WHAT IS BOTTOM-UP

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ABSTRACT

There is a substantial body of research that points to energy descent (1,2,3,4,5). In lieu of this, other significantly different forces could drive a number of changes to current thinking in landscape architecture. Examples of these include local food production, community-driven design, and localised wastewater management. While most landscape practice continues to be implemented through top-down process, for example, council driven city projects such as the shared space upgrades to Fort Street in Auckland, in general the theory on this subject suggests bottom-up design as an alternative approach that could address this emerging future in ways more relevant to end users (6). While landscape architects have begun to grapple with these issues, for example, Chris Reed of Stoss and James Corner of Field Operations, there seems to be a 'gap' between theory and practice in the discipline. Through a research by design process a number of principles that describe characteristics of bottom up design have been discovered. These are explained in the text and conclusions are drawn with regard to their possible use in landscape practice.
NEW ECOLOGY

Over the past three decades there has been a shift in understandings of ecological systems, and consequently, the paradigm in which landscape architecture is understood (7). Sometimes referred to as the new ecology, this new paradigm has emerged from an array of interrelating fields such as systems theory, complexity science, ecological science and the humanities. In landscape and ecological theory it is noted that ecological systems are complex, open, non-linear and exhibit emergent or bottom-up behaviour. While landscape theory has adopted this new understanding of complex systems, in particular the concept of emergence, what this means for landscape practice is much less widely understood.

Emergence is a characteristic of complex systems and can be described as the result of a system and its many interacting parts self-organising to produce novel and unpredictable behaviour, which can ‘have the effect of either transforming it or producing some completely new system’ (8). Another way of framing emergent behaviour is ‘bottom-up’. If complex systems evolve by emergent adaptations, it could be argued that the best bet for intervening in a system is by leveraging this bottom-up behaviour.

NEW PRACTICE

The landscape theory suggests a real enthusiasm and drive for bottom-up design methods, with some emphasising the need for implementation (9) and learning by interacting directly in the system. As Jane Woolf writes, “Though design professionals and scholars have made a wide range of interesting proposals that capitalise on landscapes’ fluctuating tendencies, there has been much less conversation about the challenge of implementing such ideas” (10). Facing a chicken/egg scenario, designers want to know how to ‘do’ bottom-up design before doing it; however perhaps the best way to learn a practice is by doing (11). As a response, the author has investigated what a bottom-up design method is, what its implications are and how to do it, using a research by design process elucidating findings by iteration, experimentation and doing through drawing.

BOTTOM-UP DESIGN IN LANDSCAPE ARCHITECTURE

In this section, it is argued that there are a number of reasons underlying the ‘gap’ between landscape theory and practice, which are explained using five overlapping frameworks for understanding bottom-up design in landscape architecture. The purpose of these frameworks is to challenge landscape architects and designers to critically question and understand the assumptions and context they work from and within. These frameworks are:

- Complex vs. Complicated Systems;
- Top-down Thinking, Bottom-up Action;
- Reform, Revolution and Emergent Social Design; and
- Agency of the Designer
COMPLEX VS. COMPLICATED SYSTEMS

While landscape theory has adopted complex systems as a way of understanding the landscape, there is little acknowledgement of other types of systems that behave in vastly different ways, and enable a more thorough understanding of complexity as comparison. The Cynefin framework (12) is an incredibly clear conceptualisation of the different types of systems, which include complex, complicated, simple and chaotic systems. Each of these exhibits different behaviour, and necessitates a different practice for effectively interacting with the system. A complex system, for example, cannot be fully understood and relationships between cause and effect can only be perceived in retrospect. This means designers must interact directly in or probe the system, learning and responding as you go. A complicated challenge by comparison, as Zaid Hassan emphasises, is one in which “the problem and the solution are clearly defined… confusing adaptive, or complex challenges with technical [or complicated] challenges is a classic error” (13).

The design projects that follow on from the landscape theory on bottom-up design often fall into this trap of treating the landscape as a complicated phenomenon that can be understood and controlled, rather than a complex system that can only ever be influenced and directed. A planning approach to design regularly mistakes emergent behaviour for complicated ‘problems’ to be ‘fixed’ with more policy, planning or prediction. In actuality, emergent behaviour is an unavoidable characteristic of complex systems, and it is more dangerous to ignore this reality or try to predict or prevent this behaviour than to respond to it as it arises (14).

