennium Parklands	LAF staff[1]	Not applicable	PWP Landscape Architecture and Bruce Mackenzie Design
2017	Barangaroo Reserve, Sydney	Simon Kilbane, Andrew Toland, UTS	Kane Pham, PhD candidate, UTS	PWP Landscape Architecture
2017	The Goods Line, Ultimo	Simon Kilbane, Andrew Toland, UTS	Kane Pham, PhD candidate, UTS	ASPECT Studios
2019	Ballast Point Park, Sydney	Simon Kilbane, Andrew Toland, UTS	Kane Pham, PhD candidate, UTS	McGregor Coxall Landscape Architects
2020	South Eveleigh Community Rooftop Garden	Linda Corkery, Sara Padgett Kjaersgaard, UNSW	Lisa Thomson, MPhil candidate, UNSW	Jiwah Design/Clarence Slockee
2020	Sydney Park Water Re-use Project	Catherine Evans, Linda Corkery, Sara Padgett Kjaersgaard, UNSW	Lei Zheng, MLArch student, UNSW	Turf Design Studio/ Environmental Partnership
2021	Bendigo Hospital	Bridget Keane, RMIT University	Peter Grant, MLArch student, RMIT University	Oculus Landscape Architects
2022	Summerland Peninsula Master Plan and Visitor Centre Precinct	Sidh Sintusingha, University of Melbourne	Jalida Salma, MLArch student, University of Melbourne	Tract Consultants

1 LAF staff carried out this initial case study in Sydney as a pilot project before the CSI Program was officially launched.
UNSW = University of New South Wales; UTS = University of Technology Sydney

The impetus for LFA to develop a CSI-type programme was similar to that for LAF. In Australia, as in the United States, there is demand for landscape performance to be verified and for evidence to be provided on how landscape projects perform over time. Equally, when projects do not perform as intended, many would like to have the information required to improve the design and implementation of later projects.

The Australian academics and practices who participated in LAF's CSI Program could see the value of producing credible metrics about project performance and were enthusiastic for a CSI model to be introduced in Australia. Having been through the CSI process of researching, assessing and preparing case studies, LFA had a group of experienced academics to draw on for support in creating the Landscape Performance Case Studies (LPCS) Program.

With the assistance of LAF, the LPCS Program was developed and has been launched in 2024. LFA and LAF have a memorandum of understanding through which LAF has provided advice on developing, implementing and managing the Australian LPCS Program. LAF's support includes providing access to its recorded training webinars and giving LFA permission to use the case study brief format to document the projects that are assessed in its programme. Both foundations see the advantage of this collaboration as a way of growing their individual capacities and organisational reach in sharing resources, experience and knowledge.

Similar to the CSI Program structure, the LPCS Program team has an academic research team leader, who receives a stipend to allocate to their research assistant(s). An additional amount is available to involve the Indigenous project consultant. The academic team coordinates with a person from the design practice, such as a lead designer on the project.

The training materials and resources currently available to LFA for conducting the LPCS Program include LAF's guidebook (Canfield et al, 2018), CSI Program Handbook, and pre-recorded training webinars that provide orientation and training for participants at the early stage of the Program. While LPCS teams are referred to this resource and the Benefits Toolkit, as the LPCS Program evolves LFA aims to collate similar Australia-specific resources, including regional project examples and assessment tools. LFA also intends to establish a database and knowledge portal comparable to the LPS platform.

Figure 2. The RMIT University team is assessing the benefits that have been realised in creating a new open space on structure when a below-grade carpark was added at Monash University (with permission from Drew Echberg, March 2021).

The first round of the LPCS Program is underway with two projects and teams.

- **Monash University** – Caulfield East, Victoria
  Project: Southern Precinct Landscape (figure 2)
  Academic lead: Professor Jock Gilbert, RMIT University
  Student assistants: Anna Durkin and Jasjit Banga, both PhD students
  Practice: ASPECT Studios
- **Curtin University** – Perth, Western Australia
  Project: Exchange Precinct Stage One Public Realm (figure 3)
  Academic Lead: Professor Peter Newman, Curtin University Sustainability Policy Institute (CUSP)
  Student assistant: Issana Burhan, PhD student
  Practice: REALMstudios

The developing LPCS Program

While the LPCS Program follows the CSI Program closely in structure, intent and outcomes, it has made a number of changes in response to the Australian context. These include changes to two operational aspects – project eligibility and programme length – and, more significantly, the addition of cultural sustainability as a fourth assessment category.

Project eligibility

In the LAF's CSI Program, projects are eligible to be evaluated if they have been completed and operating for at least one year. In the LPCS Program, proposed projects must have been completed and operating for at least two years post-construction by the time the Program assessment begins. The reason for this time lag is that, typically, projects have a 12-month period after practical completion when the landscape contractor continues to

maintain the soft landscape works. Once that contractual obligation has concluded, the ongoing management of the site is turned over to the owner/client.

LPCS Program length

The LPCS Program is scheduled to be undertaken over a nine-month timeframe, about two months longer than the CSI Program. LAF's 2025 Program, for example, will run from January through July. In contrast, the LPCS Program begins in February and runs through to October, which aligns with Australian university calendars and allows the teams more time for their field work and data analysis. Another implication of this schedule is that the project runs through the southern hemisphere's winter months, which in turn has an impact on which data collection methods will be most effective, particularly in terms of site use during the cooler months of the year.

Cultural sustainability as a fourth category

LAF's guidebook lists 'cultural preservation' as one of the 10 social benefits to consider. It defines this benefit as 'retaining or restoring culturally significant features, areas, practices, or views' (Canfield et al, 2018, p 51). Assessing cultural benefits requires a sensitive approach to gathering evidence of tangible benefits. In the early stages of developing the CSI Program, Deming produced three case studies to address this issue. Discussing these in a subsequent *Landscape Record* paper, Deming (2014) comments on the CSI Program's focus on measuring performance benefits of the projects and providing metrics: 'There are significant differences, however, between the work of measuring geo-physical factors and that of socio-cultural factors.' Further, she notes:

> Wherever intangibility is a factor in research, it can pose special intellectual and practical research challenges that demand creativity and subtlety in response … However, this should not be construed to mean intangible benefits are not critically important to … the values of sustainability. (ibid, p 105)

It follows that the LPCS Program has added cultural sustainability as a fourth category to assess. This specifically relates to the 'Connecting with Country' protocols (Government Architects New South Wales, 2023) that are integral to landscape architecture projects in Australia. All case studies generated in the LPCS Program will document how 'Connecting with Country' protocols have been incorporated into the project's processes from its inception, into site design and/or into design of specific features, through to its implementation and ongoing management. The involvement of Indigenous knowledge holders and communities throughout the project will be documented, as will their engagement with the site after project realisation, and their perceptions of the benefits that have arisen and can be extended forward.

The development of a 'method' for assessing this particular dimension of cultural sustainability for Australian projects will necessarily be specific to each site and project. LFA is collaborating with Indigenous consultants and landscape architecture academics with expertise in working with traditional knowledge holders and community, to identify effective and respectful ways of carrying out post-construction evaluation and generating meaningful reflections.

Figure 3. The forecourt to the Curtin University School of Design and Built Environment shows how the landscape design interprets the 'Living Knowledge Stream', a central feature of the Exchange Precinct's project narrative.

Evaluating the LPCS Program

At the conclusion of each iteration of the LPCS Program, LFA will evaluate how it ran during that year. The annual review will primarily focus on the operations of the Program and get feedback from the academics, student research assistants, design practice partners, Indigenous cultural advisors, and project clients directly involved with assessing a specific project. It will also seek feedback from LAF colleagues on the outcomes of the LPCS team's work.

The aim of the annual reviews is to verify that the LPCS Program is being well administered, that teams are receiving adequate support and guidance, and that the research methods, data collected and findings of the research are well documented and accurately assessed. The deliverables generated through the LPCS Program have the potential to be included as a case study brief in the LPS database.

Once the LPCS Program has assembled a body of case studies, a larger and more formal review will be conducted to ascertain if and/or how it is having an impact. External reviewers for a broader evaluation would include colleagues from academia and practice in related built environment disciplines; project clients; and relevant policy-makers from state and/or local government. Future scholarly investigation of the collection of LPCS case studies could be undertaken, building on the structures and research questions of the studies conducted by Chen and colleagues (2021, 2023a, 2023b). The results would provide a valuable comparison between the Australian and New Zealand contexts, as well as case studies produced in the CSI Program.

Conclusions

This paper has briefly traced the development of the case study methodology for documenting and assessing landscape performance over the past 25 years. The early work of Mark Francis underpinned the initial development and ongoing refinement of the LAF's CSI Program, which extended the case study approach by evaluating the outcomes of landscape performance to assess if and how the benefits delivered by constructed projects contribute to environmental, social and economic sustainability goals. The LFA is in its first year of adapting the CSI research–practice model to assess landscape performance in the Australian context and introduce it to academic researchers and professional practices.

It is becoming apparent that one of the strengths of the LPCS Program is that mutual learning can develop between the academic team and the design practice through the course of the project. The ability to report measurable and verified data about the sustainability benefits delivered by landscape projects will strengthen landscape architects' advocacy for applying proven design approaches and trialling innovative design features. For the student research assistants, this is a unique opportunity to learn and apply research methods in analysing and measuring the sustainability benefits delivered in completed landscape projects.

In addition, opportunities for mutual learning will emerge between LAF and LFA as the LPCS Program evolves in Australia. In the spirit of continual improvement and sharing knowledge, the collaboration between the two foundations has the potential to widely extend the benefits of the landscape performance assessment model to practitioners and academics in new locations.

About the author

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Bendigo Hospital therapeutic garden from above (with permission from Mark Laririt, 2019).

LANDSCAPE REVIEW

Interpreting value: Bendigo Hospital Case Study

Bridget Keane, Peter Grant and Claire Martin

Landscape measurement approaches offer important ways to determine and disseminate project performance. However, varied conceptions of performance highlight subtle differences in underlying values and expectations. By providing a multi-perspective, structured reflection on the Bendigo Hospital Case Study across the collaborators – practitioner, student and academic – this paper opens a space for discussion that allows comparison, overlap and divergent positions to emerge. Aligned themes of 'methodology', 'complexity' and 'timing' provide a common ground for discussion. Collectively, we offer insights and suggestions to contribute towards the future development of landscape performance studies.

Introduction

Landscape projects are diverse in scale, type and impact. Each project can perform many functions and result in a range of benefits across dimensions within and beyond site boundaries. This complexity is seen as fundamental to the profession of landscape architecture. Yet the integrative nature of design does not always lend itself to easy categorisation or clear articulation of the benefits for specific audiences. An evident need exists for rigorous and replicable processes to evaluate the performance of landscape architectural projects that can be of use to the profession, individual practices, clients and the wider community, particularly in the context of climate crisis. Although this type of analysis is important, the caveat is that it does not operate in isolation. Instead, this analysis could be understood in parallel to other means of discussing and disseminating project ideas and design approaches.

The US-based Landscape Architecture Foundation (LAF) initiated the Case Study Investigation (CSI) Program in 2010. Since then, the Program has acted as a primary conduit for the development of approaches to performance measures in landscape architecture. The funding and support available through the case study framework enable the evaluation of landscape architecture projects, measuring distinct types of performance. The aims and outcomes of the CSI Program are manifold – to inform future practice, create precedent, serve as a training module, and develop collaborations across academia and practice (Landscape Architecture Foundation, 2024a). Responses to it include reflection from academic researchers (Canfield and Yang, 2014), surveying the field and identifying 'major players' (Yang, 2019) and outlining barriers and enablers (Chen, Bowring and Davis, 2021).

