Urban Landscapes for Mental Well-Being: Evidenced-Based Design Guidelines

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Negative moods (tension, depression, fatigue, anger and confusion) are reduced as the garden environment offers a respite from urban settings.

Introduction

A body of research, developed over the past few decades, points to the beneficial effects that exposure to nature has on mental and physical well-being. Most studies assumed that all green spaces have the same effect on people, regardless of their characteristics. While it is true that more accessible green spaces are beneficial, Francis et al. (2012) contended that the quality of green spaces is as important for mental well-being. That is, "micro" features of green spaces (e.g., design elements such as lines, form, colour, texture and biodiversity) influence well-being outcomes. as much as "macro" level greenery provision (amount of greenery per capita, walking distance to parks). In fact, the presence of micro features and how they are arranged defines the character and specific identity of that landscape (Martin et al., 2016).

The significance of the quality of green spaces on mental well-being has been validated through a number of studies. For instance, a study in the United Kingdom found a positive association between richness of biodiversity and restorative benefits of urban parks (Wood et al., 2018). In Singapore, a cohort study has also shown that the presence of micro-level park features such as forested areas, water features and unpaved trails for walking or jogging encouraged individuals to spend more time in parks (Petrunoff et al., 2022), which in turn resulted in better well-being in the domains of social connectedness, reduced stress, increased resilience, and an increased sense of purpose and meaning (Petrunoff et al., 2021).

Apart from furnishing urban green spaces with various amenities, can they be further designed to evoke awe and positive emotions in people, to satisfy the innate need of urbanites to connect with nature?

Research Study in Singapore

A recent study by the National Parks Board (NParks) and National University of Singapore was designed to shed light to this question. The research examined the effects of six urban green spaces with different landscape characteristics, pre-evaluated with the Contemplative Landscape Model (CLM), on participants' mental well-being.

Development of the Contemplative Landscape Model

The Contemplative Landscape Model (CLM) was conceptualised and operationalised in 2011, by Dr. Agnieszka Olszewska-Guizzo, as part of her doctoral research in Landscape Architecture and Urban Ecology. Her research was inspired by the notion that among the plethora of different types and components of landscape scenes, there are certain physical attributes or sets of attributes that are more significant than others, in influencing mental health and well-being outcomes.

Upon a thorough literature review on the topics of landscape perceptions and theories of landscape design, as well as visiting dozens of case studies around the globe, a set of potential contemplative attributes was identified. This prototype set of landscape attributes was grouped into categories, translated into a questionnaire, and put through a validity and reliability test, during which a panel of ten respectable experts in landscape architecture used it to evaluate 40 landscape scenes. The process determined which were the items that matched the experts' comprehension of the topic (inter-rater agreement reliability measure) and whether 'contemplativeness', as a construct, matched what landscape architects understood it to be (validity test). The study, concluded in 2015, resulted in the development of the CLM questionnaire, which comprises seven landscape attributes that contribute significantly to the overall score (Table 1). The reliability and validity tests of the CLM had reported high reliability (Cronbach's alpha=0.82, Inter-class correlation p<.01) and validity (strong positive correlation r=0.77) scores (Olszewska et al., 2016).

Pasir Ris Park.

