SPACE NOTION AND CHILDREN IN THE STREET SITUATION

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ABSTRACT

This paper explores aspects of the notion of space among the 'street children' from a project called the "Art and Life House", in São Paulo city, Brazil. As we know, the human being and its actions manifest themselves in their natural, social, cultural and emotional environment. In the "Art and Life House" I used the notion of space to investigate the children's reality, motivating them to learn more about the reality around them, finding and describing meaning in their environment.

THE BEGINNING

I work with "children in the street situation" since 1993. "Children in the street situation" are children who spend their days living with other children in the streets of the city and their nights in shelters—or in another place. The complexity of thought and the internal beauty of these children and their culture fascinate me. The path I went through—Mathematics, Mathematics Education and Ethnomathematics, and Sociology of Mathematics, helped me to wrapped up the perspective of these children in the context of the question that I will present here: the analysis of the "space notion—orientation"—, i.e., how children's notion of space allows them to interact with their day-to-day world. For this analysis, I made a transition from an anthropological position (Geertz, 1989; Pinxten, van Dooren, & Harley, 1983) to a sociological position (Restivo, 1993). My position also draws on the work within ethnomathematics by Ubiratan D'Ambrósio and on Alan Bishop's work within mathematics education.

In a anthropological discussion, Geertz (1989) argues that the cognitive aspects of a specific culture describe an individual's 'view of the world'. The view of the world of a specific people is a picture this group draws of the things, as they perceive them in a 'simple reality'.

From my observations, readings, and reflections I could perceive the necessity of working with children in street situation to develop their world vision. To do this, I looked for a 'natural' form of education, supported by my vision of the individual human beings as a whole, integrated in the cosmos. For me, it is important to reflect upon the way we human beings have understood ourselves throughout our history.

Accordingly to D'Ambrósio (1999), the distortions in the way we human beings have understood ourselves lead to power, presumptuousness, greediness, envy, avarice, arrogance, and indifference. I work with his hypothesis that peace violations is a result of these distortions, that is, violation of the human dignity and the elimination of the individual, and the inevitability of an equitable society and an excessive aggression against nature. Like D'Ambrósio (1999), I consider that it is important for us to reflect on the shape of the beliefs of humanity throughout their history. Restivo (1993) helped me in this reflection when he says that a "social construction" perspective shows how deeply politics, education, and other social factors are implicated in mathematical work and mathematical knowledge. He also suggests that as a social institution, modern mathematics is itself a social problem in a modern society. Restivo points out that this perspective focus on transforming both ways of living, our social relationships, and the values evident in society at large.

THE "ART AND LIFE HOUSE"

The project I describe here deals with the concept of space among 'street children', sleeping overnight in a hostel called "Art and Life House" in São Paulo city, Brazil. The aim of the house, in its social and political context, is to promote and practice the vision of peace in its many dimensions: inner peace, social peace and environmental peace. In this paper, the children I describe are both children and teenagers aged from 3 to 16.

São Paulo has an enormous number of 'street children'. The overall number of these children is highly transient, since they are in and out of their homes, institutions and the street. We can easily find hundreds of children in the street. Only on one year, 2000, the "Art and Life House" received 185 different children.

The goal of this paper is to analyse the space concept, i.e., the every day geometric sense of these children. I believe it is possible to establish a global view of the worldview among these children, a global view of their views of the reality of the world as it impacts on their everyday lives. My intention is to use their points of view as a starting point to encourage them in their desire to understand the reality that surrounds them. I suggest that this can be done in terms of a sociological approach to the every day mathematics (especially the mathematics of space), which expands on a purely social notion of mathematics.

In this particular moment of world and cultural history, it is our priority to establish a moral pattern and the highest ethical guarantee, always working with the three qualities that, according to D'Ambrósio (D'Ambrósio, 1999), comprise a higher ethic: respect for the other, solidarity with the other, and co-operation with the other. To develop and apply these ideas in a way that a child can grasp the true value of their individuality, and that s/he may have the opportunity to practice this individuality in order to be valued for what s/he is, and not by how s/he is. This is our real intention.

HOW

My starting point is Bishop's (Bishop, 1999) presupposition that spatial structure has been key in the development of the mathematics as an epistemic work—calling this the activity of "locating" (that is, location as a form of the universal quest—to localise an idea in our personal understanding, to localize ourselves within our contexts). This activity is essential for the beginning of the search for our place within the universe. The humans need to know its own grounds, looking for food, exploring sea and land, and self-study are needs so basic that we can understand why "location" is a priority. Bishop (Bishop, 1999) even suggests that "location" comes prior to the activity of counting.

