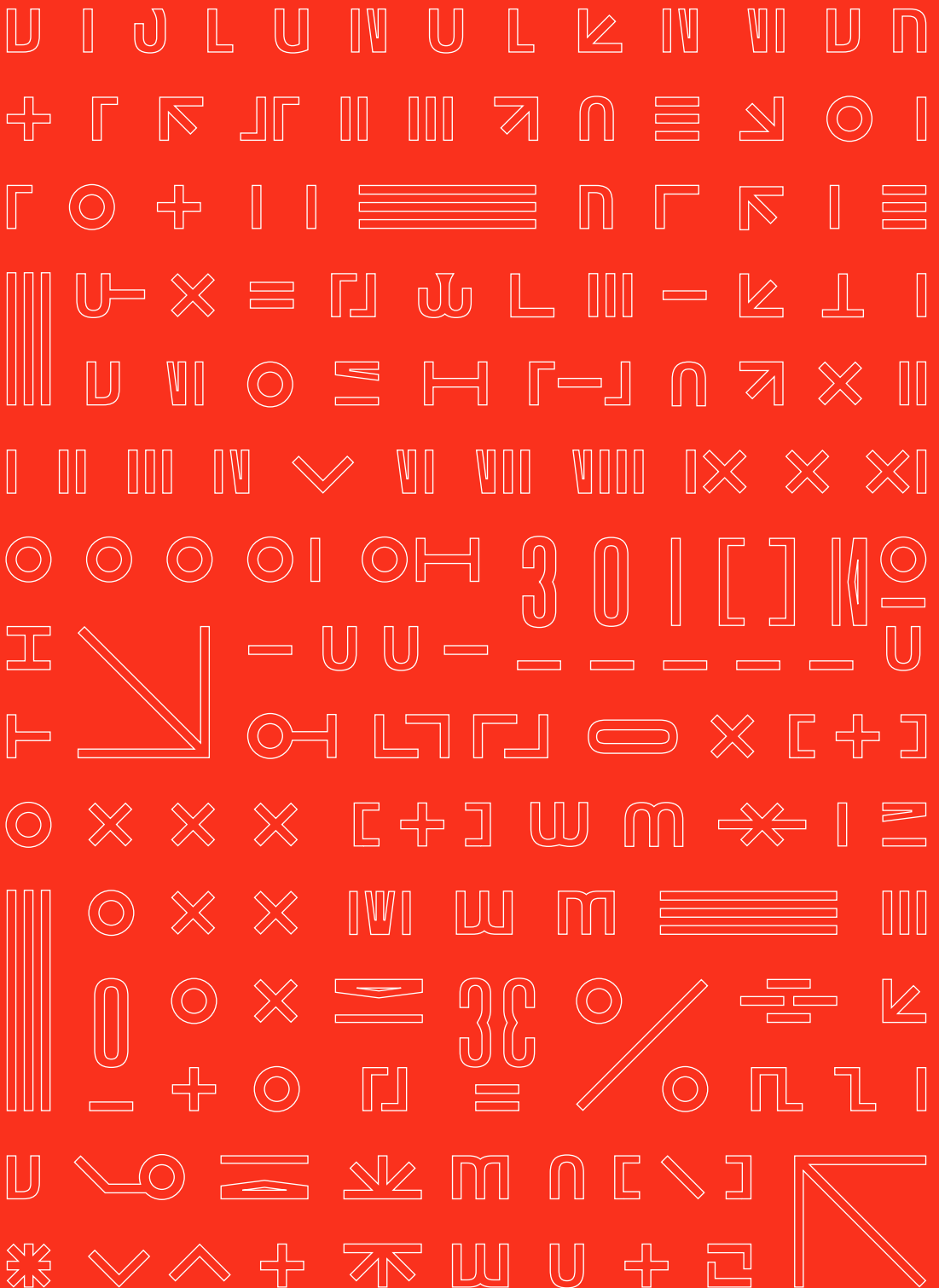
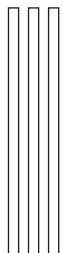
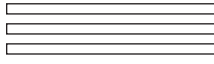


