COLOUR-CODE MODELS: THE CONCEPT OF SPATIAL NETWORK

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Abstract. The main goal for the architects or planners is to understand a perspective of the user. The foundation of the design process is to create buildings and environments, which will be both innovative and functional for all types of users, including adults and children. While planning the environments for children the particular aspects should be considered. The important questions are: What kind of contact does child have with the city, urban places and buildings? How does the child construct the picture of the city? What kind of urban or architectural spaces contributes to the relation that a child has with the environment? Most of the previous studies concentrating on creation of spaces for children have focused on the perspectives that have adults. According to CAADRIA 2010 paper, the objective of our study was to ''learn about'' (get to know the) children's perception of everyday places. The main goal of the project was to define an appropriate tool for the design process. We identified three elements, which were considered to be the most important for child's identification with environment: home, school, and the journey from home to school. For this purpose, children living in a residential community in Bangkok were surveyed. Contrariwise to the quantitative approach (Neisch, 2010), the concept of Colour – Code Models of space propose a qualitative development of this research – a graphic language which allow to understand the children's spatial world, the novel way to analyze and present space, useful for educate architects and planners.

Keywords. Spatial network; perception and representation of environment; drawing processing; data analyses; design for children.

1. Introduction

Nowadays, the world of the children and young people is created through

the new technological objects and using virtual people. These factors influence children's life style in the modern epoch and contribute to the loss of social local life and traditional model of relationship and human contact. In this paper, we present the concept of Colour-Code Models of Space. The idea of this tool is to allow comprehending of children's relation with their environment, especially children's perception of town and children's relation with urban and architectural spaces in time of digital realities. It is useful and necessary to have a variety of pictures of the city, because the fact that the urban spaces are different shows that the ways of living in the city can be different as well and we can not consider only one universal way of living in the city. Anyway, beyond some dimensions, it is almost impossible for an inhabitant to spread across the totality of "his city". There are so many faces of the urban life, that we are unaware of many districts, groups or places of our own city. Our research is based on children's perception of environment, which we studied through the analysis of drawings. In a first step, in June 2009 we conducted studies in two Thai schools - one private and one public (located in the suburbs of Bangkok). We employed a quantitative method for analyzing the drawings (Neisch, 2010), however, this method of analysis and the conclusions that we obtained did not seem to be sufficient to achieve our scientist purpose. It was then essential to develop a qualitative method of data analysis - a graphical language (Colour-Code Models) with which it could be possible to connect the elements freely and develop of them an entity of analysed spaces.

To begin with our research, we will first of all situate it in the theoretical context. In the second place, we will develop the concept of Colour-Code Models.

2. Theoretical approach

2.1. PERCEPTION AND REPRESENTATION OF ENVIRONMENT

The studies refer to the psychosocial quality of space, which are considered to be the most familiar areas for the child next to its domicile: the school, the itinerary from home to school, the district. The representation of the environment has at least two functions: it serves primarily to facilitate the location and movement within the major physical environments and, secondly, it provides a general frame of reference for understanding and appropriating this environment. Term "representation" in the broad sense is reduced either to the mental image or memory image (Piaget and Inhelder, 1967). The mental map in the studies of the environmental perception owes a lot to Lynch who

has studied the mental representations of the inhabitants of three cities in U.S. (Lynch, 1960). Categories of elements describing the content of representation were proposed also by other researchers (Appleyard, 1973, Francescato and Mebane, 1973, Beck and Wood, 1976). Exclusively related to cognitive representations formed by adults, these studies used Lynch categories to describe the content of representation studied. While the terminology used in the description of content of representation remained the same as that introduced by Lynch, the interpretation varied according to the approach taken by each researcher. Thus, while Lynch attributed to these categories of morphological and structural characteristics of the city, other researchers attributed to other factors such as level of education, familiarity, age, gender, and practices.

