A close-up photograph of several rectangular concrete blocks stacked together. The blocks have different textures and colors, ranging from light grey to dark grey. Some blocks have labels printed on them in white or black capital letters. The labels include 'GEBRUSH' (partially visible), 'ASH AGGREGATE', 'DEEP MINK', and 'WEA' (partially visible). The background is blurred, showing more blocks.

The connection
to the material &
immaterial world
through the
human senses.
Every detail Matters

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AR3A010 Research Plan
Explore Lab Graduation studio 2021-2022
Elise van Dooren & Peter Koorstra

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1. Introduction

1.1 Fascination

Since the course "BK2AC1 Bouwkunde als Wetenschappelijke Discipline" at the Bachelor of Science of Architecture, University of Technology in Delft I developed a fascination for multi sensorial design in Architecture. Prior to the graduation studio, I researched what architects have at their disposal to design with the senses in mind. This graduation studio will be a deepening out of my own research that I began during three courses and an internship minor.

The goal of the thesis research is to prove that architecture is not just for shelter or can be beautiful but is also an experience in itself through all the human senses.

1.2 Theoretical background on materiality and perception.

1.2.1 Materiality

Materiality is a core pillar of design. Architecture provides structure and represent a space. It is the material that add soul and body to Architecture. The material palette is a composition of different layers and character in its purest essence.

Only a few studies have investigated at the direct influence of material use on the architectural experience, or the experience of materials (Sadalla & Sheets, 1993).

As architects and designers, we often forget that we are part of a manufacturing process, and how essential materials are in that process, not just for simply technical or practical reasons, but also for the influence that these materials may have on the end user. This may be achieved by the feel of a leather

handrail or the way light travels through a window, creating a warm atmosphere. (Culvahouse, 1989).

These material-perception interactions change throughout time, between cultures and individuals, and in various usage circumstances. They can determine long-term positive or negative associations with materials and the artifacts that they embody in the long run. If we want to design for materials experiences, we need to first understand sensory modalities.

1.2.2 Perception and the human senses

The five senses work together to play an important part in people's everyday lives. Every instant of the day, our senses receive many stimuli. The human body delivers eleven million bits per second messages to the brain through our senses. (Markowsky, 2017).

The conscious mind, on the other hand, can only handle fifty bits each second. Colors are visible, scents are detectable, and sounds are audible. This happens unknowingly most of the time, yet it still has an impact on us. (Gibson, 1979) This also applies to architectural "viewing": a place or building is not only seen, but also smelt, felt, heard, and sometimes even tasted.

There is no need to process an experience, as the information we receive about size, shape and distance. These details are stored directly in the brain. Architecture is the art of reconciliation between ourselves and the world, and this mediation takes place through the senses (Pallasmaa, 2005).

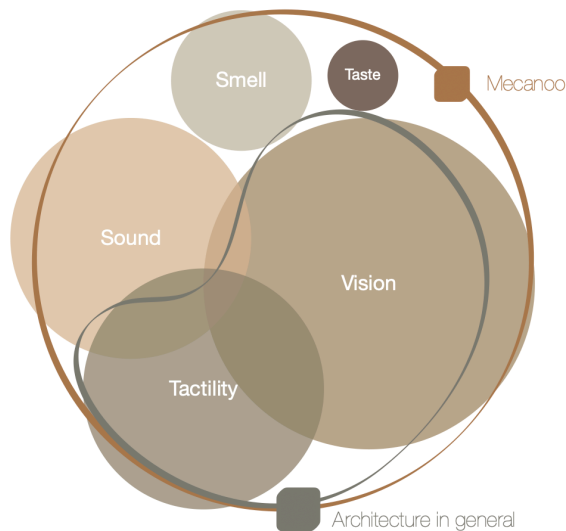


Figure 1. Interpretation of perceiving Architecture through the human senses.
Source: Selfmade Diagram. University of Technology Delft, October 2021.

(Figure 1) shows how Architecture is perceived. Most of the time through Vision, Sound and Tactility. Since Greek Antiquity, Architecture has focused on the visual (Herssens and Heylighen, 2011). According to Mecanoo, Architecture must appeal to all the senses. Architecture is about combining all the individual elements into a single concept. What counts in the end is the arrangement of form and emotion (Houben, 2017).

The non-visible aspects have a significant impact on our mental state (Neumann, 2013). As previously said, the brain is continually processing information. The majority of what we see will stay hidden from our conscious selves, but our brains will nonetheless perceive and analyze these information.

When someone enters the building, they may believe they are just inside a structure. However, being surrounded by pictures for an extended length of time can change how we view and comprehend space. The more time you spend looking at something, the more details you'll notice.

