



# **Investigating the Generalizability of Participatory Architecture Design Process Results Based on the Interpretation of Children's Drawings**

**(Case study: Comparing the Drawings of Children of Bojnourd and the Villages of Zard and Khorramdeh-e Sharqi)**

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## **ABSTRACT**

Nowadays, participatory processes in architectural design for children are considered by many architects. Children's drawings are often used as the participation tool, and the results of participation depend on the architect's interpretation of these drawings. The main problem is the degree of applicability of participation results with children in a given area to children in other areas. Children participating in different participatory processes do not possess the same characteristics of the living environment. Therefore, this study investigates the effects of children's living environment on the results of participatory processes by examining the role of children's living environment in shaping the content of the drawing. To this end, 100 urban and rural children in a participatory process draw on a common design theme. Then, the authors compared and analyzed the content of the drawings. The results showed that the content of children's drawings mainly reflected the characteristics of their living environment. Besides, the children's living environment was found to influence the outcome of participatory processes by influencing their drawing content. The results of interpreting the drawings of children living in an area are entirely local and insufficient, and their use as a design criterion is inefficient for children in other areas and does not yield the desired results.

**Keywords:** *Children, Drawing, Drawing Content.*

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## **1. INTRODUCTION**

As a significant proportion of the citizens of any society, children are in contact with a range of built environments. The disparity in their needs compared to adults has contributed to an emphasis on using participatory approaches to perceive children's needs and increase the performance of built environments based on unison. The overall framework of participatory processes includes three major steps.

The first step involves surveying children about a particular architectural subject with tools such as drawing. In the second step, various statistical techniques and instruments are utilized to analyze the content of the data obtained in the preceding step. Finally, in the third step, based on the results of the previous step, certain points are inferred and advised that are found to increase the efficiency of built environments to be better exploited by children.

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As the architect-child communication language, children's graphic arts are used to identify the needs of children. Since the development of children's needs is influenced by several factors, the critical problem is identifying the factors affecting the formation of children's ideas on a particular architectural subject because they lay the foundations of the content of their drawings.

Not all children live under similar circumstances. Since children's living environment may affect the creation of their ideas, it is necessary to pay attention to the critical role of the environment in shaping the content of children's drawings in the participatory design processes based on the participatory drawing tools.

This research examines the place attached to the children's living environment in informing their ideas regarding their ideal architectural characteristics. The research also aims to address the following questions: 1) "What is the role of children's living environment in the results of participatory processes?" and 2) "To what extent are the results of a participatory process in a specific area based on the interpretation of children's drawings, generalizable to children in other areas?"

In line with the research purpose, the participatory design process was arranged by using participatory drawing tools. Although different cities have different living environment structures, there is not much difference between the characteristics of the urban living environment in different cities that generally affect children.

Therefore, in this study, children participating in the participatory process were selected from both urban and rural areas due to the large differences between the characteristics of urban and rural living environments. Interpreting, analyzing, and comparing the content of the collected drawings helped the authors answer the research questions.

## 2. Literature Review

The focus, content, and outcomes of the research carried out over a ten-year period (2009-2019) on architect-child participation are summarized in Table 1. A content analysis of this table shows that most of the research conducted on participation with children is based on the extraction of a set of particular architectural or urbanization features.

In most of these studies, the graphic arts of children were used as a tool to extract the wishes of children, or the effectiveness of this tool was highlighted. Most of these studies present their findings as recommendations for improving the quality of children's architectural design. However, such generalization of the findings and their general recommendation continues to be relative.

Many other factors, including the living environment of the participating children, influence the results of the study and challenge their generalizability. Such findings are instrumental.

**Table 1.** Research focusing on the architect-child participation\*

Researcher	The Focus of Research/Conclusion
(Kamel Nia & Haqir, 2009) [16]	Using various participatory methods, including drawings, to find green space design patterns in a child-friendly city.
(Shahabzadeh, 2011) [8]	Emphasizing the importance of interpreting children's drawings to understand their feelings toward architectural spaces and to extract their favorite functions.
(Hojjat & Ibn al-Shahidi, 2011) [20]	Extracting strategies to reduce the fear of children's hospital space based on the evaluation of children's drawings.
(Ebrahimi & Saeedi Rezvani & Ma'ani Manjili, 2011) [21]	Extracting the principles of designing children's play spaces by analyzing their drawings.
(Haghighi Boroujeni & Faizi, 2011) [10]	Evaluating the current situation in terms of respect for children's citizenship rights.
(Mansouri & Qarabeigloo, 2011) [22]	Evaluating the current situation in terms of respect for children's citizenship rights.
(Kiani & Esmaealzadeh Kwaki, 2012) [23]	Summarizing the characteristics of a child-friendly city by analyzing the content of children's drawings.
(Kashanijoo & Harzandi & Fath al-Ulumi, 2013)[2]	Extracting the criteria for children's desirable urban spaces by recording and analyzing their drawings (used as part of the process of research).

(Karbalaei Hosseini Ghiasvand & Soheili, 2013) [24]	Extracting the characteristics of a child-friendly city by analyzing the content of the children's drawings studied in the process of research.
(Khak Zand & Aqa Bozorgi & Kadkhoda, 2014) [25]	Extracting factors affecting the architectural quality of unique learning spaces for children with mental disabilities by analyzing the content of particular questionnaires for these children.
(Matini & Saeedi Rezvani & Ahmadian, 2014) [15]	Extracting criteria for designing child-friendly neighborhoods by analyzing their drawings (used as part of the process of research).
(Ajdehfar & Ajdahfar & Omranipour, 2014)[26]	Emphasizing the effect of architecture on significantly reducing ADHD symptoms in children.
(Shahabzadeh, 2015) [27]	Examining the barriers to children's participation.
(Qasempour & Mazaherian, 2015) [28]	Emphasizing the effect of architectural solutions on the treatment process of hyperactive children.
(Golestani, Kamali and Roshan, 2015)[29]	Providing a practical solution for children's participation.
(Najafi & Doiran & Noor Alishahi, 2017) [5]	Extracting children's playground design principles based on the content analysis of children's ideas (used as part of the process of research).
(Habibi & Ezzatian & Mohaghegh Nasab, 2018)[13]	Tools that allow the child to flexibly demonstrate their purpose are the best way to get children's ideas.
(Hutton, 2005) [30]	Analyzing adolescents' drawings to understand their needs in hospital ward design.
(Pelander & Lehtonen & Leino-Kilpi, 2007) [31]	Using children's drawings to understand stressors in children's treatment spaces.
(Wilson & Megel & Enenbach, 2010)[32]	Analyzing children's storytelling to understand their feelings toward treatment spaces.
(Wilson & McCrickard, 2010) [33]	Visual artifacts can be used to engage with children.
(Van Mechelen & Zaman & Horton & Slegers, 2014)[34]	Emphasizing drawing as one of the traditional tools for engaging with children.
(C Read & Fitton & Herten, 2014) [35]	Emphasizing or developing the designer-child communication language to improve the quality of participatory processes.
(Kleine & Pearson & Poveda, 2016) [36]	Assuming drawing as an effective tool to understand the needs of children.
(Kleine & Pearson & Poveda, 2016)	Providing practical solutions for children's participation through graphic arts.
(McNally & Mauriello & Guha & Druin, 2017) [37]	Emphasizing or developing the designer-child communication language to improve the quality of participatory processes.
(Wagner & Bratteteig, 2018) [38]	Evaluating the current situation in terms of respect for children's citizenship rights.
(Van Mechelen & Vandenberghe & Derboven, 2018) [39]	Providing practical solutions for children's participation.
(Molina & Tanner & Seballos, 2018) [40]	Providing practical solutions for children's participation.
(Sang & Kun-Pyo, 2018) [41]	Emphasizing or developing a designer-child communication language to improve the quality of participatory processes.

