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## Methods for Evaluating Responses of Children with Outdoor Environments

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### Abstract

Articles on children's environment during the past 26 years provide valuable insights into methods of evaluating outdoor environments. The paper presents a review of twenty studies on methods applied to elicit data of children's interaction in the environments. Generally, the methods can be categorized into two major types: visual and structured. The former comprises of behavioural mapping, photographing and observation which can be considered as qualitative. The structured method includes questionnaire, structured interviews and instruments which can be viewed as quantitative. Combining the visual and structured methods allow a researcher to construct the validity and reliability of the research design.

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*Keywords:* Evaluating methods; children's environment; outdoor environments; children's interaction

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### 1. Introduction

Articles published on children interaction with outdoor environments provide valuable insights into methods which are relevant for evaluating children's responses in their outdoor environments. Outdoor

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environments are significant to growth and development of children. In other words, the environments shape the children, physically, socially and emotionally. Children are like puzzle for us (Greig and Taylor, 1999), and we cannot understand them perfectly without using of special methods. To understand how the environment shapes the children, many researchers in environment psychology, sociology and childhood development utilized different techniques.

This study focuses on discussing research method on outdoor environments as children's play settings. In this regard, a few number of research techniques which are suitable for doing research in children's outdoor environments is explained. Therefore, this research has selected 20 studies which have value in terms of their method and context. These methods can be categorized into two major types: visual and structured. Structured methods comprise of some methods which can be performed in verbal and non-verbal reports. These types of methods are significant because children are the best people who can explain their experience and perception of their environments (Greig and Taylor, 1999). However, in many studies, the researchers utilized some complementary methods to get the best results. These methods are visual methods which are explained in section 3.3.

The studies reviewed here discuss and suggest some special methods which are relevant to do research with children connected to their outdoor environments. It would lead many researchers who decided to do research in this issue and setting. Moreover, this paper explains some benefits and disadvantages of methods used for this purpose.

## **2. Method**

### *2.1. Criteria for selection of articles*

A total of 20 articles are analyzed in terms of used methods. The period of selected articles for this purpose appeared in 1983 to 2009. Criteria for choosing these studies included the context, method, and issues. The context focuses on aspects of urban outdoor environment. The methods are both qualitative for example behavioral mapping method in Ahmadi's and Taniguchi's (2007) research and quantitative for example survey questionnaire method in Kytta's (2002) study. The issues which had been selected were connected to children and their outdoor environments such as living surroundings, urban parks and playgrounds in which children can attend and play. These were addressed by the function of the setting.

Any decision about selecting of articles was related to what was excluded in these selections. In terms of context, excluded are articles with a focus on indoor environments such as home, or many other settings that are not in outdoor environments' classification. Methods not excluded were all those that repeat a method in the same environment. Moreover, about the issues, those articles which were related to adults or special age groups of them, also, some issues connected with children regarding with indoor environment were not selected for this study.

### *2.2. Method of analysis*

Each article was summarized and classified in terms of several dimensions. To reach to the study's aims, and to find the best methods for evaluating on children regarding to their environment, some dimensions were considered in this study included context in which the study was conducted, for example elementary school, the subject which should be connected to children and outdoor environment, children's age, and research methods that were used in these studies to collect the data.

Through a repetitious process of examining similarities in subject and context in general and differences in methods which were addressed by the studies the classification was done into identification of special methods in studying on children connected to their outdoor environments. In this processing,

tabulation of the studies was done in order to have a general perspective on those articles which were selected and their issues, settings, and methods (appendix A). The major purpose of the analysis was rather to gain a real picture that emphasizes some special methods in studying with children regarding to outdoor environments.

### **3. Finding and Discussion**

#### *3.1. Geographic representation*

The twenty studies were conducted in twelve different countries. The highest rate of studies belonged to Europe included 4 studies in the UK and 7 in other countries of Europe that 1 of these was carried out in two countries (Italy [2], Athens [2], Switzerland [1], Finland [1], Norway [1], and Poland [1]). The studies in North American included 3 in Canada and 3 in the United States. Australia had two studies and there was one study in Asia which was carried out in Iran.

#### *3.2. Outdoor environment context*

The environmental contexts range from general environments to special spaces. They include residential neighborhoods, grassy locations, parks, play grounds, and school yards as outdoor environments which children connect with them. The environments in all studies are the actual setting of the study. Although the studies represent a great diversity of settings, school playgrounds were the most frequent context.

