

Creativity in Spatial Design Processes: Establishing a Non-Routine Design Approach

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Abstract. This paper explores the implications of a process-based design approach for creativity in spatial design, with focus on landscape architectural design practice. While spatial design is often concerned with deriving ideas and concepts from the existing inventory for the production of site-specific outcomes, more research is needed to investigate other means of creative exploration to generate new and unexpected results. In this paper, a case study is presented that analyses design responses by students to a larger spatial problem through a series of abstracted smaller design tasks. Setting the smaller design tasks deliberately in a not site-related situation and using metaphors allows the designer (the student) to de-contextualise the ideation process. It is argued that through the multi-levelled experiences the process of designing itself can inspire creativity, which contributes to the generation of unexpected outcomes.

Keywords: Creativity, Process-Based Design Strategy, Spatial Design, Landscape Architecture

1 Introduction

This paper investigates the relation between the structure of design exercises and emerging creativity. The aim is explore through a series of smaller design tasks how we could actively engage with creativity in the design process. It is questioned whether parameter can be identified that designers could consider in their design approaches to allow them to consciously trigger creativity. The parameter might become relevant tools for the development of creativity-enhancing design strategies and could be equally valuable to the design profession and education in design disciplines.

While some positions see creativity expressed in the designed outcome or product, (Antoniades, 1992; Plsek, 1997) other authors rather link creativity to the act of designing and process of discovery. (Gero, 2000; Dorst and Cross, 2001; Seggern, 2008) Despite the differing concepts in localizing creativity, a common notion in these positions can be seen in

defining creativity as an opportunity to generate new ideas in order to improve conditions of real-life situations. It has been argued that the impact of creativity on these improvements cannot not only be seen in the novelty of ideas and products but also in the level of unexpectedness in which the design solution reacts to the problem base. (Gero, 2000)

It has been suggested that the creative process requires analysis, organisation and restructuring of existing knowledge, which implies conscious decision-making to identify problems within existing conditions and to propose solutions for improvement. Yet, the active search for design solutions does not necessarily produce novel or even unexpected outcomes. Seggern (2008) for example criticises distinct design strategies in landscape architecture for their inappropriateness to contribute to the generation of new ideas. Until the 1970s, design concepts in landscape architecture were informed by comprehensive site analysis as an attempt to understand existing conditions and to frame the design problem, while design strategies in the 1980s focused on the development of planning scenarios that nevertheless generated predictable outcomes. Both approaches, still taught in landscape architecture programs worldwide, rely on precisely defined processes with expected outcomes that fail to generate creative responses to the complex systems designers have to deal with.

A non-routine design situation has been proposed as the key driver for the creation of unexpected outcomes, which include notions of surprise in and evolution of the design process as reaction to changing situations. (Gero, 2000; Dorst and Cross, 2001) A fundamentally different approach to conventional landscape architectural design processes, not yet generally embraced in contemporary landscape practice, is the "inventive analysis" or "creative inventorying" formulated foremost by Bernard Lassus. (Seggern, 2008) Lassus approaches his design through

the use of small interventions on a site that serve as both analytical medium to explore genius loci, the characteristics of the site, and as artistic experiment to develop narratives for his idea generation. This process-based design implies a high level of uncertainty, unpredictability, discovery and adaptation in the design process.

2 Case Study Experiment: The Hidden Tokyo Design Studio

2.1 Establishing a non-routine design context

This study develops the concept of a "non-routine" design experience in spatial design by translating the process-based design approach into a series of smaller design tasks. Design responses by five teams of landscape architecture students¹ are compared to test the efficiency and performance of the task set up in relation to creativity.

The experiment was conducted in a one-week intensive design studio in Tokyo, in which situational and personal prerequisites for design creativity were challenged through a number of abstract and process oriented design tasks.

