REFLECTION REPORT
Urban Families in Dense Cities

RESEARCH

DESIGN

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This report has been written as a part of my graduation process at the Dutch Housing Graduation Studio of the TU Delft. In this studio, for the past eight months, I have mainly devoted my time to research and design. I applied various methods of research, all of which had some influence to my final design, a residential building in Amsterdam. The purpose of this report is to reflect on these different methods and to get an answer to the question: how and why the approach did or did not work and to what extent, and what I could have done differently. In other words, this report is a reflection on the relationship between research and design during my graduation process.
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Introduction

When we look around in the build environment, we see all sorts of buildings. They have all been invented or designed by someone. Sometimes they are very new to us and sometimes they are copies or newer versions of others. In order to come up with a final design for something, most certainly one can state that some research has been done in one way or another. There is not a single formula for achieving this end result, but everyone uses a different set of research methods. The same applies to my own designing process. Throughout my graduation process, I have also made use of various methods. In this report I will give an overview of the different research methods that I have used in the process of my graduation and I will attempt to reflect on this. The aim of this reflection is to look back and see if my approach worked and how and what I have learned from my own work. In this report I will reflect on the five aspects given in the Graduation Manual of the MSc program of Architecture, Urbanism and Building Sciences;

- Aspect 1
  The relationship between research and design.
- Aspect 2
  The relationship between the graduation (project) topic, the studio topic, the master track and the master programme.
- Aspect 3
  Elaboration on the research methods and approach chosen by me in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of the work.
- 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.
- Aspect 5
  Discussing the ethical issues and dilemmas I may have encountered in doing the research, elaborating the design and potential applications of the results in practice.
Almost five years ago, when I decided to quit working and start studying at the university, I knew an incredibly important part of going to a university is doing research. All the while designing is my favourite thing to do. In my opinion, it is the combination of the two, designing and the research behind it, that makes the field of Architecture so interesting.
Even though many times colleagues or students from other faculties jokingly state that at the faculty of architecture, we are only drawing and tinkering around with our models. There is a lot more research involved in our design process than assumed. The difference to most other faculties and areas of study, is that it happens in many different ways than they are used to or that seem obvious. It is not only about doing a lot of literature research and looking at reference projects. In the process of designing we are constantly doing research in various ways to support our design decisions. However, sometimes it is hard to give an exact definition of what research is. Is, for example, searching for the right size of a balcony or a toilet in a dwelling, considered doing research? Or is looking at reference projects considered doing research? To keep it simple, in his paper on methods and techniques for research, Theo van der Voordt defines research as collecting, editing and analysing data to find out more. According to this definition, everyone is sometimes involved in research to a certain extent.\footnote{According to van der Voordt, there is a very thin line between doing research or simply looking up something. He uses the example of a student who studies the Metric Handbook to find out how large a classroom should be. According to him, this should be classified as looking up something rather than actually doing research.} With the faculty of architecture in Delft being an institution for scientific education and research, there should also be a scientific part to researching. Henceforth, van der Voordt has defined scientific research as follows;

\begin{quote}
Scientific research is the methodical, verifiable, objective and reliable collection, processing and analysis of data in order to better understand and explain reality and thereby make it more manageable.\footnote{With the faculty of architecture in Delft being an institution for scientific education and research, there should also be a scientific part to researching. Henceforth, van der Voordt has defined scientific research as follows;}
\end{quote}
Personally, from the first day I started studying architecture in Delft, I had trouble assessing how scientific the research was that I had done during my design process. Especially regarding the objectivity to it. Because in a field such as architecture two different people could hold a different opinion regarding, for example, the architectural quality of a building. This constitutes exactly the reason why van der Voordt states that when regarding objectivity it is essential that researchers should keep personal views and value judgements as far as possible outside of the research. Another researcher should come to the same results using the same research methodology, the principle of all other things equal. The same naturally also applies to the other criteria for scientific research. In this report I will therefore try to test the above-mentioned criteria in the various research methods that I have used in the course of my design process.