\* This table summarizes the general focus of each research and their general conclusions

The content analysis of Table 1 suggests that while the findings are presented in all studies as a recommendable generalizable definitive component, their structure is based on a participatory process with the drawing tool. That is, the researcher conducts children surveys in a limited statistical society using a drawing tool on a specific design theme. He then presents his

findings for the use of others by summarizing the results of the interpretation of these drawings. Despite the favorable performance of the findings of these studies for participating children, it will be challenging to use them as design criteria for children in other areas. This is because in the process of concluding these studies, the role of children's living environment in shaping the

content of their drawings has been relatively neglected. However, the conclusions of these studies are largely based on the interpretation of these drawings.

On the other hand, the localization of the findings of these studies has not been emphasized when applied to other cultural, geographical, and other situations. Therefore, the research gap in such studies is that of the role of the living environment of children participating in the results of participatory processes has been neglected. This illustrates the direction of future research to examine the role of the living environment of children participating in the results of participatory processes based on the interpretation of children's drawings. Neglecting this gap can lead to misuse of the results of participatory processes as a design criterion for children in other areas.

Under such circumstances, an architectural project is designed and implemented based on purely inferred criteria from the characteristics of the living environment of children in another area. Such projects will definitely not be to the liking of the children of this region. The content of the drawings is highly dependent on the characteristics of the living environment, confirming the ineffectiveness of drawing as a tool to understand children's desires for their desired architecture. This inefficiency is considered as the second research gap, which can draw the direction of future research.

Hence, it can be said that these research studies are highly valuable and as soon as the next participatory researches may be able to be based on the generalities inferred from these research studies. However, the results of a participatory process based on the interpretation of children's drawing arts cannot be generalized.

To address the above research gaps, the authors sought to draw the direction of research to examine the role of two essential factors in shaping participatory design processes. These two factors are "the degree of efficiency of drawing as a linking bridge between the architect and the child and a tool for understanding the real needs of children of their desired architecture" and "the degree of applicability of the results of participatory design processes in a specific location as a design criterion for other children," discussed in the process of research.

### **3. Theoretical Foundations**

In this research, "child" was described in the Oxford dictionary as a young person who has not fully grown and has not reached maturity [1]. "Child" means, according to the meaning of a specific society, a child who has not achieved puberty. According to the Islamic Republic of Iran's legal definitions, a "child" is a person who has not reached puberty [2].

Since puberty happens typically in children between 13 and 16 years of age and in girls between 11 and 14 years of age, the normative option of fewer than 12 years of age offers a robust framework for describing a child [3], and since children under the age of six do not explicitly express their impressions and feelings by drawing. On the other hand, children who are students are linked to the topic chosen for the testing process, so the children who are the focus of this analysis are chosen in the age group of 7-12 years.

#### **3.1. Child and the Environment**

The environment influences any living being and behavioral decisions specifically and decisively and uses the senses [4]. The most sensitive and insecure group in society is "Children." Despite being influenced by the environment, they have essential skills and abilities to influence it [5]. Humans are mutually dominant and their environment. Meanwhile, children are expected to adapt to environmental circumstances because of their sexual and social vulnerabilities relative to adults [6].

The relationship of the child with the "environment" is of prime importance. This relationship also involves personality shaping for the child's physical and mental growth [7]. Designers and planners are profoundly mindful of the direct effect on children and adolescents of environmental decisions. The living environment of children and adolescents has a significant impact on physical wellbeing in many respects, such as their capacity to communicate with the environment. The psychology of children and adolescents is generally acknowledged [8]. A two-way relationship is a relationship between the child and the environment. In this analysis, the investigators consider the effect of the child on the environment.

### 3.2. The place of children in the process of architectural design

The architectural design standards for spaces expressly built for children [9] for children are usually the key consideration in architectural design for children requirements that are tied explicitly to childish expectations, naturally. Things such as the child's actual scale and the height of the earth and the environment that he experiences [6].

Therefore, we should encourage children to express themselves rather than architects when constructing areas where children are the primary consumers [10]. The child's needs and his vocabulary form the children's architecture names [11]. Meeting their psychological needs is the most challenging stage in design for children [10], given that children have the right to speak on self-related topics that are among their interests [12] and that they are in a role to accompany the designer as an engaged participatory group with

respect to social standing [13]. The aim of the design process, on the other hand, is to organize space to fulfill human needs [14]. An environment built for children's presence and needs would also be an effective and efficient environment for them [7].

This is because children's complex engagement involves their active interest in influencing and utilizing the world [15]. Reinforcing adult inference and decision-making for children is the most substantial advantage to children's involvement in creating the built environment [16]. Experience with children using drawing techniques is also an excellent technique. The explanation for this accomplishment is to create or interact in photos that are also considered part of children's everyday lives [8]. Drawing is an instrument to represent children's ideas: in Persian dictionaries, synonyms of "idea" are given in Table 2.

**Table 2.** Synonyms for "idea" in Persian dictionaries (Abadis Smart Dictionary, 2019)

Dictionary	Synonym
Dekhoda	Design, Hypothesis, Hypothesis, Suspicion
Amid	Imagination, imagination, design to be prepared for drawing.
Moein	Drawing or drawing

This term is synonymous with the pattern and idea of Wikipedia [17]. The instrument for engaging with children has its own subtleties, and their participation in the design process is unique in its practices [13].

Participatory approaches essentially aim to consider the interests of children. Art is a means to communicate concepts and thoughts that do not translate into sentences [18]. No experiment will eventually show the intellectual distinctions and features of different individuals, such as drawing, it can be said [19]. Therefore, there are certainly various levels of concepts and principles of children's drawings and their drawings, which fall under the field of graphic arts.