All of these responses provide important knowledge about the value of the CSI Program and its approach. As an alternative tactic, this paper uses a reflective practice framework to discuss and compare emerging insights across the researcher–student–practitioner team working on a Case Study Investigation of Bendigo Hospital. It offers an extended reading of the case study process from the inside, with the aim of broadening the ways of discussing an individual case to reflect on the importance of and potential for the CSI Program.

The brief for the AU$630 million Bendigo Hospital project was to deliver world-class health care facilities across a 13-hectare precinct. Located in regional Victoria, Australia, the project aimed to draw on a strong place-based response and engagement process to deliver tangible social, environmental and cultural benefits for patients, staff, visitors and the broader community. Outcomes include a walkable precinct that successfully connects

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retained heritage buildings with new hospital buildings, through legible and equitable access, inviting green through-site links and a high-quality, vibrant public realm, with 46 balconies, green roofs, roof decks, and courtyards. In addition, it has a water-sensitive urban design, structural soils and a significant increase in biodiversity, habitat and urban forest, and celebrates Dja Dja Wurrung and local Chinese culture.

Undertaking the case study revealed diverse value sets among the practitioner, academic and student researchers along with other stakeholders. The constitution of these overlaps and divergences offers a space for thinking about where interests, capabilities and expertise intersect and what barriers exist within performance evaluation of landscape projects. The cardinal question of values arose in multiple contexts and moments along the project timeline and is closely related to any evaluation of performance. Landscape architecture is commonly understood as an integrative or holistic practice that holds values around the 'aesthetic, the social and ecological' (Thompson, 1999, p 7). Yet even values that look similar or shared may differ in their external or internal points of reference or accepted forms of evidence.

The three kinds of values Thompson identified overlap partly with the performance measures outlined in the benefit categories of the CSI Program. In this way, performance assessment is already aligned to underlying values and is constrained by the type of benefits the CSI Program explicitly works to – the social environmental and economic benefits. These are then aligned to project aims, and are further narrowed by identifying what is measurable in the project and what is possible within the timeframe.

Approach

To work across these values and intersections, we offer a structured reflection across three perspectives, one from each collaborator – practitioner, student and academic. This approach is situated within a reflective research approach where the 'doing' of the work itself is a form of research and can make a contribution to disciplinary knowledge, with the understanding that the act of transforming implicit into explicit knowledge requires translation through inter-related processes of situating, reflecting and projecting. It involves paying 'attention to the system of knowing-in-practice and to reflection-in-action itself' (Schön, 2017, p 282).

Each position is reflected and discussed through the inter-related themes of methodology, complexity and timing. The themes give agency to each perspective as a process of collective meaning-making. Each was generated through a discussion of the recurring factors that influenced the success of the case study for all three collaborators and together these themes were deployed as a framework. This approach enabled the collaborators to 'record and respond to intuitive instincts about how to progress their practice as they engage with new challenges generated by research' (Candy, 2019, p 241). The themes of methodology, complexity and timing operate as a form of classification to 'produce new knowledge by sorting and structuring data into a system of organization, using typical properties, patterns, behaviors, or themes' (Deming and Swaffield, 2011, p 126).

The three themes emerged from the process of the case study as well as through reflection on the findings. The following are select examples from the findings of the case study that ground the reflective themes in case study outcomes (Keane and Grant, 2022).

- **Methodology.** While we undertook a mixed-methods approach to the case study as a whole, each benefit had its own specific method. For example, observation of the therapeutic garden revealed it offered space for a range of activities, with seven activity types noted over six observation periods across two weeks in July. This finding emphasised the importance of using a combination of approaches.
- **Complexity.** Findings on the social impact of the project revealed the complexity of the case study as it operated in complicated private–public and demographic contexts. One workaround we found was to analyse publicly available documents. In this way, we could register that the project had economic benefits such as creating

4.5 full-time equivalent (FTE) jobs to maintain the hospital landscape. In addition, we could demonstrate an increase in presentations by Indigenous patients and a subsequent increase in Indigenous liaison staff from 0.8 to 3 FTE.

- **Timing.** One of the environmental benefits we found in the case study was that the project saved 54 million litres of potable water from 2018 to 2021 by using harvested rainwater for irrigation and some building systems. This finding emphasised the impact of timing in the study because both lower-than-average rainfall and the COVID-19 pandemic contributed to the reduced water use.

The first purpose of this multivalent approach to reflection is to acknowledge and communicate the various positions of the team members and their unique interpretations of the case study research and outcomes. A second purpose is to identify areas of both alignment and difference, rather than to synthesise and foreshadow a single view. As component parts, these different positions offer insight into the values that underpin each one and the skill set that each team member enables or shares. In this work, we aim to surface and discuss common values and divergent skill sets and to consider how understanding their qualities could enable a more intentional deployment – suggesting potentials for future case studies at the nexus of landscape architectural practice and research.

Practitioner perspective

Methodology – partnerships and accountability

From a practitioner perspective, post-occupancy evaluation is sometimes a requirement and often an activity we undertake ourselves. The Bendigo Hospital project was evaluated in other ways, including by the Office of the Victorian Government Architects, through a wellbeing research project and by WorkSafe. However, the opportunity to partner with RMIT University collaborators, and for them to undertake this kind of formal post-occupancy evaluation, was valuable – in part, because these collaborators were not involved in the design, and the client did not employ them to undertake the research.

But although that independence is valuable, it is also distancing. Because the research is retrospective, as designers we were not able to use this research evaluation methodology and academic perspective in a more generative, collaborative way to inform the design process and the design itself. So, while the practitioner may respond to a design brief and to user or contextual requirements and may set the project aims from an evidence-based design approach, the lack of a formal early engagement in defining targeted benefits limits the ability to communicate some of the potential value of the design.

As the design progresses through the various design development and documentation stages, such an evaluation framework could be useful to minimise value engineering and maintain design integrity. Similarly, if the intent to embed this type of research had been considered earlier, more baseline data could have ben collated at the start of the project to help to demonstrate benefit uplift more clearly.

As a result of our involvement in this project as well as profession-wide project requirements to achieve various certification standards (for example, Green Star and WELL Building Standard) or to elect to use performance indicator tools (for example, the Pathfinder or Green Factor tool), we are incorporating evaluation benefit frameworks into our process. Where possible, we also base them on the performance series topics and sustainable features.

Complexity – performance and intention

To measure performance, you need a clearly articulated intent to measure against. Moreover, that design intent needs to be communicated to all parties across the life of the project. The governance structures of projects do not always support the communication of that intent over time and across complex stakeholder groups. Moreover, seldom is that intent communicated directly to all users.

How could a more embedded research methodology support a more iterative and incremental approach to enshrine and assess landscape performance to help educate users – whether they are staff, patients or visitors – on the true value of the landscape? How might the research methodology also better reflect the complexity of projects, in particular the interdependencies of disciplines that are involved in correlating good outcomes with good briefs and integrated design teams?

While we see a growing evidence base for the benefits of landscape and green infrastructure, many barriers remain in place and are seldom the focus of research or evaluation. Complex projects like Bendigo Hospital face barriers from inception through to procurement, use and ongoing operation. Developing a methodology that identifies these barriers could help inform projective solutions to overcoming them. When as practitioners we evaluate our designs, we evaluate not just what was built but what could have been. To realise the potential of this research in the context of climate change, alongside our successes we need to start to share our failures and to understand both the benefits and at times the disbenefits of built environment design. Developing new tools and methods for overcoming barriers and preventing adverse outcomes that we can share at scale and at speed would be invaluable.

Timing – a governance condition

Governance matters because the living dimension of living infrastructure establishes over time and, like all infrastructure, it needs management and maintenance. It matters because it can enshrine the rights and responsibilities of both users and owners beyond contractual relationships. Time was a major determining factor for the case study in that it limited engagement and access, which had a reductive impact on findings. Research programmes need to factor in the capacity for more time for complex projects with complex cohorts.

The timing of research – so that it occurs many years after a design was conceived – re-contextualises project goals and ambitions. As a consequence, what may have once been perceived to be ambitious, over five years later may have become business as usual. As construction costs escalate, we are seeing a retreat from more ambitious targets at the exact time we need to be meeting and exceeding those targets. So any cost analysis needs to capture that value. The best way to communicate a correlation between quality, sustainability features and costs would be to align budgets to landscape scope and to provide a 'per metre square' budget. Ideally the Landscape Performance Series website would also incorporate some sort of inflation calculator and currency converter.

Reflection – a landscape value proposition

Evidence-based design is now more important than ever before because of climate change – as we work together to design transitions in urban and infrastructural systems to address the risks to lives, livelihoods and the ecosystems that we are part of. Central to this evidence base is the notion of landscape performance. We now regularly draw on the metrics and indicators from the landscape performance guide to inform the development of green cover or infrastructure strategies and targets, whether the purpose is to use it for design guidance or to inform planning recommendations, to deliver improved social, environmental, cultural or economic benefits, or to interrogate comparative value of interventions particularly in relation to urban heat, water use and energy performance.

Instead of being behind an academic publisher pay wall, the Landscape Performance Series case studies are readily accessible to practitioners, which is essential to communicate the value of design and specifically of landscape architecture to other built environment professionals, prospective clients and collaborators. This research supports a move away from western concepts of health that are preoccupied by pathogenesis – an understanding of what leads to the development of disease – and towards salutogenic landscape approaches that include the causal factors we know help to achieve wellness, or optimal health. The findings highlight the indicators of sustainable development, and the changes that we need to make in design and construction methods and material selection.

These sustainable features are many of the determinants of the adaptive capacity of our cities. Further, they foreground the need to not simply mitigate adverse outcomes and impacts, but to regenerate landscapes so that they make positive contributions to their ecosystems and their social, cultural and economic contexts.

A summary of potentials emerge from a practitioner perspective.

- The CSI Program could be prospectively designed or operate in parallel to project timelines.
- Barriers could be integrated into research approach and contribute to findings.
- Capacity for more time for complex projects with complex cohorts could be factored in.

Student perspective

Methodology – transferability

Undertaking a landscape performance review through the CSI Program as a student facilitates professional development in a range of areas. The LAF team actively manages the project's structure, providing guidance and regular feedback on the research team's work. Although the student does work closely with the LAF team and supervisors within the structure of the project, there is also a largely self-driven component that pushes the student to develop the skills needed to undertake post-occupancy research. From a student perspective, finding the correct balance between working independently and the regular check-ins with the academic supervisor and LAF coordinator is key to the development of these skills, which are one of the most valuable outcomes of taking part in the project.

When entering the workforce, many students experience a disconnect between university education and real-world practice as they encounter differences between conceptually motivated university projects and the realities of delivering real-world landscape projects on time and under budget. Arguably, this is a broad phenomenon not limited to landscape architecture. Participating in the CSI Program, however, allows landscape architecture students to develop practical skills and a transferrable methodology that private practice is increasingly recognising for its importance and value.

While many students who enter the workforce may be experts in Adobe Suite or Lumion, they are often only adding to a skills base already present in the workplace. Equipping students with the ability to undertake post-occupancy assessments with a clear methodology responds to a knowledge gap in the industry and provides one way of introducing and disseminating these essential skills within the landscape industry. While this is already known to be a broader goal of the project, it is one area with the potential for further opportunities.