There is no such thing as truth; only perception exists.

So architecture is more than just shelter, there is a story behind it, a statement is made or it represents something the designer wants to show us and it affects us.

In fact, a building could be considered as a metaphysical tool. Every architectural perspective is multi-sensory. The eye, ear, nose, and skin all measure the quality of space, substance, and size. (Pallasmaa, 2005) As a result, the impression of a design can impact whether or not individuals feel comfortable.

A study by Lee, an industrial designer showed that the perfect experience of a design or object can only be created if all five senses are stimulated as much as possible and will therefore be better viewed by the user (Figure 2).

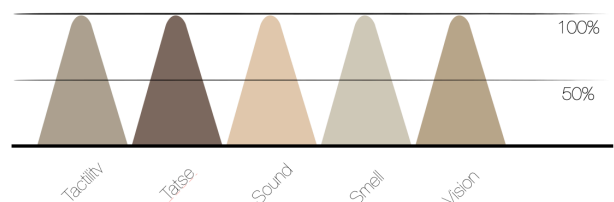


Figure 2. Own interpretation of the study by Jinsop. Lee, Jinsop. Ontwerpen voor alle vijf de zintuigen. <https://www.passbrains.com/post/multi-sensory-experience-five-senses-theory.html>
Source: Selfmade Diagram. University of Technology Delft, October 2021.

2. Research

2.1 Problem statement

As described in the previous part, the design of architecture has been dominated by the eye. This happens since ancient Greece. We, humans, are visually dominant creatures (Hutmacher, 2019). As an example, from the bachelors till today, during a design process professors and colleagues asked me “how

will a design look like” and never what experience will this design choice occur. The principle of how something appears is focused on the aesthetics. The philosopher Alexander Gottlieb Baumgarten invented the word aesthetics in 1750 (Wessell, 1972). According Baumgarten, aesthetics is the science of sensate cognition.

As Neumann said, the invisible features have an influence on our mental health. I think we deserve better Architecture and more focused on the elements we experience rather what we see.

2.2 Materiality and perception extended

Today's architects have access to a wider range of materials when designing structures. New materials are also being developed. The designer must consider various design parameters when selecting materials from such a vast array. Environmental, economical, and technical qualities, as well as those connected to usage, are all important considerations in material selection (Hegger et al., 2006). Every material selection method, in general, is used to meet a straightforward need: determining the optimum material for a certain application (Fernandez, 2006). It's crucial to understand what factors come into play when architects choose materials in order to determine what the "best" material is for a certain purpose. Besides the general approach of material selection perception and experience must be taken in to account because according to studies, we spend 90% of our time indoors in North America and Europe (European commission, 2003). As Pallasmaa (2005) said “The door handle is the handshake of the building.” When touching a material even unconsciously, it affects us anyway.

Winston Churchill, a British statesman, said “We shape our buildings, and afterwards, our buildings shape us.”. This quote was made on October 28, 1944, during a speech in the House of Commons (Churchill, 1944). The essence of the phrase is that architecture is primarily the outcome of the architect's design concepts, but that over time, after the structure has been put into use, the people who live and work in it take on the character of the structures. Therefore, it is also critical to address the psychological aspects of the design and material use, as well as to understand how design decisions affect architectural perception.

2.3 Research question

Architecture is more than just a place to live. It is an experience in itself and affects people lives. To investigate this statement, this thesis addresses the following research question:

In the Architecture discipline, what is the connection to the material & immaterial world through the human senses?

The following sub-questions provide support for the main question:

- What kind of experience do I want to have?
- What effect do I want the design to have?
- What are the sensory qualities of a certain material?
- What material evokes the chosen experience?
- What will the sensory experience be like as a result of the integration?

These questions are necessary to assemble the findings together in a logical way to obtain a design.

2.4 Theoretical background

The thesis will perform literature evaluations in order to better understand the link between perception and materiality.

This theoretical framework explains the research's basic ideas, establishes interrelationships and acts as a basis.

The process of material considerations will be examined as realistically as possible in this study using an empirical method to analyze underlying ideas about the employability of materials. The strategy followed in this regard is a retrospective study of two existing projects that were created with multi-sensory experience in mind.

- 1. Therme Vals by Peter Zumthor in 1996 | Vals, Switzerland.
- 2. Kolumba Art Museum by Peter Zumthor in 2007 | Köln, Germany

To analyse what every material's sensory qualities are a literature review will be emphasized including material by :

- Coleman, N., (2020). Materials and meaning in Architecture. Essays on the bodily experience of buildings. Bloomsbury Visual Arts. London, Great Britain.

