



REFLECTION RAPPORT

TRA-DIGITAL HYBRID

Using digital fabrications to create a hybrid design for developing countries

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ASPECT 1: WHAT IS THE RELATIONSHIP BETWEEN RESEARCH AND DESIGN IN THE GRADUATION PROJECT?

In the studio Architectural Engineering the technical research is seen as one of the most important aspects of the graduation track. On this technical research, conducted in the first half year of the graduation master, a design should be based.

In my research a significant difference is seen between where the research started and where my actual design ended. In the beginning the research was geared towards designing for the waterside of the Indonesian riverside kampung, making use of digital fabrication methods.

The technical research focussed on finding digital fabrication methods that could somehow improve the current kampung environment.

During this technical research some big discoveries and noteworthy changes determined the direction of my research. Because my research was directed towards discovering the

'unknown unknowns', there was never any certainty of what the outcome would be.

In the end my solution was very different from what I had in mind from the beginning. It was still a CNC milled solution, but local circumstances, the poverty, the local view towards certain materials, made the outcome a very different one than planned.

My final design is largely influenced by the research conducted in Indonesia and on digital fabrication methods. In the final design a CNC milled solution is used to create a reusable formwork system. In this final design, enabling the local kampung inhabitants would be the architectural strategy. This was taken from both my initial research and confirmed after a second trip to Indonesia.

Conclusively, research and design were very much intertwined in this graduation studio.



ASPECT 2:

WHAT IS THE RELATIONSHIP BETWEEN THE THEME OF THE STUDIO AND THE SUBJECT/ CASE STUDY CHOSEN BY THE STUDENT WITHIN THIS FRAMEWORK?

The Architectural Engineering studio has known three themes; Stock, Make and Flow. Within these themes multiple locations are possible, for this research Bandung Indonesia was chosen with 'Make' as theme.

The Bandung group can be considered a think tank of Monique Smit. She is currently researching a pilot project for the Cigondewah Kampung in Bandung Indonesia. In this pilot, student ideas are used to improve the housing for migrant workers. The scope of the Bandung theme group can therefore be described as the improvement of the Bandung kampungs using architectural means.

This research was part of the first group of students so no research was conducted as of yet. Therefore the students were free to choose their own fields of interest on which their research would be based. Some of these topics were; using local waste

as building material or improving the quality of the water by implementing urban scale filtering systems.

My specific topic was to densify the city to prevent the urban sprawl that is currently happening in the bigger cities of Indonesia. Digital fabrication techniques are used to improve the housing of the inner-city-kampungs of Indonesia. In this research low- to mid-low income areas are targeted.

Same as the rest of the Bandung studio I chose Cigondewah as location for the architectonic application. (see also fig. 1) In the end, I am very glad I chose a location abroad. In my opinion it teaches students a lot about working with a different mindset, in a very unfamiliar location with different means than usual. This puts your mind to work and asks for specific solutions. I found that I loved the extra challenges this creates for the students.



Fig 1. Location Cigondewah

ASPECT 3:

WHAT IS THE RELATIONSHIP BETWEEN THE METHODOLOGICAL LINE OF APPROACH OF THE STUDIO AND THE METHOD CHOSEN BY THE STUDENT IN THIS FRAMEWORK?

In my view the Architectural Engineering studio method focusses on the correlation between architecture and technology. Technological innovations are often the starting point for the architectural design. Not only does the technical research provides specific requirements for the design, for example by designing a technical 'toolkit' suitable for architectural application, it also serves often as a source of inspiration for the architectural element of the graduation track.

Because such a specific location was chosen in this project a second important element was added to this technological aspect: the location. As seen in the graph on the right, the local conditions served as both inspiration for my research, but more importantly, criteria for my research were modelled after the locations requirements.

The strategy within my building system was to enable the locals to design

their own architecture. The architectural aspect of this project was more of a strategy of enablement than an architectural design. It is of course expected that an architectural design is delivered in the end. For the graduating presentations it was therefore deliberated that showing the range of the system, showing its versatility and how it would enable the locals would be enough of an architectural strategy. A full on design was less applicable.

The architectural design consisted of four traditionally designed houses and one designed after my personal taste. This showcases that the locals have a choice to build their houses in a way they have done many years already, or that they could choose a different aesthetic.