Complexity – creative opportunities

Another key part of the project is that it promotes the development of novel approaches to measuring landscape benefits, allowing students to pursue specific areas of interest. Certainly the structure of the CSI Program could also be perceived as pushing teams towards more straightforward and established approaches to measuring these benefits. Examples of such approaches include measuring the areas of hard surface to calculate potential stormwater capture, and recording the number of trees retained on site to calculate embedded carbon. However, the way landscape benefits are measured should be closely related to the type and complexity of the focus project.

In the case of Bendigo Hospital, a range of important environmental concerns drove aspects of the design, which should not be discounted. Because Bendigo Hospital is a public health facility, measuring the environmental benefits seemed disconnected from the project's true goals so the areas that became the focus of our research were socially and health oriented. Through this lens, rather than using clear and established measurement techniques the research team was challenged to consider how to gather meaningful data that would provide insight into whether the project met these goals.

From a student perspective, the development of these measurements that related to the complex nature of the outcomes gave the most room to be creative and was one of the more interesting and challenging aspects in the project. For example, like many connections between landscape and social outcomes, demonstrating the relationship between the increased presentation of Indigenous patients and the construction of a specialised Indigenous services courtyard is extremely nuanced and complex.

When considering these kinds of social outcomes, we found that an effective approach was to draw on anecdotal evidence to complement measurements or statistical data, which reinforced the direct connection. Measuring such outcomes required unique approaches for each individual benefit. The Program offers an opportunity to push teams towards developing new methodologies and approaches, rather than reinforcing existing ones.

Timing – experimentation

While interrogating new methodologies for measuring benefits was a highlight, the timing of the project became a limitation. During the later stages of the project, it was necessary to discard several key lines of interest because we simply ran out of time. Two linked factors contributed to this difficulty. First, navigating the hospital management structure and the public–private partnership was complex. Second, the timelines that operate in settings like universities and hospitals differed from that of the LAF case study project.

Even with a range of helpful contacts within the hospital, the complexity of navigating the hospital management structure (which was compounded by the COVID-19 pandemic at the time) made it difficult for the research team to have any interactions with hospital staff or patients during the span of the project. While there was the potential for these opportunities to occur, more time would have been required to make them happen. For example, the research team had initially planned to undertake a staff survey to understand wellbeing among both staff and patients. We had intended to use the results of this survey in conjunction with publicly accessible health data to highlight a link between the landscape and specific health and wellbeing outcomes for staff and patients. Without the evidence of the experience of staff and patients, however, it was difficult to directly link the landscape interventions to the specific positive health outcomes we knew existed, and these lines of enquiry had to be discarded.

On reflection, undertaking this type of research over a relatively short period was overly optimistic. The combination of the strict CSI Program timeline and the limitations in hospital resources meant conducting any survey was always going to be challenging. Finding a balance between the more established measurement techniques and more experimental measurements is important. To address this issue, the CSI Program might provide flexible timelines that better support longer research periods and facilitate alternative methodologies.

From a student perspective, key areas that could be a focus in the future are to:

- introduce post-occupancy research skills into the landscape architecture industry more broadly through students with these skills entering the workforce
- develop new and innovative approaches to measuring landscape benefits, rather than repeating existing methodologies
- explore how varying timelines could be more specifically implemented on different project types and for diverse research types.

Academic perspective

Methodology – multiple modes

From an academic perspective, the CSI Program provided a solid foundation of support for performance evaluation research. The LAF's clear sequencing, established processes, feedback loops and exemplars operated as a carefully scaffolded research framework. This approach aligns with the stated aims of the Program as a training mechanism for academics, students and practice and reflects a traditional research process and approach.

Conducting this type of research in an institution that champions design research generated an interesting interface and some friction between institutional norms and the CSI Program. Design research processes of finding the right questions to ask, starting in the middle, and developing and discussing spatial knowledge and performance were somewhat put to the side in this project. At the same time, the experience opens a potential line of enquiry for this type of research to be inflected by institutional or research norms and encourage multivalent understandings of qualitative and quantitative value. For example, research foregrounding spatial intelligence could offer alternative means of evaluation and discernment of performance. By considering and expanding discipline-specific approaches (namely, design research, graphical analysis and spatial analysis), the design approach in the project itself could engender or imply related forms of performance measurement. This design-integrated approach could also address a known barrier revealed in a recent 'pulse check' by the LAF (Landscape Architecture Foundation, 2024b) that indicated, among other issues, that designer discomfort with framing landscape architecture via quantitative metrics reduces uptake of case study approaches.

Complexity – research processes

The project context was of multiple stakeholders across private and government domains. Because of this complexity, the study had to be navigated in real time against tight time constraints and the accessibility (or at times inaccessibility) of stakeholders. A private entity was the interface between the research team and the hospital and, while it was highly facilitative, the arrangement resulted in an additional layer of communication and negotiation. It is also important to note that the LAF as a funding body for the research is a key element of success, providing further verification and weight to the outcomes that enabled negotiation with stakeholders. This indicates a potential for longer-term collaborations and the opportunity to establish performance measures from the perspective of different stakeholders with varied value positions.

Ethics processes were completed within the university and were also required by the Bendigo Hospital research team through similar but distinct processes and timelines. Though technically the therapeutic garden was a 'public' space, many different users in various capacities operated there. Observational studies found that patient transport and patient carers extended into the garden and the space acted as an auxiliary to the hospital buildings. This was an interesting finding, but ethical limits on interacting with patients directed the research approach towards other types of investigation in the space.

The impact of COVID-19 in terms of 'survey fatigue' and the limited availability of hospital staff were further considerations, as was the issue of cultural burden on Indigenous staff. It was also important to consider if the inherent research methodology is appropriate for a diverse range of cultural groups. Stephenson (2008, 2010) offers models for incorporating cultural values and for thinking through Indigenous viewpoints. Views that may not accept or be easily captured by western models of analysis could then be a more fundamental underpinning in future studies. Combined, these issues precipitated a shift in research mode to one of 'detective work' that identified publicly available data or information to establish links that could demonstrate social landscape benefits.

Timing – aligned to performance

The CSI Program was timed to work with United States institutional and university timeframes. Working to this timing was not difficult and the CSI team provided guidance and support for it. However, it did open the question of timing and an opportunity to consider variations to the training that the Program provided. In 2024 the first round of CSI projects supported by the Landscape Foundation of Australia will be investigated. As an Australasian variant, this Program will allow for differences in institutional and student study timeframes that are more aligned with the southern hemisphere. It could also support the evaluation of regional and rural projects, as often metropolitan sites are prioritised due to their accessibility.

There is further potential to expand on the approach by considering timing (duration, location and reoccurrence) as a critical design element of the study. This would involve informing and designing the whole study in relation to what is being measured rather than having a non-arbitrary, but perhaps not revelatory limit. In this way each project or landscape would have its own research timeframe that is appropriate for seeing when benefits become visible and thus measurable.

In summary, three potentials that emerged from the Program from an academic perspective are to:

- increase the scope for design-research or other integrated methods
- widen the range of stakeholder perspectives and conceptions of performance to identify a greater variety of benefits
- consider time as a primary organising device for research, within the project and in accordance with other timelines that are related to what is being measured.

Conclusions

Table 1 presents a matrix of the three reflections across the themes that we have considered, revealing subtle differences in orientations and experiences of the CSI Program. Both overlaps and divergences are observable. The practitioner emphasised integration of case study processes in project and deliverable phases; the student saw the Program as a driver for a research trajectory to transition from study into practice; and the academic focused on research approaches.

Table 1. Comparison of thematic reflections from three different perspectives

Theme	Practitioner	Student	Academic
Methodology	Retrospective nature of the CSI Program means that opportunities are missed.	Post-occupancy research skills can be introduced into the landscape architecture industry more broadly via students entering the workforce.	Potential exists to increase scope for design-research or other integrated methods.
Complexity	Barriers could be integrated into research approach and contribute to findings.	Develop new and innovative approaches to measuring landscape benefits, rather than repeating existing methodologies.	Widen the range of stakeholder perspectives and conceptions of performance to identify a greater variety of benefits.
Timing	The research programme needs to factor in capacity for more time for complex projects with complex cohorts.	Explore how varying timelines could be more specifically implemented on different project types and for diverse research types.	Consider time as a primary organising device for research, within the project and in accordance with other timelines that are related to what is being measured.

From all three perspectives, the case study approach and experience were largely beneficial and the team's reflections overall focused on potential modifications. In a collective set of conclusions, a summary of insights has been developed related to each theme to propose the future development of case study research in landscape architecture.

1. **Methodology.** Embed simultaneous or responsive research processes into project lifecycles to improve methodologies and offer opportunities beyond the life of the project.
2. **Complexity.** Research known barriers and incorporate them into the case study design from the outset. As a starting point, Chen and colleagues (2021) identified the two key barriers to evaluation as funding and the potential for negative evaluations, and suggested 'supportive mechanisms' to address these limitations.

3. **Timing.** Foreground time as a crucial element to research design. Addressing timing in relation to landscape processes, project partners and living lifecycles will improve the veracity and type of benefits evaluated.

Some further insights surfaced through the reflection process.

- Having a student on the team as an intermediary situated in both academic and practice realms, sometimes simultaneously, is of benefit and provides further research insights.
- Educational institutions can act as multipliers for the Program through internships or by embedding researchers in practice.
- Evaluation has the potential to be reflexive and embedded in design and delivery processes.
- Using a reflective practice research approach allows for multiple perspectives and offers a model to refine insights from collaborative projects.

These suggestions are the collective outcome of a live collaboration enabled through writing this paper. They offer some ideas for developing ways to recognise, understand, assess and communicate the multifaceted values of landscape architectural projects within case study research approaches.

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Little penguin's eye view? Footprints on the sand of Summerland Beach with the Penguin Plus viewing platform in the background (image by Sidh Sintusingha, 2023).

LANDSCAPE REVIEW

Reflections on research and practice nexus through a case study investigation at Phillip Island Nature Park

SIDH SINTUSINGHA AND EMMA STEVENS

This paper reflects on a case study of a collaboration between academia and the profession of landscape architecture. The case study, funded through and framed by the US-based Landscape Architecture Foundation Case Study Investigation Program, centred on the master plan and stage 1 (new Visitor Centre Precinct) of a project for client Phillip Island Nature Parks. While benefits of such collaborations are well known and nuanced, to optimise them it is necessary to negotiate the issues that are inherent when stakeholders vary in their objectives and their relationships with each other. This includes engaging with the client and acknowledging that they have stewardship of place. Such practices can leverage greater benefits that recognise and reinforce the proficiency of professionals in the landscape architecture discipline as 'placemakers'. The role of the Landscape Architecture Foundation in facilitating the objectives, relationship and training involved in this project has been integral to successful collaboration. It is critical to have a good understanding of and respect for each other's role, as well as constant engagement and communication throughout the process.

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Introduction

This paper reflects on a collaboration between landscape architecture academia (who the US-based Landscape Architecture Foundation (LAF) refers to as 'research fellows' and 'research assistants') and practitioners ('firm liaison') to document a 'high-performing' realised landscape architecture project, framed by practices that the LAF established through its Case Study Investigation (CSI) Program. The LAF is an important initiative that contributes towards the advancement of the landscape architecture discipline through critically bridging research and design practice (Friedman, 2000) that often engages with 'wicked problems' (Buchanan, 1992).

We observe that the CSI approach engages with multiple realms in the relationship and interactions between academia and practice in the design disciplines, yielding disciplinary benefits and innovations that contribute to – and challenge – both education and design practices. It embeds the concept of 'reflective practice' (Schön, 1992) into the distinct way of 'designerly' thinking (Cross, 2006). The CSI approach ranges from practical collaborations between university academics and the profession in the design disciplines to linking theory to practices in the landscapes that enrich the education experience.

