Transience and Permanence: An Architectural Dialogue

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The American way of life is becoming increasingly transient in nature. But at the same time there is also the inherent need to have a sense of rootedness, the need for a place to call home, to belong. The current thesis is an architectural exploration of creating a dialogue between this duality. The approach is to explore a composite system, where modular prefabricated architecture is implemented in conjunction with traditional building practices. The idea is to address the transient nature and sense of belonging by combining the prefabricated modular approach with the site-built traditional approach. This study proposes that there are two types of spaces in a house that creates the overall spatial experience of a home. These can be termed as core functional spaces and more fluid or flexible spaces. Core functional spaces are bedroom, kitchen, bathroom, dining, formal living etc. Flexible spaces are more fluid in terms of function, for example – family living, lobby, lounge, connecting/common spaces etc.

In the current thesis, core functional units are proposed to be developed as modular units. The reason is, because of their defined functionality they can be designed as basic modules. The modules would be prefabricated in a factory and transported to site. The modules themselves are composed of panelised systems. This allows for a flexibility in different permutation of layouts and enables adaptability of the house with changing family dynamics and other functional needs, thus addressing the transient nature of life. The fluid spaces are proposed to be built on site allowing greater flexibility in terms of dimensions, construction material and design. This type of space addresses the sense of permanence and rootedness as they are designed to be responsive to the site forces and define the unique characteristics of a home based on client’s unique requirements. Overall, the composite approach addresses transience and changing family demographics through the modular, prefabricated, core functional units. Prefabrication is adopted for saving time and expenses of construction. Assembly line techniques, grouping of similar tasks and use of skilled labour help in achieving that. The core functional spaces serve some basic purposes which is common for every house in general. So these spaces can be considered as repeating units and forms, and can be considered for prefabrication. For example, Kitchens, bathrooms or bedrooms can be treated as basic units and thus can be designed as prefab modules. Prefabricated, modular construction is rapidly gaining interest in the building construction industry. Implementation of modular construction improves the efficiency in production and safety in the working environment. This reduces the necessity to transport many skilled workers to the construction site. Prefabrication also helps avoid other adverse conditions like exposure to harsh weather or a hazardous environment, lack of water or power etc. On the other hand, the proposed composite approach addresses permanence through the site-built components. These components are responsive to different sites and different client needs. The fluid spaces are the spaces that do not serve any specific or basic purpose for the designed architectural piece to function as a home, but rather work as a space that binds all the core functions together. The fluid spaces ne the architectural experience of a house and how the core functions are coming together to form an architectural piece that one can call home. For example, common lobby spaces, informal living, corridors etc work as fluid spaces where all the functional spaces are connected. For different households, different family needs, the fluid space can receive the functional modules differently thereby defining the architectural space differently. This type of spaces can be designed using traditional on-site construction which provides the language of permanence and rootedness. Proposed modular units themselves follow a panelised construction, so it is easy to add or remove panels to support the different arrangements of modules around different types of site built elements. Thus the composite system supports the transience by providing adaptability and permanence by responding and being rooted to the site. The overall spatial experience created by the juxtaposition of these two systems and two types of textures is the focus of this thesis.
Modern life is increasingly becoming fast and mobile. The idea of building one permanent accommodation for life that does not adapt to changes in family dynamics is increasingly going away. On the contrary, there is an inherent need in human beings to feel rooted to the place they live in. The current thesis aims to address this duality from an architectural perspective.

The thesis proposes an architectural system that combines age-old, traditional architectural style with novel construction concepts. In traditional systems, houses were built from scratch, on-site. Which made them rooted to the place and directly influenced by the site. But new, prefabrication concepts propose constructing parts of a house as modules off-site, in a factory, and transporting them to the site. This off-site, module-based process makes a house easily adaptable to changes with changing family dynamics.

This thesis proposes that there are two types of spaces in a house that creates the overall spatial experience of a home. These can be termed as core-functional spaces and flexible spaces. Core functional spaces are bedroom, kitchen, bathroom, dining, formal living etc. Flexible spaces are more fluid in terms of functionality, for example – family living, lobby, lounge, connecting/common spaces etc.

In the current thesis, core functional units are proposed to be developed as modular, factory-built units. The reason is, because of their distinct functionality, they can be designed as modules. The modules would be prefabricated in a factory and transported to site. This approach enables adaptability of the house with changing family dynamics, thus addressing the transient nature of life. The flexible spaces are proposed to be built on site. This type of space addresses the sense of permanence and rootedness as they are designed to be responsive to the site forces and define the unique characteristics of a home based on client’s unique requirements.

