Interior as "Living Machine": Connecting Ecology and Interior

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Biography

Paramita Atmodiwirjo is a senior lecturer and Yandi Andri Yatmo is a professor of architecture at the Department of Architecture, Universitas Indonesia. They obtained their Master's and PhD Degrees at the University of Sheffield. They were the recipient of Asia Pacific Holcim Award for Sustainable Construction in 2011 and Indonesian Architects' Institute Jakarta Chapter Award in 2012. Paramita's works focuses on architecture and interior education and the relationship betweem architecture, interior and users, while Yandi's works focuses on the development of design methods for architecture and interior.

Abstract

This paper describes the agenda of an interior architecture school to strengthen the ecological dimensions of interior architecture design practice. Rather than seeing ecology as a set of environmental contexts and constraints that the design practice should comply with, ecology is positioned as the primary starting point from which design ideas can be generated. The idea of interior as "living machine" becomes the starting point of understanding ecology as the interiority of the context. Understanding interior as "living machine" means exploring how the ecological system works in a certain context, how the elements of the system form a dialogue with one another. It also suggests the importance of every single element and event within the living processes, and this requires an ability to see interior and its elements in a more detailed and systematic way. The idea of interior as "living machine" could open up various possibilities of injecting ecological dimensions into an interior context. It promises the emergence of fresh, ecologically-appropriate ideas on how interior should be defined, developed and materialized.

This approach offers an important contribution from interior architecture education to promote more responsible design practice.

Keywords: interior, ecology, living machine, design ideas, performance

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Ecology: Knowledge and performance

Ecological knowledge has been increasingly considered as important in the education of interior architecture and interior design. In European Charter of Interior Architecture Training established by European Council of Interior Architects (ECIA), it is included in one of the discipline specific criteria: 'General knowledge and understanding of building and interior products, materials, finishes, maintenance, and of the concept of sustainable building methods and materials and ecological aspects' (ECIA 2013). The International Federation of Interior Designers/Architects ((IFI) Interiors Declaration also stated clearly that: 'We practice our profession with highest regard for engaging with the world's economic and natural resources in a sustainable manner … Interior designers and interior architects synthesize human and environmental ecologies and translate science to beauty addressing all the senses' (IFI 2011).

Various approaches have been attempted to integrate ecological aspects within interior design process. Most often the approaches involve the technical performance, including the selection of materials and products that are ecologically appropriate, the design of building components, interior finishes and furnishings, and the improvement of indoor environmental quality (Winchip 2011). These approaches tend to emphasise an ecological interior design approach based on the measurable performance of interior space and compliance with technical performance standards (Sorrento 2012). They also imply that the ecological performance of building or space could be expressed as the quantitative reduction of energy consumption, material-embodied energy, waste and use of resources, which is termed as *eco-technical logic* (Guy and Farmer 2001)

To ensure compliance with ecological performance, technological and environmental knowledge become important. In interior design education, the idea of ecology as technical performance is often manifested into knowledge of technology and environment. Technology

and environment courses are usually offered in parallel with design studio as a way to equip students with ecological knowledge to be integrated into their design projects. This, however, implies that ecological knowledge tends to be positioned as complementary or periphery to design process. Moreover, ecology is often considered as environmental contexts that set certain limitations or constraints for design process. Ecology tends to become a set of limits rather than the core ideas of the design.

This paper seeks possible alternative approaches to bring ecological awareness as a more fundamental principle for interior design process. Rather than seeing ecology as a set of environmental contexts and constraints to comply through design, this paper proposes that ecology could have a stronger position as a primary starting point from which design ideas are generated. It proposes the possibility to shift the role of ecology from merely as interior contexts to the more critical role as core design ideas. This shift of perspective may define a new agenda of interior architecture/design school to strengthen ecological dimension in interior architecture design practice. To develop this new agenda, we should begin with understanding the fundamental concept of ecology and how it relates to the idea of interior and interiority.

Ecology: Relation

The term *ecology* incorporates the idea of relation: 'By ecology, we mean the whole science of the relations of the organisms to the environment including, in the broad sense, all the conditions of existence' (Haeckel, in Kulper 2010, 68). The term ecology has been widely used in the study of built environment, emphasizing how man-made elements could be understood as an integral part of its environment, and how the relations are developed among environmental entities. Hence *relation* becomes a key idea in understanding ecology. Within interior design discourse, a special issue of *IDEA Journal* in 2010 was dedicated to the special topic of 'Interior Ecologies', and the introductory article suggests that 'ecological thinking applied to interiors is predicated upon relational thinking' (Lee 2010, 6).

