Asian Journal of the Scholarship of Teaching and Learning Volume 8 ■ Number 1 ■ June 2018

Reflections on Practice

Site Research in Landscape Design Studios

Yun Hye HWANG

Department of Architecture, School of Design & Environment, National University of Singapore

Correspondence:

Name: Dr Yun Hye HWANG
Address: Department of Architecture, 4 Architecture Drive, SDE1 #03-06, Singapore (117566)

Email: akiyhh@nus.edu.sg

Recommended citation:

Hwang Y. H. (2018). Site research in landscape design studios. *Asian Journal of the Scholarship of Teaching and Learning, 8*(1), 133-145.

INTRODUCTION

Promoting "learning by doing" through site research has become a core approach in the Landscape Design Studio modules offered in the Masters of Landscape Architecture (MLA) programme at the Department of Architecture, National University of Singapore (NUS). Through an overview of the MLA studio modules conducted at NUS over the past six semesters, this article consolidates the types of tools and platforms used to implement these research activities, highlights the significance of site research as a fundamental step in the landscape design process, and summarises key pedagogical outcomes. Simply stated, incorporating site research in the landscape design studio modules facilitates systemic teaching and learning in the landscape design discipline.

DESIGN STUDIOS AND SITE RESEARCH

The Landscape Design Studio, a core module granting 8 credits in the MLA programme, aims to develop higher level skills and knowledge in landscape architecture through design projects. Projects are undertaken to explore environmental issues in the urban context of an Asian high-rise, high-density built environment, incorporating the complexity of a cosmopolitan natural world with socio-ecological demands. In the module, students accomplish the following: they learn how to understand site-specific issues⁄demands, acquire fundamental skills and techniques to synthesise knowledge and relevant information, and develop logical thinking and design processes from concept development to outcomes. Site research is paramount to the module because having an intellectual and experimental understanding of a site is a fundamental component of the module's learning objectives.

The studio is split into three periods over one semester: orientation and exercise (4-5 weeks); topic and site selection (2 weeks); design development (5-6 weeks). During the first period, all members of a studio, usually comprising 10 to 12 students, work together as a large group. The items to be investigated within each studio vary depending on the specific studio topic and its objectives. For example, if the studio topic is to propose ecological design strategies for a housing development in a tropical secondary forest, students will need a theoretical understanding of tropical landscape ecology and be skilled in conducting on-site biodiversity research. Similarly, a studio proposing economic empowerment for low-income communities will require students to conduct on-site interviews to gain a better understanding of residents'

demands, along with a literature review of theoretical work on urban poverty. Depending on the topic of the studio, students will select a type of site research based on their own interests; they may investigate issues through individual consultations, small group discussions, or large group collaboration. Each student will have individual design project topics in the second period and may conduct additional site research at this point. Figure 1 shows the structure of the design studio and the process of site research over the semester.

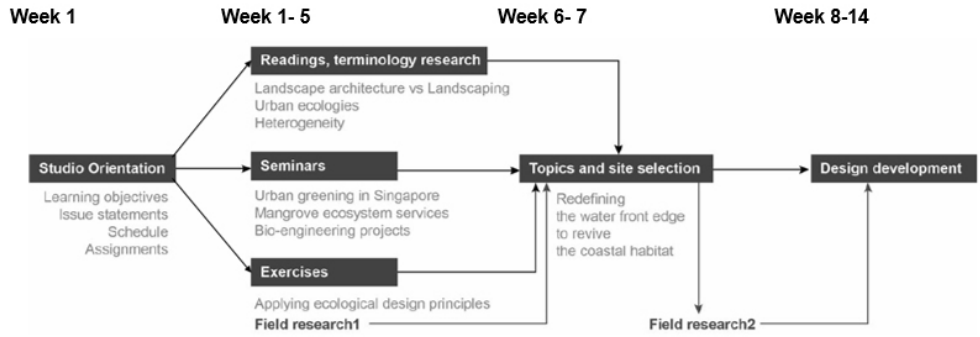

Figure 1. Structure of studios over a semester.