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+ OR -

A PROCESS-ORIENTED GUIDED INQUIRY LEARNING (POGIL) IN DESIGN EDUCATION USING SEMIOTICS AS A TOOL

Aditya Nambissan

ABSTRACT

This article takes its name from a semester 6 architectural design studio developed using semiotics as an approach to develop a design methodology / design thinking process. This involves exploring different interpretations of the symbols + and -, and their various applications to the field of architecture and design. We try to analyse, trace the course of problems/issues, and interpret ideas of subtractive processes (influenced by economic, cultural, and technological changes) involved in extracting resources from mother earth; and thereafter, the impacts of additive processes in the act of building and constructing. With the design project situated in the rich timber industrial heritage of the North Malabar region of Calicut, Kerala (India), this material is a crucial element associated with memories. The absorption of the relational aspects of timber in this region's cultural semiotics has led to interesting shifting in the built and unbuilt environments over the years. This has become the core inquiry of students' engagement in decoding signs and symbols through the mediums of photography, diagramming, and hybrid representation. These in turn inform them how to intervene using design and create an architectural project based on these findings.

#cultural memory, #architectural shapeshifting, #pragmatic design, #interpretative meanings, #material memory

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LEARNING AS A PROCESS AND PROCESS AS LEARNING

Critical thinking, the ability to reflect and respond, while also incorporating philosophies, theories, and histories, has always challenged how design education can be taught. Design thinking has been termed a mindset that lends faith to creative endeavours, a process that transforms challenges into opportunities for design (Brenner, Uebernickel, and Abrell 2016).

The multiplicities involved in design thinking and its processes were explored while I was practicing architecture independently and part-time teaching the sixth semester architectural design studio at Avani Institute of Design. Being associated with the Faculty of Architecture cohort involved in the monsoon semester studio (2022), I, along with six other faculty members—Soumini Raja, Ambili S, Sanjay Kumar, Gisny George, Satyajeet Sinha, Rajiv Babu—took up the challenge of exploring and testing an experimental semester 6 design studio brief. The studio project was titled Tectonic Ecologies—Reimagining the “minor” architecture of the Kallai (or Kallayi) region. By adding new methods and also improvising on the existing pedagogical framework of the institute and the University of Calicut, this new approach involved understanding and experimenting with various traditional and non-traditional methods of teaching/learning, and assessing their respective outcomes and feedback.

Having realised the importance of processes and critical thinking involved in arriving at design proposals (rather than setting a well packaged program with a very predetermined typological project for students to work on) the possibilities of new directions and fresh perspectives relating to the aims and objectives of semester 6 studio were investigated. The shift from a focus on a preconceived final output to one on a design studio project with an emphasis on formulation and articulation, helps students develop reasoning skills with a certain level of criticality. Once they have developed these reasoning skills, the ability to implement them—to create content in various mediums—helps them tackle the ever-changing challenges posed in the architectural design process. Meanwhile, “guided inquiry” helps in setting out certain common premises and frameworks with well-thought-out inquiries used as guidelines during design process-learning. While keeping

students engaged in the process, such an approach also tends to ease stress about the final output and the added pressures of submission deadlines and long lists of standard prescribed deliverables.

POGIL (Process-oriented guided-inquiry learning) with empirical evidence has proved that learning and retention of knowledge while receiving it through this inquiry method is far more successful compared to some other traditional and non-traditional methods. It has been extensively researched, tested and tried out in various fields such as chemistry, physiology, IT solution architecture, computer programming, software engineering (which involves essential designing and problem-solving skills for programming using certain system design patterns). “Process-oriented” methods of teaching and learning emphasise the process followed to create or achieve content, where content is considered a medium to refine and articulate reasoning skills rather than as a finished end product (Rumain and Geliebter 2020).

THE CONTEXT AND OVERALL STUDIO PREMISE

The Kallai river banks in the city of Calicut are renowned historically for timber industry-based trade links dating back to the fifteenth and sixteenth centuries. Up until the 1970s, more than 300 industries and 20,000 workers thrived on these banks. Today, the resultant vernacular architecture and its historically renowned timber industrial landscape remain in a state of decline along the ecologically fragile Kallai river. The community and the industries depended on the river for their livelihoods.