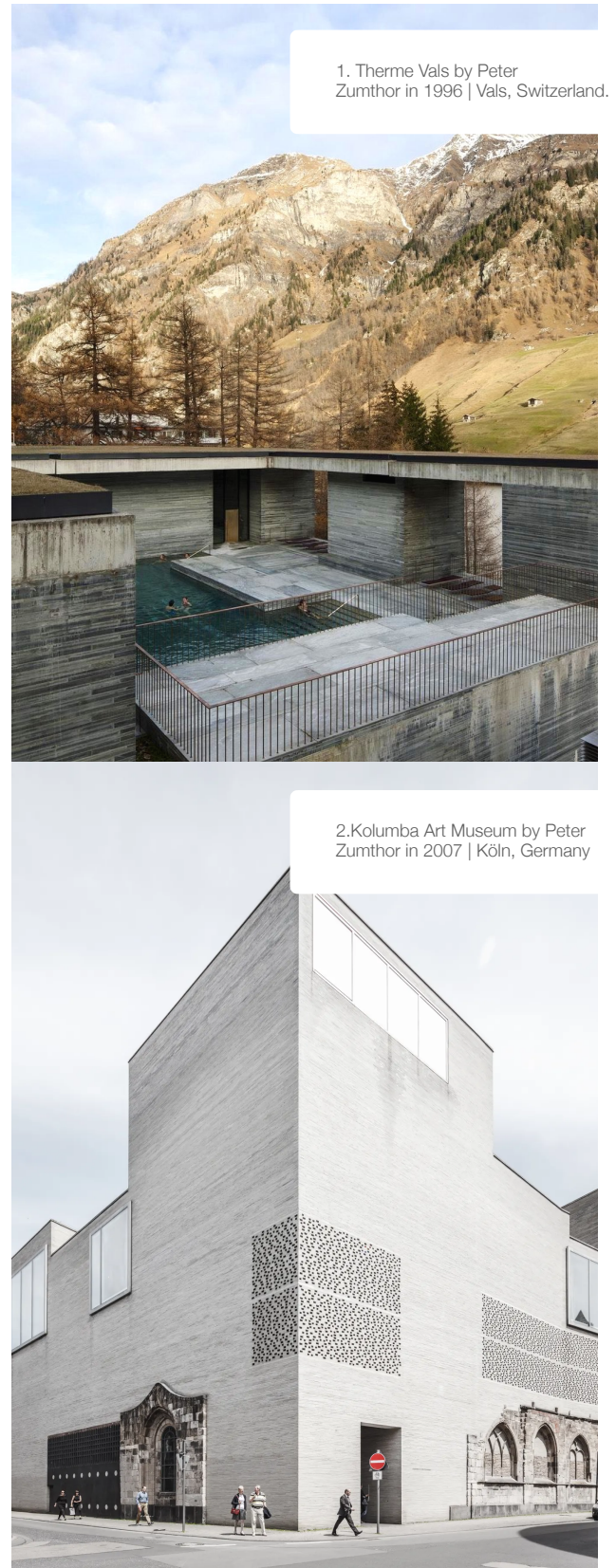


Figure 3. Therme valls and Kolumba Art Museum
Source: <https://divisare.com/projects/388269-peter-zumthor-morphosis-architects-thom-mayne-fabrice-fouillet-thermes-vals-at-7132-hotel> divisare.com/projects/349228-peter-zumthor-rasmus-hjortshøj-coast-kolumba-museum, October 2021.

3. Design and Location

3.1 design

All building could be designed with the senses and materials as focus point. In my opinion a specific building that could integrate these principles is a memorial.

A memorial is an artifact that serves as a focal point to remember or commemorate something, usually a prominent, deceased person or a terrible historical event. Something that keeps the memory alive.

Memorials have their own sets of requirements and limits, ranging from monuments such as pavilions, landscape architecture and sculptures to fountains and parks. When creating a memorial, several considerations must be made, ranging from preserving the historic event to the impact on the surrounding environment of local residents. Literature research on this topic is needed to find the right memorial for a typical place.

A relevant question can be positioned:

Would it change our perception of an historical event if the connection to the material and immaterial world would be considered?

3.2 Location

To establish a memorial, a determined site is needed because of the history and heritage of a specific environment or place what will be exhibited.

As showed below, the structure is kept intact over time but today the ambiance from 1944 is not experienced anymore. For anyone interested in World War II landmarks and history in general, the Normandy shore in Northern France is a must-see. Much of the combat in World War II took place in

Normandy, France. The liberation of Western Europe from the Nazis was made possible by the British landing on the beaches of Normandy.