Based on the previous six design studios in the MLA programme (from 2013 to 2016), the activities involved in site research have been categorised as follows:

- **Theoretical Investigation**, which refer to the provision of intellectual input by students, mainly through literature reviews on supporting theories or fundamental knowledge related to the assigned studio topic.
- **Physical Condition Investigation**, where students seek to understand spatial characteristics of sites through field observation, measurements, mapping, drawings, and spatial analysis.
- **Investigation of Intangibles,** in which students examine characteristics such as demography, property values, and social demands; these can be investigated by reviewing newspaper articles, historical maps, interviews, archives, and government policies.

Table 1 shows the types of research activities, items investigated, and commonly used tools and searching platforms.

Table 1.

Types of site research, activities, and tools used in MLA studios (LA4701 and LA 4702, from 2013 to 2016)

Type	Theoretical Investigation	Physical Condition Investigation	Investigation of Intangibles
Activity	Reviews of scientific papers, articles, books, websites	Field observation, site mappings, drawings, measurement, spatial analysis	Interviews, reviews in newspapers, Blogs, old maps, reviews of future developments
Items to be investigated (examples)	- Classification and structure of landscape (tropical forest / public housings) - Urban ecology, ecosystem services, novel ecosystem - Environmental issues (polluted river / deforestation / air pollution) - Natural disasters (flooding/ drought / earthquake) - Socio-cultural facts from South-East Asian cities - Socio-economic issues (land property / urban poverty / unemployment) - Urbanization and peri-urbanization - Case studies of similar projects	- Land form, topography, soil metrics - Infrastructure, road networks, transportation systems - Land use, built environment and associated facilities - Greenery coverage and canopy density - Types of habitat, existing flora and fauna - Microclimate, rainfall - Site specific environmental issues (flooding affected area) - Scenery and landscape view evaluation - Hydrologic system (water source / distribution / protected catchment) - Boundary condition - Landscape typology, types of greenery - Hardscape:softscape ratio - Degree of enclosure, openness, visibility - Heritage trees, valuable patches, heritage buildings - Frequency of usage of space - Pedestrian flows, users activity	- Site history (changes of landscape / landuse) - Social status (demography / population / education level / occupation) - Community organizations and engagement - Residents preference and perceptions - Site related culture and religion - Site specific social issues (vandalism / crime / health / unemployment) - Economic issues (local economy / living standard) - Future development plan / development policy - Existing management / maintenance regimes
Tools and searching platforms	- **Camera/Audiovisual Equipment**. Camera, drone, 6m tripod, 360-degree camera, 3D scanner, Action camera, video camera, voice recorder, GPS - **Measuring Tools**. Laser distance meter, ruler, tape measures, line tapes, scale stick, range finder, forest densitometers, levelling tool, angle ruler, pH level tester, water quality strip, infiltrometer, thermometer, light velocity meter, soil moisture sensor, binoculars, auger, drawing tools, PAR (Photosynthetically Active Radiation), sensor - **Online Maps/Topographical Resources**. Google maps, Google earth, Onemap, OpenStreetMap, One Historical map, GIS data - **Government Documents**. URA master plan, PUB ABC guidelines, NParks design and management guidelines, HDB guidelines, BCA green mark guidelines - **Resources Fom Non-profit Organisations**. Nature Society (Singapore), WWF, UN Habitat, Millennium Ecosystem Assessment, Wild Singapore - **Libraries/Archives**. National Library, National Archive of Singapore, NUS library, Map resource centre in NUS Geography Department		

SIGNIFICANCE OF SITE RESEARCH

Educators in landscape architecture emphasise the importance of the design studio as a forum for building a cumulative body of knowledge through reflective creative work (Armstrong, 1999), so that the studio becomes a generator of both theoretical insights and empirical learning by active doing (Deming & Swaffield, 2011). Of the studio's various teaching components, site research is key; synthesising all site-related data is a basic procedure of designing in the field of landscape architecture, and it should precede any design action (Hill, 2005). Site research can be regarded as an interactive and informative process to acquire input through provocative and objective-driven actions responding to specific problem statements. Site research in a landscape architecture studio has three educational goals: 1) develop a systemic justification process to raise issues and chose design sites; 2) increase the credibility of a project as a core step in design development, and 3) enable various forms of collaboration with others.

