In creating urban systems that might host disturbance with novelty, self-organisation with adhoc participation, and feedback with planning, we observe the lessons of the field of AI:

Planning is just a way to avoid figuring out what to do next.¹

Brooks, 1987

In his seminal work in Artificial Intelligence, Rodney Brooks developed robots whose internal reasoning process was generated on the fly through interaction, trial and error, and feedback from the real environment. This initiated a fundamental shift in AI, breaking down predominant notions that intelligence resided in knowledge and could be logically reasoned upon with ‘knowledge-based systems.’² Brooks advocated exploratory ‘making’ over theoretical modelling, and saw the potential for simple bottom-up intelligence over higher-level reason. In demonstration of his stance, he declared:

In particular we advocate building robotic insects.³

In their traditional forms, urban and architectural planning can be likened to the redundant ‘knowledge-based systems’ of AI. They perform routine procedures using statistical data and simplified representations, and deduce plans for a supposed, ideal mode of operation. They disregard outliers and do...
not accommodate ambiguity. Foremost, they are incapable of responding in the present.

Just as the field of AI now values flexibility, self-organization and responsiveness, so too must architecture and urban planning develop new modes of ‘making.’ The following introduces a pragmatic model of bottom-up planning called Feedback Architecture in which the programmatic operations of an urban zone are shaped in real time by distributed, interacting ‘tactics’ – groups, events, artefacts – that are driven by participation and responsive adhoc strategies. This model is presented with a view to creating innovative and appropriate modes of inhabitation for the post-industrial city’s new frontier: the Urban Island.

**URBAN ISLANDS + REGENERATION**

The Urban Island is an anomaly of the contemporary city. Through changing patterns of urban commodification, these formerly abandoned industrial sites are increasingly favoured as potential zones for new forms of cultural and commercial inhabitation. On the surface, these vast, iconic spaces could be seen to offer an ideal skeleton upon which to build a new multi-faceted program – they are spacious, have charming old buildings, and their former links to industry mean they are centrally located. But in reality, even though they lie embedded within the functioning city, Urban Islands – as labelled – are inescapably zones of isolation, disengagement and decay.

Encumbered by this inherent conflict, Urban Islands require more than a physical and cultural ‘program’ for regeneration. These sites call for the introduction of a programmatic ecology – a living, adaptive approach to injecting and sustaining activity.

**FEEDBACK + ENGAGEMENT**

In nature and in human cognition, feedback is a process that stimulates development. In humans, sensory information, and its complex processing, allows us to grow and learn, changing paths and making decisions where necessary.
Feedback both motivates and informs further actions. In the natural environment, feedback is the complex exchange dictating the balance between resources and population. Short term feedback enables survival on a daily basis, and long term, multi-generation feedback enables the evolution of a species.

Cities too are organisms that operate, grow and shrink according to complex processes of feedback. In 1961, Jane Jacobs observed:

Cities happen to be problems in organized complexity, like the life sciences. They present situations in which a half-dozen or even several dozen quantities are all varying simultaneously and in subtly interconnected ways. ...The variables are many, but they are not helter-skelter; they are interrelated into an organic whole.  

The accuracy of this analogy has been illustrated more recently in the field of computational modelling, which develops mathematical models that simulate the evolution of complex systems (e.g., towns, cities, and regions) as a function of intricate co-evolutionary interactions between and within them. 

Feedback can also generate and perpetuate negative influence, causing parts of a system to become idle. Within the city, Urban Islands are zones where (programmatic, functional) feedback has almost ceased. After part of a system has become inactive, the energy required for it to be reactivated must derive from more than a single node. Much like a neural network, it needs multiple inputs that share similar valencies or goals in order to create an excitation of a larger area. In the Urban Island scenario, this same analogy applies: broad-based energisation and positive reinforcement is needed to activate and reconnect the dormant region – the disconnected island.

Here, a key condition for viability of the Urban Island emerges. Typically when planning a suburban mall, a theme park or new town development, viability of the proposed plan is judged on its potential to attract future business. Its immediate aim is to engage the inhabitants of a city, and on a greater scale, entice investment and the tourist market beyond. One strategy might be to develop events or...
attractions to assure that the new development brings in enough consumers. On the other hand, and as has already been suggested, Urban Islands may well already possess several layers of potential value: proximity, spaciousness, architectural heritage, cultural history, physical infrastructure. Re-developing and re-branding them to suit some ‘ideal’ market would simply defy the integrity and complexity of their evolution. Rather, it is necessary in this context to conceive of them as systems of historical, physical and cultural richness that lie idle, and which through interaction with citizens, as an integrated whole, can once more become engaged, that is, become activated.