Since drawing will sound like a way to spend spare time, there will be more chances for children who participate, along with the peace of mind to focus on development. Thus, children's feelings about various spaces, their preferred games and habits, colors and descriptions, and many of their spatial interests and tastes in space are shown by reading the drawings [8].

### 4. Methodology

**4.1. Research method:** This is an "applied descriptive" research study in terms of purpose.

**4.2. Data collection method:** "Basic information" was collected using the "desk research" method. Besides, "required data" was collected in "field studies" using the "observation" and "interview" methods.

**4.3. Data collection tool:** "Field data" were collected by examining the drawings of children participating in the process of research.

**4.4. Research variables:** This study seeks to examine the relationship between "children's living environment" and "children's drawing content." In this survey, children's living environment is assumed as an "independent variable", and the content of children's drawings is a "dependent variable".

**4.5. Research tools:** This study was carried out using MaxQDA 10, Excel 2010, and SPSS 25 software.

**4.6. Data analysis:** Part of the process of analyzing the collected data was conducted using

any of the software utilized during the research. MaxQDA software is employed in qualitative research. It helps the researcher take notes on cards, images, texts, and other "qualitative data" collected during field studies. He can also "codify" them, link codes with a common theme, categorize codes, and compare the volume of key points in a code subset with other codes.

Therefore, this study attempted to use this software for "a qualitative analysis of data" and "coding of collected drawings". All drawings were scanned and imported into the MaxQDA environment. The authors then encoded the drawings in the software environment. Excel 2010 and "descriptive statistics" were employed to statistically analyze the coding results of the drawings. Moreover, "inferential statistics", SPSS 25 software, "one-sample t-test", "two-sample independent t-test", and "regression test" to validate the findings.

**4.7. Research duration:** This research was carried out over a period of six months. Desk research was conducted for one month in July 2019. Field studies lasted for three months, from August to October 2019. The drawings were analyzed and coded using MaxQDA software, followed by a statistical evaluation of coding frequency in Excel for one month (November 2019). The findings were summarized and validated in SPSS software, and the final results were presented for one month (December 2019).

**4.8. Statistical society:** The statistical society consists of 100 children aged 7-12 years. It consists of two parts: the first part includes 50 children living in Bojnourd and the second part includes 50 children living in the villages of Zard and Khorramdeh-e Sharqi, in the environs of Maneh and Samalqan County, North Khorasan<sup>1</sup>.

**4.9. Sampling method and sample size:** In field studies, criterion-based purposive sampling was performed. In this method, the sample selection process continues until no new data is observed, and data saturation is reached. Therefore, the authors continued the process of collecting children's drawings until the content of the drawings was duplicated. Accordingly, a total of 100 children's drawings were imported into the data analysis process at the end of the field study.

**4.10. Process of research:** Initially, desk research related to the research topic was conducted. To this end, we referred to reputable scientific databases to collect scientific articles focusing on "architectural design for children" and "architecture-child participation".

The authors attempted to scrutinize the content of this research and the methods and tools utilized in participatory processes. They then analyzed the tools and structure of the participatory processes of these research studies and developed a general framework for answering the research questions. They then entered the stage of field studies.

The sample size in the city was provided by referring to various centers, such as the Center for the Intellectual Development of Child and Adolescent, schools and extracurricular classes. Besides, the sample size in the village was provided by visiting schools, mosques, and children's gathering and play areas. Children will be more interested in participating in the participatory process if the participation theme attracts them more. Hence, taking into account the children's interest and need for play and entertainment, we tried to choose a related participation theme to meet such needs.

Therefore, children participated in the participatory process with a higher level of interest. Furthermore, children will be more interested in the process of research because they know better than anyone else their needs in the field. Therefore, the "camp" to spend leisure time was chosen as a design theme for students.

During the process of research, an A4 sheet that had already been formatted and replicated was offered to children who collaborated with the questioner. On the sheets, there were a box to complete the specifications and a framework for drawing. At the top of each sheet is the question: "How would you like your student camp look like? Paint it." The same drawing supplies, including a pack of 12 crayons, were offered to all children involved in the process of research. Each child was given an equal opportunity to draw from 10 am to 1 pm.

To win the trust of the children at the outset of negotiations, the questioner shared with the children the expression, "We want you to help us design a camp for you based on your opinions." The questioner also told all children and their parents that the study team would keep all the respondents' personal information secret.

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<sup>1</sup> Bojnourd is the capital of North Khorasan province. Maneh and Samalqan County are another county in the province located 80 km from the provincial capital, with the villages of Zard and Khorramdeh-e Sharqi in its environs.

Since certain children may not have placed their ideas on paper well, or researchers have had different interpretations of the drawings than children's own thoughts, at the conclusion of each drawing, the children were asked to explain the specifics of their drawings. The questioner then wrote down these specifics on the back of each sheet.

The drawings were scanned and unloaded on MaxQDA 10. The research team carefully analyzed each drawing individually, and the elements in it were coded with the aid of software. The descriptions written by the questioner on the back of each sheet were checked at the conclusion of coding the drawings, and the correct codes were allocated to them. The code classification was completed after the coding stage. The key divisions, called categories, and their subcategories, called material, have thus been extracted. With the aid of algorithms, the groups and their contents were collected separately for urban and rural children in the form of tree diagrams.

The frequency table of the material of each segment was then derived for the city and the village separately. The authors analyzed the data in this table with the assistance of Excel 2010. The requisite diagrams were prepared to interpret and compare the ideas of urban and rural children. By comparing the samples, reporting, and grouping the observations, the results were collected. Then, to confirm the test results, SPSS

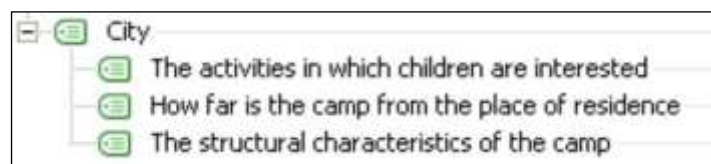
25 was used. A "one-sample t-test," an "independent two-sample t-test," and a regression test were used to prove the hypotheses in the inferential section of the study.

A regression test was used to analyze the effect of the living environment on developing children's ideas about their ideal architectural spaces. Two "independent sample t-test" is used to compare urban and rural children's opinions. For comparing the actual mean with the theoretical mean, a "one-sample t-test" was used. The inference was reached after validating the results.