	Layers of the Landscape	Landform	Biodiversity	Colour & Light	Compatibility	Archetypal Elements	Character of Peace & Silence
6 5	·Far-distance view (≥400m) ·Fore, middle & background visible ·Layers greatly enhance the visual quality	·Undulating ·Natural lines ·Stimulation to look up to the sky	·High diversity of plant & animal species ·Vegetation seems native & spontaneous ·Visible changes & motion	·Harmonious, natural, broken or warm colours ·Visibility of light & shade	·Physical & visual relations between elements are worked out ·Explicit spatial order, simplicity, harmony between natural & created	·Strongly influence overall perception	·Explicit ·Contrast to urban environment ·Accessible & safe ·No technology ·Invites to rest and relax ·Gives sense of solitude
4 3	·Layers moderately enhance the overall visual quality	·Landform is not very significant to the setting OR ·Hard to say	·Moderate diversity of species ·Moderate changes & motion	·Moderate amount of contrasting colours ·Moderate amount of light & shade	·Physical & visual relations are unclear OR ·Some elements disturbing the harmony & balance	·Are present but not important for the overall perception	·Moderate AND/OR ·Moderate sense of solitude AND/OR ·Less contrast with urban environment
2 1	·Layers are not visible OR ·Layers do not enhance the overall visual quality	·Flat OR ·Rugged	·Low diversity of species ·No visible changes or motions OR ·Presence of bio-phobic phenomena	·Lots of vivid contrasting colours ·Light & shade not visible	·Physical & visual relations not worked out well or not at all OR ·Chaos, clutter, lack of harmony	·No archetypal elements	·No character of peace & silence ·Busy ·No contrast with urban environment

Data collection during exposure to a nature scene using a multimodal EEG and fNIRS brain imaging device.

Study Method

Data was recorded during participants' actual exposure to the scenes, using a multimodal electroencephalogram (EEG) and Functional near-infrared spectroscopy (fNIRS) brain imaging device. As participants make visual connections with the environment in the experimental sites, it is also important to measure their perceptions. This was carried out using self-reported psychometric instruments.

Results

Participants' mental well-being, which was assessed through analysis of the brain imagery and self-reporting data, were found to be better in green spaces with higher CLM scores (Olszewska-Guizzo et al., 2021). Furthermore, the CLM scoring were significant predictors of the outcome measures (Olszewska-Guizzo et al., 2022).

Translation of Research Findings

To advance the application of the findings, NParks, in collaboration with Dr. Olszewska-Guizzo, developed the "Design Guidelines for Contemplative Landscapes". The publication translates the afore-mentioned research into design principles and case studies, and guides landscape professionals in using the CLM for their design.

The seven components of the CLM, as well as ways to boost the contemplative quality of landscapes through practical examples in Singapore, were described.

Design Guidelines for Contemplative Landscapes – Book Reviews

The publication, which is intended as a resource to help professionals design and implement landscapes that enhance mental well-being, has received positive feedback from key landscape professionals.

SRILALITHA GOPALAKRISHNAN
President of the Singapore Institute of Landscape Architects

The e-book, Design Guidelines for Contemplative Landscapes attempts to equip professionals and students in the field of architecture, landscape architecture, urban planners and urban designers with a framework to evaluate urban green spaces for their effectiveness in providing enhanced mental well-being for its users. The book introduces a Contemplative Landscape Model (CLM) as a quality tool to assess and validate the landscape design features for their influence on psychological health outcomes. The framework, methodology and validation process are comprehensively covered for easy application in practice. The sample case studies to apply the framework and interpret the results for improved performance are extremely useful, especially for students. Quantifying and qualifying the intangible benefits of landscape designs is critical to establish the holistic performance of urban green spaces, and the CLM tool is an essential step in bridging research and practices through its easy-to-follow toolkit. A valuable resource to keep within easy reach for all landscape architecture professionals!

Srilalitha Gopalakrishnan is a landscape architect with over 15 years of professional experience and diverse projects across Singapore, Malaysia, China, Hong Kong, and India. She is currently working as a Postdoc researcher and Project Coordinator for the Dense and Green Cities project at Singapore-ETH Centre Future Cities Lab Global. Her research interests focus on the performance of integrated landscape design in high-density urban environments for resilient and sustainable urban design solutions. She is also the President of the Singapore Institute of Landscape Architects (SILA), representing the profession at various national-level committees and strategic planning groups and chairs SILA's Leadership in Design Strategic Pillar.

HENRY STEED
Chartered Landscape Architect (UK), Past President and current Fellow member of the Singapore Institute of Landscape Architects

Current decision-making across the board is heavily influenced by research that offers accurate and irrefutable mathematical proof that a particular action can be justified. This book, Design Guidelines for Contemplative Landscapes, fits the objective of proving that people immersed in harmonious surroundings, such as well-designed public parks and open spaces, will not just benefit with fitter bodies, but will also have an improved state of mind.