Crucially, the LAF, through the CSI Program, promotes sustainable, high-performing landscapes, which helps to advance a research-informed design culture – even 'activism', as Julier (2013) frames it. Moreover, this nexus between research and practice involves navigating complex relationships and tensions between academic, intellectual critique and hagiography of designers and design projects because it requires a degree of 'unmooring from the comparative safety of prior practice behaviours and knowledges' (Downton, 2023, p 7).

Practically, the CSI Program applies the critical research tool of post-occupancy evaluation (POE) to landscape architecture projects, framed by the LAF's objectives to advance sustainable design and management of landscapes. A significant feature of the CSI Program is that it seeks to combat industry's lack of time resources to conduct research and development (R&D) and POE by bridging the gap between research and design practice.

KEY WORDS
academic–practice nexus; reflective practitioner; Landscape Architecture Foundation case study investigation; post-occupancy evaluation; landscape architecture education

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> Because resources (including time, expertise, and funding) are often limited for performance evaluation, the CSI program seeks to identify valid, defensible, and replicable metrics and methods that can be used within a short timeframe by non-experts with limited resources. (Landscape Architecture Foundation, nd)

Since 2010, by creating new case studies for its online Landscape Performance Series each year, the LAF has established an up-to-date database that documents the impacts of exemplary landscape projects from all over the world. By 2023, this publicly available database included 190 case studies. The searchable database has become an easily accessible tool for designers to educate themselves on relevant research and methods for similar projects. It embodies collaborative innovation – where practices and academia are sharing diverse knowledge, experience and landscape outcomes for the benefit of the profession.

> By investing in this research, LAF is generating much-needed information and precedents to evaluate performance, demonstrate value, and make the case for sustainable landscape solutions. (Landscape Architecture Foundation, nd)

The case study

For our case study, Tract partnered with the University of Melbourne to assess the Summerland Peninsula master plan (guiding development since 2012; see figure 1) and stage 1 built works (the Visitor Centre Precinct, completed in 2019) (see Sintusingha and Salma, 2023). The Summerland Peninsula is home to one of the most popular natural wildlife attractions in Australia, the Penguin Parade. It is a place that has unique ecological, scenic and cultural values but that was subject to unsustainable patterns of use with the potential to impact the site and the quality of the user experience over time.

Through a series of award-winning projects, Tract has played a pivotal role in shaping the Summerland Peninsula for over a decade. In particular, it set a vision for the whole of the peninsula and established a site planning and design philosophy to guide sustainable development and management. The completed Visitor Centre Precinct (stage 1 of the master plan) is a world-class wildlife-viewing destination, centred on the little penguins (*Eudyptula minor*). With the principles of sustainability, conservation and habitat protection at its core, it showcases site-responsive boardwalks, viewing platforms and underground viewing experiences, a sustainable new building, wetlands, gathering spaces, educational opportunities and, most importantly, many hectares of high-quality habitat rehabilitation. The outcome is to provide facilities that meet the highest contemporary landscape performance standards that are shaped by the landscape and are subservient to the wild coastal environment that defines this place.

The Summerland Peninsula is managed by client Phillip Island Nature Parks (PINP), a unique conservation organisation that carries out research and education programmes on Phillip Island, funded by its eco-tourism experiences and visitor attractions. Crucially, the Nature Parks Research Centre undertakes important research to inform its approach to operations and management of the land, in particular in relation to habitat rehabilitation and revegetation, carbon footprint, climate change, visitation, water and energy conservation, penguin breeding, and conservation of threatened species. Its research is based on quantifiable data that it uses to assess and improve performance. This science is also shared to promote global, evidence-based conservation practices and impacts.

We selected this project for the CSI Program in part because it was an exemplary landscape project steeped in environmental and cultural significance. More than that, our client has objectives aligned with the CSI Program related to sustainability and evidence-based research, resulting in a wealth of existing knowledge and resources that are valuable for a performance assessment of the project.

Figure 1. Tract's (2012) PINP master plan (p 101). The proposed stage 1 Visitor Centre Precinct (completed in 2019 with design variations) is located to the east of the peninsula, north of Summerland Bay, where the little penguins parade up the beach daily at sunset (with permission of Tract Consultants).

The case study evaluation method

Our LAF case study examined two spatio-temporal scales of landscape architecture interventions: the 2012 PINP master plan (figure 1) and its subsequent implementation at the Penguin Parade, focusing on the 2015 Penguins Plus viewing platform and the 2019 Visitor Centre Precinct. With a history dating back to the 1920s, Penguin Parade is one of Australia's most popular eco-tourism destination, which the non-profit organisation PINP has managed since it was established in 1996. Drawing from both quantitative and qualitative research approaches, the investigation involved collecting and analysing data from various sources, including internal documents from the landscape architect company Tract Consultants and its client PINP, as well as publicly available resources such as Nearmap, Google Maps and user-generated reviews on Tripadvisor.

Key data sources included Tract's PINP master plan, which outlines the overarching vision for the site, and PINP's annual reports (available online from 2008 onwards), which detail the implementation of interventions and significant events. The research strategy was to capture the impacts of the landscape interventions through time, triangulating data from multiple sources that were then confirmed with designers (firm liaisons) and client representatives, and through the two site visits conducted in March (autumn) and July (winter) 2023, before the penguin breeding season. The central focus of the study was to assess how PINP, through the master plan and landscape architecture interventions, balanced the demands of a high-volume tourist destination with the conservation of sensitive penguin habitats.

In the following sections, we reflect on:

- the value of the LAF CSI process and learnings for the research fellow, the student research assistant and the practice liaison
- challenges for practices to access and apply relevant research for their projects

- the infrequent opportunity to do POEs for landscape architecture projects
- integrating landscape performance in landscape architecture education.

The value of the process and learnings for the research fellow, the research assistant and the firm liaison

Research team reflection on a process that involves negotiations of project scope, objectives, process and representation

Pre-case study

The LAF CSI collaboration offers the rare opportunity for the landscape architecture profession and academics to engage and leverage each other's expertise towards mutual benefits (Wallin et al, 2014). We observe that, in allowing either side to initiate engagement, the LAF facilitates the process. In effect, it is a 'bottom-up' process of self-selecting the designed landscape that either party (or both) considers to offer valuable landscape performance lessons addressing environmental, social and economic dimensions. Each year, an LAF panel reviews US-based and international applications and then shortlists projects to be funded for the CSI Program. If required, the LAF also offers to pair researchers with practitioners.

Naturally, the incentives for each side to be involved in the CSI Program vary to a certain degree and may not always align. For academics, the draw is straightforward as the CSI Program aligns directly with university teaching and research activities. It adopts a research-led process that complements the academic objective to generate new knowledge – in this case through interrogation of case study performances. The incentives for private firms are more complex. On the one hand, they have the opportunity to conduct POEs and to draw the attention of the discipline and the public to specific projects. On the other hand, design firms are commercial enterprises seeking not simply attention but positive media coverage that promotes their practice. In this nuanced context, the LAF is more likely to attract critical, reflective practitioners who desire objective feedback in order to improve their praxis and the broader discipline.

These contrasting motivations and interpretations can potentially lead to misalignments at any stage of the CSI process, including over how to approach and scope the project, how and what to interrogate and measure, and how to represent findings or outcomes, consistent with a research process. The work of academia also involves critical review (in the name of 'public interest') and a use of language that differs fundamentally from the culture, language and semantics involved in representing public design, whether aimed at media, design competitions or awards, which is concerned with the commercial interests and branding of the designer, firm or professional body.

LAF process and management of CSI projects

To help the CSI projects to progress, the LAF structured submissions and feedback sessions into six 'deliverables' over six months (1 February to 2 August 2023). The deliverables were paired with Zoom sessions in which research teams presented their updates in turn and learnt from each other. Unfortunately, due to differences in time zone and education cycles between Australia and the United States, the session times were not viable for us – so we are not able to reflect on this important aspect of the CSI process here.

The misalignment of United States and Australian teaching cycles also limited the research assistant's engagement with deliverables where they conflicted with academic assessments on a few occasions. Fortunately, we were able to receive feedback off-cycle from the LAF CSI's senior programme manager, Megan Barnes, via the shared cloud site. We have to highlight Megan's instrumental role in shepherding the 10+ concurrent projects through the sequence of project selection, implementation, review rounds, blind peer-refereeing, and editing and formatting in preparing for the final online publication.

Informally, we learnt that incidents occur within the LAF projects that lead practice partners to become disengaged. We surmise that the reason could be that the project narrative shifts beyond 'design' to the project's sustainability and as a 'place' appropriated by people. From a different perspective, this implies landscape architects have opportunities to claim ownership of and define roles in the broader narrative and scales. According to feedback from LAF, this is one of the notable merits of our case study in that it evidences the inter-related, multi-scaled practices and roles of landscape architecture at the master plan and individual project stages.

Delivering the case study

Tract's PINP master plan that framed the renewed Visitor Centre Precinct has led to other exemplar projects that have been widely recognised locally and internationally. In Tract's view, the projects offer invaluable lessons on how to showcase the value of landscape architecture discipline in conservation. Based on this experience, our firm liaisons, Emma Stevens and Mark Reilly, outlined the broader project merits and benefits for the original application for the research team to interrogate.

In a separate application, the research fellow had to undergo an 'examination-like' process in reviewing three assigned CSI case studies from previous years. After successfully securing the grant, the academic team (the research fellow and research assistant) inherited these review statements, Tract's documentation and related material, and assumed full control of the CSI process. The LAF leaves the working relationship between the researchers and firm liaisons to each team to negotiate and agree on. In our case, throughout the process, the research team used the firm liaison (Emma) as a sounding board and, crucially, to facilitate links to the client, PINP – with whom the firm liaisons had an established relationship. We find such connections along with consistent communications to be very important in keeping the key stakeholders involved and on the same page.

In engaging with the PINP projects, it is also important to reflect on the research fellow's own preconceptions. Well-established academic literature is critical of the impacts of tourism on natural attractions (Gössling, 2002; Weaver, 2006), which influenced the research team's perception of the project. Further, the research fellow's own experiences as a tourist in several visits to the Penguin Parade over two decades led them to question whether the practice of mass tourism was an appropriate way of funding conservation. The CSI engagement significantly assuaged these concerns, after the research fellow developed a robust understanding of past conservation efforts, PINP's practices and ongoing research, and Summerland Peninsula as a historic place. The government's buyback of a housing subdivision on the peninsula (1985–2011) was a decisive advance for penguin habitat conservation, which Tract's (2012) master plan could then follow through on.

Because the site is relatively remote, and at the time of the project difficulties of access were compounded by strict COVID-19 lockdowns in Victoria, the research team focused on conducting desktop analyses of the vast amount of documents sourced both online and from Tract and PINP. The results allowed us to frame the case study and to approach the novel narrative around the history of intersections between penguin conservation and mass tourism on the peninsula.

While this narrative is beyond the design scope, we saw it as providing the critical context and clarity for Tract's PINP master plan and design interventions. Further, given the LAF's preference for comprehensive documentation and evidence, we could capture a more complex, richer, nuanced story of interventions and collaborations between different stakeholders over a long period. This reinforced the critical roles of the master plan and of PINP as the client responsible for implementing the plan and managing the facilities and conservation efforts.