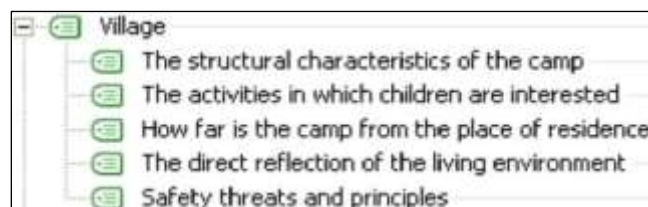
### 5. Field Research Findings

Based on the quantitative results obtained from MaxQDA 10 analyses, the number of codes found in urban children's drawings is 182, while this number is 240 in rural children. This difference indicates that more rural children are motivated to express their desires and needs more, which can be interpreted under the influence of their living environment and the number of available facilities (Figures 1 and 2).

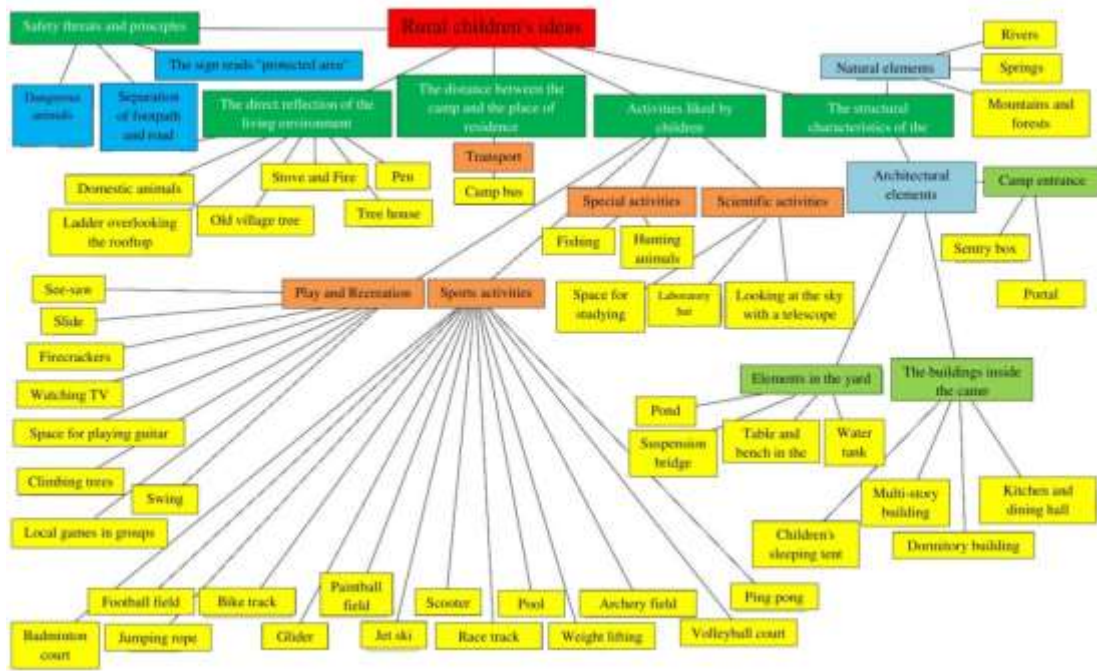
In Figures 3 and 4, the categories and content of each are extracted as a sample by MaxQDA. The comparison of these two images shows the greater responsiveness of rural children in the process of research, which can be due to more deficiencies in their living environment and education, and as a result, the achievement of more needs in these children.



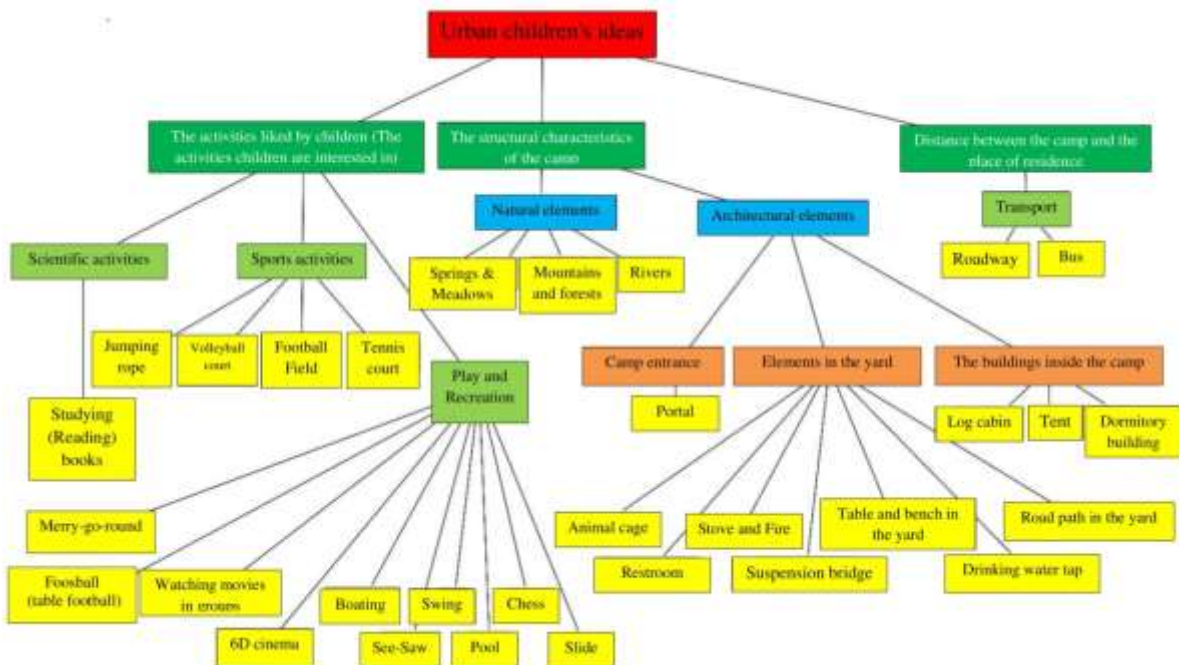
**Figure 1.** Classification of the categories extracted from urban children's drawings (Source: Authors)