The architectural implementation presented here celebrates the coming together of these two types of building processes. Overall, the composite approach addresses transience and changing family demographics through the modular, prefabricated, core functional units. On the other hand, the proposed composite approach addresses permanence through the site-built components. The composite system supports the transience by providing adaptability and permanence by responding and being rooted to the site. The overall spatial experience created by the juxtaposition of these two systems and two types of textures is the focus of this thesis.
I would like to dedicate the work to my family and the friends who have been a constant support throughout this journey. Specially my mom and dad who inspired me to believe that we are only as big as our dreams.
Dissecting a house, one can find the following two basic types of spaces: 1. Core functional spaces (e.g., bedroom, kitchen, bathroom etc.) and 2. Flexible spaces (e.g., more undefined spaces like family living, lobby etc.).

The core functional spaces can again be divided into two categories: 1. Public zone and 2. Private zone

Basic configurations of Modules

The core functional spaces can be designed as prefabricated modules. Because of their defined functionality, they can be designed as basic modules. The modules would be prefabricated in a factory and transported to site. Example configurations are shown in the next page.
Example configurations of basic spaces (core functional modules and flexible spaces)
A **composite architectural approach, a system of modules and connecting spaces**, where the core functional modules are prefabricated in a factory and connecting spaces are built on-site using traditional processes.

Addressing the transient nature of life through a modular, prefabricated approach that supports adaptability. And creating a sense of belonging through the rooted, site-built components following traditional construction processes.

The dialogue created by this coming together of two different processes and tectonics, a unique spatial experience for each family.
Prefabricated Modules

Modules cater to the core functionalities of a house like sleeping, cooking, living etc.

Each Module itself also follows basic panel dimensions so that they can be custom designed and attach easily with each other in different configurations.

Modules are transported to site and combined with site-built connecting components arranged according to site forces and program.

The connecting components of the house that are built on-site, work as a tissue that joins the functional modules together.

This flexible spaces define the spatial experience of a house based on the family’s needs, the climate and site conditions.

These spaces vary in design and can be part of the indoors or a semi-outdoor space that creates a spatial hierarchy. They can be glassed-in to be part of the indoors. They can be open or screened to create an indoor-outdoor relationship. These components are central to the design for adapting to the site conditions, climate and program.
Example configurations of flexible spaces responding to site Permanence/Rootedness/Adaptability to site and layouts of core functional spaces around them.

Layout 1

Layout 2

Layout 3

Layout 4

Legend:
- Core functional spaces
  - Public zone
  - Private zone
- Flexible Spaces
Example configurations of prefabricated core functional modules with changing family dynamics

Transience/Modularity/Mobility

A. Core Functional Modules:
1. **Private Zone**: Bedroom options
   a) 2 bed + 1 bath
   b) 2 bed + 2 bath
   c) 3 bed + 2 bath

option a_ 2 bed+ 1 bath

option b_ 2 bed + 2 bath

option c_ 3 bed + 2 bath
2. **Public Zone:**  
   a) Formal Living

3. **Semi-public Zone:**  
   b) Living + Dining + Kitchen  
   c) Dining + Kitchen

4. **Indoor-outdoor relationship:**  
   Veranda, Balcony, Porch

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**B. Site-built Flexible Spaces**  
   a) Entry lobby  
   b) Family living  
   c) Common space  
   d) Semi-outdoor porch

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option a_ living, dining + kitchen  
option b_ living + dining + kitchen

Site-built element
Example implementation of the proposed approach

Site Analysis
The design is proposed in place of the existing building.
The existing playfield is considered a major site force as it has the potential to be the focus of the indoor-outdoor relationship.
The layout is responsive to site orientation and sun path in terms of public-private zoning and allowing maximum sun light.
Narrow blocks allows ample light and air inside the house.
Garage is also designed following the modular approach using 4’ panels.
- Hypothetical client:
  - Young couple with 1 or 2 children
  - Design allows addition of bedroom units or living/dining units when the family expands in future.
  - Modular design an panel-based approach also allows removal of extra units when family size reduces.
  - (example shown later)
- Modules are designed using a panelised approach
- The difference in material and construction approach provides difference in texture and spatial experience in the two types of space.
- Functional modules are made of 4’ wide SIPs panels designed differently for wall, roof and floor
- Site built components follow traditional beam, column construction process allowing glass walls and higher sections.
- This juxtaposition creates an unique experience for the clients. More open to nature flexible spaces and more defined, cosy functional spaces.
Blow-up of a prefab module & Transportation to the site
Typical section showing module components (panelised roof, wall & floor)
Assembly of composite system on site

Site-built portion receives the modules with L-sections

View from the inside
Site-built and module connection
Module and site-built connection details
Section AA' & Front View
Side view & elevation, sectional perspective
Section CC’ & Sectional perspective
Side elevation & Side view

Ground Level

Side Elevation

module ②

site-built family living
common connecting space

module ③
- Upon entering the entry lobby, one can experience the juxtaposition of the two different architectural languages.
- The entry lobby follows a beam-column construction process with glass walls and receives the prefab modules on both sides.
- The difference in material and height provides difference in texture and spatial experience in the two types of space.
Upon entering the family living from outdoors, the juxtaposition of the two different architectural languages can be experienced as the family living follows a traditional beam-column construction approach with glass walls and receives the prefab modules on both sides.