A couple of years ago, during my Bachelor, I read a paper written by Christopher Frayling, Professor at the Royal College of Art in London, in which he called research the fuel for design. In his paper he makes the distinction between the relationship of research and design by categorising it in three types: research into design, research through design and research for design. The category of research into design is according to Frayling the most common one. It includes historical research, the study of theories and the different perspectives within the field; social, political, economic, technical, etc. With research through design, Frayling refers to the research of materials or the further development of a product by making adjustments or carrying out a series of experiments. The results of these investigations are communicated to the outside world to then later be used by others. In the last category, research for design, Frayling mentions the gathering of reference materials as an example. In this category, the research
and associated results form part of the end product, whereby the aim of the research is not primarily the communication of research results, but it is visually communicated through the end product itself.\(^5\)

Looking back at my graduation period and the relationship between research and design, I could almost divide it into the first half being mainly focussed on doing research into design and the second half doing research for design. A big part of the first half was exploratory, having mainly done literature research touching for example the historical, social and economic perspectives of my graduation theme. In that period, I have barely made explicit design decisions physically visible in my final design. In the second half, after having chosen what kind of building I wanted to design and for who, the focus shifted towards doing research for design by for example studying reference projects and testing design decisions using various research methods. What I noticed most is that during my design process it is not a matter of using one research method, to then use the results and move on to the next research. Rather that several methods can come back repeatedly on separate occasions in the process. Because you are working on so many different aspects at the same time, it is even wise to sometimes step back and take time to reflect on what results you have come up with before and to see what influence they can have at a new stage of the design. In the figure as shown on the left, I attempted to depict this process. Here you can see the different research methods that I have used and occasionally came back to later in the process. Sometimes using the exact same results but other times using the same principles of the method but then applied in a further stage of the process. These methods will be discussed more into detail, later in this report.
The act of designing is generally seen as a complicated, personal and creative process that involves a lot of different aspects. For me, at first, the act of designing was something that mainly happened through intuition. It also took many design studios/projects during my bachelor and masters to come to the realization that there is much more to it. Anton Ehrennazweig, a theorist on modern art who devoted his life’s work to the study of the creative mind, stated that in a creative process, or rather in a design process, there are no restrictive rules. Creative work creates its own rules, that only become known when the work is finished. At first the process seems completely random or intuitive, only after reflecting on it, the process becomes clear.  

Foqué describes the creative process as an interplay between rational thinking and intuitive thinking. He states that a creative process is not only based on intuition, but that it can only exist when intuitive actions are supported by reflective thinking. He calls this “the creative moment”, which is the moment when the walls between rational thinking and intuitive thinking disappear and make room for new insight. According to him, by doing this new discoveries are made in both science and art. Nonetheless, he states that the difference is that while scientific research tries to answer how things are, design research tries to answer how things could be.  

You could say that the latter is what I have done the most in the past months. To gain insight into this process, in the following paragraphs I will try to describe all research methods used during my graduation process and I will reflect on them.
In my opinion, case studies can be one of the most effective methods of research in architecture. However, case study methodology in architecture is not as finely defined as it is in for example the education of medicine, physics or chemistry. According to Marja Sarvimaki, Professor at the Bond University’s Abedian School of Architecture in Australia, this problem stems from the fact that data analysed from an architectural case study generally is viewed from diverse disciplines such as sociology, economics and ecology as a design of any sorts contains elements from these disciplines. In addition, I think this method is closely interlinked to a second research method that was subject to a paper I have written a couple of months ago; typological research. For example, a typological research into buildings, streets and accessibility can provide precedents on which the conclusions drawn could further aid and guide in my design. When looking at typologies you look at various cases. Architectural theorist Quatremère de Quincy was one of the first to develop an explicit formulation of the idea of type. He built a framework which laid the foundation for architecture to be examined and explored. He made the comparison between type and model. He stated that: “the model in the practical execution of art is an object that must be repeated as such; the type, on the other hand, is a concept to which everyone can conceive works that do not necessarily have to resemble each other. Everything is accurate and given in the model; everything is more or less vague in the type.” This refers to the ability to duplicate a model while a type is a concept that you can alter. However, the reference to vagueness should maybe be replaced by a reference to adaptability. By taking several cases in which, you study for example the type of access, you can draw conclusions of what you can use in your own design. For example, a multi-case study on floorplans in residential buildings allowed me to analyse the conditions under which families will be willing to live in other types of dwellings than those of typical single-family ground level dwellings. Quatremère considers the concept of type to form a link to the past, metaphorically this means that it was the first time that people started to see architecture as a form that allowed for analysis and further
development. This type is deduced from logic, the shape of a chair is designed by looking at the back of a man, logic in combination with reason and use defines the type and is thus the reason behind architecture. By doing this, the type that is reduced remains constant throughout history and cannot be refuted.10 Christ and Gantenbein confirm what Quatremère says, everything that is created now has been created before, to put it shortly; nothing is newly invented, and everything has a predecessor.11 Architecture is, according to them, a creative response to a list of must do’s and must haves of a client but is simultaneously a product of the designers’ preferences and all these sociological, economic, ecological etc. factors mentioned before. The outcome of this is a duplicable concept that is generalizable to provide answers for the research question. This is in essence what they call typology transfer. With their research method they believe that they can research new forms of living, where the usages of buildings can be mixed and become interchangeable and where cities can be built containing denser public spaces. The main idea behind it is that it can help the process of creating and designing duplicable types of buildings that are universal solutions for problems that are faced throughout the world.