All societies developed methods, more or less sophisticated, to codify and symbolise spatial structure. The location activity has received less attention than the counting activity, and, as a consequence, location is less well documented in the cultural studies of mathematical ideas (Bishop, 1999).

Pinxten et al. (Pinxten et al., 1983) examined in detail how particular cultures established space concepts. They consider three levels of space: physical space, social-geographic space, and cosmological space. The spatial world has multiple perspectives, not only through geometric notions but also through ideas of directional space (internal and external), positional space (intra- and inter-personal), and unlimited space (global vision), notions all of which are closely related to our own image. From these multiple perspectives, I focused on **orientation** to work with the children. My hypothesis was that orientation was closely connected with the social integration of these children, as individuals. This choice is, also, a first step towards the *respect of the other*, that is, towards *inner peace*.

Since May 2000 I worked on this project with these children twice a week – until September 2001. In the "Art and Life House" there is room to lodge 30 children overnight. The data used in this paper refer to 14 settled children, which participated in all sessions. I worked with 28 children—but it was not possible to have reliable data from the other 14, since their presence in the "Art and Life House" was very variable.

It was not necessary to perform any socialisation session between the children and me since I had already worked with them for three years as a volunteer. All the sessions were documented: by description of the one observe as well as tape-recorded. The institution has two teams of educators, rotating every day, to create and perform activities with these children. These educators work for the São Paulo City Hall and took an active part on this project. I had open interviews with them, as well as with all other employees. From the analysis of these interviews, I've collected precious data to base the activities as well as some information about how these children arrive at the "Art and Life House".

Only a small fraction of the sessions referring to the "orientation theme" — are reported here. The sessions allowed me to realise "immediately" that these children have a different notion about space, and work with this notion could helpful me to clarify some of their behaviours, and possibly learn something from them.

In the first session, the group sat in a circle and through an open and collective interview, I observed **what** represented for each child the orientation notion. There were 20 children in this session. In the discussion, I asked a very important question:

— "What do you do when you are lost?"

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All the children answered:

— "I go back home."

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After discussing this response, I concluded that these children didn't have the "being-lost" concept.

— "How?" — I asked.

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— "I always know to do it! I always go back home when I want." — One of them answered.

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I agree with Lewis (Lewis, 1976) about the human capacity to find a route and orientate oneself in space. His hypothesis is that children have a kind of "inner compass". In this session, I observed that the most difficult issue for the children were to understand what is "to be lost". The word "lost" was used in some previously activities, using games. In the beginning, I repeated a lot of times for each child the same question: "What do you do when you are lost?" Children did not answer my question — for them it was very difficult to understand the expression "you are lost".

A typical reaction was:

— "I am lost? How?" – The child said.

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— "When you are lost!" – I said.

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— "How can I be lost?" – The child said.

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For the next sessions I developed an activity about making bread — in this activity children worked in pairs on maquettes of bread. They used the bread to represent how to find their route. I chose it because of the necessity to bake bread for breakfast. Using the maquettes of bread, I wanted to observe the children's intellectual organisation regarding their "inner compass". This would help me to understand the orientation concept within their culture. These children showed a deep knowledge of the urban topography. They built the bread dough maquettes on boards with ideas of orientation, showing significative knowledge of prepositions such as behind, in front of, above, below, near, far. As they orientated themselves with their maquettes, they illustrated their knowledge about the sun, the stars and the wind. Each pair built a maquette about the theme "which is the way back home?"

AT LAST

Encouraging each child to achieve his/her creative potential showed me that these children in the street situation have ideas of orientation, which are more dynamic than static. They can distinguish objects and consider the relation among them; "everything moves" seems to be an important property objects have, according to them. It is impressive to see how easy is for them to find their route, their way, evidenced through the activities.

The observation of the activities also supports the idea that there is a process of knowledge transmission from one generation to another, within the group. Older people — always older youngsters that assume a "street parents" role — teach children in the street situation not only to orientate themselves by means of watching static objects, like buildings, train stations, street signs, and streets, but also through observation of natural objects such as the sun, moon, stars, and the wind.

The activities have brought this group of children to co-operate in the preservation of common property, because while these children orientated themselves by means of their maquettes, they give meaning to the objects on their route, on their way. Through the activities, children could observe more about what is around them… and probably could observe it because they discussed it in the group… in their group. They seem to have a complex and peculiar spatial system that can be used as subsumer to learn more formal concepts such as distance, part/whole, internal/external, and central/peripheral.

To work, study, learn, and live with these children showed me how human values and life can significatively nourish the construction of knowledge in the context of their specific culture: "All cultures have theirs own specific ways to represent the world" (Pinxten et al., 1983).

I would like to thank Tony Cotton, Ubiratan D'Ambrósio, and Vitor Teodoro for their many helpful comments and discussions regarding this paper.

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