Considering that creativity is not - or in rather rare cases - related to one single moment of epiphany as many authors claim, (Antoniades, 1992; Dorst and Cross, 2001; Seggern, 2008) it can be argued that creative processes can in fact be nurtured. Florida (2002), however, claims that creativity cannot be controlled mechanically in a switch-on switch-off attitude due to its "multifaceted" and "multidimensional" quality. Yet, the attitude of creativity can be "cultivated", both in the "individual" and in the context of "society". This suggests that there are prerequisites, both of personal and situational nature that establish a contextual framework to support creative processes.

2.1.1 Situational prerequisites

In exploring and working in a highly contrasting environment, in this case Australian landscape architecture students working in a design studio in

Tokyo, the students' familiar design context is altered dramatically. Working with the relationship between behavioural reaction and site context, the design tasks address the situational prerequisites for design through the use of the spatially and situationally relevant metaphors "hidden" and "other".

It has been widely argued that metaphors can serve as supportive tools to enhance creativity in design, particularly if introduced in the early stages of the design process when perception, reflection and critical thinking is required to identify, understand and structure the design problem. (Schön, 1983; Casakin, 2007; Antoniadades, 1992) In this, metaphors can be used to influence perception and thought processes, as they allow us to us to organize our experiences and thoughts. (Casakin, 2007)

In this study, metaphors are applied with the intention to invigorate the students' cognitive experiences in regards to spatial and cultural aspects, enhancing the reflection about similarities and obvious contradictions. Through these terms, the students are asked to perceive, uncover, characterize and structure the unknown situation in Tokyo as well as to reinterpret and speculate about their familiar Australian environment. It is also expected that these metaphors are able to provide the possibility for close reflection on a personal scale, assisting the students to identify their individual motivation, strength and their very personality as a designer. Thus, the metaphors can be understood as the driving force and connecting element for the entire studio experience.

2.1.2 Personal prerequisites

The second parameter in establishing a non-routine design approach, the personal prerequisite to design, is framed through a process-based design approach that is set up in the series of design tasks, which encourage the exploration of a larger contextual situation on the urban scale without focusing on a specific site. In this, the design process is deliberately distanced from a site-specific and outcome focused ideation process and aims to utilize site as de-contextualised testing ground.

Cognitive science shows that the occurrence of creativity is not only framed by the situational context but also by the individual mindset. Antoniadades (1992) frames creativity as an emerging process of fantasy and imagination in relation to reality. While he situates fantasy in a dreamlike, un-real condition and production of new ideas imagination is closely linked to reality through using the mind to create images as representations of the real world. Where both concepts meet on the "artistic" and "scientific" level, something new and creative can be created.

In addition, creative thinking requires attentiveness to phenomena of the current reality. (Plsek, 1997) It is

¹ 24 students from two Australian Universities participated in the Hidden Tokyo Studio: University of Adelaide (15 students), RMIT University (9 students). The students worked in mixed teams of five and four students, respectively.

necessary for creative thinking to step beyond our a-priory concepts, to maintain curiosity and self-motivation and problem-framing. (Schön, 1983) Plsek defines this moment as "escape" where we break away from early judgements and which allows us to move further. This movement can be understood both as a redirection of the former mindset or a priory concepts and as a state of free flow of ideas. In the development of the studio experiment, attention was payed to avoid the practice of rational thinking and early judgment in the design process in order to create possibilities for students to fantasise on social, cultural and spatial organisations. Studies on design methodology suggest that movement in the design process occurs continuously in the constant reflection and re-evaluation. (Schön, 1993; Cross, 2002; Seggern, 2008) This action requires a flexible and adaptable mind, the acceptance of openness in the design process, risk-taking and self-confidence (Boden, 1991)

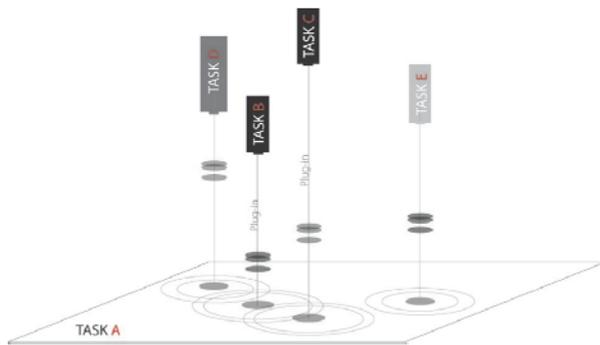


Fig 1. The independent design tasks are sequenced as A, B, C, D and E. The tasks do not relate to each other but are informed by the metaphors "hidden" and "other". The design consequence (grounding) of the "plug-in" technique is deliberately left undefined