I think this typology transfer is a more implementable form of typology research for my research problem, because it creates the opportunity to take what has been done before, improve this and implement it in
a new situation. This is what I applied during a crash course that was part of the studio. I chose four cases of which I investigated one type of access, the so called ‘street in the air’. In this typology transfer, characteristics of one case can be seen more than the other. But they all have had a certain influence on it, either on how I should or how I shouldn’t do it. In the diagrams below I put my own graduation project next to the four analysed cases.

Even though I feel that designing without doing extensive research could work, it needs backing by research, and it needs accountability, which can only be done by research. As Quatremère has stated, which I agree with, everything is based on something that has been done before in the end. As people are the product of all their experiences and the history of their being, one can never merely do something without it being defined by that.

In other words, to look at a building type or access type in which separate elements can be changed without changing the essence of the type. This is what typological research allows you to do. By studying cases and the typology transfer, insight can be gathered on the basis of precedents, the answers to the question: what has been done before, lead to solutions for my own design. So, in order to formulate guidelines for my design, a very effective method of research was doing these case studies.
HAMBURG

IJBURG

NIEUW WEST

BORNEO SPORENBURG
Excursions / Field Research

One method of research that I have used several times at separate stages of my graduation process is going on excursions, or in other words; field research. Reflecting on this method of research, I have used it in several ways depending on what I wanted to achieve. Sometimes the excursion was to complement another research and sometimes the excursion was an investigation in itself. In some cases, it was more focused on a particular research question, and in others it was purely for inspiration. You could say that the effectiveness of the excursion depends on the methodical way in which research has been done. For example, one of the first excursions I did was to complement an urban analysis of the region of Borneo Sporenburg in Amsterdam that I have done in a group. Prior to the excursion we had already done research through literature and several analyses on morphology and typology. Looking back, because of all the knowledge gained by ourselves about the area, and the simple fact of having a research question, it was easier for us to conduct targeted research to supplement our analysis then when I compare it to our trip to Hamburg. In the latter case, similar research was carried out by another group into the new urban expansion plan of HafenCity in Hamburg. Even though prior to the trip, I got to read the analysis results made by the group, this excursion had a different effect on what I got out of it. For me personally, the excursion to Hamburg could better be categorized as an inspirational one while the excursion to Borneo Sporenburg was an investigation in itself. One of the ways of researching is where I was focused on looking for something specific, while with the other I was simply being led around by others and simply looked and learned from the built environment around me. Nevertheless, in my opinion both ways of doing field research are an essential skill for an Architect. Whether it happens by coincidence or by searching for something specific, by looking around you, you get a better sense of the human scale in person.
Another excursion that worked effectively for me was one that I organized myself in a further stage of my design. In this case I was searching for ways in which I could design the transition from the private domain to the collective domain in my building. I mapped out a route along a number of residential buildings in Amsterdam West, and then took pictures of different ways that other architects designed this transition. By only taking photos, conclusions could not be drawn. That is why, as shown in the figure to the left, I started to highlight these transitions in order to form an overview of the options. Looking back at the effect that this research had on my design, I can draw an analysis of my own building in the same way in which I have been able to highlight the same kind of aspects of transition from the collective to the private domain. Reflecting on this research, according to the definition of scientific research given by van der Voordt, I believe this research came close to being scientific. A clear method of research was determined in advance and I trust that if someone else would have had the same question he would have gotten the same results, making it objective, verifiable and reliable.
Research through Literature

