

FINAL REFLECTION: RESPONSIVE HEALING ENVIRONMENTS
Robotically manufactured and operated pavilion in the AMC



TU Delft - Robotic Building Studio - AR3AE015 -2018/2019
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Final reflection - Robotic Building studio graduation

In my final reflection, I shall account for the preliminary results of my research and design in the graduation phase, including the product, process and planning. The choice of method (how) and argumentation (why) that preceded my research was a part of my study plan. This essay is also a hindsight assessment if it worked and to what extent.

Aspect 1

the relationship between research and design.

Since the project is a computational and robotically manufactured and operated intervention in the public areas of the AMC Hospital, the scope of my research was already defined within these aspects (parametric tools, automatization in the construction sector, robotic methods of fabrication and operation). In addition to this, I began with an interest in healthcare architecture and how the **meaning of wellness and healing environments has evolved. My initial questions were; how to create healing environments within the chosen building using these new technologies? What is the added value of these tools for the purpose of wellness architecture? How to integrate different parameters such as thermal comfort, acoustics, visuals, spatial quality in an holistic intervention?** It was also necessary to analyze the AMC Hospital to assess how my intervention could contribute and improve the quality of its public areas. The large (nearly 500,000 m² floor area) building was constructed between 1977 and 1979 with a concrete grid structure, including 4 large courtyards and several corridors covered in a glass and steel roof. It is a complex study-case due to the different functions and users that occupy it, including medical, research and administration staff, patients, students and visitors. There are already plans for renovation in the future within the framework of circularity, sustainability and modern heritage, whilst preserving the main function as a hospital. I found it to be an ideal test-ground for the ways in which the most recent advances in computational design and robotic construction can have a positive impact in place-making, future construction methods and Healing environments integration.

Looking back, I can conclude that my findings during those first steps informed my final design, a pavilion that integrates all of these factors and is capable of being robotically fabricated and assembled on site without interrupting the hospital's functioning. An example of this integration is the possibility of a wide range of customization in its geometry, spatial qualities, the scale and proportion of its porosity, and so forth. Furthermore, the 3D printed components of up-cycled material are sustainable and fitting to the circularity goals of the AMC.

Aspect 2

the relationship between your graduation (project) topic, the studio topic (RB/AMC), your master track

(A,U,BT,LA,MBE), and your master programme (MSc AUBS).

My graduation topic relates to my studio topic, Architectural Engineering and Robotic Building, because it focuses on how these new aforementioned technologies can have a positive impact in place-making and creating healing environments for people. It also relates to my master track of Architecture because it is an architectural intervention (a pavilion) within an existing building, considering factors such as human scale, requirements in terms of function and dimensions, general climatic strategy, materialization and assembly methods. It also relates to my master programme of AUBS because the principles, form-finding and materialization strategies I focused on could be extrapolated to other scales and fields within the faculty and professional practice.

Aspect 3

Elaboration on research method and approach chosen by the student in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of the work.

My research method and approach relates to my graduation studio methodical line of inquiry in the tools and processes I applied to reach my final results. The Robotic Building studio (within Architectural Engineering) focuses on exploring the potential of computational design and robotic fabrication and operation in the built environment. Moreover, we are encouraged to put this knowledge into practice through collaborative workshops and prototyping. I participated in several of these workshops of digital design and fabrication and could get a grasp on how to operate robotic technology and how it can expand the possibilities for designers, as well as the design-fabrication loop. During my graduation project I have also applied this through 3D printed prototypes and the use of computational strategies such as shell-structure and environmental analysis. Furthermore, my design managed to encompass different qualities together through these tools such as acoustic elements, varied porosity, special spatial qualities and other highly customized properties.

Aspect 4

Elaboration on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results.

- My scripts and methods of computational design could be applied to a landscaping, urbanism or engineering project alike (the customization, the range of options and flexibility in the form-finding strategies)
- The idea of holistic healing environments enhanced by digital fabrication methods such as 3D printed components and upcycled and/or user friendly materials can be applied to other sites and functions
- The interaction between this kind of design and building technology and past architectonic expressions, creating a new dynamic between contrasting materialities, construction methods and spatial qualities. My project is also an example of how this type of intervention in large, complex buildings can foster creativity and new life within them.

Aspect 5

Discuss the ethical issues and dilemmas you may have encountered in (i) doing the research, (ii, if applicable) elaborating the design and (iii) potential applications of the results in practice.

I didn't face many ethical issues while doing the research or elaborating the design. It has been commented before that this kind of design and fabrication technology is exclusive or limited to developed parts of the world, however, this argument is not necessarily so because in the present time it has become more democratic and its accessibility will continue increasing. Knowledge about how to use these tools is widespread online and there always ways to adapt them to different contexts and methods of fabrication, regardless of geographic, social or cultural differences. Furthermore, it is also important to consider the impact such an intervention would have in practice, particularly in a Hospital/Medical Academic Center setting. The selection of materials, vegetation and design should all enhance the healing qualities of the environment. To conclude, this is an exciting time to be a designer and as with any type of technology, the ethics will depend on the application and in the case of the positive aspects outweigh the negatives in the sense that it opens a wide array of possibilities and optimization in the built environment.