

Graduation Reflection

Draft Version

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Aspect 1.

What is the relation between your graduation project topic, your master track (A, U, BT, LA, MBE), and your master programme (MSc AUBS)?

(CP - The relationship between your graduation topic and studio topic)

Hospitals are one of the most critical and important buildings for a functioning society. Nonetheless, the focus on the efficient process of healing human bodies, has caused the architecture of these buildings to be designed as machines. Hence, the term hospitals as 'healing machines' was coined. Looking at the development and innovation within the field of medical devices, human bodies are slowly transitioning into 'healing machines' themselves. Human body augmentation has started the process of synthesising human organic material and artificial material, which slowly enables the human body to function as a healing machine on its own. Using this development of human body augmentation, the studio theme 'bodies & buildings' offers a bilateral perspective on the development of the human body within the hospital process, as well as how this affects the architecture of the hospital building/typology we know today. This challenges the status quo of the hospital within society, through the science and art of Architecture. While also taking into account how the hospital plays a significant role in multiple scales of society and the city; within the urban context of the city of Berlin, Germany, as well as on the scale of the neighbourhood; Kreuzberg, and on the scale of building blocks within that neighbourhood, as well as a building on itself. All-in-all, the Complex Projects Studio and its theme 'Bodies & Buildings' offers a multidisciplinary approach on the topic of one of the most important buildings within society: the 'hospital'. While challenging its development through the perspective of bodies and building, and thus its major role within society and the built environment, the studio offers a relevant topic within the field of design for the Master Track of Architecture, and a societal challenge that is relevant for the Master Programme of Architecture, Urbanism, and Building Sciences.

Aspect 2.

How did your research influence your design/recommendations and how did the design/recommendations influence your research?

(CP - The relationship between research and design.)

Research that occurred during the first semester of the Complex Projects Studio resulted in a design brief that set clear parameters surrounding the three aspects of program, site, and client. These design parameters and ambitions; which focused on the role of the hospital within society, the definition and characteristics of public space, and the implementation of transition spaces within the hospital - were taken further into the second semester, during the design and concept development of the project. Based on the main research question of this graduation project; "How will human body augmentation change the hospital typology of the future?", the design development focused on translating the following design oriented sub-questions: 1) "How will augmentation change the hospital process for the human body, and thus the building program?" and 2) "How can we create a living hospital structure that can grow, upgrade, and get augmented through time?".

The first sub-question looked into the diverse roles and scenarios that occur within the hospital. As current hospitals are optimised towards decreasing the distance travelled by the staff and specialists, the project offered the opportunity to question this rhetoric by hypothesising the future automation of certain departments like the hot floor, logistics, and factory departments of the hospital. By separating these automated departments in the basement and the autonomous 'human' oriented departments on top, the hospital program offers space on the ground floor to implement program for the public. That not only offers the opportunity to implement multi-purposed public amenities, but to also expose what happens behind the scenes of the hospital.

The second sub-question resulted in the implementation of a modular grid structure through several scales. Starting off on the largest scale, a masterplan based around the standardised modular grid size was created for the site of Görlitzerpark, in Kreuzberg. This enabled the creation of standardised building blocks, that could be connected or separated depending on the required space for certain departments, and the need for direct accessibility between different departments. The structure created space for the implementation of various hospital program, by implementing a standard grid of 8.1 by 8.1 meters. While also enabling future adaptability for future technological development within the hospital program through the implementation of a vierendeel truss structure. Which enables horizontal flexibility on the hospital floor, while opening up the plinth and ground floor towards the general public. The combination of the modular grid size and the structural design of these standardised blocks within the larger masterplan of Görlitzerpark enable the project to integrate within its context, by connecting and opening up certain parts of the project, while also enabling the complex relation of flows that occur within the hospital itself.

The flexibility that was introduced within the hospital resulted in the separation of certain processes within the main hospital process of the human body augmentation. With a main building that functions as a main entrance for the general public and the patient, which offer direct access towards the outpatient and inpatient department on different floors. With two flanking buildings parallel to the main building focusing on creating space for the supporting departments; the body and mind research departments. In addition to four smaller buildings

in between the research departments; that focused on the neurological and physical rehabilitation of the patient. This organisation offers room for the integration of public spaces in between the buildings, introducing different zones of transition for the public and the patient, between the public and the private realm.