#### *3.3. Empirical methods*

Forty percent of the studies used surveys as a key data gathering tool. The other five approaches were interviews (35%), observation (25%), drawing map (25%), photographing (10%), and instruments (5%). The interviews were divided into two parts: group discussion (10%) and individual interview (25%). It is necessary to explain that some of the studies used a mixture of these methods for completion of their methods to get the best results of their studies.

The interviews were considered as verbal reports that created accessibility to the inner world of children: the world of their feeling, thoughts and opinions (Greig and Taylor, 1999). This is because they allowed the researcher to explore children's individual reasons. However, the interviews which were implemented in these studies were comprised of adults' interviews and children's interviews. Interviews of adults who know children well such as their parents and teachers can help researchers well. Also, in some conditions, parents play the most significant roles in children's interaction with their outdoor environments. Of course, both of them are in individual interview branch. Moreover, interviews in these studies were done in two ways: individual interview and group discussion. Some researchers prefer to do their studies through the group discussion. For this purpose, children were asked to speak about their liked, disliked, and favorite environments or to talk about their photos which take in their neighborhoods as a liked or disliked place in a children's group. Because, in some studies, the researcher need to know about children's interests such as favorite playground, and this may not to gain through the interview and other research methods. Therefore, the researchers give instant (Francis and Lorenzo, 2002) or disposable camera (Jutras, 2009) to children and ask them to take some photos of outdoor places which they like in their neighborhood and emphasis on positive aspects of neighborhood.

Despite of these methods, usually the most popular research tools in these studies were questionnaires because they can be designed and sent to many people swiftly, and they can also analyzed easily.

Moreover, the questionnaires are designed like interviews, although they have differences in their administrations and their nature of data. In these studies, the researchers utilized two types of questionnaires to elicit data: from the parents and from the children. There are several approaches to do questionnaire with children and their parents. In these studies, usually researchers gathered the data through the computerized, online, and written questionnaires. In terms of computerized questionnaire, children were asked to complete a self-reported questionnaire in a private room with the presence of researcher to answer their questions. For doing research with online questionnaire, the researcher runs an online survey about children's view toward transportation especially in their journeys to school. Also, there is common approach to gain data through the survey which is written questionnaire. In this case, the survey can be duplicated in many numbers and given to the children and their parents to answer.

Another technique of gathering the data in some of these studies was through the direct observation. It is observing children's behavior and listening to their conversations with each other. There are several types of observation methods such as indirect and participant observations. However, direct observation was the most common with children. The method could portrait slices and complexities of children's lives (McDevitt and Ormrod, 2002). When the researchers observe children, they have to think and answer some questions such as what do they see, what do they feel, what do they think, and what do they do? With this procedure, the researcher can find children's silent voice (Greig and Taylor, 1999). In some of these studies, researchers who selected observation as a method for gathering the data watched children in their outdoor environments during the studies and recorded it by audio or video recorder to analyze.

Sometimes, variables are measured using standardized instruments such as accelerometer. Because collecting the data may be too long; therefore, it is not possible to gather them through other ways. In addition, the instrument will motivate the children to participate in the survey. As an illustration, for determination of physical activity in young people, researcher should exploit accelerometer (Page et al., 2009). In this case, children were instructed to use the accelerometer on a belt to record the data every 10 seconds. Then, the data was recorded and analyzed using the statistical software such as SPSS.

Since there are many differences between children and adults, and this makes children special in doing research with them, the researchers need to utilize special methods as complementary methods. In these methods, it should be used familiar setting such as school, and materials such as drawing and exercises (Greig and Taylor, 1999). One of the easiest approaches in completion of methods in doing research with children is drawing. Children's drawings indicate children's inner mind (Greig and Taylor, 1999). In some of these studies, researchers exploit three measurement techniques of drawing in perception of children's spatial knowledge: sketch map, blank map (Ahmadi and Taniguchi/ 2007) and mental map (van Vliet, 1983). For drawing sketch map, children were asked to draw their neighborhood on a paper, and to show some details in which they have seen. Children can utilize color and materials and also put signs such as X to show what they want. Children's sketch maps have variety because of differences in children's drawing style and drawing skill. Analyzing children's sketch maps need to assess some parameters such as orientation, structure of the routes, and details. Figure 1 shows an example of sketch map paper which was given to children to draw their home-school way.