US soldiers move out over the seawall on Utah Beach after coming ashore in front of a concrete wall near La Madeleine, France, June 6, 1944.



French bathers walk over the remains of the concrete wall on the same place as the left picture on August 2013.

Figure 4. Utah beach in 1944 and 2013
Source: <https://www.insider.com/normandy-wwii-and-today-2016-5#people-soak-up-the-sun-on-omaha-beach-august-2013-12>, October 2021.

Some of the iconic WW2 landmarks associated to D-Day in Normandy may still be seen in Normandy, France. It is critical that we remember this part of our history so that it will never be repeated. The design of the memorial and ambiance in this specific place will be inspired on events of World War II.

The location is chosen because of my own background and the historical character of this place.

The goal of the research is to design a memorial with the sensory experience and World War II in mind.

4. Method of research

4.1. Main strategy

The nature of materials leads to the proposal of new forms and an experimental approach to design (Paola, 1995).

To investigate the relation between the material and immaterial world through perception an unstructured interview is used as a quantitative research method where the interviewer, I, will ask open-ended questions based on this specific research topic.

The interview will proceed like a natural conversation. Personal background information will also be requested to get to know the person better and possibly link the answers to a particular profile. This helps the researcher to get a good idea of how a person perceives a given situation.

The questions will be answered by individuals with a background in Design and or Architecture. This is done to ensure a deeper understanding of this research topic. To receive a

For this interview a set of exteriors, interiors, pictures of material details and material samples will be showed to the interviewee. Figure 5 shows one set consisting of images and a sample from the Kolumba Art Museum by Peter Zumthor in 2007 in Köln, Germany. The material sample is the brick K51 used in the museum from the company Petersen Tegl.



Figure 5. Details of the Kolumba Museum

Source: <https://nl.petersen-tegl.dk/inspiratie/referenties/k51-kolumba-kunstmuseum>, October 2021.

4.2. Criteria and questioning

To show different atmospheric images and materials for the study, a variety of projects should be shown to the interviewees. To choose the necessary sets a specific criteria is needed: use of contrasting materials in structure, color and appearance. Also the exterior and interior must have a different ambiance.

Below, questions asked to the person about the exterior, interior and sample.

Exterior

- Do you think here a dialogue with history is visible?
- What emotions come to mind when you see this exterior.

Interior

- Would you feel comfortable being in this space?
- What emotions come to mind when you see this interior.

Material sample

- With this sample, what associations do you make?
- Having seen and felt this material for what architectural element would you consider it suitable? Facade, floor, interior wall or as a decorative element?
- What emotions come to mind when you see and touch this sample?