Developing systemic thinking process for issues and site selection

Through site research, students learn to critically interpret and articulate a site's latent character and spatial quality. They are challenged to create a compelling project from diverse input and often overwhelming amounts of site information. At the same time, they learn how to systematically organise collected materials and contents to show coherence, thoroughness, appropriateness, conceptuality, suggestiveness, and potential. In fact, this process of synthesis is a unique challenge in landscape architecture; as professionals, we must decide what is important in which aspects and deal with multiple trade-offs and tasks at the same time.

The MLA studios require students to explore ideas through the critical analysis of site-related issues in an episodic and iterative way to generate discourse. My recent articles and studio logbooks introducing the contents of studio projects have demonstrated that students are encouraged to investigate the issues at hand and engage directly with site-specific contexts through intensive site research (Hwang, 2013, 2016; Hwang & Feng, 2015; Hwang, Feng, & Tan, 2016). For example, in a design studio on managing urban habitat loss in a high-density living context, students were asked to articulate which aspects of the habitat loss were particularly problematic based on site research, e.g., loss of a stone fauna species, fragmented forest patches, quantity of greenery, human disturbance of natural growth, or/and landscape preference. Students could not comment with authority on these types of issues before they had performed comprehensive site research. At the same time, they had to learn to identify

Figure 2. Process to develop issues and site for design projects through site research.

a strategic location (design site) to showcase an issue. Figure 2 exemplifies how the items to be investigated in studio settings can be integrated into site-specific issues throughout the site research process.

Increasing credibility and reliability of design projects

The first phase of site research aims to raise issues and to find adequate sites for design projects; in the second phase, students sharpen their personal design strategies by utilising collected data. In this iterative process, students verify the accuracy of acquired information and add additional site-specific information to build credible design strategies for convincing design projects. For example, to implement a design strategy to provide continuity of local habitats in a high-density residential town, students will need to investigate the size and density of the tree canopy, the distance between buildings and forested area, and the height of existing/projected buildings. Some supporting data may come from initial input on the studio topic and related theories provided by tutors (e.g., structural and functional understanding of lowland primary rainforest, urban ecology, ecosystem services of urban forests). The acquisition of other data may require students' independent research and technical measurements (e.g., measurement of water quality) or scientific data found in a literature review (e.g., relationship between patch size and fauna biodiversity). Although the accuracy of students' collected materials may not reach the level of academic rigour which is acceptable for advanced academia, these research activities act as a compelling decision-making tool which can drive the direction of the final design product.

Figure 3. List of field research items written on a whiteboard in the studio space (left); a review session where students share the outcomes of individual site research with studio mates (right).

Capture benefits and value of collaborative work

Landscape architecture has traditionally required the consolidated socio-ecological knowledge with these systems being treated as "layers of the landscape" (McHarg, 1969) and "an integrated medium" of interconnected environmental processes and visible landscapes (Nassauer, 2012). Synthesising accumulative data through collaboration can contribute a level of research that is not achievable by individual efforts in a limited time period. At the beginning of the semester, students were asked to volunteer in one of the three groups (theoretical investigation/physical condition investigation/ investigation of intangible content). Under the direction of the tutor and based on his or her interests, each student would take charge of a couple of research items. The leader of each team consolidates data for a group presentation and uploads them in a shared folder on IVLE (NUS learning management system). The lists of items to be investigated are shared, and the submission format is standardised so that all students are aware of the big picture in field research, even as they conduct their individual field research. Some items, such as a habitat survey using a cross-sectional study, require the participation of all students. They work cooperatively and collaboratively, consolidating materials as a group and sharing responsibility of the site research activities and tasks (see Figure 3). In this way, students experience various forms of collaboration. In fact, participating in a group in a design studio fosters a sense of community (Craig & Zimring, 2000).

PEDAGOGICAL ACHIEVEMENT

Ultimately, field research leads to pedagogical achievement by: 1) enhancing the quality of design outcomes, 2) demonstrating the importance of field research, and 3) carrying with it the potential to be developed as academic research.

Enhancement of quality of design outcomes through integration of site research in design outcomes

There are no clear-cut boundaries between site research and design outcomes in design studios; rather, site research is intended to be integrated into the end product (the design outcome). The skills students acquire from conducting site research contribute to their ability to propose convincing design solutions based on accumulated field research data. Spanning multidisciplinary fields across multiple scales, the data would allow students to identify the strengths, weaknesses, opportunities, and challenges of sites, and to present these findings in an integrated manner (Felson *et al*., 2013). In many cases, the problem statements which emerge as a result of the site research findings have a direct impact by contributing ideas to the design project. For example, if a map indicates ecologically valuable landscape elements and an environmentally protected area within a piece of land designated for a future housing estate, this will inform any decisions on the location of green patches, corridors, and buffers, or the level of intensity of the development. It will contain multidisciplinary perspectives: basic landforms, information on soil quality, water flow, canopy density, fauna attractive plants, and details on the accessibility of the area to amenities.

