THE RELATION BETWEEN DENSIFICATION AND EDUCATION
Evaluating a pre-structured research methodology and approach

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I   INTRODUCTION

No one discipline or profession can stand on its own, there is always a reliance on one another. This is especially true to the discipline of Architecture. The multiplicity of architecture reaches out in to every corner it can (Lucas, 2016). This very much also implies to its connections to different disciplines of science and thus indicating the importance of research in architecture. Which also relates to the fact that the faculty of Architecture and the Built Environment is located at a Technical University. The syllabus of this course explains the importance of establishing an intellectual sensitivity and understanding the different instruments and systems of knowledge where our research is made up from. With the additional weekly lectures and readings the aim was to make us, the students, aware of this and reflect on our own process. Even though I believe that I already was aware of the importance of research I did not fully understand my own process and instruments. Reflecting on this process, with the provided readings, has given me a more insight to my own way of researching. In my studio research I do not rely on the use of one focus direction, but rather an exchange between them, using a variety of different methods and studies. As I found that there is often not one single method to research a topic or question, but a broad variety of ways can be applicable. This paper will provide more insight on the argumentation and positioning of my own process in order to obtain a better understanding.

The MSc3 graduation studio of Complex Projects is a continuation of the NYC Midtown Studio. Shifting to Rotterdam with the aim to discover and understand links and differences through the theme of international migration. Within Complex Projects both students and teachers are encouraged to look critically at everything to gather, organize, and question the complex forces that ultimately manifest themselves into our built environment. Turning it into a philosophy of design enabling students to unpack any set of design constraints and react more thoughtfully to the conditions around them. By applying a very organized and structured planning, dividing the semester in phases based on a different action of the design process, the goal is to develop a methodological and structured approach to achieve the desired result. In addition to learning how to deal with complex design tasks, how to process and organise large amount of data, how to meet deadlines and prioritise the workload.
For the first phase exploration and research collectively by factual data prepare the group to go into the next phase, the opportunity to develop your own individual fascination and further investigate related topics. This process has brought me to my studio topic of Education.

Within the topic of Education I am focussing on how densification is influencing the role of education within the Rotterdam City Centre. By looking at the changing city and with this means for education I will conceive a meaningful project for the future of cities. The focus that has risen from this research is the migration of the urban school development which comprises many topics regarding integration within the urban fabric, maximizing space, new pedagogical approaches and innovative ideologies on what education can be.

The process of densification starts with the development of urban growth. By 2050, the world's urban population is expected to nearly double, making urbanization one of the twenty-first century's most transformative trends (UNICEF, 2012). In 2018, 55% of the world's population lived in cities. by 2050, cities will contain 68% of the world's population (United Nations Population Division, 2018). This trend is also occurring in Rotterdam. due to the lack of space Rotterdam went vertical. Densifying its city centre with many high rise towers to maximize the use of space. This added density brings new challenges to the city. And there is more expansion to come. Between 2020 and 2035 the housing stock will increase with 34,000 new homes. Most of which are expected in the Rotterdam City centre. Which is expected to increase in population with 53% by 2035 (AlleCijfers, 2020). Where the development of the generation 0-19 is estimated to increase from 4,500 to 7000 by 2035 (Gemeente Rotterdam, 2016). The increase in density results in a higher demand for schools and resulted in my focus on a possible new role for education within the city. Studying the current state of the city and emerging densification has led to the necessity of using more than one research method and focus. Therefore will this paper be elaborating on a pre-structured research methodology and approach into education and studies the used methods that have defined my process to where it is now.

II   PRE-STRUCTURED RESEARCH

The Chair of Complex Projects works with a very specific general approach. Which is based upon the research methodology that resembles a lot with *Experimentation.* In which every form of research suggests the next step of the process. This methodology is also already structured in four different phases. Each made to follow further upon the other, seeing each phase as a sort of experiment, to develop a more specific question and narrative (Lucas, 2016).

- *Hard*, In the first phase the research is done collectively on the site. The focus is on mapping and collecting factual data while the group is also busy make a large physical model of the site.

The group works as a whole to obtain a broader understanding of the assigned site area. In this research the context has taken the lead in the process. By dividing topics, a broader perspective is reached as various settings from physical, historical and social can be researched at once. However being subjected to a lot of different people it is not one period, topic or viewpoint. The location in this instance is set but the boundaries can differ. My personal method that was applied in this research was focused on people and numbers, which is complete quantitative research. Through generalizable data the aim was to know the former, current and future demographics of our assigned site area. The specific research method that summarizes this first step is *Data collection* (Lucas, 2016).

- *Soft,* In the second phase each group member is focused on developing their individual fascination, and further investigating related topics.

The outcome of the *Data collection* & *mapping* of basic functions in our sight directed my fascination into the topic of Education. To further investigate this topic I used a broad systematic approach in order to gain a complete understanding. The overall research framework therefore examines the whole of Rotterdam and it's Education. The undertaken studies are temporary as they are executed to the specific context and parameters of the current setting.