The changing environmental and economic policies, technological advancements, fragmentation of labour forces, and land policies have impacted the growth of the industry leading to its steady decline. Several timber industries have perished over the past three decades; the ones that remain are the only evidence of the utilitarian architecture of the past. A few of the ramshackle timber mills have been abandoned or pulled down. Some have been repaired and rented out as godowns for various goods.

The RSP (Related Study Program) is focused on sensitising students and faculty researchers alike to the industrial architectural heritage which has shaped the city of Calicut in many ways and how these industries have evolved into what it is now. The team of students and faculty members identified six of the oldest existing timber mills along the edge of the Kallai river for in-depth architectural documentation and the production of detailed measured drawings (fig. 1). This helped in understanding and making clear the different states of functional and programmatic alterations made to these industrial apparatuses, which have, over time, been transformed with respect to the built and unbuilt environments.



Industrial architecture in Kallai was a product of economic growth and development which flourished during the colonial period. The majority of architectural investment in this region went into the building of “sheds” for utilitarian, money-churning, and resource-mincing exploitative companies (figs. 2–3). The extractive nature of the colonial system during the Industrial Age ensured that natural resources were supplied to the world through trans-oceanic trade. This included the exchange of goods, including humans, which were processed to be sold in domestic and international markets. This concentration of power, money, and resources based on ideologies of industrialism, has stripped indigenous communities of their identities, and thereby impacted the region’s cultural, economic, and ecological habitats in the long term.

FIGURE 1. Selected sites for RSP documentation conducted by Semester 6 students of Avani Institute of Design. The study was part of the architectural design studio titled “Tectonic Ecologies—Reimagining the ‘minor’ architecture of Kallai.”

FIGURES 2–3. One of the oldest existing timber mills of Kallai still operating with machines made in Belgium (Brenta bandsaw)



FIGURES 4–5. Images capturing local children playing football in an old dilapidated industry building with no roof and the fishing activities on the banks of the Kallai river.



The studio asks:

Can industrial typology be reimagined to play a pivotal role in reinstating the city's pre-colonial ecology and its identity? Such a re-imagination would consider this industrial ecology a responsive work environment offering resources to the city and would reclaim lost spaces for the citizens (figs. 4–5).

Can industrial architecture become a catalyst for initiating a dialogue between the city and its citizens?

The studio expects:

Students to critically engage in reimagining the infrastructure possibilities of mills as a space of production within a given set of contextual constraints (figs. 6–7).



FIGURES 6–7. Students documenting the existing infrastructure and mapping the conditions of old timber mills during the RSP (Related Study Program)

THE APPROACH

The semester 6 studio

This monsoon semester of 2022 at Avani Institute of Design involved sixty-nine undergraduate students engaged in the atelier principle of teaching (Weaver 1999). A version of this way of teaching was developed at the Architectural Association School of Architecture in London in the

1970s under the brilliant chairmanship of Alvin Boyarsky. From there it spread to a few other architecture schools, where it took different forms according to institutional circumstances and academic aims. At our institute, the total number of students were equally divided into seven groups and were to operate as seven different ateliers with a common context and two sites on which to intervene. The seven ateliers had various topics of focus, such as eco-architecture, post-human architecture, convivial architecture, social architecture, public architecture, architectural prosthesis, and sustainable retrofitting; all of these were broadly classified into three approaches: ecosystem, social, and built heritage.

The atelier teachers were a mix of practising architects who teach part-time and full-time teachers who have research-based practises. While exploring seven different approaches to a semester 6 studio project following a common course outline formulated using the institute's academic framework, the atelier method created a link between the education and the professional realms of architecture and research; one in which the students do not work in an actual firm but in their classrooms along with practitioners and researchers acquiring a semi-professional environment within the studio.

ATELIER METHODOLOGY

To study associations and familiarities embedded in complex interwoven realms of a place that has undergone a series of events and remains in a constant state of flux, there is a need for certain processes. Processes which could help differentiate, investigate, and thereafter form new derivatives. The idea of using semiotics to decode various layers originated in the atelier involving myself and nine students. This deconstructing is vital to help students establish a certain degree of clarity and develop critical thinking and reasoning skills while conceptualising new “objects” of design and architecture.