2.1.3 Design Task

Based on the understanding derived from situational and personal prerequisites to design creativity, a set of five abstract design tasks was developed. These tasks were structured in a model of "plug-in" tasks. (Fig 1 and Fig 2) In this model, students were asked to explore metaphors of "hidden" and "other" through a set of independent design tasks, interpreting the metaphors in various contexts of space, culture and art. Essentially, the model was aiming to inspire non-contextualized and process based exploration and thereby produce unexpected and novel results free from outcome focus and site context.

The sequential tasks A, B, C, D and E (Table 1) are employing diverse design techniques, media and materials and were executed quickly with regards to time constraints. The students presented the design outcomes in five-minute presentations each day, after conducting site visits and spending approximately three hours on each design experiment. All tasks were group work in teams of five students.

In the second phase each team was asked to apply the essence of the individual design task experiments A, B, C, D and E to a specific site, to inform a somehow collated design ABCDE. Thereby site became a de-contextualised canvas, a testing ground with no attributes other than the ones defined by the students' observations in Task A. The canvas like attributes offered the emancipation from the design object site itself.

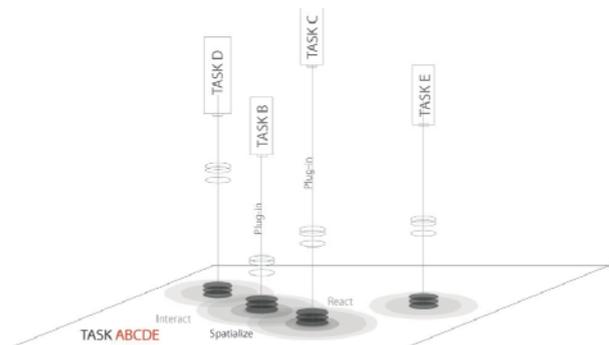


Fig 2. The set of design tasks operate as a "plug-in" system to generate multidimensional overlay of tasks, form & concepts in the second phase of the design experiment

The "plug-in" approach forced students to question means of overlay and integration. Through the approach it was asked to consider multiple aspects of form, narrative and program. Thereby it became possible to create overlays of physical design outcomes, which allowed alternative interpretation of form generation and ultimately could be translated into function. Students framed their design strategies mainly through individual problem-solving techniques such as sketching, note taking and resolution of drawing overlays through combined digital and physical models.

3 Performances

In order to capture and evaluate the effect of the experimental set up of the studio tasks on the creative process, the behaviour and attitude as well as the strategies developed by the students was observed. The observation focussed on the process of resolution of the set tasks as well as the success of the design outcome in regards to rigour and depth of ideas in form, and knowledge generation. In accordance to the modular set up of tasks, we will first discuss the performance in Phase I that deliberately distanced the students from a site-specific outcome, before outlining how students approached the plug-in exercise in Phase II.

Table 1. Sequence technique and product of the plug-in tasks

Task	Technique	Product
Task A <i>Site</i> Tokyo, Odaiba	Experimental mapping through diverse and self selected media such as photography, recording and sketching	Multi information map that challenges the notion of site and defines site as canvas
Task B <i>Mapping Contradictions</i> Ginza Avenues and Laneways	2D and 3D abstract modelling utilizing found objects	Abstract representation of specific spatial conditions in dense alleyways through model
Task C <i>Dissecting the City</i> Saitama Storm-water System “Underground Shrine”	Sections utilizing photography and video	Abstract representation of underground and above ground sites through experimental sections
Task D <i>Edge</i> Yokohama Waterfront	Diagramming and video mapping	Experimental documentation of edge conditions at specific site
Task E <i>(un)Folding Space</i> Tokyo, Tsukishima	Origami modelling and folding technique	Abstract representation of spatial context and use through folded model

3.1 Performance Phase I

In the first task, Task A (Site), the students were asked to produce a multi-layered base map of the site where the final design would be grounded. The wording of the task emphasized on experience and discovery, but made no formal connection to the metaphors “hidden and other”.

