THE PRODUCTION AND USE OF TACTILE MAPS IN SÃO PAULO, BRAZIL - AN OVERVIEW AND PERSPECTIVES

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ABSTRACT

In this paper, the purpose is to discuss about the current production, use and distribution of the tactile maps in the state of São Paulo, Brazil. The authors will present the methods of this production and their implications, and the importance of the work to prepare students and teachers to use these materials.

This production started with the research of Professor Dr. Regina Araujo de Almeida (Vasconcellos) of University of São Paulo, in 1989. Before that, the maps were only prepared by teachers and institutions that supported visually impaired students. The authors participated on this research making and testing the materials, giving workshops etc.

Since then, the work developed at LEMADI and the materials produced can be considered like reference in the area of the tactile mapping in all country. At present, there is a pile of tactile graphics that can be consulted at LEMADI. Since 1994, CAP has been producing the tactile maps and distributing them to the 62 public schools where there are blind students in the state of São Paulo.

Basically, the tactile maps have been produced in two main methods, and copied in the Thermo-form machine. In one method, they are made with several materials to stand for point and line symbols and areal patterns such as different kinds of papers, sands, clothes, threads, buttons and others. By the other one, the displays are made in aluminum foil with several tools to label and emboss the symbols. Afterwards, copies are made in a Brazilian plastic or in other

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materials that have been tested to make them more lasting. From 1994 to June 2000, CAP made more than 5,735 copies of tactile graphics.

In 1999, the authors started to produce audio tactile maps with a new software developed by Professor Don Parkes (University of Newcastle, Australia) for the Atlas of Americas. The software is pioneer for allowing sighted as well visually impaired people to make audio-tactile graphics. Besides that, it represents a great advantage because it adds resonant information to the tactile graphics.

The authors have realized in their work with blind students the necessity to get them ready to read and interpret tactile maps and this work may be done at the initial grades of the school. In addition to that, to prepare the teachers of Geography and specialized teachers to work with this kind of material is essential. Many of these teachers think that the tactile graphics aren't useful for the blind students and this fact obstructs the access to this material by these students.

For that reason in the past, LEMADI offered courses and workshops about tactile graphics and since 1994, CAP has been offering workshops to specialized teachers of all State of São Paulo.

Finally, the purpose for the future is to make plans to use in Mobility, something unheard-of in Brazil and offer workshops to students and teachers in the area. The authors are studying and discussing about that in an international research group (sponsored by PAIGH – Panamerican Institute of Geography and History).

INTRODUCTION

In this paper, the authors will present the current production and distribution of the tactile maps in the State of São Paulo, Brazil.

Until 1989, the production was made by teachers of blind people and institutions that supported blind people. There were no researches at Universities on the theme.

In 1989, Professor Dr. Regina Araújo de Almeida (Vasconcellos), started a research about the tactile graphics at LEMADI – Laboratory of Geography Education and Teaching Material, University of São Paulo. In the first part of the research, a group composed by geographers and students of Geography made maps, graphs, time line, stories, games, models about the Amazon Region. In the second part, other group made similar materials about the state of São Paulo.

During this period, the materials were tested by blind students of public schools and we offered workshops for teachers of Geography and teachers of blind students. The research was presented in several congresses, seminars and conferences.

Since that time, LEMADI became reference for researchers of all Brazil that started to study this theme. At LEMADI, there are maps, graphs, games, stories, models that students, teachers, parents, institutions, schools and researchers can consult.

Since 1994, the production of tactile graphics started at CAP – Pedagogical Support Center for Visually Impaired People. The material has been distributed to the public schools where there is a specialized support (in a support room) for blind students in the state of São Paulo.

In this state, the support to the visually impaired people has been made by integration/inclusion. The students (about 1,200) attend classes with the other students and they have a special assistance in other period with a specialized teacher.

At present, the production is made at CAP by a geographer and also teacher of visually impaired students. The Center prepares the masters and distributes the copies (in a Brazilian material called Braillex similar to Braillon) to support rooms of the public schools.