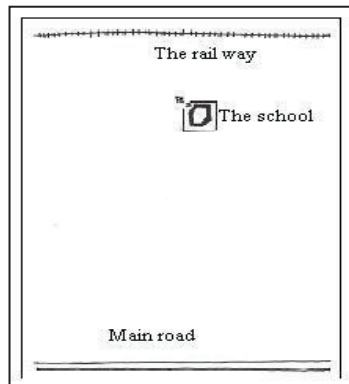


Fig. 1. A sheet of paper given to children to draw sketch maps of home-school way; Source: Rissotto and Tonucci, (2002)

However, for using blank map, children were given aerial map in which it has been identified some key elements to find the situation such as position of parks and schools as points, and railway as line. Figure 2 (a) shows an example of blank map. Children are explained about the map by researcher. Then, children were asked to identify some data that the researcher needs to know such as position of their home, school and the routes between home and school. This data is known as qualitative data, and it will be analyzed descriptively. Sometimes, children were not given any key elements in the map, and were asked to draw mental map, for instance mental map from their home to school. Figure 2 (b) shows the example of mental map.

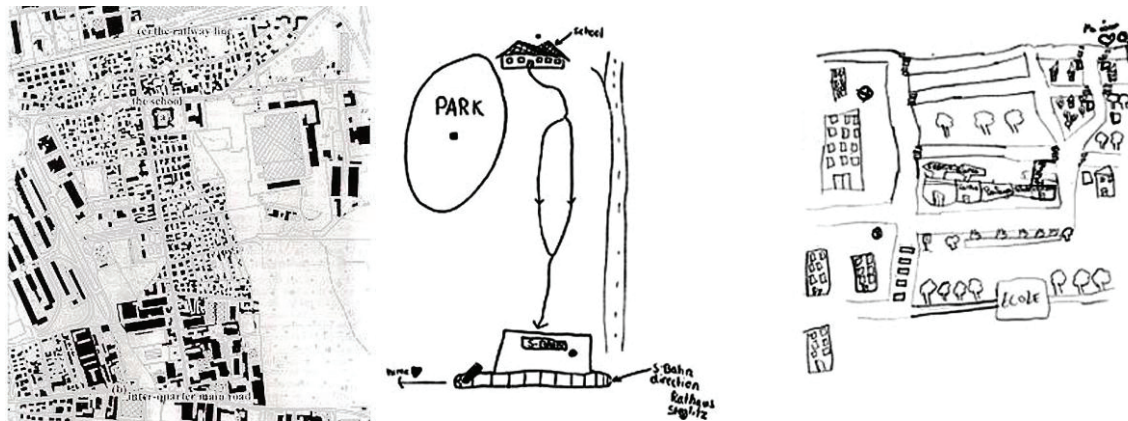


Fig. 2. (a) Blank map. Source: Rissotto and Tonucci , (2002); (b) Mental map. Source: www.urbantick.blogspot.com

#### 4. Conclusion

Choosing the suitable approach for doing research with children is concerned with nature of research questions, the participants, and what a researcher want to do with them. All research methods point to qualitative and quantitative methods. However, there can be relationships between qualitative and quantitative methods. For example, there is relationship between behavioral mapping as a qualitative and questionnaire as a quantitative method. Because these methods have potentials to be overlap to each other

in practice. Therefore, in many of these studies, researchers have chosen two types of methods: both qualitative and quantitative.

Generally, this paper discusses about two different types of method to do research with children in outdoor environments: visual and structured methods. Visual methods are behavioral mapping, photographing and observation, And structured methods are survey Questionnaire, interview and instrumentation. In some of these general two methods, researcher involves in methods directly such as observation in visual method group. As mentioned before, there are several observation methods, but in doing research with children in outdoor environment, it has been utilized direct observation. However, there are also indirectly methods such as photographing and behavioral mapping which is divided into three types; sketch, blank and mental map.

On the other hand, some methods are organized and prepared before, then researcher ask the respondents to answer (written or oral) or to utilize such as preparing questionnaire in three types: computerized, online, written, and structured interview in two types: individual and group, and standardized instruments such as GPS and accelerometer. Figure 3 shows many suitable methods which researcher can utilize to gather the data.