**INTERACTIVE SYSTEMS**

In the 1960s, art installation emerged as a potential form of interactive, temporary architecture. That is, it attempted to do what architecture had always done—produce spaces, places and experiences by adapting existing conditions—but in addition, it placed emphasis on the *participant*. Art thinking in general was moving away from the ‘art object’ towards new forms such as performance and video art. In his influential text *Systems Esthetics* of 1968, Jack Burnham describes a perceivable shift from an object- to systems-oriented culture within which:

...the specific function of modern didactic art has been to show that art does not reside in material entities, but in relations between people and between people and the components of their environment.

Following this logic, within installation art, the audience is an integrated component of the work, rather than a passive, invisible onlooker. Through participation (prescribed, incidental or other) the artwork evolves and progresses over time based on the interactions with numerous participants.

At the same time architecture also underwent changes of a comparable nature. The emergence of the Non-plan theory embodied in Cedric Price’s 1961 *Fun Palace* proposed that buildings need not be planned but rather respond to conditions of users. Spatial design was conceived in the form of systems for enabling potential activity, rather than as a fixed spatial plan. This was in fundamental opposition to...
the simplistic geometry of post-war Modernist approaches. Unlike art, however, architecture did not come to conceive its existence as possible through - and one with - the interaction and participation of the human user. Architecture was, and arguably still is, conceived as infrastructure to contain and enable human activity.

In parallel, urban theorists of the 1960s including Jacobs, Meier and Alexander, developed a theoretical understanding of the city as a complex adaptive system, focussing on connectivity and information flow, rather than physical form.\(^{10}\) This thinking, in parallel with the emergence of the computer era, gave rise to recent notions that the urban environment can be programmed, or guided, using a bottom-up distributed approach, rather than planned using a top-down, geometrically determined method.\(^{11}\) This proposes small modifications of existing dynamics of the city, with the aim of influencing larger patterns in a ‘ripple effect’.\(^{12}\) Roger Sherman explains how processes of the city can be penetrated:

Comprised, like an ecology, of layered, overlapped and nested arrangements of systems and subsystems organized in scale-hierarchic arrangements, these intangible but actual processes and functions—which are materially manifest in the structure, forms and patterns we observe in the city—once understood, allow architects and planners to get at the operations behind them, providing the tools by which to change urban life.\(^{13}\)

Hence, in this and other concepts of participation and responsiveness in art, architecture and urbanism, the capacity for the human user or participant to actively stimulate or influence the art/architecture/urban system is an emergent theme. The artefact and human, together conceived as a system, are able to react and evolve in response to each other and the greater environment. This brings us back to a discussion of feedback, since a key feature of feedback is that it involves the return of part of the output (from a person, artwork, city, machine) back into its input. If the output influences the information coming back in, then even the most simple adaptive system has the capacity to affect future events. Thus a system at any given time is a consequence of actions at an earlier time. Likewise, the human participant is more than an integrated component, but also an active creator of the system.\(^{14}\)
Following Sherman’s speculations for bottom-up architecture and urban planning, it is possible to extract and define a new mode of design common to these three spatio-experiential practices (art, architecture, urban planning). Varying in manifestation and progression, but nevertheless apparent, all three processes involve the design or modification of structures that enable human interaction with a complex system (existing or fabricated), with the aim of stimulating or guiding its development and output. Thus art, architecture, and cities alike are systems that can be constructed or modified expressly to integrate and enable human participation, not simply as a mode of inhabitation, but as a means for influencing the development and direction of the system itself.

This notion for design is especially applicable to the context of the Urban Island. If the Urban Island is conceived as an existing system to ‘be engaged,’ this overlooks the possibility for new, innovative and creative modes of interaction. If the goal is simply to ‘reactivate’ this system it would mean bringing back its former state of operation (e.g. industrial production). Rather, the challenge for Urban Islands is the introduction and integration of meta-systems through which innovative, exploratory programmatic modes can be investigated. These meta-systems must engage and adapt existing systems of the site, upon which a feedback-based participation infrastructure can be introduced. The foundations of these ideas are concretely demonstrated in the following participatory urban development projects.

**PREVIOUS EXAMPLES: ART + URBAN DEVELOPMENT**

Urban development is a theoretical and practical pursuit that addresses issues arising in the urban realm, such as the planning of a new highway or the redevelopment of an old industrial site. The approach presented here is to develop events and frameworks that function as large-scale ‘analogue’ interactive systems within which members of a community can explore these issues in an alternative, engaging way. This avoids a top-down approach to planning, but rather aims to provide a system for motivating and inspiring creative and meaningful participation towards a common goal, while also providing an avenue for expression of opinion not available through traditional urban planning.