2.2. PATTERN LANGUAGE

Christopher Alexander, architect and mathematician, wrote: "*a pattern language has a structure of a network. However, when we use the network of a language, we always use it as a sequence, going through the patterns, moving always from the larger patterns to the smaller, always from the ones which create structures, to the ones which then embellish those structure, and then to those which embellish the embellishments*" (Alexander at al, 1977). The "pattern" appears to relate to two different levels: 1) the level of the real world (or rather the real world's perception) and 2) the level of the world of conception. The designer works in a distance from reality - in the abstract space with its own components and its own rules of operation, even if the real world stays always the starting and the ending point of the design work. The two essential components of the world of design are the "problem" and its "solution". It consists of the definition of a "relationship" that very quickly becomes "Pattern": term by which we get a more defined picture of the space character of these entities and of their dependency in relation to "context". Later, "Pattern" is conventionally extended to the problem and its context. Procedures, introduced by the "pattern language" operate at two different levels: the level of production and use. The "pattern language" is considered to be a set of rules of patterns combination and serves as help in programming and in design process. The aim of the "pattern language" authors was to provide the designer a complete methodological tool, which accompanies the start of programming at the end of the design process. No doubt, the "pattern language" functions currently as "a reservoir of information", but it does not mean that this bank really gives the desirable information to the user. Our objective is to create a language that will take this into account. We will refer to the studies of Ch. Alexander by creation of the structure of the language based on network and sequences.

2.3. CHILDREN AND DESIGNERS

Children's life's spaces and its experience are influenced by the job of architects and urban planners. Planners need to understand better the children's lives and social relationships and have access to and support from child and youth centred policies and practice. Planners have become aware of the need to plane for and with children and young people. Public participation stays in the centre of good planning process and is universally acknowledged as a "good thing" for planners (Freeman, 2005). According to the author, the work on design planning should be based on the will of creation of good environments. It is also important to point that, contrariwise to what we can think, the children use the space in a very broad way. Everything takes place between places, where children live, where they have their activities, where their fellows live, etc. Freeman differentiates three main concepts, which need to be taken into consideration: transport, housing and shopping and speaks about the importance of the correlations between them. He specifies also the requirements of planners: they need to be able to understand how both current and future planning developments, designs and processes impact on children; to recognize the changing and complex nature of childhood, to develop an understanding of children's environmental experiences, to understand what do the children want.

2.4. DESIGN PSYCOLOGY

We also often refer to the concept of design psychology when we want to create or to define the ideal places. Interesting is the idea of the transformation process of my house' to 'my home' (Israel, 2003). This study illustrates how the concept of design psychology can be prestigious for architectural design. Childhood environments have powerful and lasting effects on people. This is why it is reasonable to use the exploration of the ways of Design Psychology to the design of spaces dedicated to children. It can be suggested that the transition from childhood to adulthood is a period when youth frequently congregate in public places, where they seek to shake off the constraints of home, but do not yet feel comfortable of feel alone in spaces mainly inhabited by adults. (Pooley at al, 2005). Furthermore, young people feel more secure when they find themselves in the urban space. How these spaces are then used and frequented by children? The authors seem to have the same question. *It is likely that young people have always been highly visible in urban areas, but we know relatively little about how the use of urban space by young people has changed over time.*

2.5. UTILITY OF THE CONCEPT

We believe that the development of a graphical tool for analyzing the perception of space can help us to find the answer to this question. Especially, according to the authors, we suggest a factor that has surely changed in recent decades: the personal mobility of children, which is mostly related to commuting as the journey from home to school, shopping, playing or other leisure activities. It seems important to find a way that could help us to study these factors graphically. The concept's of the Colour-Code Models goal is to allow understanding how children perceive their environment, how they perceive a good environment and what are their expectations for it to be. In the future, the Colour Code Models of space could become a tool for public participation in design process or planning.