Before starting university, I was not a big reader. But now, especially in the course of the past five years it is certainly a big part of what I do. Looking back at my graduation period, doing research through literature has practically gone parallel to all other activities. This method was an important part of choosing the subject for my graduation. In contrast to fellow students that soon had a topic of interest, it took me a little bit longer to come up with something that interested me enough and that made me enthusiastic. By simply delving into current social issues in newspapers and then focusing on Amsterdam, I finally found an interesting theme; urban families being driven out of the city.

In the first half of the studio, the focus was put on understanding more of the historical and social context of families in the city. Based on reading books, scientific articles, newspaper articles, housing-related magazines and government policy, the aim was to formulate a design task for the second half of the studio. Personally, I think this way of doing research is the easiest to link to scientific research. By studying literature, I was able to obtain a better theoretical basis to formulate principles for my design. The reason that I can most easily link this type of research to scientific research, is because of the extent to which you use other sources, you read the findings of researchers who have previously studied the same matter. Besides, after having studied the material on families in the city, I noticed that someone else that was conducting research on the same theme, though not exactly the same, the results were at least comparable. This confirms van der Voordt’s criteria on the objectivity, verifiability and reliability of scientific research.

On the other hand, what I find difficult from literature research, especially with a relevant theme such as the subject I have chosen, is the large amount of information that you must be able to logically process in your own report. I could certainly improve the efficiency of doing research in this way. I am convinced that I have read and found much more than what I was able to write down and conceptualize. I think this is mainly due to experience. I could often have taken a step back to reflect on what I had read to give myself the opportunity to structure it better.
Although I mainly did research through literature in the first part of the graduation, it was certainly part of the second part in which I switched to the designing phase. The difference is that the literature research in the second part was less structured, and that in some cases it could be classified as looking up something instead of doing research. For example, books I read while designing are a book by Maarten Wijk about the ergonomics of space, or the book *Cities for People* by Jan Gehl, which focuses on the design of the city taking into account the human scale. The conclusions I have drawn from these books have never been reported in writing but can be seen back in the design.
Verkeer rondom de ontwerplocatie

Haven-Stad Amsterdam

- voetgangers en fietsers
- auto te gast
- hoofdweg
- parkeerplaats

- recreatie
- haven

100m
Site analysis/research

One of the first lectures I attended when I started studying architecture was about a text from Christian Norberg-Schulz; “Genius Loci, Towards a Phenomenology of Architecture”. In this text he refers to the Roman concept of Genius Loci meaning the spirit of the place. I learned that one of the first things an architect should do before designing a building, was to visit the location of the building that is to be designed and search for this Genius Loci. The same applies to the start of the graduation studio. So already on the first day we all went to the building site, to then present our first impressions. The advantage of physically visiting the site rather than only looking at drawings and maps, is that you also get an impression of aspects such as sounds and smells but also the scale and size of the location in person. So, our perception of a place is largely determined by the properties of the place. However, these properties are not static but can change and develop with the place through time.

Therefore, to get a complete analysis of the site, it is crucial to complement a site visit with other methods of research. So, in addition to visiting the site, I also consulted historical maps, I looked at future plans from the municipality and I made analytical maps which I was then able to use for the starting points of the urban plan for the area. I am convinced that only after having done an extensive analysis of the site, it will be easier to substantiate decisions you make during the design process. Reflecting on these methods of research, what I find interesting is that the results of the different studies were comparable to the results of fellow students using the same methods. You could even state that the part of presenting our individual first impressions of the location, which initially sounds very subjective to me, were all similar, the only difference was probably the drawing style used by each student. According to the definition of scientific research given by van der Voordt, you can therefore classify these methods as being scientific.
Research by using Models

I personally find this method of doing research the one that runs most parallel to design. You are essentially testing and researching things while designing. You can do this physically, for example, with polystyrene or cardboard, or digitally with 3D programs such as Sketchup. The great thing about this research method is that it can also be done by using the different scales. I have therefore used this type of research both in the phase before the P2 where I was busy developing an urban plan and in the second phase of my graduation where the focus was on designing the building. Models can be used purely for research but are certainly also interesting to present ideas to others. In this chapter I will give a description of the different ways in which I have done research through models during my graduation.