**Figure 2.** Classification of the categories extracted from rural children's drawings (Source: Authors)

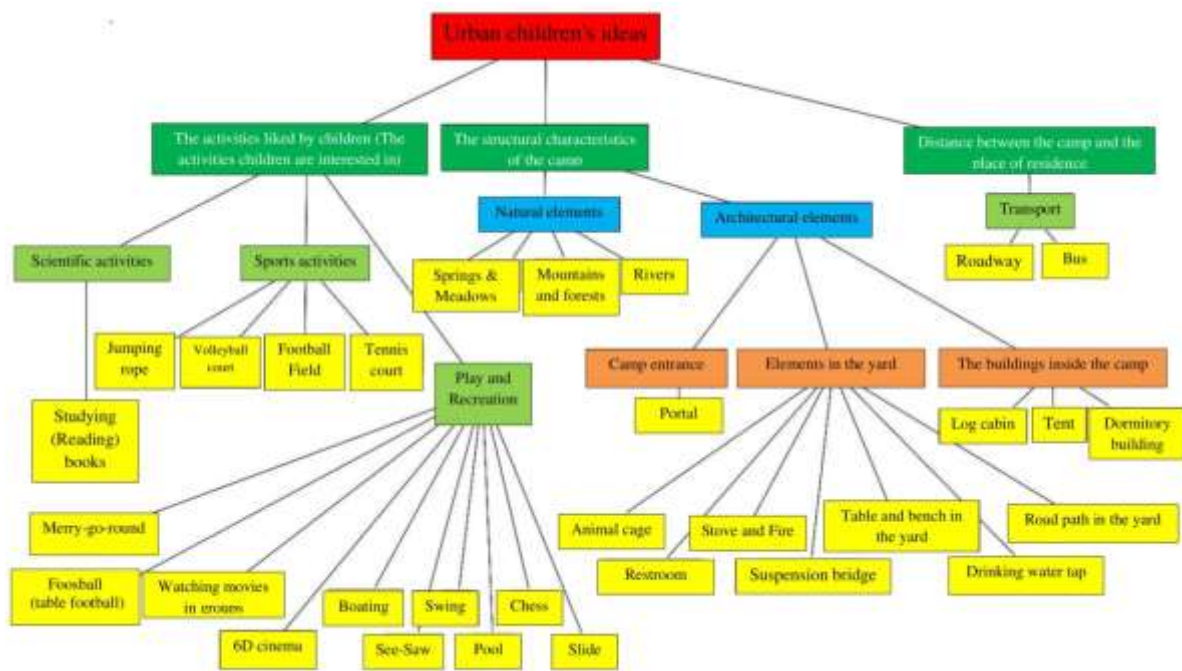


**Figure 3.** Categories and the content of their subset based on analyzing the rural children's ideas (Source: Authors, MaxQDA)



**Figure 4.** Categories and the content of their subset based on analyzing the urban children's ideas (Source: Authors, MaxQDA)





**Figure 4.** Categories and the content of their subset based on analyzing the urban children's ideas (Source: Authors, MaxQDA)

Comparing the general principles extracted from urban and rural children's ideas reveals similarities between the general principles of their demands. However, based on the effects of their living environment, urban and rural children express differently the desires and criteria for the desirability of their desired space. Findings suggest that it is possible to research the role of the environment in shaping children's ideas in two fields. Next, such reflections are a clear representation of the living condition of the child.

In rural youth, these principles are apparent and do not go unnoticed in urban children. As seen in Table 3, the two types of "threats and safety principles" and "direct reflection of the living environment" are among those present only in rural children's ideas.

Second, the principles implicitly affected by the aspects of the children's living environment are expressed in the drawings mentioned below of one of the two children examined.

**Table 3.** Comparing the frequency of the categories extracted from the ideas of urban and rural children (Source: Authors)

	Rural Child	Urban Child
Safety threats and principles	9	0
Direct reflection of the living environment	25	0
Distance between the camp and the place of residence	5	7
Activities children are interested in	93	73
Structural characteristics of the camp	108	102

As seen in Table 4, rural children refer to elements not found in urban children's drawings in their drawings. These elements comprise a significant proportion of elements that are frequently identified with rural children. They

also drew guard dogs for the children in the camp area. They are portrayed as a community formed around a fire anywhere a group of children is painted. Stoves and fire are an essential part of their lives, based on what they have described in

their drawings. Fire plays a crucial role for them, particularly after school, when they go to the desert with their livestock, both in terms of providing heat and protection against predatory animals.

Multi-story and newly constructed dormitory buildings (compared to the current situation in the village), animal pens, and dunes have also been painted by rural children, which may be attributed to the crucial connection between humans and animals in rural communities. The importance of animal treatment and the proximity of human and

animal living space is one of the axioms of life for rural children. It has become an essential concept for them, as they have described in the drawing of a camp.

Other objects include a ladder overlooking the building top, usually used for roof traffic in the village, drawn next to the buildings in the camp area. As a result of the value of the roof as a place for a part of everyday life events, it can be reflected in rural children's ideas (drying fruits and vegetables, etc.).

**Table 4.** Percentage frequency distribution of the elements resulting from directly reflecting the living setting in rural children's drawings (Source: Authors)

	Percentage
Various domestic animals	34%
Stove and fire	21%
Pen	15%
Straw-rick	12%
Ladder overlooking the rooftop	9%
Old village tree	6%
Treehouse	3%

The "protected area drawing" in their drawings has been alluded to by many children. Every day in their lives, they are faced with such signals. For them, environmental conservation has become a concept, so much so that this important one is strongly emphasized in the drawing of a camp. The frequency of codes linked to the five groups extracted from urban and rural children's ideas is contrasted in Table 3. As table shows, "threats and safety principles" have become an essential term in rural children's minds and were stated in a recreation camp drawing. Table 5 indicates the

frequency for rural children of the material codes in this group. A little reflecting on this table suggests that the nature of their living environment explains urban children not paying attention to this category, since the reasons that have motivated rural children to focus on this category are not present in the urban structure (wolves, snakes, etc.). Or an approach to their removal has already been considered (street construction and separation of car and pedestrian, etc.).

**Table 5.** Percentage frequency distribution of the content of the "threats and safety principles" category in rural children's ideas (Source: Authors)

	Percentage
Separation of footpath and roadway	56%
Regarding protected areas	22%
Dangerous animals	22%

**Table 6.** Comparing rural and urban children for emphasizing natural and architectural elements (Source: Authors)

	Rural Child	Urban Child
Architectural elements	68	38
Natural elements	40	64

Table 6 indicates that the priority of building construction was given to the shortage of rural children's living room in the statistical population

of the study population. Since the urban children observed in this research do not have this problem and, conversely, suffer from a sort of

dissatisfaction with repetitive urban elements, natural elements have been their focus. By living in nature, the rural child finds a different experience in the camp room. For him, the natural world is a concrete and common aspect, while being in nature is a new concept for urban children, based on the analogy made in this illustration. Grasslands, valleys, and trees are part of everyday life for rural children. Thus, the emphasis on this aspect in their drawings is much less than the emphasis on urban children.

The importance of rural children on the entry sign, as seen in Table 7, is due to the robust visual relation with the village entrance sign, situated on the route of their kindergarten. Nevertheless, metropolitan children are much less related to such an element. As a result, much less of their thoughts are related to this element. In the form of a board, the entrance is summed up from an urban child's viewpoint. Although the entry contains a headboard and a guard room in rural children's concepts, they demonstrate the curiosity of rural children in the reality of being in a formal space of a certain boundary.