“+ or –” became the anchoring title of the atelier I guided with nine students who were tasked with “thinking like an architect” by role-playing and considering the team as practising architects of an atelier. The team focused on a process driven approach to design, grounded in pragmatism while also exploring the possibilities of semiotics as a tool within the design process to understand, analyse, and decode certain layers which could help formulate architectural design proposals. Certain critical inquiries were discussed in the atelier which laid the foundation and served as a starting point from which multiple paths could be taken with diverse thought process and ideations.

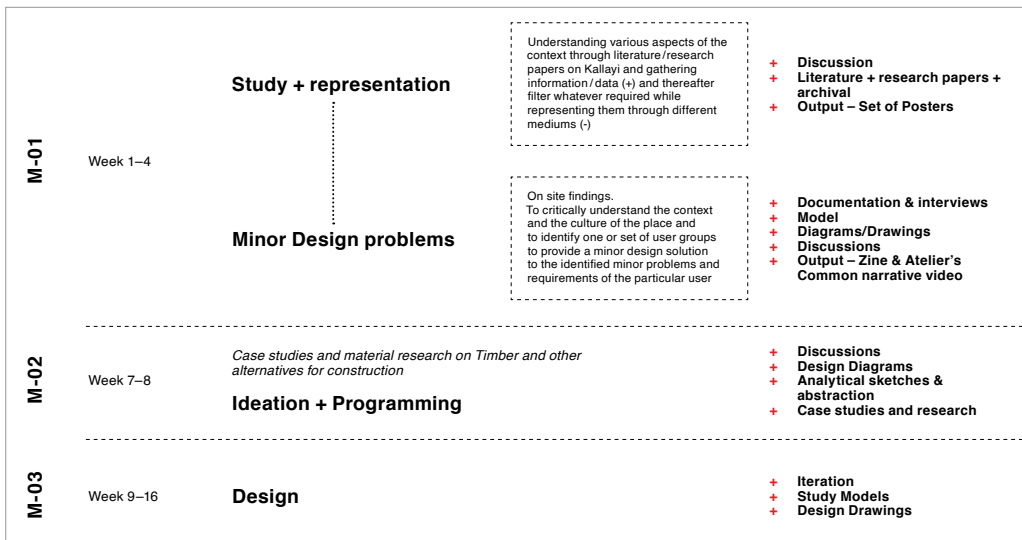
As technology advances in all realms of life, and especially considering recent explorations in materials and even construction tech-

niques like using CLT (Cross Laminated Timber), can technology initiate a certain alternative or revival in the interdependent industries of timber and construction? As the world shifts from an industrial to a post-industrial society, the sustainability of these industries is also questioned. If so, what are the possible additions and subtractions (+ or -) to reinvent typologies which will have their basis in eco-socialism and eco-economics? Furthermore, to consider the idea of “sustainability” not only as protecting and sustaining nature, ecological systems, and non-human beings, but also as co-existing with and sustaining people’s lives, economies, and cultures. These were some of the inquiries and lines of thoughts initiated while exploring ideas of sustainable retrofiting, its potential for building a circular economy, and the relevance of material cultures.

Seminal texts like *Small is Beautiful: A Study of Economy as if People Mattered* by Ernst Friedrich Schumacher (1973) and *Toward a Minor Architecture* by Jill Stoner (2012) were shared as initial scholarly readings and discussed in the atelier to establish an axiom for the atelier’s philosophy and a common thread for weaving multiple narratives. Being a facilitator and a mediator, the guidance given by me was then structured with experimental, rational, and pragmatic exercises while simultaneously giving room for students to explore and produce radical and original output/content. They were encouraged to experiment with multiple mediums and skill sets which they are equipped or interested in (sketching, painting, doodling, photography, collage, videography, and creative writing).

