

CARTOGRAPHIC EDUCATION FOR SCHOOL TEACHERS AND CHILDREN: CURRENT AND FUTURE CHALLENGES

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Abstract

The paper examines experiences with groups of teachers involved in the cartographic education of three very different groups. It discusses an evaluation done after twenty years of work with special needs cartography related to continuing education for geography teachers. It notes the relevance of preparing school teachers to deal with cartography in the classroom using conventional and digital technologies. Special needs cartography is more than maps for people with sensory and physical impairment; it also involves those who face different issues related to map production and use, such as indigenous populations, particularly native peoples in remote villages and settlements, with particular reference to Indigenous peoples in Brazil. They use cartography in different ways, for different reasons. In addition, special needs cartography facilitates the acceptance of diversity among students, promoting inclusion. School teachers have to study cartography through continuing education courses in order to be able to use graphic language, properly teach their students and also to fully understand the relevance of maps in our society.

Key words: cartographic education, graphic and cartographic language for minorities, tactile maps, ethnocartography, tourist cartography in schools.

Introduction

After several decades of research on cartographic communication process, there is still a need for applied research. In fact, the variety of map uses and users is growing. There are an increased number of innovative products and a wide range of map producers with little training. On top of all this, cartography faces an amazing transformation due to digital technologies and resources, which have changed everyday life and school realities, opening new worlds of teaching and learning, of leisure and work. Figure 1 summarizes these scenarios (Almeida, 2009). Are teachers and parents well prepared to deal with cartography and its new challenges, either at home, everyday life or in the classroom?