The table also reveals that rural children are twice as likely to draw the building as one of the most critical elements of the camp as urban children. This ensures that providing camp events within suitable and protected buildings is a necessity for rural children. Although the same activities are related to urban children, the sort of room proposed for such activities is very different. There is a kind of fatigue from being in tedious architectural spaces in urban children's ideas, whilst rural children's ideas illustrate the desperate need to include stunning and enticing architectural spaces.

Examining Table 8 reveals that urban children are more interested in depicting meadows, valleys, and trees in their drawings. Analyses reveal that, relative to rural children, the depiction of natural elements in urban children's drawings is doubled. This degree of concern indicates that urban children's fundamental necessity is to be in nature and be close to natural elements. Although this is common for rural children, and since they still live in the heart of nature, it is not one of their goals to display this aspect.

**Table 7.** Comparing urban and rural children for considering natural elements in their ideas (Source: Authors)

	Rural Child	Urban Child
Entrance	18	2
Yard elements	13	15
Buildings within the camp	37	21

**Table 8:** Comparing the architectural elements proposed by urban and rural children (Source: Authors)

	Rural Child	Urban Child
Meadows, mountains and forests	23	48
Springs	2	3
Rivers	15	13

Analyses reveal that, in general, urban children, with regard to seven distinct elements in their drawings, have a more detailed view of the elements in the camp area relative to the four elements in rural children's drawings (Figures 3 and 4). On the other hand, a general analysis of the drawings and the observation of the authors by the statistical group during the observation reveals that, in terms of the chance of drawing on the surface, the rural children and urban children involved in this study are comparable.

This partisan opinion, however, may have a more significant cause. The world in which children

live is the crucial cause of this disparity. Because of the richness of the decor, urban landscapes have provided more concepts for urban youth. Analytical study of the components reveals that much of the elements drawn by urban and rural children are just as they often see in their living room (Table 9). It also reveals that some of these elements are different for urban and rural children by contrasting these elements and the reasons children provided to the writers when drawing.

For example, the bridge over the river, mainly listed, is vital for a rural child. However, the urban child painted the bridge over the river solely as an

aspect of decoration or leisure (standing and fishing) (Table 9). In the yard, an urban child frequently paints tables and benches. This theory is the product of visual contact and the frequent usage of tables and benches in areas overlooking apartments, parks, and other furniture in urban environments that are always visual and practical communication with the children under research. As seen in Figures 3 and 4 (Campus Elements), the importance of water in quenching children's thirst in the camp and their need for sanitation is emphasized by both urban and rural children. While the urban child tackles this need by drawing the toilet faucet and drinking water, the rural child colors the specific toilet building and stresses the area's water tank and water tanker to fulfill the water needs. The urban child addresses curbing in the passages. However, while some passages are drawn in the rural children's drawing, no such specifics are taken into account.

The emphasis of village children on the presence of diverse buildings in the camp area, as seen in Table 10. While the study of the ideas of urban children suggests that they have less focus on this topic. In modern architecture, living in dilapidated and dangerous architectural spaces has become a problem for rural children, while the study results indicate that urban children do not have much interest in this issue. This consideration is critical for rural children, as seen in the table above. Several of them have portrayed the camp as a multi-story structure. This is where metropolitan children in this group have not shown any concern. Rural children found the dormitory to be a different structure, while urban children had a higher propensity to sleep in tents and wooden huts, even though they noted this. However, for rural children who have had the privilege of being in such spaces many times, these two types have not been particularly appealing.

**Table 9.** Comparing the content of elements drawn by urban and rural children  
(Source: Authors)

	Rural Child	Urban Child
A quantitative comparison of urban and rural children for considering the elements present in the campground	36%	64%
Comparing the degree to which the functional capabilities of the precincts elements	73%	27%

**Table 10.** Comparing urban and rural children for emphasizing the different buildings proposed in the campground  
(Source: Authors)

	Rural Child	Urban Child
Tent	5	12
Multi-story camp Building	20	0
Dormitory building	8	4
Kitchen and self-service	4	0
Log cabin	0	5

Interestingly, for urban and rural children, the idea of a camp implies a place beyond the limits of their everyday lives. Both organizations have embodied this notion by demonstrating the path leading to the camp and the special bus for transporting youngsters. They have painted the camp as a place apart from their everyday life environment. Thus, for both groups, the camp has common sense, but the camp features vary from the living environment of each research group (Table 11).

Table 12 indicates that urban and rural children's planned events are identical and can be divided into three categories: science activities, sports, and leisure and games. But the critical point for both events is the disparity in the focus of these two

classes. Also, it is possible to consider the material of any of these groups (Figures 3 and 4). It is shown that environmental characteristics have also been influential in this field by contrasting the material of tree diagrams and slightly extracted tables. The rural child has more focus than the urban child on science activity. The explanation for this is that the school lacks modern educational facilities such that it prioritizes the creation of the laboratory or telescope installation room over the urban child who has these spaces in his school open. In urban students' works, focus on certain elements is scarcely seen, owing to the lack of these services in their educational setting or particular parts of their school contract.

Compared to urban children, Table 12 indicates rural children's focus on athletic events. The effect of the living environment on the development of the ideas of children is also apparent here. For an urban child, most of the programs alluded to are accessible for rural children. Even during the

school holidays, they have the chance to take extracurricular sports classes in different areas, so they don't have to think about those events. However, rural children have put great focus on diversity in athletics, owing to a lack of facilities.

**Table 11.** Comparing the percentage frequency of the degree to which urban and rural children emphasize the location of the camp outside their living environment (Source: Authors)

Rural Child	Urban Child
64%	54%

**Table 12.** Percentage frequency of the content of the activities proposed by urban and rural children (Source: Authors)

	Rural Child	Urban Child
Scientific activities	10	1
Sport activities	44	18
Play and recreation	37	45
Special activities	2	0

The analysis of the children's favorite activities group reveals that urban and rural children have relatively similar concepts. However, the argument to be considered is the heavy focus on local community games for rural children (Figure 5), which is not expressed in the quality of urban children's ideas.

Provided that in the village square and in their spare time they typically play group sports, they show considerable interest in this form of entertainment, which reveals the effect of the living environment on children's ideas. In this respect, the unique outdoor practices suggested by rural children (Figure 5, Fishing and Hunting) shaped by their environment and living circumstances and are not expressed in urban children's ideas can be pointed out.