TOP-DOWN THINKING, BOTTOM-UP ACTION

The framework of ‘top-down thinking, bottom-up action’, a restatement of ‘think global, act local’ in systems terms (15), provides another way of understanding this gap between theory and practice. Top down thinking is characterised by an ability to step back and view a system as a whole, prioritising connections rather than breaking the system down into smaller and smaller components in order to understand it. When combined with top-down thinking, bottom-up action is not acting without context; it is based on an understanding of the whole and utilising ‘leverage points’, where small-scale changes can influence the larger systems in which they are a part.

While landscape architects have a long history of top-down thinking, the framework within which the profession practices, and the viability of many if not most landscape architectural projects is firmly rooted in top-down action for “validity, funding and implementation”. (16) Top-down action that relies on governmental or corporate buy-in and funding is inherently compromised, and the road from planning to implementation is long and full of surprise dead-ends. In addition, there is evidence to suggest that even when large-scale actions are achieved, such as policy change or large conservation projects, these actions can have limited effects or equally large-scale, unintended and problematic consequences on the system as a whole (17,18,19). This limitation is expanded on further in the following section.

REFORM, REVOLUTION AND EMERGENT

The Reform-Revolution-Emergent framework offers a useful conceptualisation for understanding how designers and landscape architects engage in complex socio-ecological systems or landscapes. When framed in this way, it becomes easy to recognise that landscape architecture as a method for societal transformation typically engages in complex systems by trying to ‘Reform’ the status quo – be it through public policy or through the upgrading of an existing streetscape.

The emergent approach to social transformation is analogous to bottom-up action. Where there is scepticism from top-down governmental and funding bodies (and some landscape architects themselves) around trying a new methodology, especially one that is rooted in experimentation and relinquishing control, bottom-up movements such as tactical urbanism and social innovation (20) are dedicated to using experimentation to create new parallel ways of practice. As Buckminster Fuller famously said, “You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete”. (21) While landscape practice is mostly concerned with the reform of existing systems (such as transport, green infrastructure and public space), deep change in this context comes slowly, if at all. The Reform-Revolution-Emergent framework firmly places emergent and bottom-up action as the most effective way to bring about systemic change.

SOCIAL DESIGN

The landscape theory around emergence and bottom-up design speaks at length in relation to ecological systems, referencing biological concepts and natural processes such as succession (22) and morphogenesis (23). Some literature extends and applies this understanding to social systems, and points to the need for a bottom-up approach which accounts for social processes in landscapes, rather than just ecological. However there has been distinctly less engagement with bottom-up design in highly urban and social contexts, both in theory and practice. This is reflected in the projects that have engaged with bottom up design, particularly at a large scale, which have been more successful when concerned with ecological processes. (24) On the other hand there are projects that may have fully intended to engage in urban challenges in a bottom-up manner but lacked the social design tools for successful implementation. Such projects range from the local and current, such as Kai Auckland (25), and the international and past, such as the Koolhaas/OMA Downsview Park proposal Tree City (26).

Typically, the social processes which landscape practice has engaged with have been those that are outward and visible manifestations of an already-built urban realm. These include, how people use space (most often this refers to recreationally but can include a “wide range of social and cultural functions, from annual festivals to casual encounters” (27), how people and vehicles move through space, and how long people stay in the space. However, the
emergent and bottom-up processes that contribute to urban space are also those deeply concerned with the creation of place, not just the use of it.

Participatory design has perhaps emerged in recent times to address this niche.

Designers under the broad movement of Tactical Urbanism have perhaps had the most success in employing bottom-up participatory design in the urban realm, however this has often been limited to a small scale, such as the block or the street. Conversely, where top-down organisations have co-opted the incremental method of bottom-up design for large-scale projects, the final outcome is generally business-as-usual. This can be exhibited by the permanent redesign for the trial-based pedestrianisation of Times Square, New York, which has just concluded its $55 million reconstruction.

The framework of social design offers a more focussed and ambitious lens for understanding how designers might engage with the more fundamental social processes which create landscapes.