The first study I did was focused on the urban plan. For this I used both physical and digital models. I did this part together with two other students where we went through discussions and consultations to test what an ideal plan was for the area assigned to us. Once we made a statement about the necessary density of the area, we started using polystyrene on a scale of 1 to 2000 to test various options about the possible urban morphology in the area. Parallel to this, as soon as we had an option that we thought was appropriate for our concept, we switched to a digital model to see if it really fits, as you can model exactly to the millimetre on the computer. The advantage of physical models is that you can work relatively quick in a simple way and come up with many different alternatives, but on the other hand they are often not very accurate, which means that you still have to switch to a digital model. Once we had a definitive version of our plan, we moved on to a physical presentation model that we had laser-cut in MDF. However, at a later stage this also turned out to be a study model because later we also made enough adjustments to it. From this study, regarding working with models, you can conclude that it was an interaction between digital and physical models.

Once in the design phase of the building, I also did various model studies. To come to a shape of the building, I did a combination of model studies. For example, by means of volumes in the form of blocks
of different sizes, each of which had to represent an apartment. I have investigated various possible options for stacking the apartments above and next to each other. During this research I noticed that it was very inefficient if I wanted to form an entire building with these blocks on a 100 x 60-meter plot. That is why I switched to a digital model where I could copy and paste in a faster way. On the other hand, the danger of working with a digital model is that you can lose yourself in the constant adaptation of minute things, as a result of which you can sometimes no longer see the entire development process to an end. Once you have a final shape of your building digitally, it is advisable to make a physical model of it. In my opinion, you often see new things in a physical model that you do not see on the computer. Here you can also take into account the scale of, for example, a previously made urban development model to look at the integration of the building in the area. That is why, somewhere halfway through the design process I made a model of my building with polystyrene. I discovered that the building deviated too much from the urban morphology. This allowed me to start a new study again. The biggest problem was the closed building block structure in the urban plan that my building deviated from. As a result, the following study focused on investigating ways to give the block a better fit with its environment. This study was conducted in the same way as the previous studies, a combination between physical and digital models. Once I was satisfied with one option on the computer, I made it with foam and cardboard to then adjust the imperfections of it again in the digital model until I came up with the final version.

Reflecting on doing research through models, I am convinced that the combination and switch between digital and physical models ensure the best results. One complements the other and vice versa. Since this is a method where you do research while designing, I find it difficult to link this to scientific research. I can imagine that another person who would conduct research on the same research questions using the same methodology could perhaps come up with similar results but hardly anything exactly the same. In this type of research, in my opinion, a large part of one’s own creativity comes in place, so that each individual will most likely come up with a different possible solution.
Sun studies

Sunlight in first instance feels like an odd thing to have to study. Without thinking about it we deal with it automatically on a daily basis. However, for an architect it is an aspect of great influence to his or her design. The great thing is that we know everything about it, making it predictable where the sun will be at what time of the day in which season of the year. Therefore, analysing it on different scales will help making decision on the orientation of the building and the shape that it will get. It will help you to decide how to organize the program of the building and the usability of spaces. Nowadays, almost every design program on the computer has an option to do a sunlight study. During my graduation I have done several solar studies. First in the phase of researching the building site. The existing street structure in the urban plan was predominant to the positioning of the building blocks. Because it is not directed precisely to the north but is twisted a few degrees, the orientation of the building blocks in relation to the sun had the advantage that the intermediate streets could receive some sunlight even in the winter. As a result, as long as the streets...
were wide enough, in this case 20 meters, I could design the streets in a way that children can play outside while the sun is shining. I did a second sun study while developing the shape of the building. Although the urban plan already stipulated that we had closed building blocks, I made openings in strategic places in my building so that the sun could shine in the courtyard at different times of the day and that as many houses as possible could have sun on their private outdoor space. Thanks to the results of this solar study, I have also been able to take into account that homes that do not get the sun directly onto their private outdoor space also have a French balcony on the sun side, which means that the quality of living is good for the residents. Reflecting on this method of research and its scientific nature, you can certainly categorize it as being scientific. If another person were to use the same method, including the fact that the sun will always follow the same orbit throughout the year, the measurement results and conclusions would always be the same. There is a good chance that even design decisions by different people would be comparable based on the research results of a sun study.
Aspect 2