The quality of the work of the design studios has been demonstrated by the student awards related to the site research. Since 2010, twenty-one design schemes from the design studios have won local and international student awards including those offered by the Singapore Institute of Landscape Architecture (SILA), and the International Federation of Landscape Architecture (IFLA). Figure 4 shows an example of how one design scheme developed from site research culminated in a design proposal that received a SILA student award in 2016 (Sync-Biosis, Students: Chang Mei Fen, Wong Chao Chao).

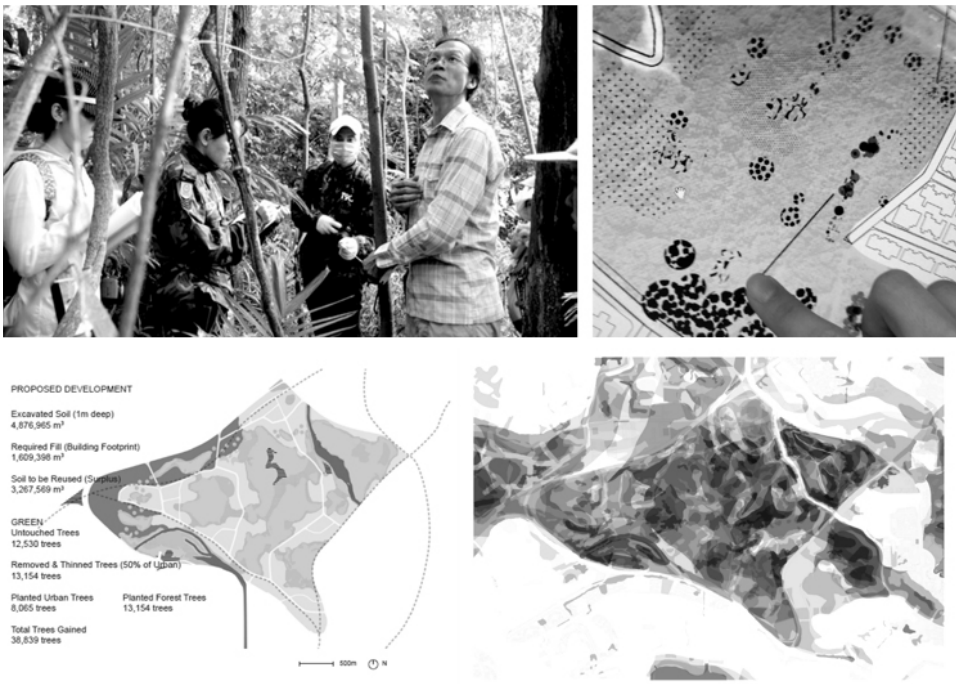

Figure 4. Integrated process from site research to design outcomes where the task is to evaluate valuable patches that should be protected from housing development. Clockwise: On-site research, Data mapping, Site evaluation, Site planning.

Recognition of importance of field research

Site research affects all four criteria of studio grading—contextual understanding (25%), critical thinking (25%), logical design development (30%), communication & team work (20%). Although there is no clear proportion between site research and design outcomes, as explained in the earlier section of this article "Enhancement of Quality of Design Outcomes Through Integration of Site Research in Design Outcomes", the criteria are aligned with the expected achievements through site research that were described in the earlier section of this article "Significance of Site Research". In the section "What You Learned From the Studio", which students had to submit as part of a final report for two recent studios (2015 to 2016), about 80% of students (19 out of 23) provided a descriptive reflection in which they expressed their appreciation of learning through site research. They noted that they had the opportunity to apply their site research skills in a diverse range of tasks, from theoretical studies to hands-on construction. They appreciated that various stakeholder groups, including government agencies, external advisors

in practices, and lecturers from other MLA modules, provided intellectual input on specific site research projects and were directly engaged with students in various site research activities. Examples of student feedback can be found in the Appendix.