The difference in façade treatment and material provides difference in texture and spatial experience in the two types of space.
Conceptual sketch - View from dining module towards the living-room module

- This view depicts the interior of the prefabricated dining room module looking out towards the living room module past the entry lobby.
- The spatial experience is different inside the modules as they are more introvert in design as opposed to the extrovert, glass walled flexible spaces.
Sequence of Construction

Step 1

Step 2

Step 3

Step 4

Step 5

Step 6

Step 7

Step 8

Step 9

Step 10

Step 11

Step 12
Assembly of a module: Wall panels assembly

Interior and exterior of top track is attached to top panel using #10-3/4" tech screws and each stud

Standard 18 GA top track with 1-1/4" leg

Attachment plate on panels, spanning from one panel to the other using min. (6) #10-3/4" tech screws, (3) into each panel

3"x5" GA standard attachment plate

Standard 24 GA corner metal 1"x7"  
legs of corner metal is to be attached with panel using min. (1) #10-1/2" tech screws @ 12" on center

Wall panels are numbered and should be installed from left to right

Leading edge of each panel is to be attached to adjoining panel using min.(1) #10-3/4" tech screws & 12" on center

Standard 18 GA bottom track with 1-1/4" leg

Interior and exterior of bottom track is to be attached to panel using min. (2) #10-3/4" tech screws & each stud
Tongue and groove panel dimensions and view

Wall panels assembly

Interior panel to panel connection
Wall panel dimensions

3 types of exterior siding panels

Aluminium section for joining

Exterior wall panels
Panel-to-panel and track-to-panel connection

Panel to panel shiplap joint connection

Panel to panel no lap corner connection

Track to panel connection
Thermapan Floor panel

Section

8' x 16' Thermapan panel Floor plan

Floor Section "A"

Floor Section "B"

Floor Section "C"
4’x8’ ThermaSteel Roof panel
Adaptability of the example design with changing family dynamics

- The example design is adaptable to changing family dynamics. When a new module needs to be added or two modules placed side-by-side, the new module is constructed without the panels that might cause double wall conditions. On the other hand, if a module is removed then new wall panels are added to the remaining module to provide necessary wall condition.
- The wall panel and track based structure of the modules allow this flexibility.
Adaptability of the example design with changing family dynamics

Option b_ 3 bed + 2 bath
Discussion and Future Work

The current thesis was an exploration of a composite architectural system that addresses the issue of adaptability in housing. Future works can focus on different tectonic explorations of the two types of architectural process – traditional on-site construction and prefabricated off-site construction. Other potential scopes of work are to study the affects of different regional contexts and different clients on the composite approach. And exploring the temporal adaptation of a home with changing family needs.

Conclusion

The American way of life is increasingly becoming transient in nature. But at the same time there is also the inherent need to have a sense of rootedness, the need for a place to call home, to belong. Exploring a dialogue between duality of American life from an architectural perspective lies at the core of this thesis. This study argues that there are two types of spaces that define the spatial and architectural characteristic of a house. Dissecting a house, one can find two types of spaces- one is the core functional space, and another is the flexible or fluid space. Functional spaces are the basic functions necessary for a house, like bedroom, kitchen, dining etc. And fluid spaces are the spaces that create the spatial experience of the house. How the functional spaces are organized around a fluid space helps define the spatial experience of a house.

The current study proposes to design the core functional spaces like bedroom, kitchen etc. as modular prefabricated units brought to site and the fluid spaces like the common space, connecting lobby etc. as on-site construction. The focus of this study is the exploration of the tectonic relation and the dialogue between architecture for these two types of spaces. The idea is to address the transient nature by the modules brought to site. The fluid spaces that are built on site, addresses the sense of permanence and rootedness.

The core functional spaces serve some basic purposes which is common for every house in general. For example, Kitchens, bathrooms or bedrooms can be treated as basic units and thus can be designed as modules. These modules can in turn be constructed in a factory off-site to increase efficiency and reduce construction time and expenses drastically. The house can grow by adding modules according to changing family needs and on the other hand modules can be removed to address reduction in family size. Thus prefabrication and modular architecture assists in adaptability.
On the other hand, site built elements and fluid spaces create the sense of belonging by responding to the surrounding and creating flexible spaces based on unique family needs. Non-modular traditional approach gives more freedom in design in this case. The architecture and material of these two different types creates different spatial experiences for the occupants.

Overall, the thesis explores the implementation of modular prefabricated architecture in conjunction with the traditional building practices. Modular construction is rapidly gaining interest in the building construction industry. Implementation of modular construction processes improves the efficiency in production and safety in the working environment.

This study proposes a dialogue that celebrates the coming together of these two types of building processes. The architectural proposition of these two approaches coming together creates a balanced, responsive and adaptable home.