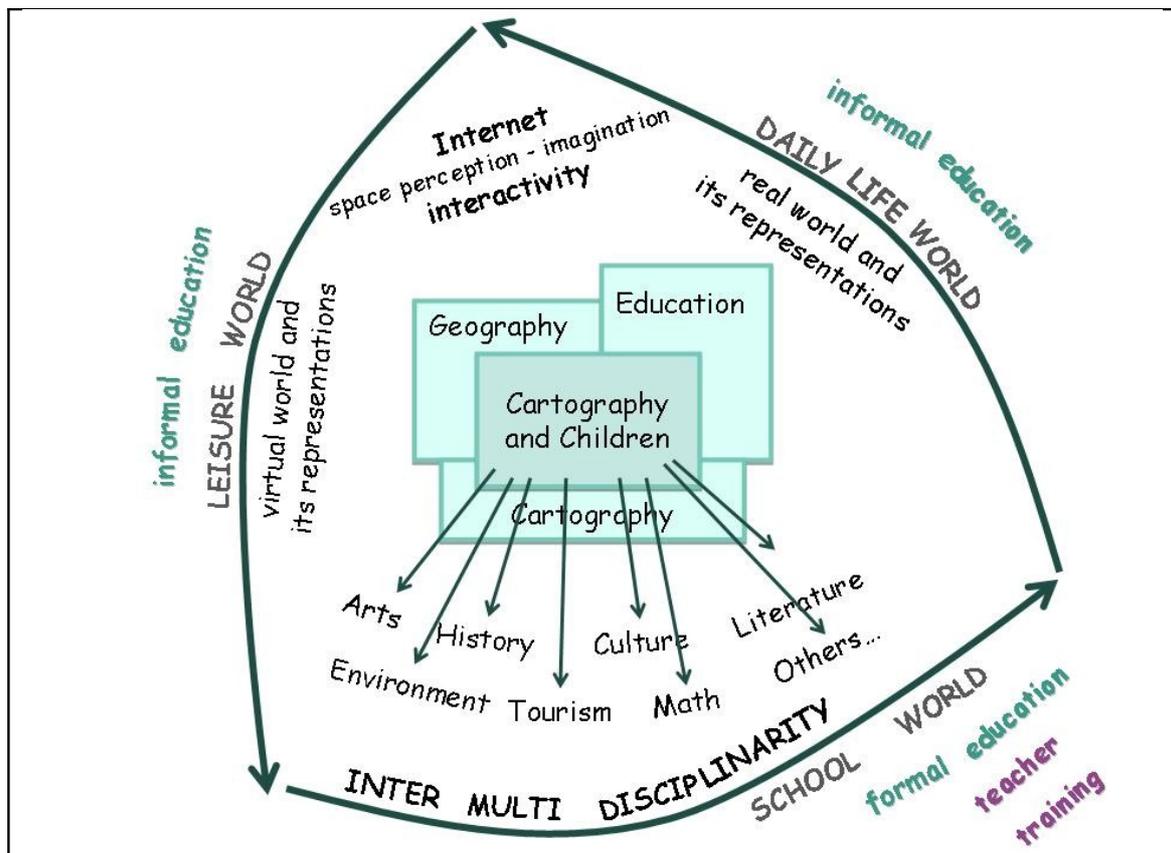


Figure 1 – Where is Cartography in the world of young students?

The old questions asked within communication cartography, in the 60's and 70's, have now new meanings: **WHY** making a map (reasons, purpose of the map), **WHAT** will be represented (map content) and **HOW** (graphic and cartographic language – design and resources), **for WHOM** (type of users, age, special needs), **with WHICH results** (efficacy evaluation of the whole process). Technology has changed the answers to those questions, but there are still some challenges to be faced, including the proper training of school teachers to work with innovations, new cartographic products, new procedures and most important, dealing with youth who have different minds and expectations compared to the past.

The paper presents three experiences with school cartography and teacher training during more than two decades within the Laboratory of Geography Education at the University of São Paulo: cartography for special needs users (low vision and blind people); ethnocartography with indigenous groups from the Amazon region; introducing tourism cartography at schools, for young students and their teachers. The three cases were analyzed in terms of learning and teaching cartography, particularly with respect to finding new ways to introduce maps to specific groups of users. Successful results were obtained and they highlighted the relevance of cartographic education in all levels, also they brought attention to the still valid approach of cartographic communication research and its applied issues.

In Brazil, there is a large and very active group of people working and doing research about maps and children, school cartography and preparation of teachers. Since the beginning of the international ICA working group in 1993 (Anderson, J. & Vasconcellos, R., 1995) there have been several conferences, meetings, and publication of a book on School Cartography (Almeida, Rosângela, org. 2007).

Special Needs Cartography and Tactile maps

The present study is based on three approaches which were tested with school teachers by the author and evaluated during several years. With respect to special needs students, the author has already presented the research results in several occasions and past conferences (Vasconcellos/Almeida, 2007, 2005a, 2002, 2001, 1996, 1995, 1994, 1993, 1992, 1991).

A tactual graphic language was studied and a methodology proposed to introduce maps and basic geographical concepts, e.g. plan view, scale, distance, location and orientation, to low vision and blind people. The study concentrated attention on two areas: 1. Tactile graphic design and production - analysis, construction and evaluation of various techniques and cartographic products; 2. Tactile graphics use - evaluation of the communication process and development of training programs for teachers and students with visual impairment.

In previous work, the author outlined a set of guidelines directed to map design, production and use which were tested for two decades by a team at the University of São Paulo. All public schools in Brazil are implementing the inclusion of special needs students, but teachers are rarely prepared to deal with them in the classroom, and there is not enough didactic materials available. For this reason, there is much to be done yet.

In the last years, projects have been developed in Latin America, with the coordination of Alejandra Coll, Director of the Tactile Cartography Centre, from the Universidad Tecnológica Metropolitana, Santiago, Chile, and the participation of a team from the University of São Paulo (Carmo & Sena, 2005, Sena, 2008) and with support of institutions such as OEA e IPGH. Results have been impressive and many tactile maps designed, produced and distributed in several countries. One example is showed in figure 2.