For the first part of this study the spatialization of data is denoted by *mapping* which was the most applicable method to achieve a broad knowledge that could make it visibly understandable. Some of which could also be defined as a sort of *concept mapping* as they are used to produce illustrative cluster maps depicting relations between each other or to showcase clusters (Burke, O'Campo, Peak, Gielen, McDonnell, & Trochim, 2005). This method provides structure and objectivity to either quantitative or qualitative data. The following maps are 2 examples of a series of 26 maps regarding the Primary and Secondary Education in Rotterdam.
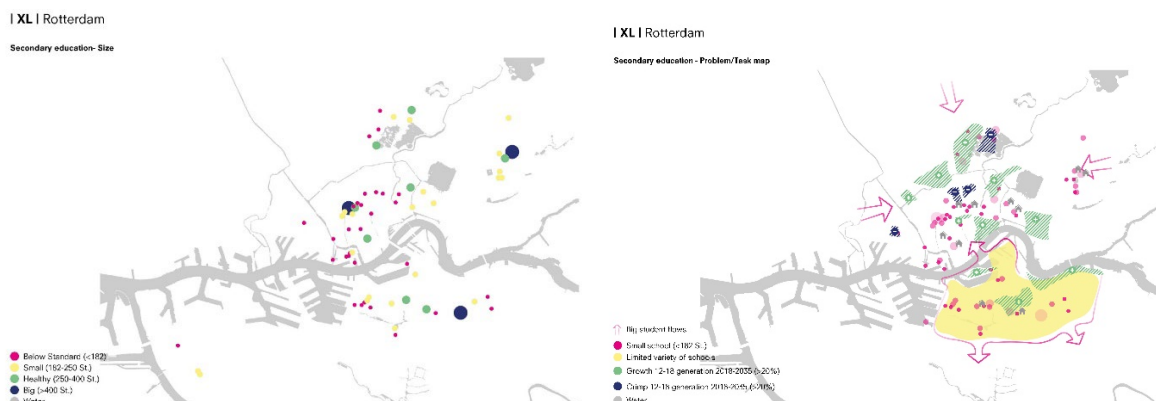

Figure 1: Rotterdam Secondary Education, Source: own work

Besides the visualized data to strengthen the story more data is collected through *data collection* specifically based on the primary and secondary education of Rotterdam. This will underlie as a second layer of information to the already made maps. Most of this acquired information was easily obtained through the municipality of Rotterdam. The diagrams below show an example of this data.
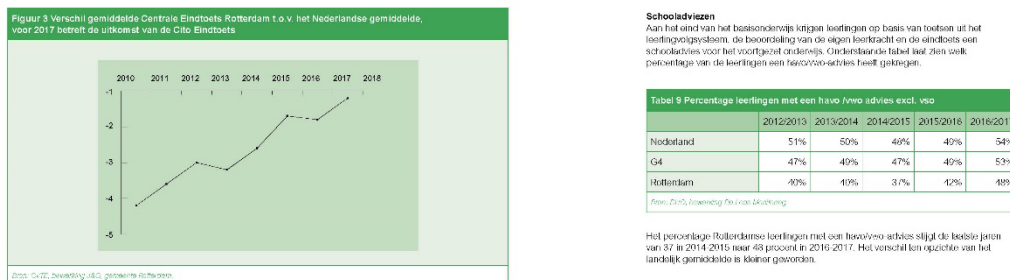

Figure 2: Staat van het Rotterdams onderwijs 2018, Central test score averages. Source Gemeente Rotterdam.

- *Space & Brief,* The third and fourth phase, was supposed to be inspired by a study trip, to gain physicality an spatial experiences of current trends and changes. The goal is to speculate and predict an urban vision which is then translated in a design assignment.

The third and fourth phase is where we are currently working in. Due to the impossibility of experiencing the site fully as a group we are basing our urban vision upon the pervious made research, this limits our understanding of the environment. The *Fieldwork* would have given us the possibility to implement other research methods such as *interviewing.*

In order to formulate a design assignment the next research step has to be taken. In order to do that in a correct way that is substantiated by evidence *typological* research has to be done. In which I am not looking for standardization or a typification which is also rejected by Oechslin in his 'Premises for the Resumption of the Discussion of Typology' (Oechslin, 1986). My aim is to clarify the relationship between educational concepts or ideologies and the architecture that results from this. By interpreting these 'types' through a systematic approach the scope of variation can be described. As we have only started with this phase I do not have concrete examples of this.

III   RESEARCHING DATA, MAPPING & TYPOLOGY

Having used various methods in research it is valuable to reflect and discuss their context and changing values, especially for the research method of *data collection*. The history of data has changed enormously, particularly regarding quantity, types and analysis. The first forms of data were collected to record inventories of such. Later this evolved due to calculations and science related to astrological studies. Discovering new forms of data resulted also in the need for new ways to collect, analyze and store. In particular the storage of data when the first computer was invented. with the commercialization of computers, even more storage was needed to keep pace with the influx of data sources (Peersman, 2014). Institutions started to see more and more value in the impact data and analysis could have. But only recently in the 1990's the biggest influence, the internet, revolutionized everything about data. Which meant an expansion of more data, types, collection, analyzation and so on. It's evolution has already started ,*Big data*. Preforming in new forms of cognitive technologies and transcending boundaries as if the possibilities are limitless (Salthouse, 2011). While data, storage and analysis keeps evolving it is sometimes overwhelming. Especially for us as architects, interpreting data in the correct way is utmost important. Understanding the collected data is therefore very important, visualizing this information as well. This has been a big part of my own research, understanding the abundant amount of data and translate this into a visualization. Another key aspect in this matter is the validity and reliability of the data. Ensuring the quality of the collected data involves that they can be verified by others (Warta, 2019).