3. The concept of Colour-Code Models

3.1. FROM SOCIAL NETWORK POPULARITY TO SPATIAL NETWORK'S IDEA

Virtual social networks are very popular and present in almost everyone's life nowadays. If the social networks work so well, why not to create a "spatial network"? The goal of this concept is to allow identifying and charting the important elements, which could be then brought, together and completed by the additional data or information. After such a configuration, it will be possible to read a message of representation and to interact which means analysis of spaces. We refer to the social networks for two reasons. First, they allow the assembly and structuration of predefined information about the profile and the profile user. In addition, this information can be linked to the network, which makes it easier to publish, share and to interact. Consistent with this fact, the new digital reality locks up in the audio-visual images that young people need for communication and information. It is a common opinion that children nowadays communicate virtually, and perceive the world through the new technologies. Since this is a common behaviour, consequently, our concept of Colour-Code Models is based on the principle of the social network, which can talk to children, and it will be able to be used not only to the data analysis but also in the more developed version. In a way, it will be able to be used for public participation in design process. To understand the principals of a social network, we concentrated on functions of Facebook - one of the most popular social network worldwide.

3.2. METHODOLOGY AND DATA

For cutting the urban space and delimiting the profiles of spatial elements,

we defined three elements, which were already detailed at the beginning of the paper and which are the most important elements for child's identification with its town and for its environmental education: home, school and journey from home at school. 'The trajectory studies' function as a method, which allow perception, reading and analysis of exact space. This journey is for children a field of everyday urban experiences. We asked 5 to 9 years old Thai children to answer some different inquiries through several drawings. On the first drawing, children had to draw their journey from home to school. In the analysis, it was then possible to study children's urban environment and equipment. The second enquiry concerned a classification of their relatives by intimacy's degrees, enabling us to study their human environment through symbolic intimacy circles. In the third exercise, children had to draw the plan of their school and differentiate the space where they feel "at home", the space "dedicated to everybody" and the space, which is "forbidden" to them. The fourth activity consisted of sectioning their house inside, sketched with maximum of details, which was the objective to identify space, lifestyle and specific equipment.

3.3. STRUCTURE AND SEQUENCES

The key elements of each enquiry generated a profile of them. Therefore, we create a journey profile, a school profile, a home profile and a relationship profile. All this elements drawn by the children have the profiles, which are connected together within the limits of their author. At this stage, the structure of our tool is based on some particular elements of the space that appear in different sequences. These elements include other elements that define them, supplement them, etc. The profile of the element is represented by a kind of avatar. In the virtual spaces, the avatar is like a second skin and an assemblage of partial objects. In our model, the profile of avatar is a colour synthetic representation of the element drawn by the child. As our concept is the Colour Code Model and in our opinion using colours facilitates the analysis of data, we started using colours in the profiles avatar creation. The examples of avatars are shown in the Figure 1 (school-yellow, home-magenta).
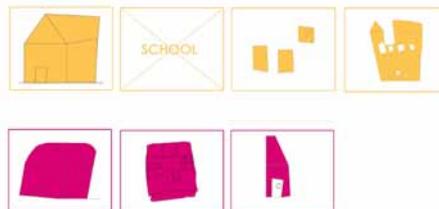

Figure 1. The examples of school and home avatars.

The profile is composed of cropped elements, which define it in the sequences. The Figure 2 presents all profiles with developed sequences corresponding to the data collected for one child.
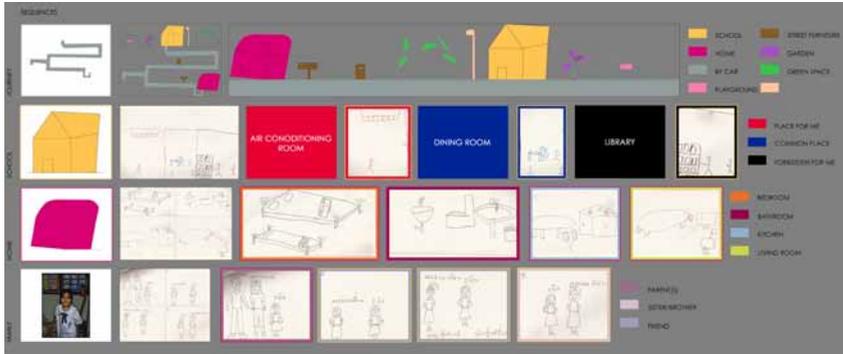

Figure 2. One child developed spatial profiles.