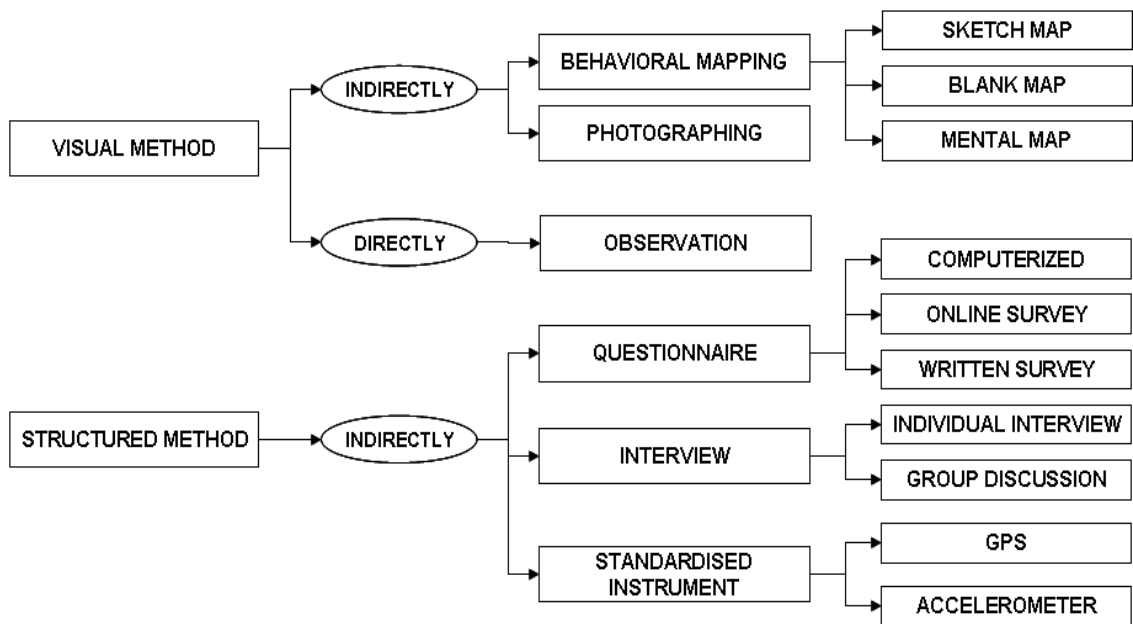


Fig. 3. The results of used methods related to children at outdoor environments



In order to get the best finding, the results of qualitative and quantitative are triangulated. For example, Ahmadi and Taniguchi (2007) elicit the data through the questionnaire, interview, and behavioural mapping which comprises of sketch map and blank map. One of the best findings of their research was that age and travel mode are two significant factors which are related to children's spatial knowledge.

As mentioned before, some of these techniques reveal the inner mind of children that other methods cannot manifest it. Appendix A indicates that many researchers exploit incorporation of techniques to do their researches.

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**Appendix A. General perspective on articles regarding to methods**

Method	Issue	Number of Respondent	Author/Year	Context	Country
Questionnaire	Children's living surrounding, children's safe routes, children's spatial knowledge, children's cycling, Independent mobility, Affordance of environments, Children's active free play, Children's transportation, Urban forms and children's travel mode.	1726, 43000, 75,6, 143,212, 318, 12240	Huttenmoser (1995), Osborne (2005), Ahmadi & Taniguchi (2007), Orsini & O'Brien (2006), Page et al. (2009), Kytta (2002), Veitch et al. (2008), Yeung et al. (2008), McMillan (2007).	Neighbourhood, Home-school way, Home, School	Switzerland, UK, Iran, Canada, Finland, Australia, USA
	Children's living surrounding, children's spatial knowledge, children's cycling, Affordance of environments.	926, 32,6, 98	Huttenmoser (1995), Ahmadi & Taniguchi (2007), Orsini & O'Brien (2006), Kytta (2002), Hefl (1988).	Neighbourhood, Home-school way,	Switzerland, Iran, Canada, Finland, UK
Observation	Children's play behaviour, Landmark use, Natural environment as a playground, Ergonomic design for children, Children on playground.	94,36,46, 29,35, 30,29	Pellegrini (1990), Smith. et al. (2008), Fjortoft & Sageie (2000), Nowakowski & Charytonowicz/ (2007), Pellegrini (1987)	Playground, Natural Environment, Home,	Athens, UK, Norway , Poland, Athens
	children's spatial knowledge, Children's freedom of movement, Children's travel behaviour, Affordance of environments Children's active free play.	75,64, 148, 162,212	Ahmadi & Taniguchi (2007), Rissotto& Tonucci (2002), van Vliet (1983), Hefl (1988), Veitch et al. (2008).	Home-school way, City, Suburb, Neighbourhood	Iran, Italy, Canada, UK , Australia
Photographing	Children's participation, Children's outdoor place.	28	Francis & Lorenzo (2002), Jutras (2009)	Neighbourhood	USA, Italy , Canada
Instrument	Children's independent mobility	1307	Page et al. (2009)	Neighbourhood, Home, School	UK