In another survey, ten students (LA4701, during Academic Year 2017/18) were asked to indicate the importance of site research as a percentage of the overall studio gradingthe mean score was 81 out of 100, which presumed that students clearly recognised the importance of field research as a core component of the studio.

Academic potential to be developed for further research

Several student projects have been developed as actual implementation projects and/or further academic research. This outcome is in alignment with Armstrong's (1999) argument that the design studio, as a site for education research, is part of a larger research programme. To give one example, the field observation of spontaneous growth of urban greenery in a studio motivated a student to develop her site-specific research findings in a research dissertation and in a paper published in a journal (Hwang *et al*., 2016). Although we cannot confirm that this type of research outcome directly originates from a studio's site research, the richness of knowledge and in-depth understanding of issues generated during the research period can certainly be converted into interesting topics for academic research. Figure 5 shows the interconnections between work done in design studios and students' dissertations and academic outcomes.

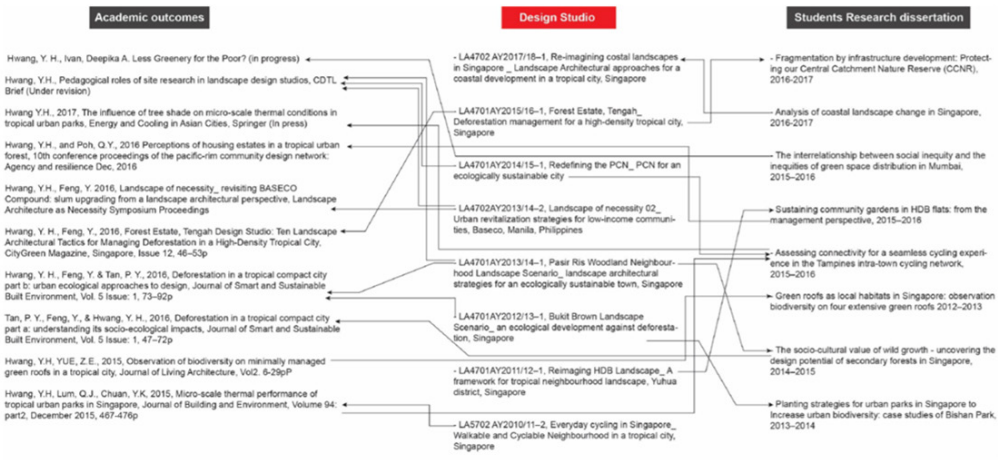

Figure 5. Illustration of the interconnections between work done in design studios, students' research dissertations, and academic outcomes.

CONCLUSION

A common bias is to view landscape architecture as a profession of superficial beautification when in fact, the field of landscape architecture is a complex one which engages environmental and social science disciplines using multidisciplinary and transdisciplinary approaches. In this milieu, site research is an essential working process. In the case of the studios, they allow both tutors and students to keep themselves updated about all kinds of current and impending landscape architecture-related issues in a comprehensive manner. However, there remain challenges and limitations in conducting site research within a studio setting. For instance, the data collected by students may not meet the scientific accuracy required in academia, or the research may end up being unfinished because of a lack of time and resources. In addition, it may not be possible to cover all the latest research techniques, tools, and theories of complex issues. Application of blended learning (online learning platform) with an integrated studio that actively collaborates with other design disciplines may help to overcome such challenges, so further studies are needed to evaluate the efficacy of site research. In sum, however, site research in the landscape architecture studio exposes students to research techniques and academic input, and helps them develop a systematic way of thinking through a site development project from multiple angles, whilst equipping them with the tools required to produce convincing design deliverables and further research. In short, site research in the studio is an essential part of a productive learning environment.

REFERENCES

Armstrong, H. (1999). Design studios as research: an emerging paradigm for landscape architecture. *Landscape Review, 5*(2), 5-25. Retrieved from https://journals.lincoln.ac.nz/index.php/lr/article/view/72 .

Craig, D. L., & Zimring, C. (2000). Supporting collaborative design groups as design communities. *Design Studies, 21*(2), 187-204. http://dx.doi.org/10.1016/S0142-694X(99)00041-1

Deming, M. E., & Swaffield, S. (2011). *Landscape architectural research: Inquiry, strategy, design*. Hoboken, N. J. : John Wiley & Sons.

