The studio ‘Architectural Engineering’ gives the opportunity to thoroughly investigate a technical fascination as well as applying the research in a design phase. It can be perceived as a very unstrained architecture studio. The graduation project consists of the research of ‘Music in Heritage’ and the design of the Acoustic Agora inside the Van Gendthallen.

The research focussed on the acoustical design for large spaces inside heritage. The problem statement which lies at the base, is that a lot of large spaces in heritage suffer from bad room-acoustics due to non-absorbative materialisation. Most of the time, the solution consist of simple baffles hung from the ceiling or absorbers attached to the authentic walls, which is not an integrated design.

The methodology of this research consists of four parts. It started with a thorough literature study into room-acoustics, then a study into cases were an unconventional integrated acoustic design was present. After these, based on the case studies and literature a series of solutions were developed and fourth, simulated afterwards to quantify the solutions.

This method worked out very well and it gave a lot of possible solutions for the acoustic design in the design phase, which means that the design phase could evolve without a specific solution in mind.

The design focussed on the design of an unstrained place for music, which does not cuts itself off of the public space around it. The concept for this placed was a city square, or where it evolved from; the Greek Agora. This approach was chosen because of the fact that almost all music performances take place in secluded boxes. The design started by a mass-study of the configuration of functions around a square, a study into the characteristics of city squares and the proportions of some existing squares.

While the design evolved, the acoustics were constantly taken into account. This manifested itself in the detailing and materializing mostly. When the design entered a near-final state the architectural design was simulated and the acoustic design was fine tuned.

Half-way the design phase the research into the characteristics of a city square or agora appeared to be superficial. Physical characteristics of a square were well studied, but the research into the dynamic nature of a square during the day, week and year was unconsidered. The consequence was a small setback. Next time, better identification of the necessary research into a subject is necessary.

The order in which the different levels of development of the architectural and acoustic design were executed worked very well and resulted in an integrated design.

**THE RELATIONSHIP BETWEEN THE OF THEME OF THE GRADUATION STUDIO AND THE CHOSEN SUBJECT.**

The chosen subject, the technical fascination, is room acoustics. This subject fits the studio. Room acoustics is a technical, physical field of study, but at the same time it always influences the architecture. It indirectly influences the architecture in a visual way, because of the presence of solutions to create an acoustic design, like aborbers. However, more important are the acoustics itself. The architectural design does not only consist of the visual, but it involves the entire atmosphere of spaces. The acoustics influence the way a space or room is perceived.

**THE RELATIONSHIP BETWEEN RESEARCH AND DESIGN**

The architectural design for the Van Gendthallen functions as a case-study for the research, while at the same time a new kind of architectural function, the Acoustic Agora, was researched and developed. In order to accomplish this new approach for a place for music performances, a tailor-made acoustical design was needed.

During the design-process, the acoustics of the Agora were kept in mind. This resulted for instance on implementation of Helmholtz resonators on certain new walls of the Acoustic Agora.

When the architectural design was almost finished, the acoustics of the design were simulated to determine what final solution was necessary to enhance the acoustics.
This method worked very well, because the initial design headed already in the right direction, because of the knowledge gathered from the research. Because of this, few additional measures were necessary.

THE RELATIONSHIP BETWEEN THE METHODICAL LINE OF APPROACH OF THE GRADUATION STUDIO AND THE CHOSEN METHOD.

The methodical line of approach of the studio basically consists of three parts or phases; the determination of the graduation project, the research and the design phase. While the first is predetermined in terms of methods, the research and design phases are unstrained. While the latter two seem separate, the studio requests a certain blend of the two theme’s; during the research phase a draft-design is made and during the design phase, the research is applied.

Because of an abstract approach in the research phase, the creation of the draft design did not come easily. On the other hand, the abstract method is suitable for the implementation during the design phase; the wide variety of tested solutions and combinations gave a lot of freedom in the design phase.

THE RELATIONSHIP BETWEEN THE GRADUATION PROJECT AND THE WIDER SOCIAL CONTEXT

Although every project with high acoustic requirements demands a tailor-made acoustic design, the results of the research can be taken into consideration in an early stage of the design process. The quantified effects of the different solutions for the Van Gendthallen can contribute to the prediction of the performance of similar solutions in similar buildings in an early stage.