Generally speaking, the main element's avatar is followed by the original drawing, which is then analysed, cut and used for the Colour-Code configuration. The proceeding of sequences development changes according to the elements specificity. The first line is the sequence of journey. The original picture is redraw and synthesised with the colour charter. The section of journey is created. Thus, we can define the main elements of drawings, examine the spatial connexions and observe the proportions between the elements. The second line is the sequence of school representation, the third that of home and the last one is the representation of the social relationships. Two colours define the sections: 1) the colour of each element and 2) the colour of home or school, which are places, the elements of interest belong to. Using such an approach, it's easy to analyse the data (Figure 3).
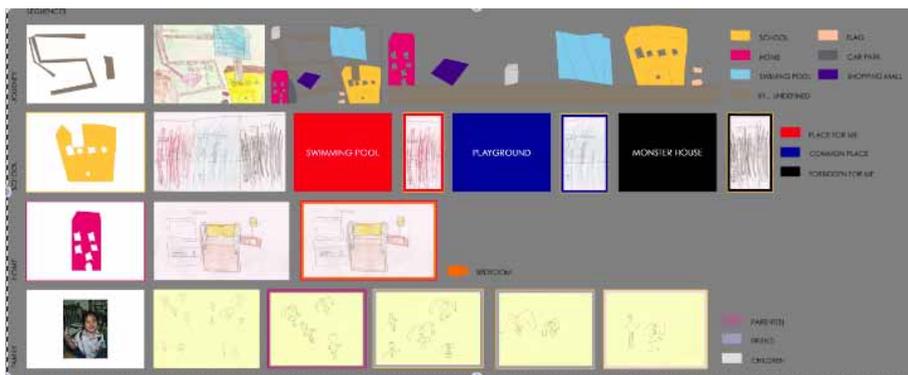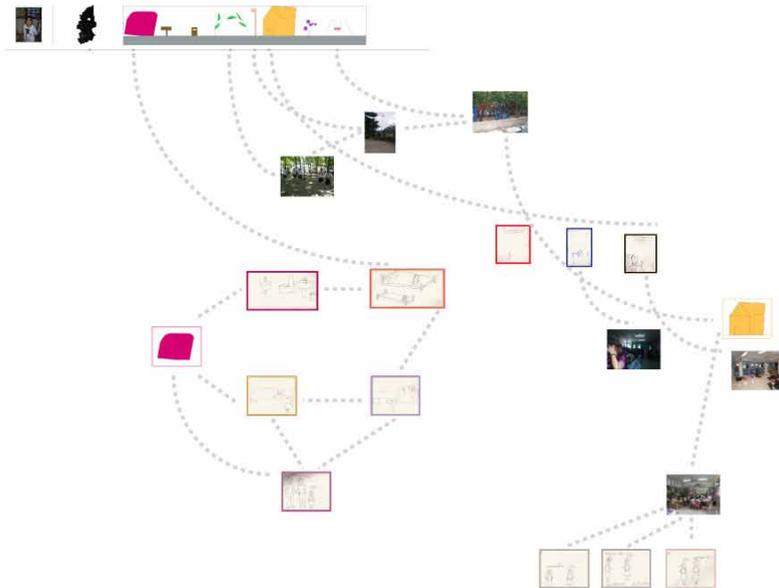

Figure 3. Example of sequences

Allegedly, The Colour-Code Model allows examining the connexions between the elements and their potential configurations. As regards, we are able to analyse the spaces according to users and understanding how they perceive and define the environment.

3.4. NETWORK AND OTHER CONFIGURATIONS

Using the sequences of Colour-Code Models, on one hand, we are able to observe all data that we collected for a child, the importance of each of the elements for the child and the configuration in which the child presents the elements. On the other hand, also the possibility to segregate the elements and create networks seems interesting. All together, the network shows the relations of elements without the configuration of sequences and leads to the complete image of studied places (Figure 4).