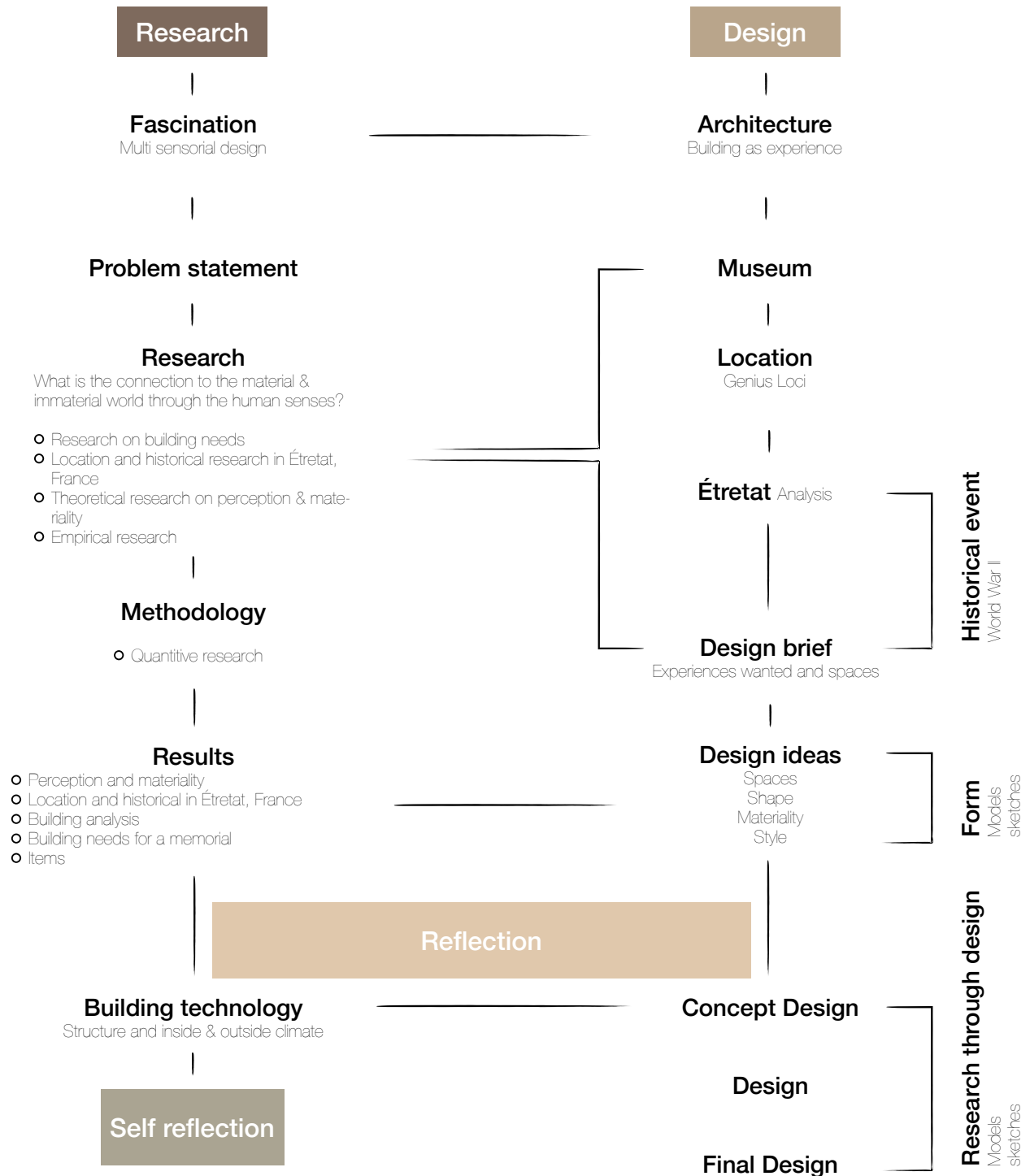
5. The expected outcome and the results

Users, whether driven by technology or environmental concerns, are, in my opinion, the ones who determine the ultimate success (or failure) of materials choices within the complexities inherent in choosing materials and a design. That is, how people react to and experience the materials chosen by the designer determines the success of a design.

I expect that from the quantitative study, certain items will emerge focusing on association and primarily feeling.

These findings of the study will provide me with tools to use in a design based on the material and immaterial impact on humans.

6. Research diagram



7. Bibliography

Churchill, W. (1944). Mr. Churchill's Speech in the House of Commons, 28th of September 1944 (Pamphlet ed., Vol. 1). Ivar Haeggstroms Boktryckeri A.B., Stockholm, Sweden.

Culvahouse, T., (1989). Architecture of Surface. Tulane Architecture.

European commision. (2003). Indoor air pollution: new EU research reveals higher risks than previously thought. IP/03/1278. Brussels.

Gibson, J., (1979). "The ecological approach to visual perception". Boston : Houghton Mifflin

Hegger, M., Fuchs, M., & Zeumer, M. (2006) Appropriate Forms of Construction - Criteria for the selection of materials. Detail, 2006(6), 652-657.

Herssens, J. and Heylighen, A., (2011). "Designing Architecture for more" in A framework of haptic design. Leuven: Universiteit Leuven.

Houben, F., (2017). "About Mecanoo." accessed October 1st, 2020, (<https://www.-mecanoo.nl/Office/Mecanoo>).

Hutmacher, F. (2019). Why is there so much more research on vision than on any other sensory modality? Frontiers in Psychology, 10, 2246.

Kohnstamm, R., (2009). "Zintuigen". In in kleine ontwikkelingspsychologie. Bohn.

Markowsky, G., (2017). "Information Theory | Mathematics". (Encyclopedia Britannica, <https://www.britannica.com/science/information-theory>).

Neumann, K. (2013). Synesthetische architectuur. Licht Ontdekken. Reportage Rainer Diersche.

Pallasmaa, J., (2005) "The eyes of the skin: architecture and the senses." Chichester: Wiley.

Paola A., (1995). Mutant Materials in Contemporary Design. New York: Museum of Modern Art.

Verbeylen, W., (2013) "Bouwen voor alle zintuigen" in Blinde ontwerpers werpen nieuw licht op architectuur Leuven: KU Leuven.

Wessell, L. P. (1972). Alexander Baumgarten's Contribution to the Development of Aesthetics. The Journal of Aesthetics and Art Criticism, 30(3), 333-342. <https://doi.org/10.2307/428739>