In thinking about ecology as relations, it is important to understand the characteristics of the relations among elements. 'Ecologies are characterized by ongoing, open-ended, animate negotiations within and between complex entities' (Stewart and Sherringham 2010, 14). Through ecological thinking, any elements should not be considered isolated or independent from their broader contexts. The understanding of ecology as relation also suggests the idea that each entities of environment is always part of its contexts: 'Objects are always objects-in-

relationship, as organisms are organisms-in-environment' (De Kay 2011, 267). Thus seeing interior from ecological perspective forces us to consider interior elements, parts or spaces in relation to broader environmental contexts.

Ecology: Interiority

An understanding of ecology as *relations* is critical to the idea of interior and interiority, as a fundamental idea behind the interior design. Interiority refers to the abstract quality that are important in defining the interior. It is a 'theoretical and immaterial set of coincidences and variables from which "interior" is made possible' (McCarthy 2005,112). This definition of interiority could be discussed further in relation to the idea of ecology in the understanding and making of interior. Ecology concerns with the relation among different parts of the environment; it suggests the importance to consider the presence of interior entities within their broader context, and it also involves the negotiations within and between entities (Stewart and Sherringham 2010). If interiority could be understood as a set of variables from which interior is made possible, then these variables are manifested as the ecological patterns of relationship, which together make possible the interior.

Another definition of interiority includes 'the internal logic of tectonic structures' that emphasizes on part-to-part and part-to-whole relationships (Rahim 2010). According to Rahim, designing from interiority means designing based on the internal logic and through the control of part-to-part and part-to-whole relationship. This understanding of interiority locates the idea of ecology – which is essentially relations – as the interiority of the built form. Hence the ecological perspective of interior becomes an approach to comprehend the interiority of the built form, as how a form relates to its contexts.

The understanding of ecology as relations has some implications on how we see, map and represent interior. By thinking ecology as relations, then ecological approach to interior design emphasized on a system of relationships. This understanding has a further implication on shifting the way we design interior, from *technical system design* to *living system design* (Sorrento 2012). While technical system design focuses on the performance of built form, living system design focuses on the connections and interrelationships. Within interior design context, the understanding of interior as living system is essentially the understanding of its interiority.

The following section will illustrate further how the understanding of interior as living system could become the basis for ecological interior design process. By designing interior from the perspective of living system, it is possible to address ecological aspects of interior more deeply and comprehensively, as will be illustrated in the following interior design education approach.

Ecology: Interior as "living machine"

The idea of ecology as the main perspective in defining interior design methods and approaches was implemented in the final year interior architecture studio at Universitas Indonesia. The studio explored the idea of interior as "living machine". The idea of living machine was inspired by various ideas of "machine" as explored and applied in architecture and interior, especially Banham's ideas of anatomy of dwelling as illustrated by Dallegret that suggests the dominance of building machinic system over architectural enclosures (Banham 1965).

Banham and Dallegret's work was particularly important as it proposed a dramatic shift in seeing architecture as shelter and enclosure into architecture as system and as the conditioning of the life within. This represents a shift of priorities 'from enclosure to building systems' (Kulper 2010, 84). In this understanding, the built form is no longer seen as enclosure or envelope but rather as a system that works within and defines its inhabitation. In this design studio, this shift of perspective is brought further into design learning. The aim was particularly to consider ecological aspects not merely as contexts, limitations and constraints, but to bring it further as the core design ideas.

The fundamental question in designing from ecological perspective is: 'How can we find or generate form that reflexively orders and is ordered by process?' (De Kay 2011,70). In this studio, the design process was initiated by the students' readings on ecology and inquiry into certain living system in the environment. Understanding interior as 'living machine' requires the understanding of dynamic living processes that are embedded in an existing context, as natural processes that are important to ensure the good living of all the inhabitants. This may vary from understanding of systems embedded in certain biological living process, systems embedded in human relation to his environment, or any other systems.

This inquiry allowed the students to examine how a system works, and various kinds of dialogues within the system; the dialogue between the animate and the inanimate, the built and the natural, the part and the whole, the small and the large, the dynamic and the static. It

allowed the students to explore the elements that made up the whole system, and how the relationships among elements occurred and affected the performance of the system. This became an inquiry process that promoted the students' understanding of interiority of the ecological contexts they worked with. This understanding of ecological relation as the interiority of the contexts in each project then became the foundation for students to develop their own creative interior design ideas.

The following two examples of students' projects under the main theme 'living machine' illustrate some possible ecological approaches of interior design, which were primarily driven by the understanding of interiority of the contexts.