Workshops and technical guidances have been offered to all teachers of visually impaired people of public schools of the state.

I - PRODUCTION OF TACTILE MAPS IN STATE OF SÃO PAULO

For the production of tactile maps is necessary to consider:
- the selection of the information before making the tactile map;
- the use of few symbols in each display to avoid confusion;
- the study of the suitable scale;
- the selection of the material to be used in the map according to theme;
- the choice of the suitable method of the production.

There are four methods in the current production of tactile maps in São Paulo:
1) The tactile maps are made by collage with several materials like different kinds of papers, clothes, sands, threads, buttons and others.
2) The tactile maps are made in aluminum foil with several tools to label and emboss the symbols in a piece of rubber.
3) The tactile maps are made with strips and relief ink for cloth.
4) The audio tactile maps are made in the computer with a special software (TGD - Tactile Graphics Design program) created for this purpose.

The first and the second methods are more usual in our production and the copies are made in the Maxi-form with braillex.

1) The maps made by collage

Advantages:
- a lot of options of materials to represent the line and point symbols and areal patterns;
- the copy is better;
- the master is more lasting;
- the material is cheap.

Disadvantages:
- A lot of time to prepare the masters;
- There is a loss of the accuracy in the maps;
- There is a restriction to use plastic materials because of the heat of Thermo-form machine.

Questions to discuss about:
- In maps of different scales sometimes some symbols used are the same in the several displays because there is a minimum that can be noticed by touching;
- The information to put in the tactile display needs to be selected;
- It is necessary to make several maps of the same place to represent different information;
- It is necessary to enlarge the scale to represent the information in some cases.

2) The production in aluminum foil with special tools

Advantages:
- At first time, this method seems to be faster;
- The problems with precision still exist but, in general, the maps show more precision than the tactile made in the first method;
- There are a lot symbols available to stand for the information.

Disadvantages:
- There are few Brazilian tools to make this kind of material. Most of them are imported. Because of that, there must be a restriction for this production.
- The quality of the Brazilian aluminum is not so good and the result of the work is damaged;
- The quality of the copy is worse in this method compared to the first method;
- Because of the heat, it is constantly necessary to recover the master.

3) The tactile map made with strips and relief ink for cloth

Advantages:
- The method is faster than the others;
- It is cheap and accessible;
- It is suitable for maps and graphs of exams.

Disadvantages:
- There are few options to represent the symbols;
- There is a loss of the accuracy of the map;
- It is not appropriate to make copies from this kind of master.

4) The audio tactile maps made with a special software (TGD - Tactile Graphics Design program)

In this way, the maps are made in the computers. The software was developed by Professor Don Parkes of University of NewCastle, Australia and it permits to sighted and visually impaired people to make audio-tactile graphics. In 1999, the authors of this paper participated on the workshop "New Techniques on Mapping for Visually Impaired People" in Ottawa, Canada, sponsored by BIRD and PAIGH (Panamerican Institute of Geography and History) to make the maps for visually impaired people for the Atlas of Americas. The software is pionner because it allows to visually impaired people to make graphics and because it adds resonant information to the tactile graphics.

Besides that, it is possible to import graphics from the other programs and to format for printing in an embosser (Braille printer). The graphics can be printed in the dots way by the embosser.

To add resonant information there is necessity to have a kind of digital pad (called TAG Pad) and microphone.

The tactile display is printed in a special paper called flexi-paper that is flexible and more lasting.

Advantages:
- To make multiple copies per time;
- The production is simplified because from each master in the computer can be made several copies in the print;
- Economy of time and work;
- The resonant information because braille takes up a lot of space ;
- Both sighted and blind people can make graphics.

Disadvantages:
- The costs of import goods in Brazil;
- The costs of the sheets (or papers).

II – REPRODUCTION OF THE TACTILE MAPS

In the first and second methods the maps are copied in Maxi-form with braillex. In the last months, the reproduction has been made with PVC that is more lasting and the texture is better for touching.

In the third method we don't make copies. The displays are made to be used in that way.