Moreover, the multi-scalar story is arguably relatively unknown to the public, especially in terms of the integral role that landscape architects play in balancing the conservation effort with mitigation of tourism impacts. A more familiar narrative is how their work enhances visitors' experiences, as captured in professional journals and design

websites that showcase the spectacular architecture and landscape interventions of the new Visitor Centre Precinct and penguin viewing platforms. By way of counterbalance, we highlighted and represented the case through the often unsung role of the master plan and, crucially, PINP's interpretations and implementation, framed through the expansion and rehabilitation of the penguin habitat. While LAF's online Landscape Performance Series, geared to represent individual landscape interventions, does not capture the multi-scalar nature of the PINP case, the website offers a downloadable 'Methods' document that provides this information in detail.

Drawing from both qualitative and quantitative research approaches, we analysed and mapped habitat changes based on the PINP research team's data collected over decades, which we triangulated with analyses of aerial images and data from two site visits. As noted in the published CSI report, we can establish only correlations rather than causes because multiple variables (many of them unknown) influence the habitat (Sintusingha and Salma, 2023, p 26). Notable among these variables is the COVID-19 pandemic, which significantly disrupted the case study. The many variables are persistent challenges in interpreting scientific data and linking them to design decisions and actions.

There were many other aspects of the case study that we considered interrogating, in particular children's experiences and perceptions of the eco-tourism as framed by the master plan and stage 1 designs. Another aspect is the design of the rehabilitated landscapes and the penguins' artificial burrows. They are potential topics for future interrogations. Already, the student research assistant has sustained her engagement with the case study by incorporating it into her independent thesis project in semester 1, 2024.

The value of the process and learnings for the firm liaison – reflections from the practice partner

Among the reasons why we participated in the CSI Program were that we wanted to measure project performance, understand the value and impact of our projects, and improve future project outcomes. The process and learnings of this Program were valuable for our practice in the following ways.

First, they made us aware of the Program and its growing, searchable database of knowledge. The database is a valuable way to access resources and research methods relevant to the Program from across the globe, which we can also apply to future projects.

Second, after going through the CSI journey with the University of Melbourne, we have gained an understanding of the importance of the performance review process, and of establishing specific, measurable objectives through the design stage. Further, we are able to advocate for them using tangible, evidence-led data.

> As a training program, CSI is an important impetus in moving the landscape architecture discipline toward designing every project with specific performance objectives, documenting project goals and design intent, routinely collecting performance data, and integrating landscape performance in design education. (Landscape Architecture Foundation, nd)

Participating in the CSI gave us the opportunity to learn tested methods of evaluating landscape performance under the guidance of a programme that was backed by years of experience.

Third, the Program's process and learnings were of great value in fostering connections between landscape practice and academia. Tract has a long history of working and collaborating with the University of Melbourne. Each year, we invite students from the university to join us for a three-week intensive internship, during which they complete a joint research assignment, while our team provides guidance and mentoring. We value the fresh ideas from the students, and they benefit from collaboration with built environment practitioners.

Another way in which we continue to participate with the University of Melbourne is through the landscape detail design course run by Sidh Sintusingha. In this course, students review built landscape projects and their documentation packages as part of the

assessment. This subject is aligned with our shared interests in POEs, and is part of the reason why Tract teamed up with Sidh and the university for the CSI Program.

Through the CSI Program, we have been able to measure the environmental, social and economic benefits of the project and provide tangible metrics to not only support its achievements but also confirm that we are meeting our project goals and objectives. The outcome for this case study shows that the master plan and associated projects offer exemplary lessons in nature conservation that are worthy of sharing.

While the completed stages are exemplary projects in their own right, the master plan highlights an important overarching narrative. Specifically, that narrative tells of the value of the landscape architect in leading those early stages of a project where big decisions and thought innovations are made. In this case, Tract was able to provide information about and advocate for the landscape and environment from a strategic site planning perspective.

We are thrilled that our shared case study for the Summerland Peninsula master plan and Visitor Centre Precinct is published as part of the Landscape Performance Series. It will support other designers, students, researchers and policy-makers in advocating for landscape architectural projects with a focus on conservation, habitat rehabilitation and nature-based tourism.

Practice challenges: accessing and applying relevant research and undertaking POEs for landscape architecture projects

For some projects in landscape practice, existing relevant research may not be available. To innovate, practices often need to go beyond their projects and take R&D into their own hands. However, this is not achievable for many practices, where a given project may lack the time, expertise and/or budget required for research.

As a pioneering landscape architecture practice in Australia with a legacy of designing and delivering outstanding environments for over 50 years, Tract is acutely aware of the value of landscape architecture and its impact on communities, cities and environments. We see the value in looking backwards and learning from past projects, in order to look forward and innovate for future projects.

Over past years, Tract has undertaken POEs, which have ranged in their focus from residential communities to city-shaping projects such as the Cairns Esplanade. As we looked back on Cairns, we saw two decades during which the parkland had become a hub of activity and culture. The project stimulated the revival of the central city of Cairns and linked it back to the water's edge through new waterfront recreation. Its sustained popularity is a testament to the vision of the landscape architects and to the value of landscape architecture.

While we acknowledged the success of these projects, what the studies did not capture, due to limited time and lack of access to resources, were the measurable environmental, social and economic benefits from the projects. Having the ability to point to evidence-backed, design-led improvements would be invaluable in advocating for the value of landscape architecture.

More recently, Tract has targeted more measurable research, looking at a range of environmental benefits such as tree canopy coverage and carbon emissions. However, the extent of such internal R&D remains constrained by limited time and resources – issues that the LAF CSI Program seeks to combat, as briefly discussed above.

Integrating landscape performance in landscape architecture education

As schools of landscape architecture play a pivotal role in educating the next generation of landscape architects, the LAF CSI Program is an effective way to involve students of landscape architecture in real-world project aims and outputs. It is an opportunity for them to collaborate with not only landscape practitioners, but also clients, consultants and any wider members of the project team who are involved in the CSI Program.

More broadly from an educator's point of view, the CSI Program is one of the LAF's critical contributions to the discipline, which addresses the notion of 'precedents' in

landscape architecture (or design) education. Precedents are widely employed throughout a landscape architecture degree in a variety of ways and could be more structured and coordinated. For example, precedents are currently used in introductory subjects such as landscape architecture history, which defines the 'landscape architecture project' through historical precedents, or in capstone subjects like landscape practice that use a real project to simulate and learn about landscape architecture documentation and practice workflow. There is certainly more scope for research- and performance-oriented approaches to precedent studies in landscape architecture education.

As noted above, Tract's partnership with the research fellow began with the firm's engagement in education. In particular, since 2005 Tract (and other Melbourne-based practices such as the City of Melbourne, Aspect Studios, Urban Initiatives, and Oculus) have contributed documentation packages to be used as real-life case studies in Sintusingha's landscape documentation (2005–2009) and landscape detail design subjects (2010 to present) in the Master of Landscape Architecture Program at the University of Melbourne. While focusing on detail design, buildability, materiality and representation for construction, the group precedent study assignment also interrogates users' experiences, interpretations and appropriations of the design at human scale – a 'POE-lite' exercise. Students then interview the representative designer at their office and, in some instances, bring updated observations to the designer – as many of the projects are several years old and are in varying degrees of transition from a realised design concept to a lived place. Students finally apply their accumulated skills and knowledge to design a micro-landscape architecture project.

Insights and implications

We conclude with the following insights.

- Broadly, the LAF CSI process provides support through offering integrative approaches and actionable guides that form a link between theoretical speculation and practice application for both academics and the profession. However, more studies (like those presented in this issue) are required to gauge the broader impacts and effectiveness of these collaborations – including through aligning objectives to achieve longer-term benefits for the stakeholders (academics, students and practitioners).
- Outside of LAF, there are established models of researcher–industry partnerships in public research projects. However, factors such as the long lead times, administrative loads, high overheads and compliances can be significant disincentives against such collaborations. As discussed, an approach where design firms engage and participate in education offers avenues for academic–practitioner nexus – and has led to our LAF CSI collaboration. Anecdotally, many senior designers undertake research-based higher degrees with an eye towards applying them to a research-informed practice. On the other hand, perhaps as an emerging trend, many design firms employ researchers as part of their staff – a private model of investing in and conducting research and POEs in-house.
- Critical to any successful collaborative projects are relationships and managing relations – especially in a voluntary process like LAF. In our case, Tract and the University of Melbourne, as well as the firm liaison and research fellow, have collaborated in an education setting over many years. This has established the knowledge of and respect for each other's expertise – as well as a degree of trust – that create a good working relationship.
- The client forms another critical dimension in the case study. In our case, PINP is a stakeholder with a long-term engagement in and relationship to the place – 'key informants' in research lingua. For the CSI Program, this facilitates and reveals a deeper understanding and knowledge of place and an awareness of longitudinal place-based environmental, social and economic forces driving change. This knowledge is practically captured in the master plan and its implementation by PINP – as well as being elaborated for the CSI Program in our exchanges with the PINP research team.

The implementation of PINP's master plan over time could be categorised as 'co-design', defined by Sanders and Stappers (2008) as 'the creativity of designers and people not trained in design working together in the design development process' (p 6).

- PINP's commitment to and stewardship of place aligns with landscape architecture practice that involves negotiations between dynamic, living socioeconomic and ecological entities. The focus of our multi-scalar CSI Program on the master plan and stage 1 implementation highlights landscape architecture as an exemplar of placemaking – a bottom-up, place-driven process. It stands in contrast to top-down, design-driven 'place-making' (Project for Public Spaces, 2007) or 'placement', which implies a non-place without an active designer.
- Related to the above point on 'place', the timing of a POE is a critical variable. A POE conducted at the point of project completion assesses the design, whereas one conducted long after construction – allowing for the emergence of factors such as users' interactions and appropriations, effects of climate and maintenance regimes – evaluates the design as a place. We surmise this to be a variable that influences the CSI collaboration between researchers and practitioners. A newly realised project manifests 'designerly thinking' and focuses analysis on design practice; in contrast, a project subjected to multiple seasons of use, wear and tear affords a 'design thinking' analysis (Davis et al, 2024, pp 9–10) of a complex, multi-layered place more biased towards the users' needs, appropriations and experiences. Ideally, POEs would be conducted at multiple time-intervals to form a more robust and useful case study.
- The expansion and internationalisation of the LAF CSI model, such as in the Australian-based Landscape Foundation of Australia, bodes well for the long-term health and growth of the discipline.

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Te Whāriki Subdivision, Lincoln, Canterbury, New Zealand. The landscape performance of this subdivision development was assessed using the Landscape Architecture Foundation's Case Study Investigation evaluation framework, revealing its environmental, social and economic benefits (image by Guanyu Chen, April 2021).

LANDSCAPE REVIEW

Why landscape architects should embrace landscape performance evaluation: The 'market' perspective of landscape development

GUANYU CHEN, JACKY BOWRING AND SHANNON DAVIS

This paper uses the lens of George Akerlof's 'market for lemons' theory to explore why it is necessary for landscape architects to adopt landscape performance evaluation. This theory, which addresses the degradation of product quality due to information asymmetry and a lack of information, is applied to landscape architecture to highlight similar underlying challenges in the discipline and the industry. The lack of practices assessing the actual performance of built landscape projects prevents landscape architects from explicitly and persuasively communicating their true value to clients, resulting in a 'market' saturated with low-investment projects that focus on low-value aspects of landscape architects' work – or 'lemons'. Here we argue that implementing performance evaluation can mitigate these issues by providing empirical evidence of project benefits, thereby reducing information asymmetry and increasing the information available, and fostering a market for high-quality landscape projects – or 'peaches'. We argue that by embracing performance evaluation, landscape architects can enhance the transparency of their projects' performance and contribute to the disciplinary rigour. This shift is crucial for the profession's growth and its ability to address contemporary environmental and socio-cultural challenges effectively.