AGENCY OF THE DESIGNER

The frameworks of Complex vs. Complicated Systems; Top-down Thinking, Bottom-up Action; Reform, Revolution and Emergent; and Social Design all contribute to a metanarrative about the level of agency a designer holds. It goes beyond the willingness of the designer to let go of what the built outcome might look like, or to 'compromise' their expertise by enabling community participation. From ideas of complexity to emergence to scale, all subvert the post-Enlightenment ideology of humans as historical change-agents (28). Confronting this paradigm requires accepting the limits of human design, and it is only then, paradoxically, that designers can wield bottom-up design as a tool for change.

WHAT IS BOTTOM-UP DESIGN?

Bottom up design can be explored through doing or drawing. In order to do this one must first be concerned with the idea that the re-making of landscapes is entwined with the perception of where we live. Every landscape has existing relationships embedded within it. And every project has a set of, for want of a better word, criteria associated with it. Doing and drawing require us, as designers, to configure these relationships with a projects criteria in some way. The act of 'doing' this allows for unexpected events to occur. With an inquisitive, drawn (29), and designed focus, thoughtful and responsive landscapes may emerge that strengthen bonds between people and place.

A series of sites within the Mt Roskill suburb in Auckland, New Zealand are utilised as testing grounds for a bottom-up approach to the implementation of some existing community projects. From this investigation, a set of principles has been formulated by the author which underpin bottom-up design. It is important to note that, through design, the outcome of this project has been an interrogation of a bottom-up approach rather than a designed outcome, although this is a by-product of the research.

PRINCIPLES

- Bottom-up design occurs over time, with implementation and then feedback being key stages of the design process, not end goals.
- Bottom-up design thrives off change and uncertainty, working in partnership with forces that will inevitably shape a project in unpredictable ways.
- Bottom-up design is inclusive of the people directly affected by the challenges it is seeking to address.
- Bottom-up design is concerned with building social capital.
- Bottom-up design utilises the small scale.
- Bottom-up design is visionary.
- The following section will elaborate on each of these principles, referring to knowledge that has come out of fields such as landscape theory, complexity science, systems theory, ecological science and design theory.

PRINCIPLE 1

Bottom-up design occurs over time, with implementation and feedback being key stages of the design process, not end goals.

“Designing with time is a little different from designing in space. The design thinker has to be comfortable moving along both of these axes” (30).

In recent times, understandings of design have coalesced around a concept that can be loosely described as iterative design. This can be observed in the rise of various overlapping design movements such as design-thinking, human-centred design, tactical urbanism, social labs, action-research, and research-by-design.

While some of these terms and movements have gained traction relatively recently, the process of iterative design itself is far from new. For millennia, communities have employed iterative design in shaping their world, with some fantastic urban realm examples having been charted by Mike Lydon and Anthony Garcia in Tactical Urbanism: Short-term Action for Long-term Change (31). Beyond human communities, iterative and bottom-up design can be observed in ‘natural’ or non-human systems such as the ecological systems dealt with in landscape architecture.
Bottom-up design thrives off change and uncertainty, working in partnership with forces that will inevitably shape a project in unpredictable ways.

“There are no cheap tickets to mastery. You have to work at it, whether that means rigorously analysing a system or rigorously casting off your own paradigms and throwing yourself into the humility of Not Knowing. In the end, it seems that power has less to do with pushing leverage points than it does with strategically, profoundly, madly letting go” (32).

Where a planning-based approach views emergent behaviour as ‘problems’ to be ‘fixed’, a bottom-up design process feeds off change and uncertainty. As bottom-up design is a process, which occurs over time, the design outcomes therefore hold the capacity to respond, adapt and strengthen over time.

This process is facilitated by emergent ‘events’, which force the designer(s) to respond in ways that could not have been predicted before the event occurred. This general type of design process has been described as adaptive ecological design, adaptive management and designed experiments (33). Many if not most of these approaches are derived from resilience theory, either directly or indirectly (34).

To understand this using a landscape example of an emergent ‘event’: a flood (which is often utilised in explaining resilience theory). If a community garden experiences a flood event, damaging or destroying intensive garden beds, a bottom-up design process could respond in any number of ways. The community may choose to build raised bed structures in the affected areas to mitigate any future flooding. They may choose to reconfigure the garden beds using small cut and fill operations, moving the intensive garden beds to higher ground, and converting the affected area into informal infiltration areas, planting species adapted to wet conditions, such as banana or taro. The community may look further up the catchment where a swale could be implemented. Or there may be a need for storm water devices with larger holding capacity, which could require the community to look at responses at scale. This might include looking at the origin of the overland flow paths and responding at the source.