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Figure 1
Sample pages from the Tada Manifesto
important aspect of the design of the system is the harnessing and adaptation of existing structures of urban interaction within each context. These include existing methods of information exchange, infrastructures for enabling physical urban change, or culturally specific means of expression of opinion.

The TADA Manifesto: The Old Taichung Brewery is a controversial six-hectare abandoned industrial site in the centre of the city of Taichung, Taiwan. The government has earmarked it as the site for the new Taiwan Art Design and Architecture (TADA) Centre. In an era of economic uncertainty, the programming of an institution to propel Taiwan into the global cultural economy, while maintaining responsiveness and flexibility to local demands and context, is a key concern of the involved parties. Without creating a fixed spatial or infrastructural plan, it is imperative to design a system for enabling numerous people to collectively build a vision and methodology for action for the ongoing development of the centre.

The TADA Manifesto is a document containing 99 so-called guidelines for the design of programs for the TADA site (Figure 1). Rather than proposing a fixed program, the manifesto is an evocative collection of interrelated yet ambiguous statements and images that can be used individually or collectively to stimulate ideas for the site. “The manifesto proposes an alphabet that can be used to invent the site over again. It is a device for generating an endless number of situations. It is a multiplier of chance and a freedom machine.” Some statements are ‘04 TADA means love’, ‘29 TADA has rhythms,’ ‘12 TADA is Dada’ and so on. The original document contains 99 statements, however an important clause maintains that any statement can be modified, and new statements can be added, with only one rule that none can be deleted. Thus it is intended as a participatory document that is developed by all interested parties to be used as a means for communication and generation of new ideas for the program of the TADA site.

Shimokitazawa Urban Typhoon Workshop: Shimokitazawa is a thriving, alternative neighbourhood buried within modern Tokyo. Its narrow street morphology, which survived destruction during the war, underlies the charm, visual complexity, and diversity of its mostly privately owned

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WORKSHOP PARTICIPANTS USE PERFORMANCE TO PROTEST THE SHIMOKITAZAWA ROAD DEVELOPMENT
shops, bars, clubs and restaurants catering to the diverse tastes of its inhabitants. It is a 'sub-culture island' within the city. *Urban Typhoon* was a five day workshop established to provide a framework for participatory activism in response to a massive road construction that the municipality is planning to run through the neighbourhood. The implications of the road plan are that the local culture and unique street morphology will be lost, not only through physical destruction, but also due to the introduction of large, generic commercial centres flanking the 26-metre wide road.

The significance of the workshop was that it generated intense interaction and debate between leading creators and critics from Shimokitazawa, greater Japan and numerous other countries. Thirteen units of ten participants were formed that individually developed creative schemes to address the issue of the road construction (Figure 2). An important strategy of the workshop design was to initiate relationships with local grassroots activist groups and businesses. The feedback from the workshop was the basis for a series of new collaborations between international artists and local activists, enabling the initial structure of the workshop to continue evolving as an experiment in broad-based (international, interdisciplinary) participatory planning for a normally inaccessible, local urban issue.

**FROM INTERACTION TO ACTIVISM**

The *Urban Typhoon* and TADA projects provide a basis upon which to build a multi-nodal, development-oriented participatory system for initialising and motivating community involvement with an Urban Island. As seen, the function of the constructed 'system' within the urban realm is to guide new forms of interaction. If the structure of the system has the capacity to generate new relationships, feedback offers guidance for the participant to instigate change through informed action. Furthermore, beyond action, *activism* is possible. The system encourages meaning to be produced about issues and in ways not otherwise accessible; the system both motivates and protects its participants. Moreover, the nature of interactivity (action and feedback) itself influences a sense of purpose and motivation, as similarly expressed by interactive music developer Todd Winkler:
Interaction means action…Interactivity comes from a feeling of participation, where the range of possible actions is known or intuited, and the results have significant and obvious effects, yet there is enough mystery maintained to spark curiosity and exploration.20

Winkler is describing a system with both constraint and freedom that enables intervention but also continuously generates possible pathways. It implies a system within which semi-autonomous growth or arrangement of structure is able to occur through ongoing participation and feedback. The design and function of such a system is what I term Feedback Architecture.