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Introduction: The market for 'lemons'

In a well-known paper, 'The market for "lemons": quality uncertainty and the market mechanism', economist George Akerlof (1978) discussed the mechanism that leads to the degradation of the quality of goods in a market due to information asymmetry. He pointed out that in a poorly regulated market with information asymmetry, 'lemons' tend to dominate unless external interventions are introduced (Akerlof, 1978). This research achievement was awarded the Nobel Prize in Economic Sciences in 2001.

A 'lemon', in American slang, refers to a car that a buyer finds to be defective after purchasing it. In contrast, a car of high-quality is a 'peach'. In his paper, Akerlof (1978) uses the market for second-hand cars as an example to explain how information asymmetry affects the market. In a market with information asymmetry, buyers are unable to make a distinction between a 'peach' and a 'lemon'. Although sellers know whether they are selling a 'peach' or a 'lemon', due to the lack of widely recognised practices and techniques for evaluating a car, they cannot prove to their buyers that the higher-priced car is a 'peach'. Therefore, the buyers are only willing to pay the fair price of a 'lemon' to reduce the risk of overpaying. As a result, the sellers holding a 'peach' tend to leave the market, and 'lemon' sellers will take that share. This in turn will cause a decline in the average quality of cars in the market, as well as reducing the size of the market. With the decreasing average quality of cars in the market, the average cost that buyers are willing to pay will be lowered. This reinforcing feedback loop will eventually lead to the collapse of the market.

The 'soil' for 'lemon' landscapes

According to Akerlof (1978), the phenomenon of the 'market for lemons' exists in a wide range of immature markets, where information is asymmetrical between buyers and sellers. Coincidentally, landscape architecture is a field where information asymmetry is

playing a role in its 'market', posing challenges. According to Megan Barnes (2019), the program manager of the Landscape Architecture Foundation's Case Study Investigation Program, based in the United States, the landscape architecture profession is not 'adept' enough at reporting project performance and the benefits that its work can offer.

As Barnes (2019) explains, many landscape architects know that their project can achieve positive results at a general level, such as sequestering carbon, harvesting, cleaning and reusing stormwater, and reducing energy consumption, but they are often unable to answer questions about how much water has been collected, cleaned and reused, or to what extent the water quality has been improved as a result of their design interventions. The way landscape architects communicate the value of their works is often through describing 'features', rather than 'benefits'. Yet their clients, who are most often non-specialists, understand 'benefits' better than 'features'.

Similar to the market for second-hand cars, in the market for landscape architecture, the sellers (that is, landscape architects or their firms) understand the values that their work could deliver, but due to the lack of techniques, cost of the evaluation and other reasons, they have difficulty proving and communicating the value of their work to their clients. Clients, therefore, only set their sights on 'lemons' or low-value aspects of landscape architects' work.

It has been widely observed that built landscape architecture projects have rarely been evaluated to understand and demonstrate their benefits (Arnold, 2011; Bowring, 2020; Carmona and Sieh, 2005, 2008; Chen, Bowring and Davis, 2021, 2023; Doidge, 2001; Hiromoto, 2015; Laurian et al, 2010). Despite claims that various functional features form a part of their design interventions, most built projects have never provided any evidence to prove that their designs are really achieving the declared benefits. In New Zealand, even the projects that have received the New Zealand Institute of Landscape Architecture (NZILA) sustainability award, which are expected to demonstrate strong functional benefits, have seldom been evaluated systematically after their completion. As a result, in the publicly accessible materials of those projects, a typical way of communicating their design benefits is similar to describing their design intents – all the statements were about their *expected benefits*, but not the *evaluated actual effects* of their design interventions.

Waitangi Park, for example, was a recipient of the NZILA Sustainability Award of Excellence in 2008. It was one of the few award-winning New Zealand projects that have been assessed for their actual performance. Yet the evaluations did not assess its contribution in areas such as water conservation, biodiversity and reduction in energy consumption, even though Waitangi Park has a strong focus on sustainability and claims that the design contributes to all of these areas. A compelling way of communicating the values of such projects would be to support such functional claims with empirical evidence, but in all the publicly accessible documents and on relevant webpages, the contributions to sustainability are communicated in a similar way to describing design intents. It offered no empirical evidence proving the project's contribution to sustainability and, further, no data to show how much or to what extent it has contributed to sustainability.

This lack of empirical evidence is also a key driver leading to information asymmetry between landscape architects and their clients, users or any other interested groups. This driver tends to push 'peaches' out of the landscape architecture market and contribute to a collapse of the market. Without a doubt, the market for landscape architecture is a complex system, and many other forces are also driving the market. Many of those forces may be able to counteract the negative impacts that result from information asymmetry. Therefore, under the joint action of all the driving forces, the system of the market will eventually reach a balance and not necessarily lead to a market collapse as Akerlof's theoretical analysis suggested. However, according to Akerlof's theory and Barnes's observation, information asymmetry has to have, and has been having, negative impacts on the landscape architecture market.

In addition to information asymmetry, an even more problematic driver with negative effects on the landscape architecture market is a lack of information. In contrast to the scenario of information asymmetry, lack of information means that the 'sellers' (that is,

landscape architects or their firms) in the landscape architecture market do not even have a sense of whether their works are performing as they were expected to or not, other than that some generic research shows that they should, or landscape architects' experience tells them they should.

As Barnes (2019) explains, there are many claims in the industry that landscape interventions improve water and air quality, sequester carbon, improve safety, enhance social wellbeing and achieve other benefits. A substantial amount of research supports these claims. However, the research is seldom for specific built projects. Therefore, landscape architects, in many cases, have no sense of whether their design interventions are effective or not in the specific contexts of those projects. In a worst-case scenario, the projects could even have negative effects that go unnoticed.

Performance evaluation as a catalyst for a market for 'peaches'

As discussed, the main reasons that lead to the market for 'lemons' are information asymmetry and a lack of information. The most obvious solution is to evaluate completed projects to get more information about the performance and effectiveness of landscape interventions, and thus reduce information asymmetry and increase the information available. Although it is inevitable that information asymmetry will always exist to some extent, evaluating completed projects could help to minimise the negative impacts that result from it.

From a historical perspective, the growth of the landscape architecture profession and discipline has resulted in the emergence of issues about the lack of information. At the early age of the profession (from antiquity to the 1900s), 'landscape architecture' practices were often associated more with aesthetics, power showcasing, and culture, rather than functionality and sustainability. It is only since the 1960s that functionality and sustainability have gradually become among the main areas of focus for the discipline.

As the landscape architecture discipline is still young in the field of functionality and sustainability, it is natural that little attention has been paid to the actual performance of landscape projects. However, the discipline is maturing, especially in the 2020s, with landscape architecture now recognised and designated as a science, technology, engineering and mathematics (STEM) discipline (American Society of Landscape Architects, 2023; Brodka, 2023; Niland, 2023). In this context, it can be expected that increasingly more attention will be paid to investigating the actual performance of landscape practices, and in that way offering empirical evidence and helping to restore and preserve a market for 'peach' landscapes.

In addition to the macro perspective of the history of the discipline, viewing the issue from various micro-level angles contributes to an understanding of the barriers hindering the implementation of performance evaluations. For example, practical barriers identified include a lack of funding and motivation, the potential risks from negative evaluations, and insufficient knowledge and skills in conducting an evaluation (Arnold, 2011; Bordass, Leaman and Ruyssevelt, 2001; Hadjri and Crozier, 2009; Lackney, 2001; Marcus et al, 2008; Roberts et al, 2019; Zimmerman and Martin, 2001). However, recent research has also identified enablers that can help overcome these barriers (Chen et al, 2021). Exploring these enablers revealed promising pathways for creating a more supportive environment for evaluation practices in this evolving era of landscape architecture (ibid).

In essence, the landscape architecture profession is standing at a pivotal juncture, where landscape performance evaluation can reshape the 'market' dynamics. The term 'landscape performance evaluation' (lower case) here serves as an umbrella concept encompassing a range of evaluation activities that are typically conducted to investigate how landscape designs function in their built form, measure their success, learn from the past, inform future practices and provide evidence for value communication. This umbrella concept covers a wide range of practices, which include:

- Landscape Performance Evaluation, which is often used to denote the evaluations conducted following the Landscape Architecture Foundation's Case Study Investigation evaluation framework or other similar evaluation practices that adopt a holistic approach
- post-occupancy evaluation, which is commonly used in environmental design and planning disciplines to understand and evaluate how a built project functions in reality after it is constructed and occupied and/or how users engage with and value it
- other evaluation practices in the landscape architecture and allied fields, encompassing activities covered by terms that are less commonly used in practice and communication, such as environmental audit, environmental design evaluations and facility assessment.

By addressing information asymmetry and the lack of information through rigorous evaluation practices, landscape architects can enhance transparency and build trust with clients. This evolution towards a market for 'peaches' not only safeguards the profession's integrity but also positions it for sustained growth in an increasingly complex environment. As the discipline advances, embracing a culture of continuous evaluation will undoubtedly pave the way for a flourishing 'market' that recognises and rewards the true value of landscape solutions.

Limitations and contributions of the analogy

While this paper draws on the 'market for lemons' to highlight issues in the landscape architecture discipline and industry, it is important to acknowledge several limitations inherent in this analogy.

First, the comparison between the market for second-hand cars and the market for landscape architecture developments rests on a vast simplification. The 'market' for landscape architecture projects is significantly more complex, involving a broader range of stakeholders, contextual variables and intangible values that do not directly parallel the relatively straightforward transaction of purchasing a vehicle. While Akerlof's theory provides a useful framework for understanding the effects of information asymmetry, it does not account for the full spectrum of factors influencing the landscape architecture 'market'. Other factors, along with the mechanisms discussed in this paper, may collectively shape the 'market' dynamics of the industry. In using the analogy, this paper does not aim to exhaustively map the terrain of the 'market' dynamics but, rather, aims to provide a theoretical lens for understanding one aspect of the complex system. Future studies that further explore these dynamics and comprehensively map the terrain will be instrumental in building understanding of these dynamics.

Second, the application of economic theories to landscape architecture is relatively novel and, therefore, not yet fully integrated into the discipline's theory framework. Given this distance between economic theory and landscape architecture practice, some specific insights from studies on the 'market for lemons' may not be directly applicable or be able to solve the unique challenges facing landscape practitioners and researchers.

However, the concept of the 'market for lemons' addresses the fundamental underlying logic of the impacts of information asymmetry and a lack of information, which remains valuable in any context with products and clients. We believe, therefore, that such an analogy is valuable and can potentially provoke new thoughts and catalyse further conversations.

Overall, in this paper we have not intended to provide concrete solutions to or direct criticism of current practices within the landscape architecture discipline. Instead, our primary goal is to offer a new perspective on understanding the underlying logic of the landscape architecture 'market' and to emphasise the potential role of performance evaluation in enhancing transparency and disciplinary rigour. The analogy is intended to serve as a conceptual bridge to encourage fresh thinking and dialogue rather than providing a definitive guide to how to resolve the identified issues.

