Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Reinis Melgalvis
Student number	4687663

Studio		
Name / Theme	Architectural Engineering Graduation Studio	
Main mentor	Mauro Parravicini	Architectural design
Second mentor	Michela Turrin	Researcher Computational design
Third mentor	Paddy Tomesen	Building Technology
Argumentation of choice of the studio	As an aspiring architect, I am deeply interested in the ways in which digital technologies can improve the design process and enhance the quality of our projects. I firmly believe that architecture is both art and science, and that it is essential for designers to bring these two worlds together. Using computational technology, we can build powerful tools that can help us understand the environmental impact and cost of our designs, as well as the spatial qualities that make buildings livable and functional. By incorporating this knowledge into the design process as early as the conceptual stages, we can make more informed decisions that lead to better results in a shorter time. The graduation studio of Architectural engineering is technically oriented and the possibility to research your own topic of interest presents the ideal opportunity for me to further explore my passion for digital technologies in architecture under the guidance of experienced instructors.	

Graduation project	
Title of the graduation project	Campus Village Delft: Improved visual quality of student dwellings
Goal	
Location:	Delft Campus
The posed problem,	Not enough student dwellings and student dwellings of insufficient quality (For more elaborate answer see below)

research questions and	Main question: How the parametric performance evaluation model of visual-spatial quality can enable more informed decision-making in the early stages of design for student dwellings? Sub-questions: - What visual-spatial parameters determine their quality? - What design parameters affect these variables? - How can a parametric evaluation model analyze visual quality parameters based on design elements?
design assignment in which these results.	Design student housing of high visual-spatial quality through explicitly informed decisions guided by a parametric evaluation model.

Problem Statement:

There is a great deficiency of affordable student housing, and the demand is expected to increase in the coming years. Currently, there is a shortage of over 25.000 student dwellings in the Netherlands, while the demand for student rooms is expected to increase by nearly 50.000 in the coming 8 years. From these dwellings over 5000 will be required in Delft. This means that we have to build a lot of student dwellings and we have to build them fast.

While the quantity of student housing is a prominent problem, the importance of spatial quality cannot be overlooked. As the spatial quality of the dwelling has a direct impact on the well-being of the student, this should be addressed more explicitly in the design process. Factors such as views, privacy, lighting, and spatiality among others have a direct impact on the perceived spatial quality by residents. Furthermore, the quality of accommodation has a significant impact on the learning process of the student and their academic performance.

Decisions made on the early stages of design such as building shape and orientation will have a significant impact on the performance of the building including that of spatial quality As much as 80% of the design outcome is influenced by decisions made during this time, while the relative time spent on this phase is rather short. Therefore, feedback required for informed decision-making should be provided with minimal input so that multiple design alternatives could be compared explicitly and efficiently.

Process

Method description

Research is meant to inform the design process by better-understanding aspects of visual quality in residential architecture. As a result of research, an evaluation model is built to both study other precedents of student-dwelling projects, but also to test the designed variants in the graduation studio. This will help me to explicitly reflect on the relationship between form and quality from the first mass studies in design, and by making different alternatives and studying their qualities, more informed decisions can be made to achieve better results.

Research is divided into three parts, progressing from a more theoretical beginning where the spatial quality and its factors are defined, to a more practical application where a parametric evaluation model is built. Various research methods have been utilized in each part of the research.

Firstly, to gain a deeper understanding of the aspects of visual quality, a literature review is conducted to study existing theories of visual quality in residential spaces. This is supported by primary research through interviews with students to gain further insights into their perceptions of spatial quality and the parameters that affect it.

The dwellings of the interviewed students are further examined as case studies in order to determine how design parameters such as circulation space, windows, building shape, and orientation affect the spatial quality parameters.

In the last part of the research, a visual quality evaluation model is developed in the visual programming language Grasshopper, based on the identified visual quality parameters and the design elements that affect them. Experimentation in the form of research by design is applied as the research method for this part.

Literature and general practical preference

In research literature review is primarily conducted to determine the aspects of visual quality and their affecting parameters. It is partly academic research but also building regulations and standards, that have attempted to define qualities of daylight and view before.

The design process is guided through an explicit analysis of various existing student-dwelling projects and their typological characteristics such as shape, circulation, and structure. These typologies are then reimagined in the context of TU Delft campus.

Reflection

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

The designed project of student dwellings in the Delft campus is a task of architects and therefore fits well within the master track (Architecture), as the building is integrally designed from the first concept of shape and mass, all the way to detailing of building construction. It also fits well within the master program of AUBS as it addresses innovative ways to design a more sustainable built environment around us. Technology is used in almost every industry to enhance efficiency, but also quality. In my graduation project, I address this potential, by exploring the possibilities of computational design to make dwellings of higher quality.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

While the influence that spatial quality aspects such as daylight, view outside, and privacy has on our mental and physical well-being is widely acknowledged, they are often not explicitly addressed in the design process. Ultimately, this leads to the residential architecture of lower quality. By analyzing the spaces we create we can better understand the influence our decisions have on the space, and make any required improvements. Computational tools can facilitate this analysis by conducting extensive geometrical analysis and providing visual data for designers.