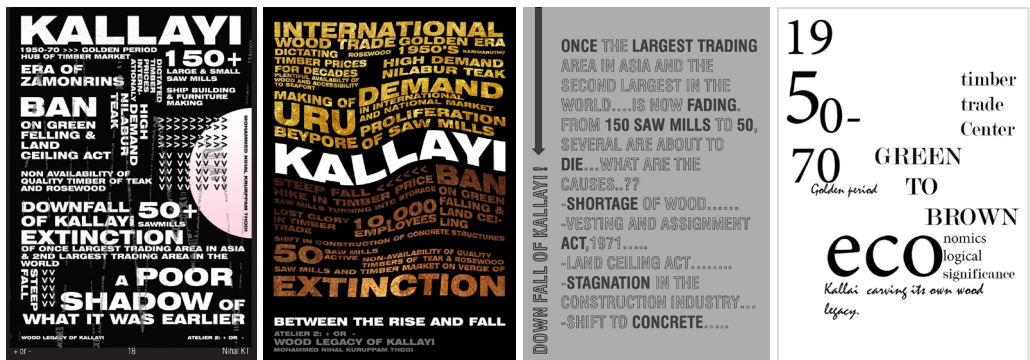
The studio sessions were mostly organised into three modules according to the available number of weeks (fig. 8). The first module (M-01) followed the design process which stimulated discoveries,

FIGURE 8. Course structure developed for the Atelier’s methodology.



interpretations, ideation, experimentation, and evolution as discussed in the IDEO's much celebrated classic "Design thinking for Educators" (IDEO 2018). Interpretations of the symbols + and - were often explored, discussed, and even applied in various stages and processes of the design studio and in its operation itself. This stage involved the "additive" (+) process of knowledge building by collecting and gathering existing information using archival documents and research done on the history, socio-culture, the economy, and the importance of timber mills in Kallai. Research papers like "The Wood Legacy of Kallai: Lessons for The Future" (Kunhamu et al. 2011) were initially shared as readings, followed by an exercise to extract certain important information, such as words, numbers, sentences, expressions, or an idea which one could relate to. Subsequently, the students were required to turn the derived content from the reading exercise into a set of posters which visually and graphically reflected their discoveries and interpretations. This process could be interpreted as a "subtractive" (-) process or a reductionist approach of analysing and articulating a complex set of information into its fundamental constituents; in this case it was visually expressed through a set of typographical posters. (fig. 9)

FIGURE 9. Posters made by students (Nihal Lulu, Adila V, and Sneha Ajith).



After exploring and refining information in the first part of the study acquired through literature and readings, the next step involved on-site learnings, recordings and collecting real-time data. This prompted students to put aside their textbook knowledge acquired from readings and research papers, and put on their thinking hats (The de Bono Group 2019), while experiencing the context of Kallai in real life and perceiving it sensorially as well as intellectually.¹ The multiple layering on the region's ingrained cultural patterns and the state of flux it is in, was observed and recorded while interviewing or having critical discussions with the local people.

As Umberto Eco proposes, "the whole of culture should be studied as a communicative phenomenon based on signification systems." (1975)

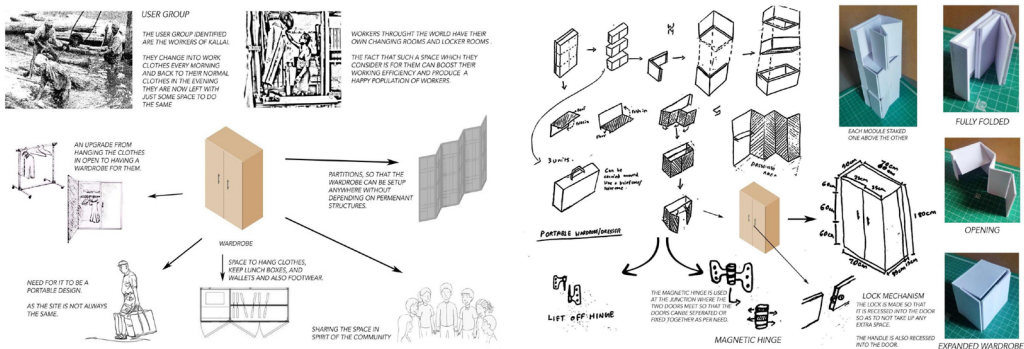
¹ "Six Thinking Hats" is a brainstorming and decision-making technique which involves wearing metaphorical "hats," each representing a different mode of thinking: blue: the process; white: facts; red: feelings; yellow: benefit; green: creativity, black: caution.