The relationship between the graduation topic, the studio topic, the master track and the master programme

As mentioned before, it took me some time to choose a good topic for my graduation that would make me enthusiastic. Reflecting on the relationship between my graduation topic and the studio topic, I can state that I succeeded in my choice. A major question within the Dutch Housing Graduation Studio is; how do we want to live and what kind of buildings do we need to allow for that? In the Dutch Housing Graduation Studio, we are looking for an actual need, a problem in the real world that needs to be solved. In my graduation topic I sought for a solution for a problem that many big cities are facing; families who are driven out of the city. I have researched how these families could continue to live in the city, in what kind of building that should be and what that should look like. I made an attempt to find the ideal solutions but at the same time look at ways for standardization of these solutions connecting my topic with the starting principles of the studio. By immersing myself in the future of housing in the Netherlands my theme follows not only the fundamental basis of the Dutch Housing Studio but also of the master track and master programme given by the TU Delft.
Aspect 3
Elaboration on the research methods and approach chosen by me in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of the work

In the previous chapters I have extensively discussed the research methods that I chose during my graduation. I think a large part of the chosen methods were the result of the way the studio was set up. Having a clear structure of when something should be done was very pleasant. It gave me a grip and a clear picture of what awaited me throughout the entire process. The focus on researching a specific topic in the first half of the studio, up to the P2, has led to more depth in my research than in previous master studios. The structure of the studio and the way of doing research have amongst others, ensured that it is scientifically substantiated. The research tutorials ensured that I could sharpen my subject, so that I could ultimately come to a more concrete design task. Although the layout of the report was already determined in such a way that it was difficult for me to write a well-connected study. But in a certain sense this probably also has to do with the limited experience I have with writing. Furthermore, I found the given research seminar very effective, especially when it comes to investigating precedents, which provided a good starting basis. The fact that the studio with exactly the same structure is followed simultaneously by a large group of students ensured that you could exchange ideas with others throughout the entire period. At the same time, this sometimes resulted in less original solutions, which is a logical consequence of sharing ideas with others. Nevertheless, I think that in general, the structure of the studio and the methodical line of inquiry have ensured that I have been able to carry out my research effectively and have come to an optimal design.
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 graduation project is the result of extensive research on current social issues. The fact that I am not the first to research the theme of families driven from large cities is proof of this. I have been able to use many of my findings in my design and I am convinced that in the future others will be able to adopt these further. Because my graduation research is made public on the TU Delft repository, it will be available to everyone in the future. I hope that these results will also inspire others to elaborate on this. The design I made is not the only solution to the problem I have investigated, but it is certainly a new addition to the ones that already exist.
Aspect 5

Discussing the ethical issues and dilemmas I may have encountered in doing the research, elaborating the design and potential applications of the results in practice

In my search for current societal issues in our cities, it is impossible to escape from the theme of my graduation. As I mentioned in my research report, many young families in Amsterdam are dissatisfied with their homes and with their living environment and as a result many of them move, involuntarily, away from the city. As a consequence, the diversity within cities decreases, resulting in the segregation of the population. However, families indeed want to stay living in the city, but the problem is that the housing supply is not sufficiently tuned to their needs. In other words, the right houses are missing. I am convinced that the design I made is realistic for the current situation in which we live. Often limited space and financial resources are a major problem that designers and builders encounter. I think that by taking this into account, especially in the design process of my graduation, I have largely been able to tackle these problems. I see the feasibility of carrying out my design in practice as very realistic. Especially when it comes to the ideas and principles that I have used as a starting point, but also the construction technology aspects. These are based on the existing building practices.
Notes

2 Ibid. p: 5
3 Ibid. p: 6
4 Ibid. p: 5
5 Christopher Frayling, "Research in Art and Design " Royal College of Art Research Papers 1, no. 1 (1993/4).
7 Ibid. p: 38
10 Moneo, Oppositions: On Typology. p: 28
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