All-in-all, the design process during the organisation of the departments showed the clear complexity that is related to the flows of the patients, and specialists between departments. These flows limit the flexibility of the project significantly, and this was discovered through developing multiple design proposals, in close connection to the development of a metro map of the patient process that occurs during human body augmentation. These complex processes with multiple stakeholders also exposed the important role of the client within the rigidity of the hospital processes, and the importance of scenario-development within hospital design. Having Neuralink as a hypothetical client enabled the freedom to develop hypothetical scenarios within the hospital of the near future, but this also shows the high dependency of the client in the development and design of the hospital of the future.

Aspect 3.

How do you assess the value of your way of working (your approach, your used methods, used methodology)?

(CP - The research method chosen by the student in relation to the studio.)

The studio of Complex Projects has a pre-described structure and methodology for developing your research that you have done during the first semester, into a design in the second semester. As the first semester was structured from three different perspectives; the program, the site, and the client - this approach has subsequently been pushed further in the following semester. During the 15 weeks leading up to the P4, the first five weeks were dedicated to developing physical massing models that take into account the different aspects that are at stake from the program, client, and site perspective - which eventually were presented during the P2.5. The five weeks following the P2.5, were focused on further developing the design of the project based on the aspects that were discovered in the massing phase. While also developing an overarching concept that synthesised these various aspects into one project. The result of this synthesis was presented during the P3.0. The five weeks following that presentation are dedicated to further developing the plans, sections, materials, facade, details, and image of the project. Which in the end will be presented during the P4.0. Subsequently to these three different stages leading up to the P4.0, a group-assignment was also worked on, that looked into the topic of 'Materials', through the development of a 'material atlas', a 'material-benchmark', a 'material-design framework', and a 'material-index'.

This sequence of the pre-described structure and methodology of the studio of Complex Projects, in addition to the parallel development of the group-work resulted in an underdeveloped, and lack of attention towards the complex dependance of the client, and its involvement in the hypothetical scenarios that affect how you can design and implement certain departments and program. As the client plays a significant role in creating a hospital organisation that is able to split up into separate buildings, and offer flexibility in finding a balance between a human-oriented design, and an efficient design that allows the flows and hospital to function. This reliance on the client inevitably affects the potential of the hospital to be specialised, transparent, multi-purposed, part of the urban fabric, flexible, and adaptable for the future. Which is also a good reflection of the practical world, but this dependance should have been demarcated earlier in the research phase of the first semester, instead of during the design development phase of the second semester.

In addition to the studio, the seminar group of hospitals also visited the hospital architect Gortemaker Algra Feenstra in Rotterdam several times for additional questions and supervision regarding the organisation of departments and general questions regarding the design of hospitals in general. This additional tutoring also emphasised the generalist approach of the studio Complex Projects and the necessity for additional consultations regarding specialist information that are relevant within hospital design.

Aspect 4A.

How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects? The relationship between the graduation project and the wider social, professional, and scientific relevance.

The stigma and singularity in use has affected the role of the hospital negatively as it hides the important public role of the hospital within our society. As well as the activities that happen behind the walls, corridors, and doors, that are synonymous to the hospital experience we all are exposed to, whenever we are visiting a hospital. This will also affect the awareness surrounding the development of new medical treatments, and the public discourse surrounding the development of Human Body Augmentation, taken as research subject in this case. The design assignment challenges the current notion of hospital architecture and offers new insight of what the future hospital typology could be. By looking at how human body augmentation will change the process of human bodies moving through the hospital, we can also look at how this will affect the architecture facilitating this complex process. All-in-all, this will offer relevance by challenging the design potential of hospitals through multiple scales of the built environment, while also challenging the current role and participation of the most important public building typology within society.