**Feedback Architecture**

Where architecture traditionally dealt with buildings and structures for long-term human inhabitation, it now must also address systems and their structure as spaces within which the demands for human existence can be fulfilled in temporal and intangible ways. This is not implausible if one observes the increasingly digital and networked methods being adopted in design and construction today. Digital theorist William Mitchell’s vision of architecture in the digital era proposes:

Architects of the twenty-first century will still shape, arrange, and connect spaces (both real and virtual) to satisfy human needs. They will still care about the qualities of visual and ambient environments. They will still seek commodity, firmness and delight. But commodity will be as much a matter of software functions and interface design as it is of floor plans and construction materials. Firmness will entail not only the physical integrity of structural systems, but also the logical integrity of computer systems.21

Exploiting this flexibility of the term ‘architecture’, I will outline three basic points that characterise the emerging definition:

1. **Architecture is an abstract, natural, or man-made system consisting of two or more interacting parts.** For example, cellular architecture, skeletal architecture, software architecture, naval architecture, information architecture, neural architecture, musical architecture, et cetera.
2. **All systems can be said to have an architecture.** A system is a complex of interacting and interrelated components that has structure and, through interaction, behaviour. Structure is the interrelationships within a system that collectively form the ‘architecture’. Structure defines the behaviours between components, and the behaviour of the system overall. It may be fixed, responsive, adaptive, or autonomous.

3. **In the system, the structure embodies the subjective mapping from elements of the human experience to elements of other components of the system.** The human component, which is the human inhabitant(s) or user(s), is an equal and integrated part of the system. For this reason, architectural design is always concerned with human interaction in constructed systems.²²

Hence the practice of Architecture is the art of creating an actual, implied or apparent plan of any complex object or system that incorporates human interaction, inhabitation, utilisation, adoption, manipulation, or participation. The design of the system structure aims to achieve functional/operational and aesthetic/experiential goals through interaction. As a medium in architecture, with its own inherent affordances and constraints, interaction can be used to bring certain qualities to a built environment, just as form, light and sound do.²³

Furthermore Feedback Architecture involves designing buildings, workshops, software, businesses, events, and so on, not as individual modules with a long-term function and commercial stability, but as integrated systems that attempt to address short-term goals directly through human interaction. Each such occurrence can be likened to a game or battle tactic: a course of action to achieve a short-term (localised) goal, but operational within a greater strategy, the overall plan (e.g. to win the game), which may involve complex patterns of individual tactics. Here I adopt Michel de Certeau’s notion of a ‘tactic’; individuals or small groups that are able to establish ‘ways of operating’ within a greater constraining system that rely on improvisation, modification and flexibility to generate creative solutions for ‘survival’.²⁴ In this view, tactics are adaptable in the face of change, and able to take advantage of opportunity that results through change. They are lean, makeshift and responsive, and shape their own unique worlds through creative inhabitation of the system.²⁵

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Considering this blur between roles of participation, design, activism and game play, how can we define the tools and techniques of the Feedback Architect? As illustrated in the above examples, various levels of intensity and responsibility emerge within each ‘tactic’, and throughout the greater system. Organiser, participant, designer, guest critic, facilitator, advocate, are just some of the levels we observed. But in a complex system scenario – perhaps on an Urban Island – where numerous ‘tactics’ are operating simultaneously and adjacently, and the island itself is offering a physical, cultural and historical infrastructure, there is need for feedback between these systems.

Feedback, and in this case development, cannot occur without a protocol, or channel, for communication. As communications theorist Alexander Galloway notes, without efficient protocols the performance of a distributed system (such as the internet) is weakened. The fact is that its strength lies in the very nature of its connections: non-hierarchical, self-organising and open source. In both city and Internet analogies, the capacity for the designer (or hacker) of these systems to become a “better diagnostician,” much like a doctor or mechanic, becomes important. This indicates that the Feedback Architects of the new Urban Island condition, may well be the self-appointed, visionary doctor/hacker-types who little-by-little implement “protological transformations,” either as “terrorist or libertarian,” advocating symbiosis between nodes of a system or systematically creating disturbance in order to generate rebirth and novelty, since even in the optimistic mode of participatory development, reinvention is an essential element of adaptability.


4. For example, the Docklands in London, and in Melbourne, the Old Taichung Brewery in Taiwan, and Cockatoo Island in the Sydney Harbour.


6. For example, the Docklands in London, and in Melbourne, the Old Taichung Brewery in Taiwan, and Cockatoo Island in the Sydney Harbour.

7. Ibid.


11. Ibid.

12. Sherman, R: 2005, If, then: Shaping change as a strategic basis for design, 306090 08 Architecture, p. 104.

13. Ibid. p. 104.


15. Ibid. p. 104.


18. Ibid.

19. For activist activities in Shimokitazawa see: http://stsk.net/en/


23. Ibid.

While ‘tactics’ are portrayed in a positive light here, in de Certeau’s model, tactical operations are a way of avoiding the omnipresent ‘strategy’ – mass production, genericism, multinational institutions.