About the authors

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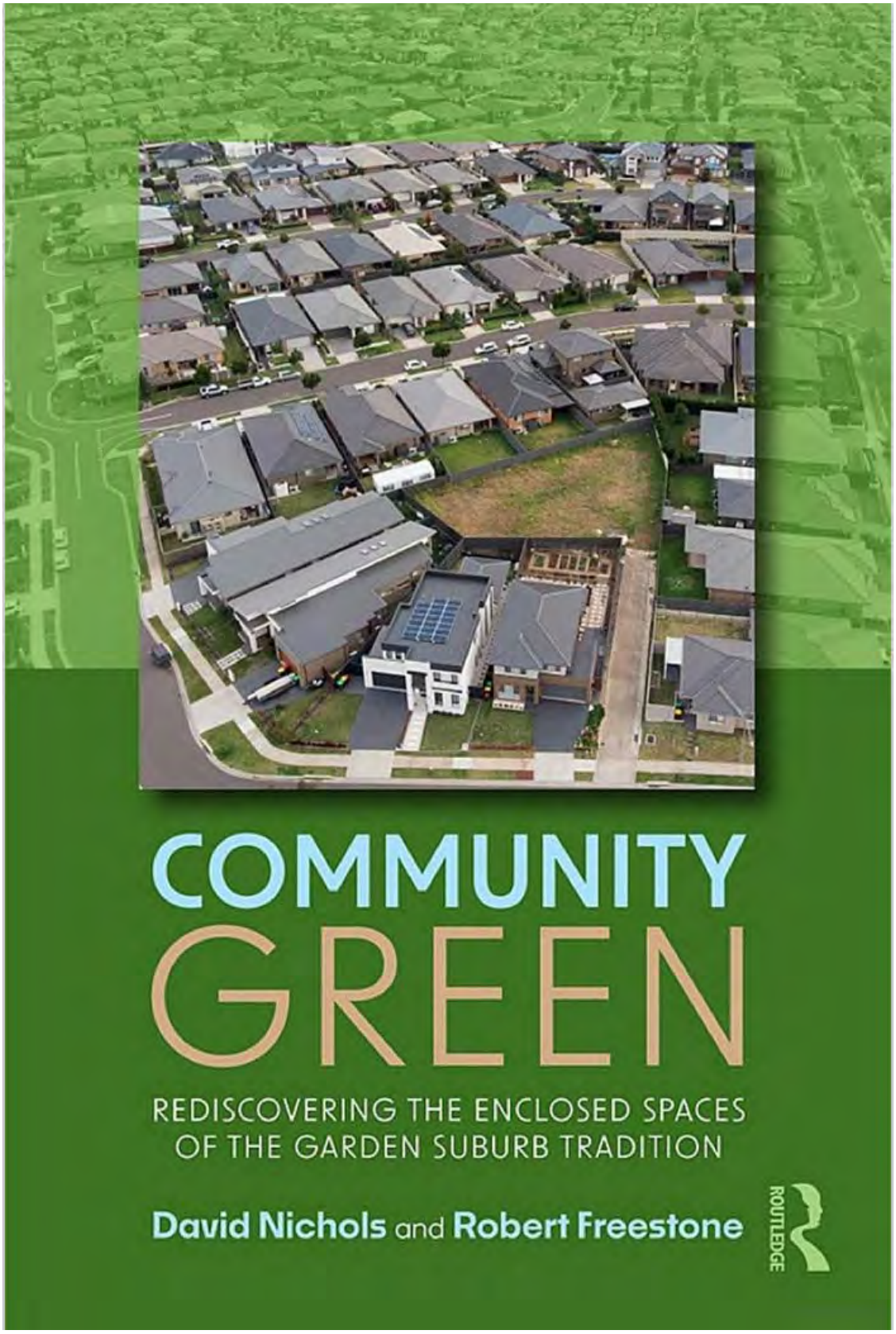

Front cover of *Community Green: Rediscovering the Enclosed Spaces of the Garden Suburb Tradition* (with permission from Robert Freestone, 2024).

LANDSCAPE REVIEW

Neighbourhood open space in suburban liveability

KEN TAYLOR

Community Green: Rediscovering the Enclosed Spaces of the Garden Suburb Tradition, David Nichols and Robert Freestone. Milton Park, Abingdon: Routledge, 2024, ISBN: 978-0-36746-245-1 (softcover).

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This encyclopaedic work by Nichols and Freestone is the result of extensive thinking, international review and research over several years. As the succinct preface page indicates, neighbourhood open space ranks highly as a key component in suburban liveability assessments. In this context, the book connects the past, present and future of planning specifically for small internal open spaces. It resuscitates the enclosed, almost secretive reserve from history as a distinctive form of local open space whose problems and potentialities are relevant to many other green community spaces. This then opens up wider connections between localism and globalism, the past and the future, and connects to broader global challenges of cohesion, health, food and climate change.

Community Green: Rediscovering the Enclosed Spaces of the Garden Suburb Tradition is an extensively illustrated book with an international coverage – including examples of open space that tell human stories of civic initiatives, struggles and triumphs. A strong point is its human focus, and not least those who live with small internal open spaces in residential settings. In this way the book extends beyond a physical urban planning textbook based on the theme that towns and cities are places for people.

The book is both timely and welcome. A major reason for this hinges on the political and governmental reviews and action taking place in cities and towns worldwide to combat urban sprawl by increasing densities, even though the book does not address this phenomenon. As urban areas densify, green spaces integral to the layouts will be needed not only for their value as breathing spaces but also as spaces that are attractive to and for people and for urban wildlife.[1] Examples from the past as outlined in the book, while addressing mainly suburban settings, provide valuable lessons for those contemplating the introduction of new developments in existing residential areas. It is certainly of benefit to any planning proposals to increase densities in existing lower- or medium-density urban settings.

Allied, indeed central, to this consideration is how and why we should be projecting to politicians and planners that people's sense of place in urban areas does not depend on architecture and buildings alone. Fortuitously we are also currently seeing the publication of scholarly and professional papers on the critical importance of green spaces in cities. Flowing from this, an important task is now getting this notion fixed in the minds of politicians and government planning agencies.

The introduction to *Community Green* (pp 1–15) convincingly sets out the logic of the book and its purposes, given that enclosed green spaces deliberately provided by planners have an extensive and usually a strong validity and a legacy, with some in use for over a century. In my mind, this prompts the question of whether the past is indeed a foreign country where people did things differently. The book's central focus is on making a case for a re-evaluation of internal reserves as a distinctive form of local open space that delivers social benefits. This is stated unambiguously on page 2, so that readers should bear in mind that:

KEY WORDS

book review; community green; neighbourhood open space, suburban liveability

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[1] On the topic of urban wildlife, see recent comment from Croeser and Kirk (2024).

> Our history-based argument for the significance, retention and replication of that form examines the ways it has been propagated, misused and misunderstood over many decades and across numerous cities and nations … The book can be read as historical study of the promotion, diffusion, hybridisation, reinvention, and misunderstanding of an innovative idea. It can also be considered as making a case for local city governments and neighbourhoods to heed history when seeking to understand the potential and environmental values of such features.

With this focus, the book logically adopts a historical overview study of community greens to establish a robust test of what does and does not work in their construction, use and governance. Coincidentally the authors do recognise that the character and features of the internal reserve are shared with street-frontage parks, courtyards and variations on the village green. They also state that the book is primarily an excursion into medium- and low-density planned suburbia. Nevertheless, as mentioned above it seems to me that the book also contains lessons for those proposing and constructing increased-density developments in cities as the urban housing crisis mounts – in particular, the importance of appreciating that internal reserves serve a purpose, whether it be active or visual, rather than being just leftover bits of land.

Here I am reminded of a time many years ago in the United Kingdom when, as a young town planner with a developing interest in landscape architecture and landscape planning, I attended a talk on open space use and design. The presenter thought-provokingly suggested there are two main types of urban open space – doing spaces and seeing spaces – and that seeing spaces can be just as valuable as doing spaces. Many of the myriad of examples of internal reserves in *Community Green* are combined doing and seeing spaces such as Greenwood Common in Berkeley, California, USA (pp 156–157). Such spaces avoid being experienced as leftover, soulless places.

As a guide to reading the book, the authors set out four key elements of a genuine internal reserve.

1. **It should be enclosed by residential properties.** The open space forming the reserve is surrounded on all sides predominantly by buildings. In this way, it can be considered a 'backyard extension to a suburban home', which is a concept dating back over 100 years. One example shown is a 1921 garden suburb design for Goulburn in New South Wales, Australia, which comes from John Sulman's influential *An Introduction to the Study of Town Planning in Australia* and shows open access to the reserve (p 109).
2. **It should be at the rear of properties.** Here the authors stress 'rear' means precisely that. The familiar original Radburn layout (New Jersey, USA) – which separates pedestrians and vehicles and treats internal spaces as large internal parks in a superblock where houses have two fronts (one to the street, one to the park) – does not, according to Nichols and Freestone, provide examples of internal reserves.
3. **It should be accessible to all.** Most internal reserves adjoin residences, but may also be available to residents in the surrounding neighbourhood (and visitors).
4. **Its functions can (and probably should) periodically change.** Changes will occur as demographics change over time. For example, a children's play area may morph into a low-key active recreation or community garden as children grow older and move from the area, leaving older residents as the majority.

In the introduction, the authors explain the terms 'Garden Cities' and 'garden suburbs' (pp 7–10) and their relationship with internal reserves. The early town planning movement co-opted both as examples of fit-for-purpose, local open space. Whilst the media and non-experts tend to use the two terms interchangeably, Nichols and Freestone point out that they are not interchangeable.

The garden suburb as a setting for house-and-garden living pre-dates the garden city concept. Ebenezer Howard introduced the concept of the garden city in the late 1890s publication *Garden Cities of Tomorrow*. He advocated for self-contained new cities set away from older industrial cities to provide healthy living conditions for residents. An early example showcasing best practice of a garden city in the United Kingdom is Letchworth Garden City, designed by Unwin and Parker in 1903.

The earlier concept of the garden suburb emerged in the mid-nineteenth century. Interestingly, garden suburbs were anathema to Howard because 'they only ameliorated the horrors of industrial, slum-ridden London' rather than eclipsing it with separate new towns (p 10). It was not surprising that it was also anathema to Unwin and Parker, who designed Hampstead Garden Suburb in England. The suburb consisted of just over 5,000 properties and was home to around 16,000 people. Undivided houses with individual gardens were a key feature. It included 11 interior spaces, some of which were tennis courts, but the majority were allotment gardens (p 43).

Forest Hills Gardens is one of the best-known American examples of early 20th century planned suburbia (p 46). According to the authors, 'the New York Times described it as one of the few American contributions to the "industrial" and "garden" suburbs promoting equality between classes' (p 47). Notably the renowned designer Frederick Olmstead (New York Central Park) was involved, seeing a number of potential uses for the spaces such as for tennis courts, passive recreation, children's play areas and gardens.

The first five chapters of the book are organised chronologically, dealing with the periods 1890–1915, the 1920s, 1930–1960, the 1960s and 1970s, and 1980 to the present day, before the final chapter provides an overview. The text is the outcome of over two decades of progress, thought, research and discussion. It reflects a prodigious effort on behalf of the authors and gives a fascinating look into how the idea of the internal reserve has quietly but steadily developed. *Community Green* is replete with examples and the rollcall of famous names and places in the lexicography of planning history, both practical and theoretical. I recall many years ago a senior academic colleague suggested that when one wants to know in which direction to head, it is a good idea to understand fully where one started. This book certainly fulfils that adage.