Project #1: Living liquid habitat

In the first project, the student investigated the living system of water as the living habitat of Koi fish. This project was initiated by understanding how the process of water purification plays an important role ecologically as well as aesthetically to support the habitation of Koi fish. This example illustrates that the understanding of interior as 'living machine' requires the understanding of dynamic living processes that are embedded in an existing context, as natural processes that are important to ensure the good living of all the inhabitants.

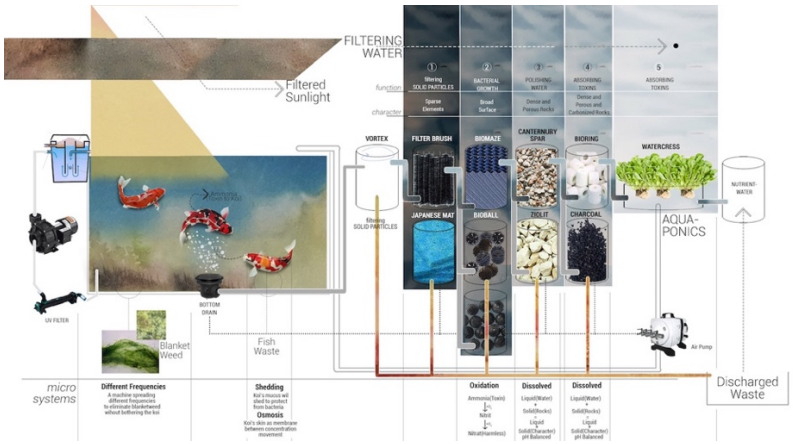

Figure 1. Ecology of Koi fish living habitat as the generator of interior ideas
(Images by Astidira Apti 2016)

The student's inquiry into water living system as the habitat of Koi fish involved the identification of the different materialities that occur in the water purification process, the investigation of dialogue between materials and water, and how such dialogue became the generator of interior spatial quality. This inquiry allowed the students to examine how a system work, and various kinds of dialogue within the system. It allowed the students to explore all

elements that made up the whole system, how they are all related and how they affected the performance of the system.

Figure 2. Dialogue among materials, water, interior space and programmes
(Images by Astidira Apti 2016)

The project was developed in an existing old warehouse complex located in a sinking part of an urban area. The project responded to the relation between existing buildings and the surrounding water by injecting the process of water purification system into this context. Functionally, it provided an interior setting with educational program to build awareness on the importance of water ecological system particularly for Koi fish, and generally for all living species. The understanding of water habitat defined the sequential events of interior spaces. All the spatial programmes are defined in relation to the water purification system. The system also defined how the spatial intervention is performed within the existing building structure, and how the relevant interior materials and furnishings are inserted into the whole system.

Project #2: Growing interior playscape

The second project, The Growing Playscape, took the starting point from the tree growing processes, which involved the growing media and the climatic context where particular types of trees could grow. The inquiry was made into the different types of growing media and the different types of climatic condition, and how their characteristics became important for the survival of the trees. Here the student made a thorough analysis on each type of material involved in the growing process to understand its material properties and characteristics.

This project took the starting point from the tree growing processes, which involved the growing media and the climatic context where particular types of trees could grow. The inquiry was made into the different types of growing media and the different types of climatic condition, and how their characteristics became important for the survival of the trees. The understanding

of how the dialogue was established among trees, growing media and climate became the basis to define the quality of interior space.

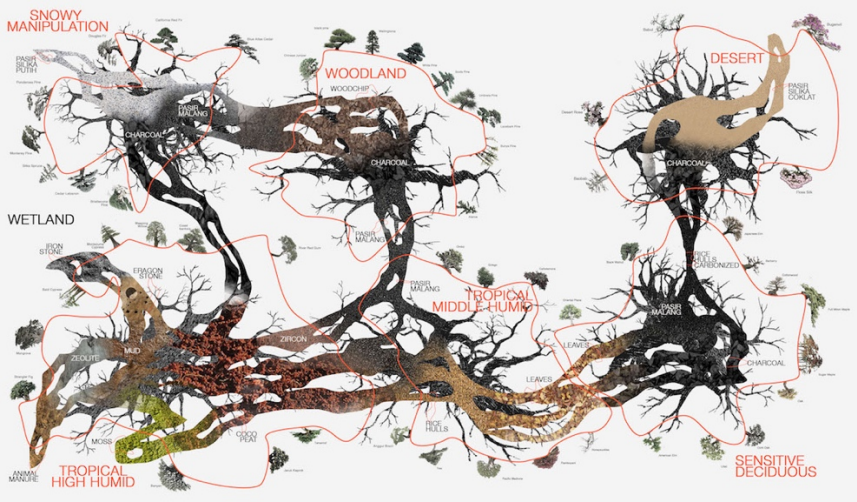

Figure 3. Investigation into the role of growing media as living habitat of trees (Images by Edo Septian 2016)

The project was developed in an old, abandoned building in the Old Town area. The ecological system of tree growing habitat was injected into the interior setting with the programmatic function to provide a playscape for body physical training and adventure. The understanding of how the dialogue was established among trees, growing media and climate became the basis to define the quality of interior space.