1976, 22) Communication in the form of verbal, non-verbal, visual, and other sensorial aspects were explored in this stage. It was studied via different mediums such as photography, videos, sound recordings, hybrid cartographies, and pictorial diagramming, with an intent to spur mixed forms of outputs based on instincts and reasoning.

While trying to record and document different cultural, socio-economic, ecological, built-unbuilt relationships, and their impacts on the context, students were also asked to identify and observe all the actors and activities involved in this region at present. They were instructed to pick one actor or a group of actors and to acquire in depth knowledge and observations regarding their activities. After that, they were asked to conceptualise a minor design intervention for the considered functions and certain activities involved in the respective actor's life. To associate and familiarise themselves with the context by following processes which help in differentiating the actors and activities from a complex web of interlinked actors and activities, helps students to analyse, decode, and decipher; initially on a minor scale and gradually increasing in complexity by adding and linking more actors and activities.

To be able to observe, interpret, and derive critical responses before programming and conceptualising a project of a large scale, a smaller scale design output was experimented with (furniture design, product design, and pavilions etc.). Decoding patterns observed in behaviour, culture, and built-unbuilt environments, and to comprehend as well as articulate these through visual codes was the primary goal; an attempt to thoughtfully translate them into design projects in the further stages.

FIGURE 10. Samples from the zine with student works (Jishnu K. R.). Source: https://issuu.com/adityaavani/docs/zine_ad



The final output of this stage was a compiled set of original works by students in various mediums (sketches, diagrams, collage, montage, photos, video snippets, and texts) which was then printed as a zine (figs. 10 and 11). These works were reviewed openly among the team and assessed, while also guiding them further through discussions and healthy debates. Through multiple interpretations and constructive

criticism from peers, which gave scope for further refinements, values of shared learning and reasoning skills were developed to progress to the next stages of the studio.



FIGURE 11. Samples from the zine (Aadila V, Nihal Lalu). Source: https://issuu.com/adityaavani/docs/zine_ad

INTERPRETATIONS, DERIVATIONS, AND IMPLEMENTATIONS

After exploring several levels of studies which allowed students to freely express their understanding and intuitions through different experimental mediums of representation, the second and third modules (M-02 and M-03) were focused more on architectural application. They further explored a certain process of meaning-making while also making new meanings to formulate an architectural project.

Contrary to previous stages which involved group assignments and teamwork, students were encouraged to approach tasks individually, reflecting their own interpretations and learning outcomes from the previous processes. This was intended to achieve a diverse range of outputs and a palette of ideas from nine students in a single atelier. Noting down levels of codification and interpretations of the symbols + and - was done at multiple stages of the design process, to be analysed and conceptualised further. During the programmatic stages of the design process, a couple of students conceptualised partial subtractions of existing timber mill activities to add newer programs that responded to the present or to a speculative future. While few students add and diversify the production of the timber industries to sustain and uplift a dying industry, there were also proposals to entirely subtract the activities and the infrastructures related to the industrial typology and replace them with completely new architectural objects with newer visions. The students decided what degree of addition and

subtraction to adopt while retrofitting/reusing/deconstructing/reconstructing/replacing the built and unbuilt spaces. By exploring addition and subtraction with regards to activities, user groups, volumes, and spatial arrangements, students found themselves engaged in their own paths to meander further into an iterative design process.

The challenge was to apply their interpretative, meaning-making skills to understand the transformation of the architecture, to understand this transformation as a phenomenon interlinked with changes in various parameters, and furthermore to propose radical and rational solutions which could lead to a pragmatic design mixed with instincts and reasoning. The influence of cultural semiotics of the region on the architectural language and vice versa, was explored. Timber as a vital material associated with memories and its links to the historical, cultural, and economic aspects of this region was also not neglected during the design approach.

This phase embraced the multiplicities of thoughts and approaches taken by the students to explore and develop an architectural program. After this, they designed an architectural object/building, which involves several levels of additions and subtractions while formulating a design process and its articulation.