So why is such evidence needed? Mainly because decision makers must understand that providing such facilities ultimately results in a healthy, thriving, efficient populace who love the city they live in, and work hard to keep it that way. It also keeps them out of hospital.

Of course, finance comes into play in evaluating any intended action's value. In this case, there is a perception that taking up potentially valuable land with a park or open space, is economically irrational. Far from it! De-stressed citizens recreating in green public open spaces and shady corridors with outdoor activities such as contemplation, play and exercise, return handsomely in nation-wide productivity, and harmony at every level and age-group.

What is interesting about this analysis is the revelation of what happens to people when they move from a stressful environment to a restful and pleasant one. The response takes place in the brain, which is the organ that suffers from stress, causing all sorts of negative reactions and illness. We already know that walking from a busy street and pressurised office into a green oasis of tranquillity induces positive reactions. Now we can measure it.

The designer needs to take note that not all green spaces have the same beneficial impact. Some turn out to be somewhat lacking in the qualities that induce a calming effect. It seems that the closer the design is to a natural equivalent, the more effective it is. Thus, rigid geometry seems less effective than organic alignments. Screening by plants to separate the hard from the soft, provision of shade to lower temperatures and remove glare, and selection of rich and diverse plant types as opposed to monoculture will boost the psychological effectiveness.

We are moving away from the city of the industrial era, and not before time. Even in the mid-19th Century there were radical moves to reverse the ghastliness of the early Industrial Cities. This included the first Public Parks, the "Green Lungs" of public spaces. It was obvious even then that life in a dirty, polluted pressure-cooker city was not sustainable.

The message went round the world. Life, it said, is not just about wealth creation and industrial output. It is a human issue, where the lives, health and well-being of an entire population must be assured to enable a society to function successfully.

A hundred and fifty years later, we are still working at it, to transform our cities into high quality environments for the benefit of the populace. Health and wellness have become essential conditions for a successful community. Continuous linked greenery, healthy outdoor exercise, contact with nature, separation from massive infrastructure, safe and attractive locations within easy reach, are all hallmarks of the modern transformed city.

This Book delves deeply into this subject and is an impressive analysis and recommendation on how to take Green Spaces, Corridors and Parks a whole lot further. I shall certainly use it, not only to guide my own designs, but as a tool to convince decision makers to continuously take this further: nothing short of transforming the physical environment, and changing the way we do things, where the community is the priority.

My final thoughts relate to the mathematical equation. As a non-mathematician, I realise that everything in this book is what I do every day, and have done for a long time, but in an intuitive way. Now this proves it. I feel good that this is explained so well, and given mathematical credibility to both adherent and critic.

I have always known that to walk into the "Green Air" of a Park, removed from traffic and hot concrete, and to sit on a bench under a tree and relax alone or with family, washes away the grime, stress and noise of the city, and brings me and everyone else to a state of contentment. Now this can be measured and applied to planning and design. Excellent!

Henry Steed is a Chartered Landscape Architect (UK) with 50 years post-grad experience, 40 in Singapore. He is Design Director of ICN Design International, an award-winning firm of Landscape Architects based in Singapore. His experience extends through tropical, arid and temperate zones, in urban, rural and natural environments in Asia, Middle East, Australia and Europe. The making of fine landscapes, to Henry, involves sensitive artistry and hard-nosed technical knowledge of construction and horticulture, to transform urban hardness into attractive landscapes for people to enjoy.

Henry has created every kind of landscape, from nature trails to hotels and housing gardens, parks, campuses, zoos, streetscape, airports, hospitals and high-rise city-centres. Passing on his experience, he teaches NUS Landscape Students, encouraging them to develop the expertise to create their own visions of the future.

The book is now accessible on NParks' website.

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