The design strategies observed were conventional analytical mappings through photo documentation and sketch/ notations in all five teams. All teams documented the known or obvious parameter of their chosen site strongly based on a first site visit using conventional techniques and tools. The notion of exploration and design creativity was marginal, the main emphasis being quantitative capturing of features.

In Task B titled “Mapping Contradictions” students were asked to visualize the spatial contradictions they experienced in an area of high spatial contrast between luxury retail and hidden public laneways through abstract models. The task description included strong reference to non-outcome defined process and metaphors, but did not suggest material choice or media.

Team 1 developed a comparison of image vs value embedding a consumerism critique, which was represented through material choice (everyday used and found material) and explored the spatial contradictions through material performance.

Team 2 worked with a similar paradigm of highlighting the observed contrasts working with found material (food container and wires) to fabricate an interactive model as an abstract reflection of façade and interior spaces.

Team 3 who worked to fabricate a box that translated the observed spatial contradictions took a similar approach. The outcome was exceptionally crafted, this process however limiting the explorative qualities of the teams’ approach to the task through focus on the final product appearance.

Team 4 chose to focus on the representation of the experience of the spatial conditions observed. In this a book became the medium and was dissected physically uncovering layers of unknown.

Team 5 took the approach of individual reflection through abstraction, working with familiar material brought from Australia.

In evaluating the outcome of task B, the creative process was found to be diverse and producing unexpected results, rather than simple capturing of impressions all teams were successful in generating an abstract response to observed site features through use

of material and capturing of complex situational aspects through abstract models.

Task C again emphasized contrast and metaphors of hidden and other, however focusing on the vertical in “Dissecting the City”. A site visit to Tokyo’s underground storm water management system informed the task. Four teams chose to work with photo collage technique, exaggerating qualitative spatial contrasts in montages. One team took the metaphoric interpretation of functionalism set in the larger context of the city in a montage drawing.

The outcome was less creative than task B, but the sequencing of tasks enabled the reflection on previous success in abstraction. Even though, most students worked with familiar technique, the outcome reflected a degree of abstraction, which was partly observed in the previous task B, yet not in task A.

Task D (Edge) combined a field visit of Yokohama’s waterfront precinct and asked to question spatial boundaries through mapping technique and use of video. The task did not emphasize on contrasts or the metaphors but suggested a non-standard use of media.

All but two teams again focused on the representation of condition/site. One team represented dissolving boundaries through photo collage that highlighted the experiential factors of boundary, however the approach remained superficial. Another team challenged conventions of representation in a flipbook, which was successfully uncovering the edge conditions within the site and thereby reinterpreting the common notion of edges in landscape architecture.

Students perceived the final module in the plug-in tasks most difficult. Task E (un/Folding Space) asked the students to work with the origami paper folding technique to represent spatial conflicts between private and public observed on site in Tsukishima, a quarter with high occurrence of spatial appropriation.

One team produced a modular interpretation of the spatial conditions through a number of folded objects, yet did not utilize the technique of folding as a means of expression. All other teams resorted to folding paper without direction or result leading to discovery. The expression “Origami” seemed to predict the folding technique instead of embracing the concept of fold as medium of discussion.

3.2 Performance Phase II

The second phase in the plug-in schema asked the students to reflect and to extract information from each individual task to inform a design speculation for the site observed in task A. A number of different strategies were observed:

Team 1 worked with the selection of one most dominantly perceived element in the model produced for Task B. In this a feature of the model was taken and implanted literally in site. The other tasks’ works informed the design conceptually, the proposed infrastructure being inspired by observations of edge conditions, and the concept of modularity responding to the folding task.