Felson, A. J., Pavao-Zuckerman, M., Carter, T., Montalto, F., Shuster, B., Springer, N., Stander, E. K., & Starry, O. (2013). Mapping the design process for urban ecology researchers. *BioScience, 63*(11), 854-865. http://dx.doi.org/10.1525/bio.2013.63.11.4

Hwang, Y. H. (2013). *Bukit Brown landscape scenarios*. Singapore: CASA, Department of Architecture, School of Design and Environment, National University of Singapore.

Hwang, Y. H. (2016). *Tagore forest landscape scenarios: landscape architectural approaches for a housing development in a tropical city.* Singapore: Centre for Advanced Studies in Architecture, Dept. of Architecture, School of Design and Environment, National University of Singapore.

Hwang, Y. H., Feng, Y., & Chang P. M. F. (2016). *Forest estate, tengah: Landscape architectural tactics for a high-density tropical city.* Singapore: CASA, Department of Architecture, School of Design and Environment, National University of Singapore.

Hwang, Y. H., Feng, Y., & Tan, P. Y. (2016). Managing deforestation in a tropical compact city (Part B) Urban ecological approaches to landscape design. *Smart and Sustainable Built Environment, 5*(1), 73-92. https://dx.doi.org/10.1108/SASBE-08-2015-0023

McHarg, I. L., & Mumford, L. (1969). *Design with nature* (pp. 7-17). New York: American Museum of Natural History.

Nassauer, J. I. (2012). Landscape as medium and method for synthesis in urban ecological design. Landscape and Urban Planning, 106(3), 221-229. http://dx.doi.org/10.1016/j.landurbplan.2012.03.014 ■

APPENDIX. Examples of Student Feedback on Learning by Doing Site Research

'We were taught to survey the forest, gather data and analyze the site in great detail. I was intrigued by the marvels of nature and how the tiniest details that we had uncovered about the forest could eventually be translated into our design proposal. The academic journey started off with rigorous research and analytical thinking, and ended with an evaluative process of designing the outcome of the landscape of the Tagore forest after a presumable number of years.'

- Sun Hao Jen Ashley, LA4701 AY16/17

'The focus of the design is on a macro scale compared to the micro scale we did previously. I learn how to consider multiple aspects of the environment and do site analysis more thoroughly. Instead of designing a site, we are designing connections and links that function on multiple levels. Moreover, we have to justify our own site with the analysis of the area. This studio is an eye-opening one as it opens me up to a greater issue of the field and relationship of design and environment. This will help me to have a more holistic and considerate design in the future.'

- Wu Yu-Chen, AR3101a, AY15/16

'Both site analysis and data collection were really new skills to me as these were to be emphasized and done in detail. Although I struggled during this process, I learnt a lot. It has greatly opened my mind and is definitely a learning process that is valuable for all of us.'

- Neo Jasmine, AR3101a, AY15/16

'The past four months have made me realize that the landscape architecture design should be grounded in reality and research. Working on our project was tough at the start, but gradually, we learnt to think in a logical way to make a convincing design through a large amount of research, material reading about ecological concepts, trekking through the deep forest, constant discussions, thinking, mapping and interviewing the residents. Those invisible attempts are worthwhile and they provide abundant supporting information for design. All these gains in this semester will become useful tools for further explorations in the future.'

- Su Yuting, LA4701, AY15/16

'The process involved intensive research, critical thinking, mapping and analysis, all of which helped build a foundation of knowledge on Singapore's landscape. From the macro-scale of greenery and forest types, to the micro-scale field research on species mapping, to case studies of Punggol, it was an endless evaluative process in designing a timeline for the development in Tengah. Through these, I have learnt the different possibilities of sustainable development and thus critiquing Singapore's shortcomings in this aspect.'

- Chang Mei Fen Pearlyn, LA4701, AY15/16

ABOUT THE AUTHOR

Yun Hye HWANG is an Assistant Professor at the NUS School of Design and Environment. Her research, teaching, and professional activities focus on emerging demands in fast growing Asian cities by exploring ecological design and management against manicured greenery and the multifunctional role of everyday landscapes. She focuses on transferring knowledge of urban ecology from academia to practice through active interdisciplinary and transdisciplinary collaborations.