Figure 4. Example of network

An important aspect of our analysis is the possibility to go out of one person sequences or network's configuration and compare spatial elements profiles all together in many different configurations (Figure 5), like the journey representations.
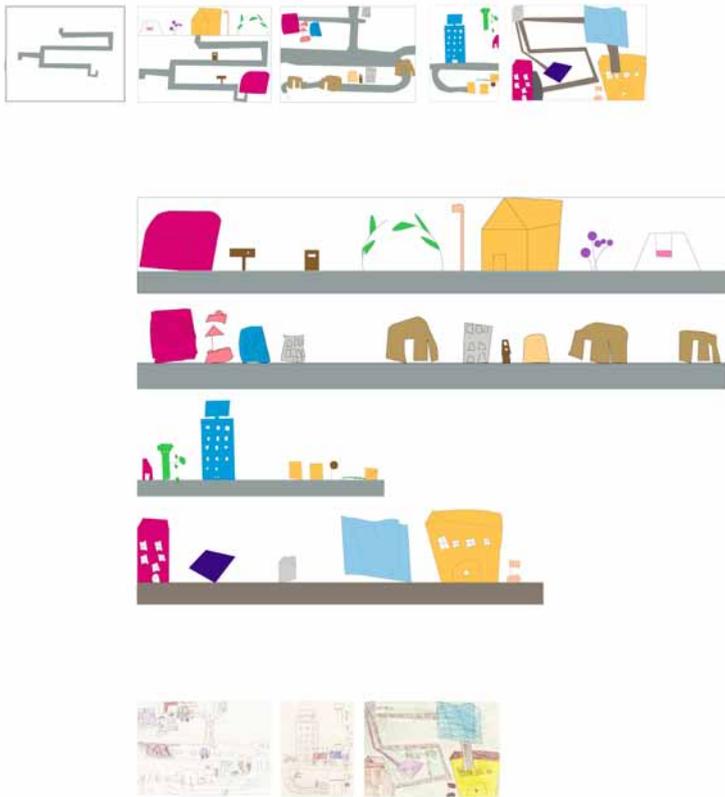
Figure 5. The representations of journey.

This configuration allows having all information together: children's drawings (or fragments of children's drawings), pictures of existing, real maps and mental maps, information about users, reflections of the users, our reflections, conclusions, etc.

4. Conclusion

To conclude, it isn't possible to examine all spatial factors neither by just looking on child's drawing nor by making the quantitative analysis. The configurations of elements picture a lot and allow to link elements between the different surveys (different questions about the perception of environment) as well as to make sequences. It needs to be point out that the child doesn't perceive the space of the city as a one continuous episode but as individual events. Thus the employment of Colour-Code Model allows having an idea of the children's spatial environment. Admittedly, the sequences and network –

allow understanding the child's contact with the city and with urban places an how does the child construct the image of the city. We may outline that these inquiries allow identifying the different spaces where children use to spend most of their time. The results of experimental works made with children make also possible the development of new design tool based on the idealistic vision that children have of their environment. It is then possible to apply to the interface a kind of synthetic childlike image of what is a city, containing information on transports, areas they use to cross, buildings next to which they use to be, etc. Nonetheless, our paper doesn't touch on the subject of results of analysis. The goal was to present and assert the utility of the concept of Colour-Code Model and to situate it theoretical approach.

In addition, we found nevertheless a limitation of this kind of studies - it is not possible to compare the results of our surveys to a spatial reality the drawings referred to. To understand well and be able to use the data collected through the surveys, it seems to be essential to have an idea of the existing reality, without which we are not able to analyse completely the results. Based on this, we realised that it is necessary to add to our surveys questions, which could allow us to place the results on the specific urban space and, in the consequence, to be able to compare them with a visual reality.

The concept of Colour-Code Models it's also a database, a tool of architectural and urban conception that could assist a design projects. So, we need children's drawing for develop this tools, but we need too the maps and pictures of real environment, because all this information form a complex image of children environments perception. In the future, the Colour-Code Models of space could become a tool for public participation in design process or planning.

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