The content of the play and leisure division for urban and rural children is related to Table 13. The frequency of the codes suggests that their living environment often affects the sex given by the children. Urban children often spend their free time in the park, according to the interviewer. Therefore, they have primarily related to items like carousels, slides, six-dimensional cinema, swings, and swings in accordance with their experiences in sports and entertainment in the camp. This is while the mode of play and entertainment in rural children's ideas is entirely

different. Playing local community games is the core aspect of their proposal.

The substance of Table 13 thus indicates that children's living conditions have become the determinant of the fun and play definition. Of course, they have developed special hobbies, such as playing the guitar, as a hobby, according to conversations with rural children. The study of the authors indicates that the explanation for this design is often the impact of children on the role of media and cyberspace, not specifically on their living environment.

Scientific activities		Sport activities		Play and recreation		Special activities	
Urban Child	Rural Child	Urban Child	Rural Child	Urban Child	Rural Child	Urban Child	Rural Child
Reading books	Reading books	Jump rope	Jump rope	Boating	Play guitar	Fishing	Hunting
	Lake	Volleyball	Volleyball	Art classes	Watch movies		
	Technology	Football	Football	Watercolor class	Market		
		Badminton	Badminton	Story game	Firecracker		
		Football	Jet Ski	Music	Music		
		Swimming	Swimming	Swing	Swing		
		Chess	Chess	Swimming	Swimming		
			Swimming pool	Local games	Local games		
			Golf				
			Weight lifting				
			Ride a motorcycle				
			Drive a car				
			Football				
			Play ping				

**Figure 5.** Comparing the frequency of the subset of the category of the activities proposed by urban and rural children (Source: Authors)

**Table 13.** Comparing the frequency of the content of urban and rural children's ideas about the concepts of play and recreation

(Source: Authors)

	Rural Child	Urban Child
Boating	0	1
6D cinema	0	1
Watermanship	0	5
Merry-go-round	0	2
Slide	8	2
Swing	9	12
See-saw	3	12
Play guitar	1	4
Watch movies in groups	1	0
Firecrackers	1	0
Climb trees	1	0
Local games in groups	14	0

### 6. Summary of findings

What has been seen is that urban and rural children's concepts (Figures 3 and 4) have a number of parallels. However, the content of the main categories varies from each other or, if they are identical, in urban and rural children, the focus on them differs. Thus, children's living environment has a considerable effect on shaping their thoughts in relation to their ideal spaces. They represent what they struggle with on a regular basis in their drawings (Figures 6 and 7).

That is, in a stream that relies on the environment and position of their existence, the idea of their ideal architectural space is created. Consequently, the quality of children's works of art in each geographical area around a single architectural motif is affected by the circumstances of their place of residence and, due to those conditions, varies in various areas. Based on the study of their thoughts, this influences the consistency of the architect-child participatory processes.



**Figure 6.** Examples of urban children's drawings  
(Source: Authors)



**Figure 7.** Examples of rural children's drawings  
(Source: Authors)

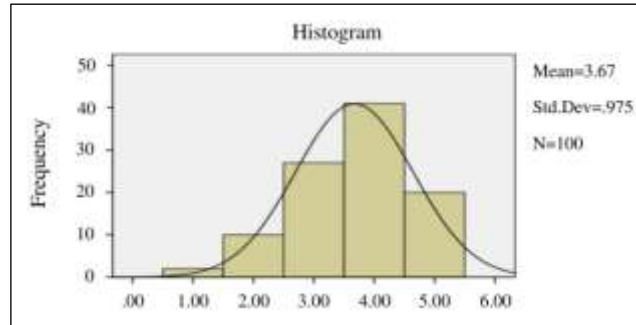
### 7. Validation of findings

One-sample t-test and two-sample t-tests in SPSS 25 medium were conducted to validate the results. The mean of the population is contrasted with the mean of the researcher using a one-sample t-test. The average status of the statistical society is determined by means of this test. The two-sample test compares each other with the sum of the two sets of respondents.

In other terms, the means obtained by random samples are tested in this test. This means that, if the number of samples is equal or unequal, samples from two distinct societies are randomly chosen. The means of comparing the two societies are contrasted with each other. The outcomes of the one-sample test on the role of the living environment in influencing ideas for children are shown in Table 14.

**Table 14.** Results of one-sample t-test about the role of the living environment in the formation of children's ideas about their desired architectural spaces (Source: Authors)

Mean	SD	SE	T-value	df	Sig.
3.6700	0.97499	0.9750	14.907	39	0.000



**Figure 8.** Histogram of the role of the living environment in the formation of children's ideas (Source: Authors)

The data in the table indicates a "significance level" of 0.000 and less than the 0.05 error rate. Also, based on the details in this table, the histogram derived indicates an average value of 3.677 (Figure 8). In each sample, the hypothetical mean is 3. The amount obtained in this analysis is higher than the hypothetical mean, which confirms the position of the living environment in the medium to high-level development of children's ideas. Therefore, with a 95 percent likelihood, based on the degree of significance and the average described, it can be argued that living environments have a fundamental influence on shaping the ideas of children regarding their ideal architectural spaces.

Further analysis was made of the hypothesis that 'there is a substantial disparity between the outcome of participation of urban and rural children with respect to the reliance of the outcome of participation on their place of residence.' A two-sample t-test for this purpose was used. The two separate t-test samples compare the definitions of the two respondent classes with each other. That is, the means

collected are judged from random samples. For this reason, participants from two separate populations (urban and rural children) were randomly chosen, whether the sample size was equivalent or unequal, and the means of comparison between the two groups were made. Using the t-test of two groups in relation to the confirmation or denial of the hypothesis, it is noted that it can be argued that the hypothesis is based on the premise that there is a substantial gap between the outcome of participation and urban and rural children in terms of participation, given the significance level of 0.000, which is smaller than the error rate of 0.05, with 95 percent likelihood. It can be shown that there is a significant gap between attendance and children living in two different regions, using the details in Table 15. The main hypothesis is confirmed, as the resulting significance amount is less than 0.05, and H0 is denied. There is somehow fluidity in the outcome of architect-child engagement dependent on the study of children's graphic arts in terms of children's life condition (Table 15).

**Table 15:** Results of the independent two-sample t-test about the fluidity of the result of architecture-child participation in terms of children's living environment. (Source: Authors)

	Mean	SD	SE	T-value	df	Sig.
Urban children	3.9400	0.81841	0.11574	14.907	39	0.000
Rural children	3.3200	1.23371	0.17447			

Then, to verify the influence of variables on each other, a regression test was used. This research can be used in some situations to conclude excellent relations between independent and dependent variables. The goal is usually to forecast one or more criteria variables from one or more predictor variables in research that uses regression analysis. If the purpose is to estimate a predictive variable from a criterion variable, the bivariate regression model is used.