Looking back at the preliminary results and the design process so far, the project has offered an insightful look into the important dependence on the organisation of program and flows within the hospital, and how this is tied to the interests of the different stakeholders at play and their relevant scenarios when designing a hospital. As the research questions the role of the hospital within society, the vast amount of flows between departments; the patient, the specialists, the logistics, and the general public - exposed the lack of design flexibility in regards to opening up the hospital organisation towards the public. As this project is developed on the hypothesis that certain departments will be automated, it needs to be taken into account that other research needs to be done when developing future specialised hospitals. Nonetheless, the approach towards creating a hospital structure that enables different types of departmental organisation and adaptability towards the future, is still relevant to the generic typology of the hospital. Especially with regards to the significant role of constant development within the medical industry and technology.

By setting a hypothesis for an automated future for the hot floor, logistics, and factory side of the hospital, the project looks into a future that separates two worlds; that of the automated 'healing machine' underground and that of the 'human body' above ground. This hypothetical development will enable space for the general public to integrate within the hospital program. This will not only merge the hospital user with the general public, but also the hospital as a building within the urban fabric by offering multi-purposed amenities.

Aspect 4B.

Ethical issues and dilemmas you may have encountered during graduation.

When looking at the scope of ethical issues and dilemmas, the project was based around the development of human body augmentation which is an ethical dilemma on its own, as it questions the boundaries of the human body and conscience. This controversial dilemma has been used as an important point of interest for the client, industry-backer 'Neuralink', to set a precedent for wanting to open the hospital towards the general public. In turn to

stimulate discussion and transparency towards the general public in regard to this development.

Aspect 5.

How do you assess the value of the transferability of your project results?

As the preliminary results of the project are based on a modular grid structure that has been assessed during the research phase of the design brief during the first semester, and programmatic spaces that fit into that modular grid, the project benefits from a high level of transferability.

Starting off on the largest scale, the project implements a masterplan for Görlitzerpark in Kreuzberg, that enables the implementation of an array of standardised buildings, that follow the modular grid (8,1 x 8,1M) with a standard layout of three by three bays. This creates space for a standardised steel core construction in the middle bay, that houses all vertical circulation and shafts. While creating space in the surrounding bays for the programmatic spaces of the hospital. The three bay width of this standardised building enables the implementation of various program that can be found in the different departments of the hospital; office, hotel, factory, hot floor, research, and space for services and storage. In turn, the grid of the masterplan enables the standardised buildings to connect to each other to create linear or clustered buildings, similar to that of the existing hospital organisation strategies. In addition to connecting buildings to extend flows within the buildings, the buildings also create voids that can function as public or private courtyards on the ground level. This modularity on the large masterplan scale of the urban fabric, as well as within the building and its programmatic spaces enables a high level of transferability of the project results. The masterplan can be adjusted towards different building plots and can also enable different hospital organisation typologies, while also taking into account the direct context of each plot. The hospital can open up towards a park, and close towards streets facing other Berlin building blocks, just as implemented in the preliminary massing and layout of the current project. Which takes into account the existing greenery of the park, as well as the surrounding 'blockeandbebauung' of the Kreuzberg neighbourhood in Berlin.

General reflection

All-in-all, this graduation project that focused on “How will human body augmentation reflect change in the hospital typology of the future?” was able to show the highly complex network of flows that occur in hospitals. In addition to their subsequent limitations in regards to efficiency between departments; specialists, logistics, and patients - and their ability to open up towards the general public, while also taking part of society, and its urban fabric. The preliminary result is a building that integrates within the city of Berlin, by functioning as a collective of buildings, that function as separate departments, and together form the ‘collective of Augmented Bodies’. A building that offers a clear separation between the automated and human future of the hospital, while opening up the ground floor towards the general public with multi-purposed amenities. In addition to taking in account the existing context of Kreuzberg, Görlitzer Park, and the surrounding blocks of ‘blockrandbebauung’, through the masterplan that has been developed for Görlitzer park, that enable the hospital to function as a Building Block, while also creating space for the park and the general public to interlink with the hospital. Visitors and patients can use different transition spaces to activate the hospital, as well as to separate the public and the private realm through the application of different architectural threshold elements, public spaces, and levels. As this project is developed on a hypothetical scenario for human body augmentation, it needs to be stressed that more research is needed in regards to the development of human body augmentation on its own, and how this affects the procedures and the scenarios that are relevant within a hospital that is specialised within human body augmentation. This development and the dependance on the client within the design process of the hospital typology of the future, play a significant role in the design possibilities and subsequent limitations.