Team 2 worked to extract one formal element each from all tasks to generate form of proposed spatial elements on site and speculate on how the generated form could be integrated into site context and interpreted functionally. This strategy produced a new and abstract form on site, which did not immediately respond to functional or formal requirements but rather underlined the experimental character of the chosen approach.

Team 3 laid a strong focus on the conceptual interpretation of the set of tasks. However, the spatial design produced did not formally or conceptually respond to the set of tasks, rather a distinct design idea was developed and interpreted to “fit” the themes discovered in the tasks.

Team 4 worked with a strong focus on material and the associated discoveries in the model of task B and generated a highly abstract model, which informed function and connections on site. The other tasks however remained merely conceptual.

Team 5 resorted to splitting the site in five distinct rooms, enabling each team member to work individually on a chosen theme. In fragmenting site, a formal or conceptual overlay became not viable. Yet some of the individual design responses generated form or program, which were influenced by the integration of the individual task set.

Even though the process of deliberate distancing from a “result” in the five individual tasks created a degree of difficulty and unfamiliarity, which led to most teams resorting to simplified form overlays or integration of objects or forms generated, new and unexpected results were achieved which will be discussed subsequently.

4 Discussion

The structural set up in separating spatial context (site) from experimental design ideation in the set of individual tasks was a first component in establishing a non-routine design scenario.

In the design outcomes of the design experiment that built on the structure of de-contextualization, three main strategies to synergise design tasks A, B, C, D, and E into ABCDE were observed:

- a. Focus on form – either reductive, based on only one very strong aspect or a comprehensive overlay, with the aim to equally incorporate all tasks
- b. Focus on spatial processes – further interpretation of pure form generation through integration of spatial and temporal dynamic
- c. Focus on atmosphere & experience – overlay of cognitive experience, cultural aspects, with full neglect of form

The main focus on form (a) is often avoided in landscape architectural design. Yet here form is serving as primary idea generator that challenges conventional concepts of open space design that relate entirely on site aspects and aims to integrate form rather than to drive design through form giving processes. Here, the form driven strategy offers to explore alternative scenarios of spatial use in relation to form, the potential extends to generating new and unexpected user experiences or possibilities for user appropriation.

The focus on spatial processes (b) in itself offers a new perspective on the dynamic processes, which are in landscape architecture generally translated to natural processes and user behaviour. Here the translation strongly relates to three-dimensional space as well as movement and infrastructure, which is directly influenced by user behaviour.

The focus on atmosphere & experiences (c) is a common strategy in landscape architecture as it generally relates directly to site context. But here, used as de-contextualisation concept, the strategy provides two unexpected possibilities: a multi-layered synthesis of experiences over a larger area and therefore more complex and an almost holistic amalgam of urban qualities and the strategy to translate and abstract experience in a highly unusual site with the aim to contrast the contextual condition.

While responding to the process driven method increased creative processes and led to more production and testing than usual, effectively the majority of students did not succeed to synergise the design tasks into a spatial outcome.

Nevertheless the individual elements of the design task enhanced the creative process in most teams significantly. Five main components that helped to trigger creative processes could be identified:

- a. Process
- b. Synthesis and translation
- c. Metaphors and contrasts
- d. Tools
- e. Time

The embracing of process (a) creates a supportive environment for designers and allows to reflect more freely on design propositions. The impact of preconditions and prerequisites are reduced so that alternative scenarios can be developed without limitation of too early judgements. In the landscape architecture context this enhancement of free exploration has shown a great potential in freeing the designers from contextual constraints of site specificness.

The challenging translation (b) of individual design tasks required the students to re-organise their thinking to synthesise the experience of the design tasks spatially. A successful synthesis proved to be more focussed on re-structuring and re-interpretation and was mostly free from outcome oriented pragmatism. Successful performance was often producing highly abstract artistic expressions that generated new knowledge in regards to theoretical concepts and understanding of spatial interrelations.

The use of metaphors (c) proved helpful in determining an overarching theme for seemingly disconnected individual tasks in the further development of a synergetic design brief. In addition the framing of the metaphors through contrasts supported design ideation processes. Contrasts were established through contextual situations and it was found that the more emotionally stimulating the task was framed, the better the performance in producing new and unexpected results.