In a bottom-up design process, what the flood event facilitates is not a more robust design outcome, as this would mean a garden that resists future flooding to a high degree. It is not a more resilient design outcome, as this would translate to a garden that is capable of bouncing back to its original state after a flood. In a bottom-up design process, what actually happens is that the garden changes state and benefits from the flood event.

**PRINCIPLE 3**

Bottom-up design is inclusive of the people directly affected by the challenges it is seeking to address.

The theory and practice of participatory design has gained traction in planning and design disciplines. This can be understood as an emergent response to the failing of urban planning and design practice to address social issues in an adequate manner. In particular, the planning-based approach generally does not take an inclusive approach in the design and implementation of solutions to urban challenges (35). Joi Ito states, “the only way these solutions work is when they’re developed in partnership with the people actually affected by these problems” (36).

This has driven the need for a new practice that goes ‘beyond consultation’; one that recognises and values people as active participants in their urban and public realm.

In a normative civic project there is normally the need to engage in a consultation process; the designer is often required to ‘tick the box’ that shows that a consultation process has been undertaken. In a bottom-up approach this engagement between interested and affected parties is what drives design decisions. This attribute is described by Tim Brown who states that, “Society needs a new approach to innovation that aligns the needs of human beings and the natural world”. “Design thinking which builds on the ways designers conceptualize their work, can provide that approach, and it is not limited to designers” (37).

To fulfil this principle of bottom-up design, social design skills such as communication, facilitation, mediation and organisational ability demand a place in the landscape architect’s toolbox. Designers perhaps need to learn to relinquish control of what the built outcome looks like, and instead focus energy and skills on how to seed, manage and measure the social processes by which the built outcomes are generated.

**PRINCIPLE 4**

Bottom-up design is concerned with building social capital.

Adjacent to the participatory design movement, there has also been a rise in theory and understandings of social capital (38), and how this concept can influence and direct urban planning and design practice (39). There is a growing appreciation of the role social capital plays in all communities. While landscape architecture has a long history of exploring the connections between people and their places, social capital provides one of the most coherent frameworks for understanding the importance of community’s role in the creation of places.

In Understanding the Social Dimension of Sustainability, authors Dillard, Dujon and King describe the social aspect of sustainability, in part, as: “the processes that generate social health and well-being now and in the future” (40). They go on to explain, “the processes are both a means to, and an end of, social sustainability. Indeed, for the social aspect of sustainability in particular, processes may often be more important than outcomes” (41).

This can be understood by using a landscape example of a project for social sustainability, such as a neighbourhood traffic calming project. A guerrilla traffic calming project achieved by a community engaged in a participatory design process (i.e. bottom-up design) may be far more socially sustainable than ‘best practice’ traffic calming measures designed and implemented from the top-down.
Social capital offers a way of qualifying the difference between these two processes, which both achieve a traffic calming outcome. One of these processes builds social capital, while the other does not. A bottom-up design process builds the capacity for community to work together, and in doing so reinforces the pattern for future projects to be accomplished in the same manner. This example makes clear that the process of building social capital is perhaps more important the traffic calming outcome itself.

PRINCIPLE 5

Bottom-up design utilises the small scale.

There have been a number of theorists to discuss the role of scale in urbanism, though it is often viewed only through the lens of physical scale, and not organisational scale. Where New Urbanism critiques the vast scale produced by modernist planning, often referencing a loss of ‘human scale’ (42), landscape urbanism seems to argue for a full immersion into the complex, large-scale ‘megaproject’ nature of our cities today, with the critique placed more on the false dichotomy of ‘landscape’ and ‘urbanism’ (43). While New Urbanism heavily attributes the scale of cities to the age of the automobile, both movements seem to be less concerned with the broader impact of the age of cheap energy on the scale and nature of today’s cities (44). Bottom-up design is concerned with the question: how will both the physical and organisational scale of cities adapt to a changing age of energy availability?

PRINCIPLE 6

Bottom-up design is visionary.

It is accepted that large-scale, top-down projects will always face constraints. Most often the constraints restrict a project to operating within the current (business-as-usual) paradigm. This often results in a project perpetuating the current paradigm, rather than offering solutions which challenge the status quo.