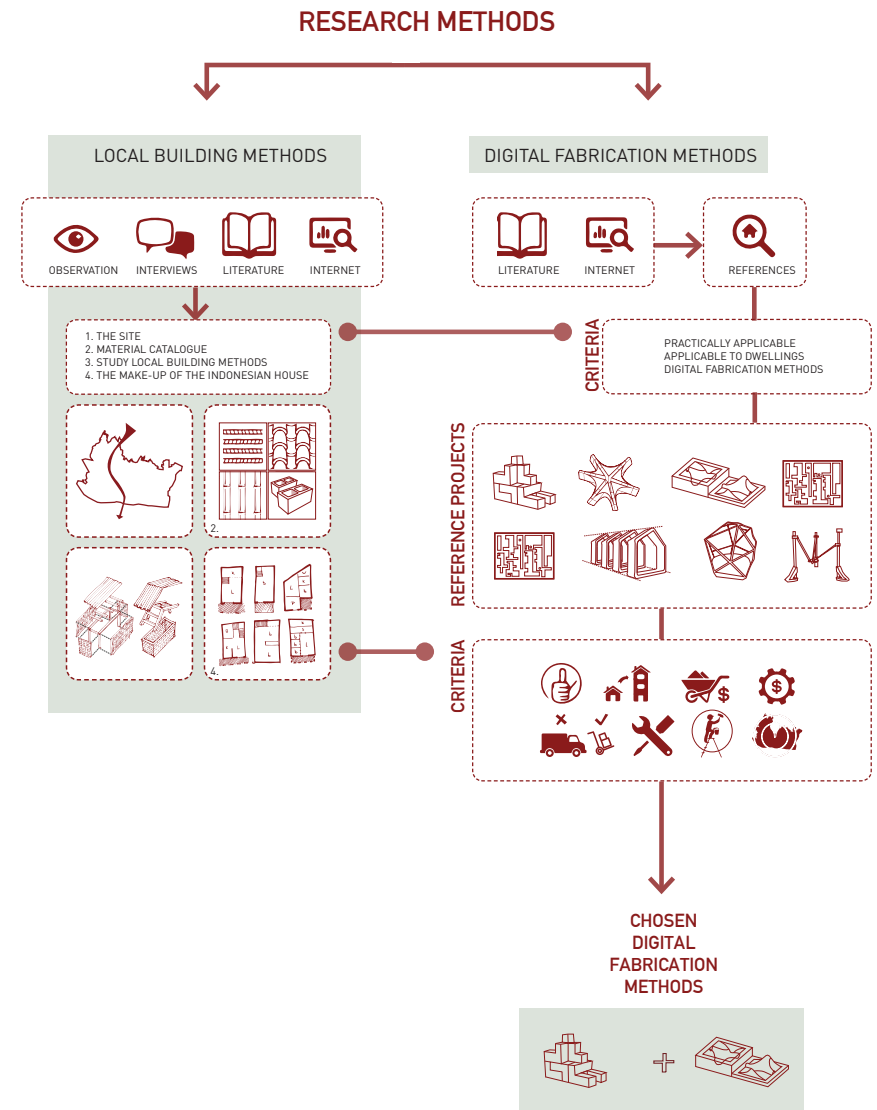


Fig 2. Research methods graph digital fabrication methods

ASPECT 4:

WHAT IS THE RELATIONSHIP BETWEEN THE PROJECT AND THE WIDER SOCIAL CONTEXT?

The Global Health Observatory (GHO) estimates that in the future, as soon as 2050, cities will contain a majority of the world's population. Estimations are that around 75 % of the total world populations will live in cities. The Indonesian population grew almost three times its original size, from 90 million in 2000 to 250 million in 2014. It is estimated that in 2050, the population will grow another 60 million more.

According to the Global Health Observatory 50 percent of Indonesians lived in cities in 2010, and Tunas & Darmoyono (2014) state in their chapter 'Self Help Housing in Indonesia' that 80 percent of the urban inhabitants live in kampungs, currently that is almost a 100 million Indonesians. These kampungs are self-build housing areas that are inhabited by mostly low to mid-low income inhabitants. These kampungs originate from rural villages that are being swallowed up by the nearby big cities. Once part of the

urban fabric the kampungs are densified in the vertical direction only. Local building knowledge is not sufficient in building up more than two storeys high. The big cities of Indonesia are therefore huge in sprawl, but very low in density. Since most work is situated in the city centre huge traffic jams occur, it is immensely difficult to make an urban planning for such a city.

Densification is therefore key in making the cities of Indonesia work in the future. The kampung are rich in cultural value and economic activities, they are much more than just sleeping spaces. Demolishing the kampung and building high-rises would therefore not provide the solution in my opinion. Better is to provide the self-build area's with more building knowledge to build over two storeys high and to allow the kampung inhabitants to individually densify the kampung. This is therefore the solution this research was geared towards.



Fig 3. Visual representation kampung Cigondewah