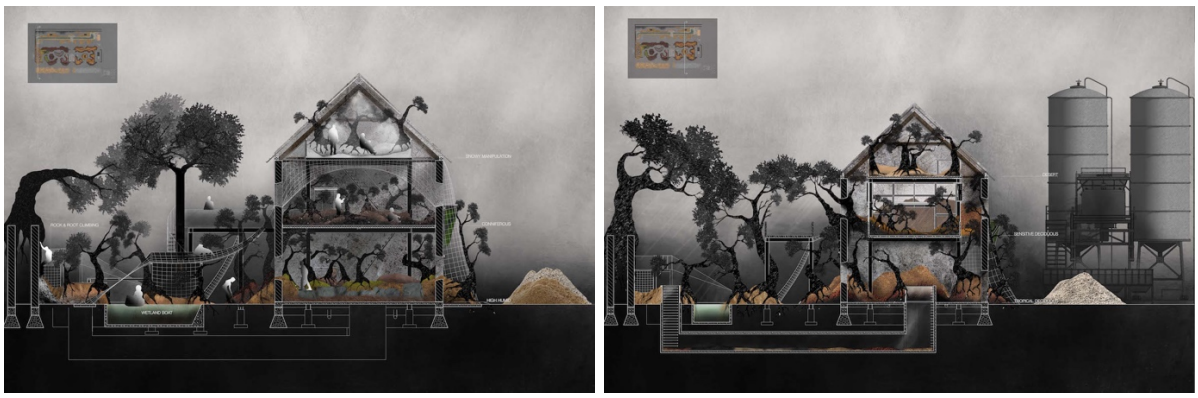

Figure 4. Dialogue between existing structure, media contour and texture and trees (Images by Edo Septian 2016)

The interior space was configured by the composition of surface contours and textures, along with the environmental system that supported the growth of trees within the space. The tree

landscape became interior elements as well as interior enclosure. The presence of trees as natural elements took dominance over the building, suggesting the primacy of natural ecology over the built form.

Both projects above demonstrated some attempts to break from the boundaries of interior design process normally performed in many interior design schools. Rather than working on existing building as a shell or enclosure for the interior, the design process emerged from an understanding of the ecological systems embedded within the contexts. Through the process ecological elements were presented not merely as compliance to standard technical performance or standard environmental quality. The idea of ecology became the core generator of interior intervention, and the interior elements were driven by the ecological system. The ecological elements became the manifestation of the interiority of the contexts – water living ecology in the first project and tree growing ecology in the second project. The process elaborated on how the presence of interior elements, including the materials, textures, colors, atmosphere, were primarily driven by ecological system.

Ecology: Performance + ideas

It becomes important for interior/architecture design school to re-address the design learning strategies toward more ecologically-relevant design process, which could be achieved through two major adaptation strategies.

The first way this was done was by redefining the understanding of interior performance in design teaching. By injecting ecological perspective into interior design process, interior performance takes a new dimension; it is not limited to the performance of indoor environments for human comfort, the performance of space in energy conservation, or the performance of materials in terms of energy-embodied material process. While such performance is definitely crucial to define the quality of interior space, the ecological design process illustrated in this paper suggests further thinking into different kinds of interior performance. These include: the performance of interior space to work with natural living systems; the performance of interior elements (materials, textures, colors, construction details) as attached to ecological contexts; and the performance of the interior program as offered by the nature of relationships – part-to-part and part-to whole – between an interior and its existing context.

The second adaptation strategy was by positioning ecology as core ideas within the curriculum structure, rather than as complementary or peripheral aspects of design. The ecological approach to interior design expands the possibility of ecological ideas to become the main generator of interior forms and qualities, and as a trigger for finding new possibilities of interior materiality. This could be done by making ecology an inherent part of studio teaching. This will require the reformulation of design studio briefs and stages of learning. Various aspects of interior design learning are brought back to ecology as the core ideas. An understanding of living system, as described in this paper, could become a potential trigger for new interior design learning processes. In turn, this new processes could further redirect interior design practice as a whole toward more ecologically appropriate design processes.

Acknowledgement

The ecological interior projects illustrated in this paper were the works of Astidira Apti and Edo Septian, the final year students of interior architecture at Universitas Indonesia. The presentation of this paper in ACUADS Conference was made possible by the funding from Faculty of Engineering, Universitas Indonesia.

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