The second research method is *mapping*, which just like *data collection* has changed over the centuries. The origins of the map stems from its physical representation of landscapes and connection to space. Mainly used as a directional tool with strict conventions of scale and legend. Over time the use of maps has developed as a methodological instrument used throughout a wide variety of field (Murphy, 2007). Used to document or analyze notions of place, relationships or processes (Powell, 2010). As mentioned before one these is the concept mapping that approaches ideas in a way to visualizes the concept. Which can be graphically instructive when literacy communication is problematic or can help transfer interpretations. In the field of architecture it has been a long development from Giambattista Nolli's iconographic maps to where we are today (Verstegen, & Ceen, 2013). The urge to illustrate and communicate our work as architects has evolved as a visual culture that compresses our data or information so that it can be understood. Consequently the term *mapping* has moved far beyond its conventional use and means.

The understanding of the type and typology within the architectural field has had different variations starting from the French Enlightenment . The history of this concept can even be seen as un continuous attempt to understand it, as it is so important to us as architects (Ming & Jingyi, 2019). The architectural typology can be found in different categories of the field. Broadly discussed and modified by trends and movements. The modernist architectural discourse the type almost got discarded even. Reduced to the notion of a stereotype. Many architects and theorist have given a definition the type. Rafael Moneo's 1978 essay "On Typology" gives a critical look at the definition of types. He interprets the type as a concept that is used to describe a group of things with the same formal structure. The continuity of the architectural design to the historical memory corresponds in this to peoples psychological cognitive experience (Moneo,1978). The writings of Aldo Rossi, mainly The Architecture of the City (1982), influenced many. In which Rossi focusses on the similarities of the universal and the character of the city through a study of the urban, using a typological-morphological approach. His approach prioritizes universal over particular and suggests that this permanent, universal, collective character is the type. Rossi defined typology as the study of elements of a city and of architecture that cannot be further reduced (Rossi & Eisenman, 1982). The type has been worked over by many within the history of the architectural discourse. The typology could even be seen as a common language of design that can provide coherence and a shared meaning in the built environment (Guney, 2007).

IV   POSITIONING

The Chair of Complex Projects investigates all the different scales of architectural related thinking, aiming to expand the knowledge about design and urban development to broaden the mind of future architects. The pre-structured research phases are intended to target all the scales of the architectural discourse; global, national, region, city, building and detail. As their believe is that the architect operates within many different scales and contexts, consequently having to see through many lenses as an architect, philosopher, strategist, planner, politician, organizer, artist, economist or even a visionary. In this way a strong and analytical approach to the design process is cultivated. If you resonate with this message about the architect the pre-structured research methodology will guide you into developing these aspects. In the last few month I did experience personal growth in my critical and analytical thinking process, writing this paper made me even more aware of this. However, I do find some aspects of the approach to be limiting. The research products that visualize how the research leads to the narrative, and in its turn translated into a design, are too restrictive. The architect through the lens of the artist sometimes needs to have their artistic freedom, within their natural boundaries. The approach also limits the options of available research methods due to the delivery of products and narrative that is to be presented every 4 weeks. They pre-describe the expected method in their description, especially in the first and fourth phase, ''The focus is on mapping and collecting factual data''. This pushes certain research methods to be used. The fourth phase every student is even told to do typological research in order to validate your design brief. It is in their beliefs that this

will result in the best projects. Even though I do find all this too restricting I agree with their approach relating to the future.

Especially with the enormous development of *data collection* in the past decades and its exponential rise in importance. Incorporating this into the practice of architecture is not to be left out. Understanding and visualizing collected data is therefore very important in the architectural discourse to communicate with other practices or people. This is where the research method of *mapping* has made big developments transforming in some ways to also an artistic matter. As a method I think it belongs to the fundamental toolkit that every architect should master. This goes without saying also for the typology, which can be seen as a continuous discussion over time that should never be discarded. The research methods that I have used in my process show importance and relevance to understanding my overarching topic. The reflection of these research methods in this paper and the provided literature and lectures in this course have given me more insight on the reasoning behind my choices. To conclude the discoveries that I have obtained from writing this paper, a pre-structured research methodology can work very well if you resonate with the adjective approach. Within the predetermined frame work set up by the Chair it is possible to select your own research method, however limited due to deliverables. The approach to continuously advancing your narrative by developing from one phase to the other is carefully considered. However, it should be up for constant discussion, evaluation and open to alteration.

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