The findings of the regression test on the influence of the living environment on the development of children's ideas about their ideal

architectural space show that the regression coefficient is equal to  $R=0.733$  with a significance level of  $\alpha=0.000$ . Since this "significance level" is lower than our significance level,  $\alpha=0.05$ , we have ample proof to dismiss the null hypothesis, thereby dismissing  $H_0$  and confirming our fundamental hypothesis. We thus assume that a decrease in the number of children's definitions of 0.733 is predictable for a change in a standard deviation unit of the living world (Tables 16 and 17). This suggests that the environment and place of life profoundly influence the child's attitude towards architectural space

**Table 16.** Results of regression test on the effect of living environment/space on forming children's ideas about their desired architectural spaces (Source: Authors)

How to enter variables simultaneously	Method=inter
Multiple correlation coefficient	0.733(a)
The coefficient of determination	0.537
The adjusted coefficient of determination	0.532
The standard error	0.71002
Analysis of variance	113.75
Significance level	0.000

**Table 17.** Regression test coefficient on the effect of living environment/space on forming children's ideas about their desired architectural spaces (Source: Authors)

	B	SE	Beta	t	Sig.
Constant value	0.749	0.272		2.752	0.007
Living environment	0.755	0.071	0.733	10.665	0.000

### 8. Conclusion

In the public view of the architecture theme suggested by them, urban and rural children have everyday needs (student camp). It is possible to categorize the divisions suggested by them under identical names. Although the content of these definitions varies, depending on the setting and place of residence of each of the classes examined.

Therefore, to address the first research issue, it should be noted that the fundamental position played by the living environment of children on the outcomes of the architect-child participatory process is clarified by the determination of the impact of the "living environment" on their creation and ideas, as well as the "key role" of these principles in the "content" of the drawings drawn during the process of participation. Thus, the substance of children's drawings, which forms the foundation for the architect's decision-making, is the embodiment of their living environment. The effects of participatory processes focused

entirely on the study of children's drawings are also affected by the location and living conditions of the children concerned (Figure 9).

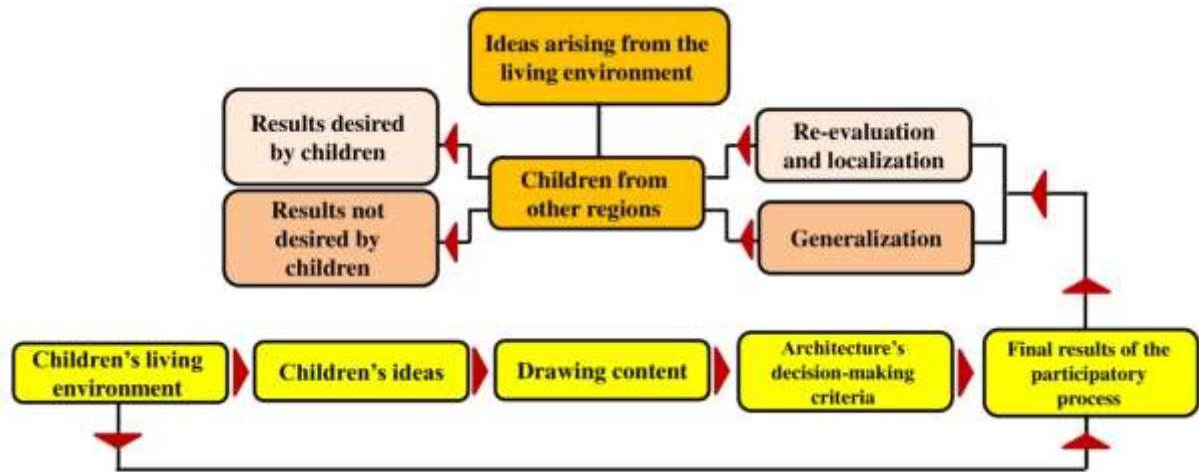
In answer to the second research issue, it should also be remembered that the generalizability of the outcomes of participatory processes based on the study of children's drawings in a particular region, as a design criterion for children in other locations, is relative. The outcomes of architect-child involvement focused on the participatory drawing instrument are often flexible and contingent on the involved children's place of life. The outcomes of participatory procedures in which only drawing devices are used are thus local. It is not necessary for the outcomes of such processes carried out in a single field to be extended to be designed for children in other countries. In this case, the expected outcomes cannot be obtained until the region is "localized" after children are involved.

The reflection in the drawings of the living world's actual state, along with the disparity in the



abilities of children to draw and convey ideas in the context of graphic arts, suggests that drawing alone is very useful as the architect-contact child's language. The utilization of such participatory methods tends to increase the level of interaction

and the full comprehension of children's needs. However, some of their needs, wishes, and expectations can be deduced from the drawings' content.



**Figure 9.** The dependence of the participatory process results based on the interpretation of children's drawings on their living environment characteristics (Source: Authors)

In light of the above, when a participatory process is performed using children's drawing arts, the initial data collected by the architect reflects the realities of the living environment of participating children. In other words, in their drawings, children do not try to express their true desires for their desired architecture but rather to show a graphic expression of what they are actually facing.

Thus, although widely used by architects as a participatory tool, drawing alone cannot help achieve the objective of participation. It lacks the efficiency needed to understand children's needs as an effective language of communication.

Not all children, on the other hand, have the same drawing power. Therefore, many children participating in the participatory process may not even be able to reflect the characteristics of their living environment on paper. Therefore, the content of the drawings is limited to the place of participation, on the one hand, and it alone does not express all the wishes of the children on the other hand.

Four conclusions can be drawn from this study. First, contrary to popular belief, establishing a participatory process requires more than just using the participatory drawing tool. The architect should design the participatory process so that participating children are allowed to comment on

the design theme during the process using a variety of participation tools.

Second, interpreting the content of the drawings does not necessarily mean extracting all the children's wishes, but it means understanding the realities of their living environment as well. By analyzing and interpreting these realities, the architect must make decisions about design proposals. Therefore, the degree to which an element is repeated in the collected drawings does not mean that children are interested in the presence of that element in the new architectural spaces to be designed for them. Third, the results of participatory processes obtained simply by interpreting the drawings of children living in a given area are not directly applicable to children in other areas as a design criterion. These criteria should be re-evaluated based on the views of children living in the area in a new participatory process and implemented after localization.

Fourth, the inefficiency of the drawing will cause participation to deviate from its original direction, that is, children's comments about their own architectural spaces. This helps demonstrate the direction of future research in reviewing participatory tools, studying the solutions used to address their shortcomings, and providing more effective tools.

Therefore, the results of this study will help improve the quality of participatory processes by introducing shortcomings, using drawing as the most common architecture-child participation

tool, and opening a window to examine the capabilities and effectiveness of participatory tools.

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