FIGURE 12. Mapping activity + programming + intervention. Conceptual diagram by Aadila V.

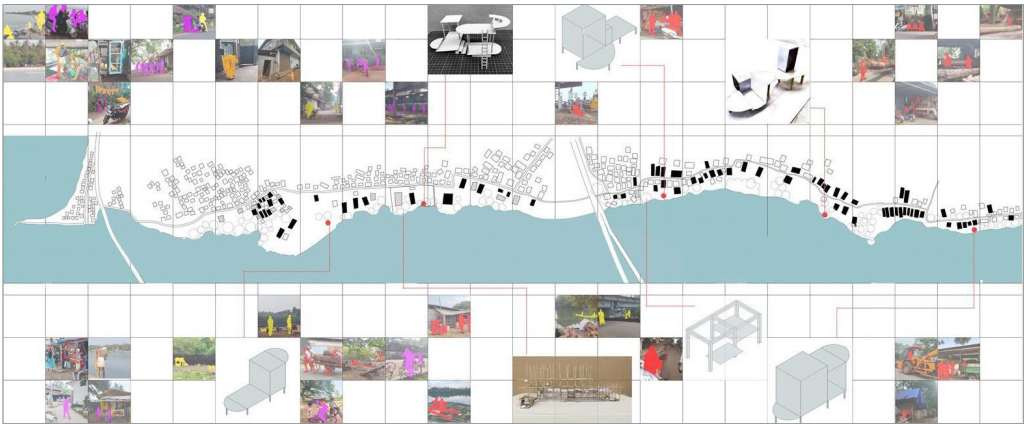


Figure 12 represents a student's interpretation of conceptualising an architecture of relations. As Umberto Eco frames it, “[s]ignificative forms, codes worked out on the strength of inferences from usages and proposed as structural models of given communicative relations, denotative and connotative meanings attached to the sign vehicles on the basis of the codes—this is the semiotic universe in which a reading of architecture as communication becomes viable.” ([1973] 1997, 184–85) The student attempted to observe, analyse, and decode patterns of activities performed by different sets of users across this region, both visually and through oral communications. Interpreting and mediating a continuous flow of events which construct the social perceptions of

all the agencies involved in the existing and ever-changing cultures of this region. Decoding these agencies spatially while also generating pragmatic forms, becomes the responsive gesture of the designer (fig. 13).

By approaching the given two sites for intervention, as a “part” of the “whole” and understanding complex sets of various actors/actions contributing to the cultural semiotics of this “whole” region, this project attempts to explore various communicative possibilities of architecture. It tries to establish vital relationships of the part to whole and vice versa. By deducing certain activity patterns, architectural codes, and visual signs from various users contributing to the context of the Kallai, a relational matrix and its mapping helped the students to continue intervening at smaller scales (fig. 14). If these minor designs spread across the region respond to the inhabitants who are “part” of the “whole,” could the major design be a re-creation of the “whole” inhabited by these “parts”? These were some of the inquiries undertaken by the students to conceive a critical approach to design which was conceptually rich.

FIGURE 13. Conceptual ideation diagrams by Aadila V mapping different agencies, users and activities in the context.