Such top-down projects may or may not begin with a strong vision, however it is without question that because they are dependent on governmental or corporate buy-in and funding they are inherently compromised, sometimes due to vested interests in maintaining the status quo.

Rather than trying to implement a top-down solution that by its very nature must operate within the current business-as-usual constraints, bottom-up design starts with a vision – and takes adaptive, incremental but sure steps towards that vision. Bottom-up design is nimble and flexible enough to work on the fringe of what is currently acceptable and what will be the new norm as large scale forces continue to change around us.

Vision is a powerful and necessary element to bottom-up design. Donella Meadows, one the world’s foremost systems analysts, articulates,

“In my experience that path is NEVER clear at first. It only reveals itself, step by step, as I walk along it. It often surprises me, because my computer and mental models are inadequate to the complexities and possibilities of the world. Holding to the vision and being flexible about the path is the only way to find the path.”
CONCLUSIONS

While the principles and the conclusions that follow read in a sequential manner, with each building off the one before it, in actuality there are innumerable accounts of overlapping, interconnecting and reinforcing: such is the nature of complexity. As the sections ‘An Emerging Practice’ and ‘Bottom-up Design in Landscape Architecture’ posited, the larger context within which landscape architecture operates is changing rapidly. It is important to note that the section ‘What is Bottom-up Design’ highlights just a few of the understandings and practices that have emerged to fill the new niches that are opening the way for a bottom-up approach. These include:

Designers need to interact directly in the complex systems in which they are trying to affect change. This means designing by doing, rather than by planning. Designers must again adopt iteration and experimentation as the primary means of designing in the urban realm, as it has historically existed up until the most recent 100 years of the planning paradigm. Designers need to discard assumptions and predictions about the landscapes they are working within, and instead adopt a learning-by-doing approach to finding things out about a landscape. These localized findings can inform further interaction and intervention in a landscape and its comprising and encompassing complex systems.

Within this process of iterative and experimental design that occurs over time, designers will need to work within a context of change and uncertainty, using this to their advantage. Rather than a robust practice which would merely cope in the face of uncertainty, and rather than a resilient practice which would only bounce back to a previous state after unexpected events, a bottom-up practice welcomes uncertainty into its toolbox. Any unexpected events must be treated as opportunities and in turn be interpreted as the emergent ‘existing landscape conditions’ which form the basis of the analysis phase that is so fundamental to landscape architecture practice. Beyond offering opportunities for learning about and reading a landscape, the opportunities for design are also expanded by uncertainty (not reduced, as a planning approach would interpret it). Rather than a practice that tries to ignore or prevent emergent behavior, bottom-up design enables unexpected events to become opportunities for coming together to learn, design, build social capital and grow stronger overall.

Designers need to engage in the social processes that create the urban realm, rather than those which are outward and visible manifestations of an already-built urban realm. This has to happen not necessarily at the policy level, but at the fundamental and most systemic level of behaviours, attitudes and values. This can be achieved by coming together and working with the people who are most affected by the urban challenges designers are trying to address.
Social capital is both a necessary ingredient for and a product of working in this inclusive, bottom-up manner. The building of social capital then becomes a primary goal for designers, with the resulting capital feeding back into future projects.

Social capital is built primarily at the peer-to-peer level, which points to a certain (small) scale of urbanism which designers need to engage with.

The small-scale character of bottom-up design both allows for and is a manifestation of a practice that pushes the boundaries of the status quo. A visionary, nimble, and flexible practice is one that will be able to navigate an emergent future, at the fringe of our current business-as-usual paradigm.
In the case of a landscape architectural investigation, design thinking and testing is carried out through drawing.

Excerpt: “Creative communities’ guru Ezio Manzini explains, the term refers to shifts in the way individuals or communities act to solve a problem and generate new opportunities. Here, then, innovation is intended as a catalyst for social change – a collaborative process through which citizens can be directly involved in shaping the way a project, policy, or service is created and delivered”.

Barnett describes the main challenge with the Mau/Koolhaus Tree City proposal and the approach to bottom-up design that was taken, which ultimately led to its abandonment part-way through implementation.
process involves drawings that display information (survey, analysis, design) drawing in this sense is more diagrammatic and is used as a tool to gain information on how things work.


(34) Ibid.


(41) Ibid.


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