Also the combination of highly abstracted forms of representation with the situational challenge was found to produce new outcome. Consequently, rigour and depth of ideas in these tasks were perceived strongest. (e.g. Tasks B, C).

Considering a wide array of tools (d) in both, material and media, and encouraging their non-conventional application led to design becoming inspired through material and medium not only by site and context. This allowed the discovery of new interrelations between form and function where both can be simultaneously developed and questioned.

Time (e) was a crucial factor in the triggering of creative processes. The intensive period of the design studio led to very rapid fabrication and ideation “moments”. The freeing from outcome and the enabling of quick design experiments offered a more intuitive approach, where student did not spend much time conceptualising and discussing but rather focussed on making and experiment.

Derived from the situational and personal prerequisites discussed, the tasks set process based design in context with strategic use of metaphors, tools of sequencing and structuring and has led to insights in design processes in landscape architecture.

5 Conclusions

This paper aimed to investigate the relation between the structure of design exercises and emerging creativity. We established and tested a specific non-routine design situation through a systematic approach of non site-specific, non-product driven design tasks in contrast to conventional design practice in landscape architecture.

Five parameter (process, synthesis and translation, metaphors and contrasts, tools, time) have been identified through this experiment, which enhanced the design students' creative performance.

As an alternative design approach to routine situations where problem framing and idea development are closely related to site-specific situation, the applied plug-in model allowed design students to embrace the design process as generative element for unconventional and unexpected outcomes.

We suggest that the freeing from spatial and contextual site aspects through a strategic use of the discussed components process, synthesis, metaphors, material and time can trigger design creativity and produce novel and unexpected results.

In addition we find that this process is particularly fruitful as creativity enhancing strategy in the ideation process. We suggest, however, that in the process of translation into a refined design proposal more direction is needed to keep the creative momentum of non-routine design schemas. More self-consciousness and self-direction on the designer's side are needed to determine an outcome that satisfies in non-routine design solution and positioning in context.

References

- Antoniades, A. C. (1990) *Poetics of architecture: Theory of design*, (New York, John Wiley & Sons).
- Boden, M. (1991) *The creative mind - myths and mechanisms*, (London, Wiedenfeld & Nicholson).
- Casakin, H. P. (2007) *Metaphors in design problem solving: Implications for creativity*. *International Journal of Design*, 1(2), 21-33.
- Cross, N. (2002) *Creative cognition in design: Processes of exceptional designers*. 4th Conference on Creativity & Cognition. Loughborough, UK.
- Daley, J. (1982) *Design creativity and the understanding of objects*. Design Policy Conference. Royal Colleges of Art, London, Butterworth & Co.
- Dorst, K. & Cross, N. (2001) *Creativity in the design-process: Co-evolution of problem-solution*. *Design Studies*, 22(5), 425-437.
- Florida, R. (2002) *The rise of the creative class*, (New York, Basic Books).
- Gero, J. S. (2000) *Creativity, emergence and evolution in design*. *Knowledge Based Systems*, 9(7), 435-448.
- Krull, W. (2008) *With brains, heart and hands: For a culture of creativity in scientific theory and practice*, in: H. V. E. A. Seggern (Ed.) *Creating knowledge*. Berlin, Jovis), 8-11.
- Motloch, J. L. (2000) *Introduction to landscape design*, (2nd edn) (New York, John Wiley & Sons).
- Plsek, P. E. (1997) *Creativity, innovation, and quality*, (Milwaukee, wisconsin, ASQC Quality Press).
- Schön, D. (1983) *The reflective practitioner*, (New York, Basic Books).
- Seggern, H. V. (2008) *Exploration: Creativity, understanding and idea*, in: H. V. E. A. Seggern (Ed.) *Creating knowledge*. Berlin, Jovis), 68-79.
- Stamm, B. V. (2008) *Managing innovation, design and creativity*, (John Wiley & Sons).