In the fourth method, the reproduction is made by the printing as many copies as necessary.

III – MATERIAL PRODUCED

1. Material produced at LEMADI

Maps, games, stories, graphs, models, time line

2. Material produced at CAP (from 1994 to 2000)

Maps and drawings

MASTERS	COPIES
84	5.735

III – DISTRIBUTION OF THE TACTILE MAPS

The copies made are distributed by CAP to all public schools of the state of São Paulo where there is specialized support for visually impaired students. Besides that, some kits with maps have been distributed to institutions and students.

At LEMADI, the material is available for consult. This material is not distrubute.

Number the schools: 62

Number of the special resources rooms: 86

Number of the visually impaired students in the State of São Paulo: about 1,200

IV – USING TACTILE MAPS

In our work with blind students we noticed that many students don't use tactile maps because there aren't available materials.

There are many problems in using of tactile maps in São Paulo and Brazil:

- there are few available materials for blind people;

- there are few researches in that area;

- there is little incentive and few specialized people to produce this kind of material;

- the blind students aren't prepared to read and use drawings, graphs, maps and models;

- the access is difficult because a lot of people (teachers and other professionals) think that they don't need this kind of material.

Preparing to use, read and interpret maps

In general, these students aren't prepared to read tactile maps and many teachers don't know how to teach them to use these displays.

Some things must be considered in the reading of the tactile graphics:

- the title;

- the information of the map;

- the key;

- the scale;

- the reference points (orientation);

- the symbols and patterns;

- the way how the hands touch the extension of the material: from bottom to down, from left to right.

For this reason, it is clear that it is essential prepare students to read tactile maps. For that, it must be necessary to prepare the teachers either.

In the past, at LEMADI courses of tactile graphics were offered and since 1994, CAP has offered workshops and technical guidances for teachers of support rooms for visually impaired students. In these courses, workshops and technical guidances the themes are:

- What is the map?
- History of the Cartography
- What is the tactile map?
- Basic concepts in Cartography
- How to make a tactile map
- How to read and interpret a tactile map

As sighted people need to learn how to use a map, graph and other graphic; blind people need either. Then, the students must learn to read and interpret maps since first grades.

V – MEETINGS ORGANIZED

The authors participated on the Organizing Committee of the following meetings:

- February 1994, **4th International Symposium of Tactile Maps**, University of São Paulo, Brazil;

- May 2000, **Latin American Meeting on Geography Teaching for Visually Impaired People**, University of São Paulo, Brazil.

VI – THE FUTURE ACTIONS: THE WORK IN MOBILITY

There are no formal work and researchers in Brazil on Cartography and Orientation and Mobility. Until now, the mobility instructors have been using tactile graphic displays in informal way. Most of the time, the instructors don't use any graphic material in the work with blind people.

This work with tactile maps and plants will be started by the authors of this paper with more two people because of the research project developed by geographers, cartographers, teachers and parents of blind students of Argentina, Brazil and Chile called "Tactile Cartography as a support for the spacial mobility of Blind Ones". The research is sponsored by PAIGH – Panamerican Institute of Geography and History.

The group is trying to set patterns for the production of tactile maps and graphs in the Latin America.

The work will be start with the space near and known of the students: their houses and schools. Mobility maps of the school and the streets near the school will be made. The work will done with a mobility instructor to use and value the tactile maps with the students. The symbols and patterns will be researched to be used in the tactile maps of large scales.

VII – CONCLUSION

It is necessary in the State of São Paulo and in the rest of the country to increase the production of the tactile maps. For that, more teachers of Geography and specialized teachers need to be prepared and the government should invest in this production.

In all states of the country are being created Pedagogical Support Centers for Visually Impaired People as the center of São Paulo. One of the purposes is to establish patterns for the production of the tactile maps and other tactile graphics. The country is so large and there is not a production of tactile maps as the production in State of São Paulo.

The idea for the future is to start the work with maps and mobility; to go on the production of the maps; to carry out more researches on the theme; to organize more meetings and seminars and to offer workshops for teachers and parents.