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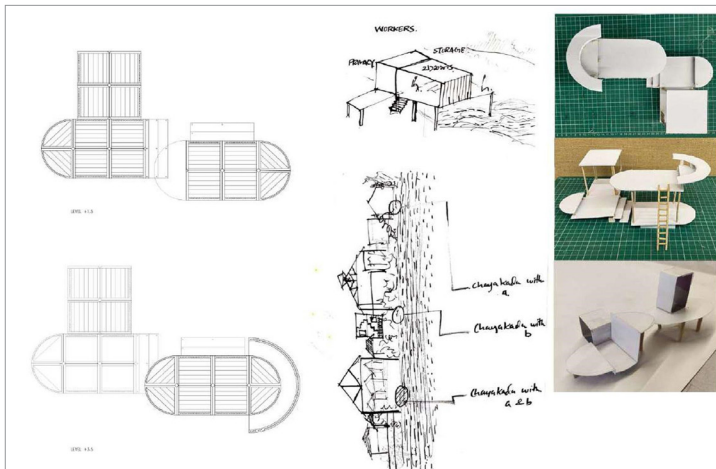
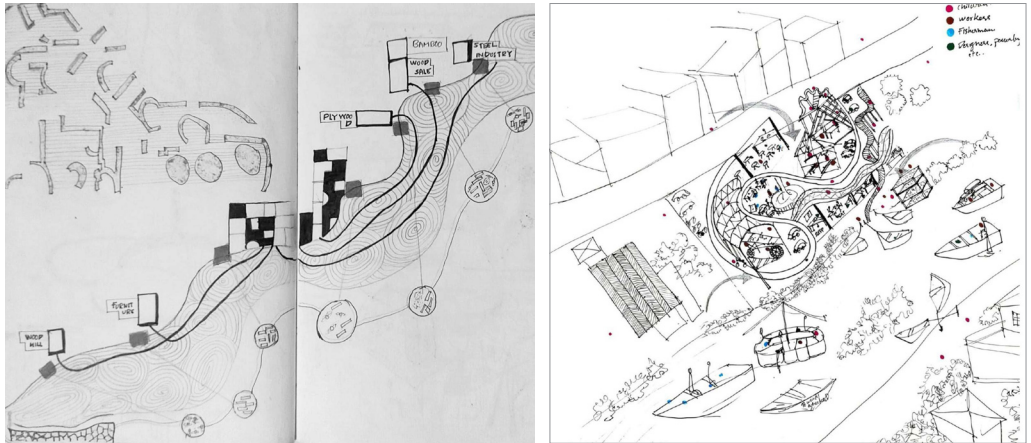


FIGURE 14. Conceptual study models and diagrams of design explorations by Aadila V.

Figure 15 captures the conceptual explorations and ideations by a student who interpreted the architectural object as a simple structural framework with multiple possibilities. This open structural frame acts as the “whole” onto which the smaller parts spread across the context could be plugged in or recreated in this system to form new interlinked systems. The proposed structural framework uses a fairly simple construction and



FIGURE 15. Conceptual study models and diagrams of design explorations by Aadila V.

is installed using familiar local timber (coconut and areca palm) along with other available materials which were researched and mapped across this region. The typology is a hybrid one or could also be interpreted as an architecture void of a specific typology as such, since new functions could be added or subtracted according to the requirements of multiple users engaging and inhabiting this region and the newly intervened architectural object. This architectural object is added between two existing dilapidated industrial buildings, which has now become an open democratic space for kids to play football, cows and goats to graze, growing vegetables, for workers to rest or take a nap, to drink a cup of tea, and numerous other open activities. In this way it embraces the ideas of encounters, cultural phenomenon, and occurrences which subtract the rigid utilitarian aspects of an industrial typology, while adding more layers of openness and various hybrid possibilities.

“The object of use is, in its communicative capacity, the sign vehicle of a precisely and conventionally denoted meaning—its function. More loosely, it has been said that the first meaning of a building is what one must do in order to inhabit it—the architectural object denotes a ‘form of inhabitation.’” (Eco [1973] 1997, 185)

POSTSCRIPT

The vast field of semiotics and its vital relationship with architecture can open up new possibilities and methodologies of teaching and learning architectural design. These should be explored and developed further to form a better understanding of a world filled with signs and symbols. If this also incorporates various non-traditional or alternative ways of pedagogical approaches with well thought out goals, radical intellectual outputs can be achieved. This essay attempted to share some of the insights and processes involved in an experimental architectural design studio conducted using different methodologies and explorations. Principles of semiotics were used not only to analyse and decode existing or evolving languages of architecture, but also to explore the possibilities of incorporating them into design teaching methods which can help in understanding associations and form new ones. It encourages critical lateral thinking and interpretative skills for deriving unconventional solutions to sets of complex issues faced in this contemporary world; one of which is entangled with multiple layers of problems and intricacies. Methodologies and academic frameworks which incorporate these learnings from such experimental studios have to be carefully developed and assessed further to understand these alternative methods and their impact on design teaching and learning. This essay is open to critical interventions in architectural design education and accepts speculative opinions which can contribute to a collective and progressive environment of radical learning and teaching methods.

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