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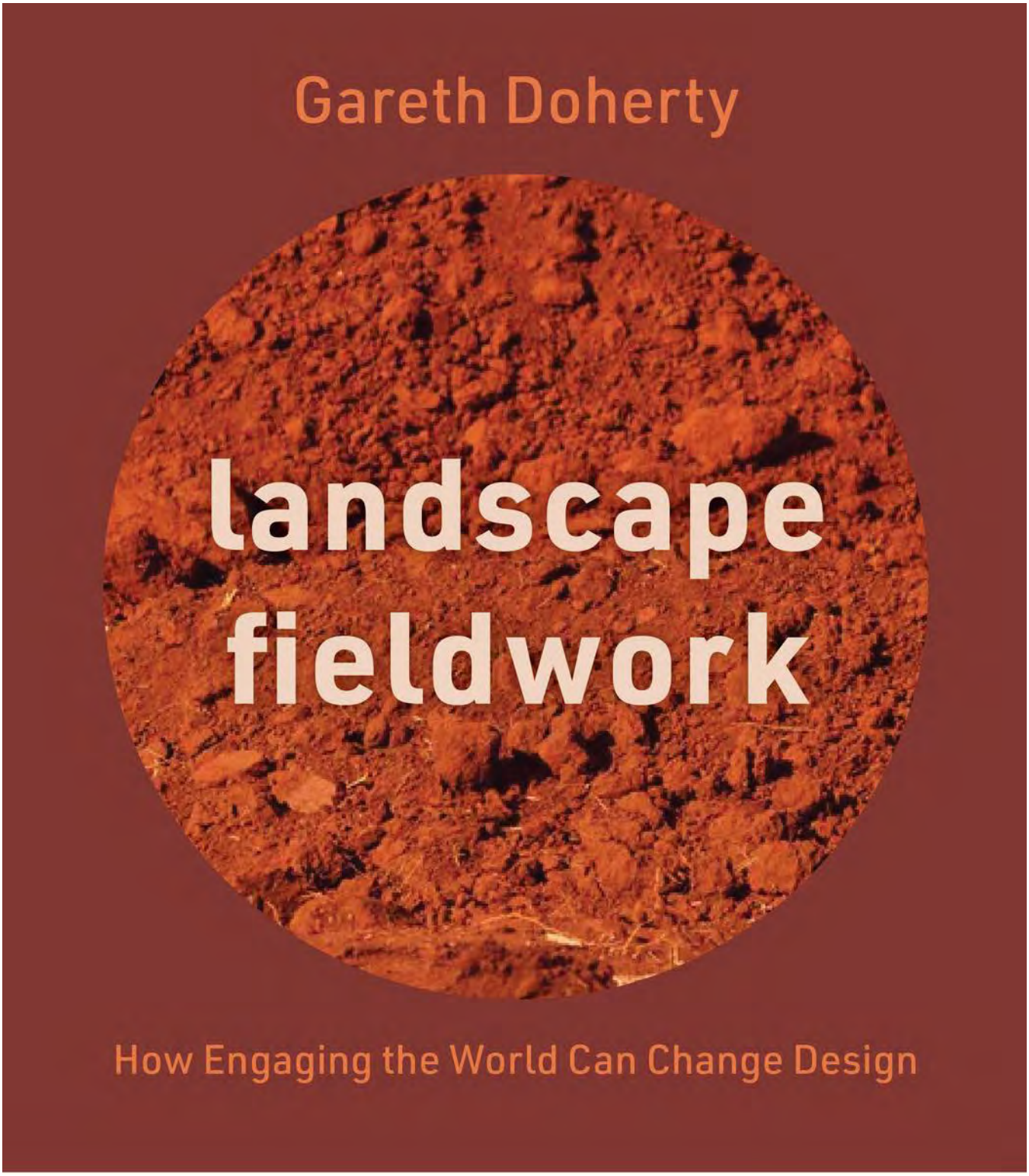

Front cover of *Landscape Fieldwork: How Engaging the World Can Change Design* (with permission from Gareth Doherty, 2024).

LANDSCAPE
REVIEW

A feeling for fieldwork

MARTIN BRYANT

Landscape Fieldwork: How Engaging the World Can Change Design, Gareth Doherty, Charlotteville: University of Virginia Press, 2025, ISBN: 9780813952628 (cloth).

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This book is about methodologies in the field *for* landscape architecture, which of course has always been part of the methodologies in the field *of* landscape architecture. It acknowledges that fieldwork is not new. But the concerns of climate have adjusted the lens, iniquitous power relationships are now more apparent, and the technologies for distancing ourselves from realities have become more available. So, we need to reinvent the way we do fieldwork, because reading about, feeling and tacitly knowing the relationship between a landscape and its people is still core to making creative turns in landscape architecture.

In the Coen Brothers' 2007 film *No Country for Old Men*, a sequence of scenes in a vast, dry grassland leads the narrative. As the pronghorn-hunting Josh Brolin character roams alone in the seemingly endless landscape, a drug-deal-gone-wrong story unfolds with the disturbing immediacy of a wounded pit bull, abandoned cars, trailers full of drugs, dead bodies, a nearly dead body and a cash-filled suitcase. But there is little action. The tempo proceeds at the character's slow and deliberate walking pace in the landscape, guided not by what he does, but by what he sees.

As the camera zooms in and out, filmic drama builds with clues offered by the landscape. Long shots scan the panorama. Close-ups read the ground's fine-grain. The rifle's viewfinder cross-hairs capture a distant tableaux of stillness.

Each scalar iteration of landscape triggers curiosity. The barren mountain horizon explains the dry ground, which confers open grassland for the wild herds, which parallels the lonely congregation of cars, which reinforces the remoteness, which must have invited the subsequent shoot-out, which explains the wounded dog. And then, a tipping point. A hunch turns the hunter/observer into the story's protagonist when he tracks *el ultimo hombre* – the last man standing – to the shade of a lone tree, with a suitcase full of cash.

Gareth Doherty might see parallels between this sequence and the fieldwork methods of a landscape architect. Doherty has just published a memoir of his landscape fieldwork undertaken in part-exotic, part-everyday landscapes that he renders curiously fascinating. They include remote Irish villages, suburban Netherlands, a Bahraini city, Bahaman Cays and Brazilian *terreiros*. In them, he explains a playbook of tactics for understanding the nature of landscape through the reading of scales, the agency of immersion and the application of observation tools. But there is more to this than science. He draws out the feeling of landscape – none more so than in the gripping prologue where, as a young boy with his mother and grandmother, he witnessed weekly cataclysmic land clashes and the occasional petrol bomb in the Troubles of Derry–Londonderry – and carries it through to the spiritual finale when he is sent into a subconscious trance by an orisha's ritual in the *terreiros* of Bahia. And, like the Josh Brolin character, he intentionally blurs observation (fieldwork) with pre-occupation (pre-fieldwork), with catalytic responses (prototype design).

While the Coen Brothers, as film directors, and Doherty, as landscape fieldworker, deal with people as part of the landscape, there is of course a point of departure: Doherty engages with the living.

KEY WORDS

social ecologies; ethnography; fieldwork methodologies; fieldwork design

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Gareth Doherty is notably the co-editor of the important landscape architecture tome, *Ecological Urbanism* (Mostafavi and Doherty, 2016). Its discourse arguably succeeds and differentiates landscape urbanism from ecological urbanism, in that the former proposes the ecology of landscape's natural processes as the driver for urbanism, while the latter, drawing from Felix Guattari's (2000) *The Three Ecologies*, frames an interplay of social, cultural and environmental ecologies as the makings of sustainable cities.

The lineage is salient because Doherty's recent *Landscape Fieldwork* is rich in the people dimensions of its place-studies. In fact, the social and the cultural almost overshadow the discussion of the natural processes of the landscape. This may, of course, be his point: that one learns and knows about a place through the people there, from their daily practices, their language and their customs, and by appreciating local people's engagement with landscape systems. For example, one can only discern an Irish person's attitude to landscape care by finding out who the grandparents supported in the 1922 independence battles. Similarly, the problem of the impoverished 'commonage' in the Bahamas – the non private-island landscape – can only make sense by correlating the inherited dependencies of enslaved descendants with first-hand observations of the too-free-range chickens that overrun the underproductive Cays.

In another important precedent, the work in Bahrain is from Doherty's earlier monograph *Paradoxes of Green: Landscapes of a City-State* (2017). There, he laments the West's importation of an attraction for 'green', which is contrary to the colours of the Bahraini desert and has left locals with an appetite for verdancy that the climate's water regime just cannot support. After living in a green neighbourhood for a year, after endless walking, and after learning the language and particularly its connections between colour and form, he concludes on the essence of the spectrum of the desert's ecologies in understanding and designing for these people and this landscape. The Bahraini story has been adapted to form a chapter in *Landscape Fieldwork*, where the year-long fieldwork is crucial to the book's narrative.

Crucial too are the book's divergent conversations with farmers, residents, shopkeepers, academics, bureaucrats, orishas, prime ministers and presidents. Hence, just as much as it is a playbook for fieldwork tactics, *Landscape Fieldwork* is a memoir. This is not surprising. In fact, one of the underpinning practices of fieldwork for Doherty is ethnographic. Ethnography is both empirical and personal. Because it frames science in a first-person point of view, it necessitates recognition of the biases of the researcher. On the other hand, it also champions the science of first-hand encounters, and thereby eschews our discipline's reliance on reducted and interpreted secondary source mapping in the representation of landscape. Ethnographic fieldwork, Doherty suggests, is anthropology and landscape architecture working together, which explains the intertwined socio-ecological narrative.

The memoir, which proceeds chronologically through Doherty's life, reveals how, in his first project in his home town in Ireland, his design emerged from his own experiences of growing up and knowing the landscape and its people. Then, as a landscape architect, he has to come to terms with the complexity of knowing landscape and people, without the luxury of growing up in its socio-ecological environment. So he experiments in ways to connect people with landscape through design. After the organised chance of social encounters in the Netherlands, he communicates design through gaming. The year in Bahrain showed that flashcards of landscape vignettes enabled communication with locals most effectively. In the Bahamas, he collectivised fieldwork and ran exhibitions for locals with a 1:1 model of a chicken coop and a story about how it could re-domesticate the islands' poultry, make the landscape more productive and empower the locals' independence.

The memoir also diverges into Doherty's conversations with a number of mentors, who may actually be his community of practice because they all share a fascination with fieldwork. They include landscape architects like Geoffrey Jellicoe, Roberto Burle Marx, Anne Whiston Spirn, Ian McHarg and James Corner. They all appreciate the need to dig deep and demystify landscape through fieldwork and, in places like Jellicoe's sacred groves at Shute, they simultaneously want people to feel it, to let it into the subconscious where its mystery can persist.

All of this – the mapping, the conversations, and the prototyping - Doherty postulates is fieldwork. That is, it is work that enables one to know the landscape and its people, and to design with it.

The overlap with design is important: Doherty seeks methodologies not just for describing and representing landscape, but also for prescribing a creative outcome. The outcomes vary in their focus: in Ireland, it is on the process of cut and fill to make a public square; it is on the prototypical chicken coops that are dispersed across the commonages in the Bahamas; and it is on the adaptation of *terreiros* in Bahia so that they can be preserved across the city. The design research work is thereby close-up and human-scaled, but also projects out to the scale of the city, and the country. It is captured, on the one hand, as the memoir that is intensely warm and personal and, on the other, as a playbook of tactics, both of which are what Leon van Schaik (2011) characterises in design research as 'the constant probing of actuality … [to] establish new knowledge about design practice'.

In his critical reflection on deep and complex place studies, Doherty suggests that the intensely local reality of landscape fieldwork is relevant to the urgent global pressures of climate and social equity. In our working-day realms where digitisation of landscape is increasingly available, the domain of fieldwork methods can cultivate creative design projections based on the situated relationship between natural systems and people. Work in the field *of* landscape architecture may be more expansive than it has ever been, but the ethnographic socio-ecological work in the field *for* landscape architecture still offers rich, novel and inspiring outcomes.

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