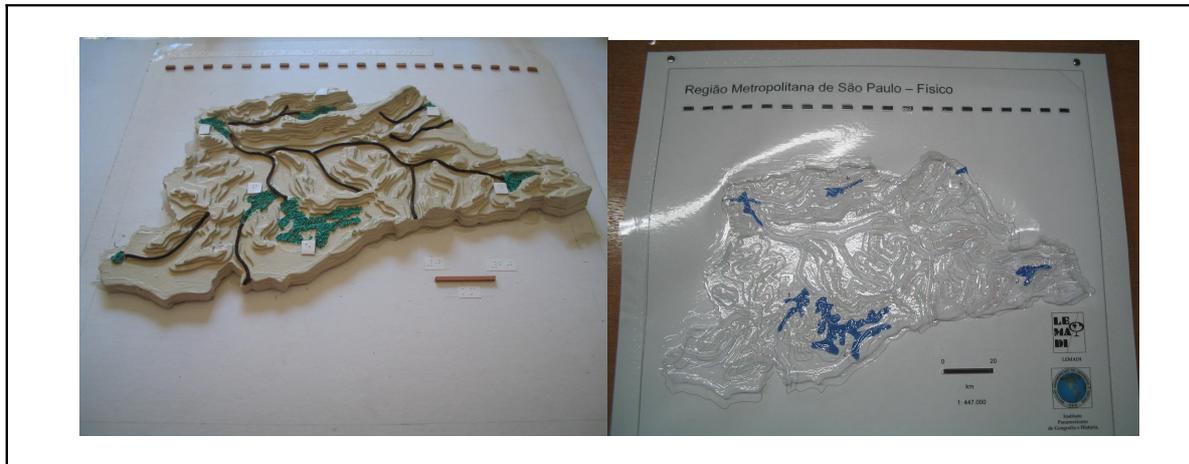


Figure 2 - City of São Paulo Relief Tactile Map, Sena e Carmo, 2005.

Ethnocartography and indigenous geography: workshop with native teachers

Another experience related to cartographic education for minority groups was the introduction of cartography to native teachers working in schools located in Brazilian Indian lands. Between 2000 and 2009, in the State of Acre located at the Brazilian Amazon Region, several workshops coordinated by the author, were organised. She presented mapping techniques and products, remote sensing images and GPS technology to native representatives from several ethnic groups. These activities took place at the Education Center of CPI (Comissão-Pró Índio do Acre), a Brazilian non-government organization which has developed several projects related to indigenous people and their lands, in the last 30 years.

Maps are part of their lives and their work; they draw maps of the geographical space to protect their land, to make environmental assessments, to visualize their space. They need conventional maps and digital maps, but they also make images of their worlds - material, physical, social, cultural, spiritual – that sometimes look like works of art.

The results have been presented previously (Almeida, 2007, 2006, 2005b, 2001, 1999, Marchese & Almeida, 2005). This case study provides some answers to the questions why, how, what, for which reasons and with which results are maps being produced and used. After these experiences, ways were developed to prepare native school teachers to deal with cartography at the Indian villages. There was a need to make concessions and adaptations, such as to value drawings of their environment at the same level as conventional maps (Figures 3 and 4).



Figura 3 - Brazilian Indian working with maps and youngsters drawing their own maps, in a Acre State village, Brazil (photo Renato Gavazzi, CPI-Acre).



Aula de cartografia - Diagnóstico sócioambiental da TI Marmoadate

Figura 4 - Native environmental agents and teachers during a map activity at an Indian village, Brazil (photo Renato Gavazzi, CPI-Acre).

Touristic Cartography at School: The Pathways to the Future Project

The last case dealing with cartographic education for teachers is an initiative to introduce tourism at public schools. The project, called *Pathways to the Future*, accomplished the training of over 800 teachers, in the period of 2006 and 2008, under the coordination of the author. The programme was a joint venture between the University of São Paulo and the Federal Government (Ministry of Tourism). The

teachers from 16 Brazilian states were engaged in workshops to learn about tourist cartography, including a lecture on introduction cartography and practical activities with maps (Figure 5). The evaluation of this experience showed clearly that teachers are not fully prepared to work with maps and to teach cartography to students of all grades.

In order to facilitate and improve this task of working with maps at classrooms, the program developed cartographic games (Figure 6) and other practical activities which accomplished the challenge of motivating teachers and students. Besides receiving a book (instructor and student versions), teachers also got a CD-ROM with power point presentations, exercises and material about their city and state. A conventional map and an illustrated tourist map were produced to each of the 16 states (Fiori, 2005, 2008).

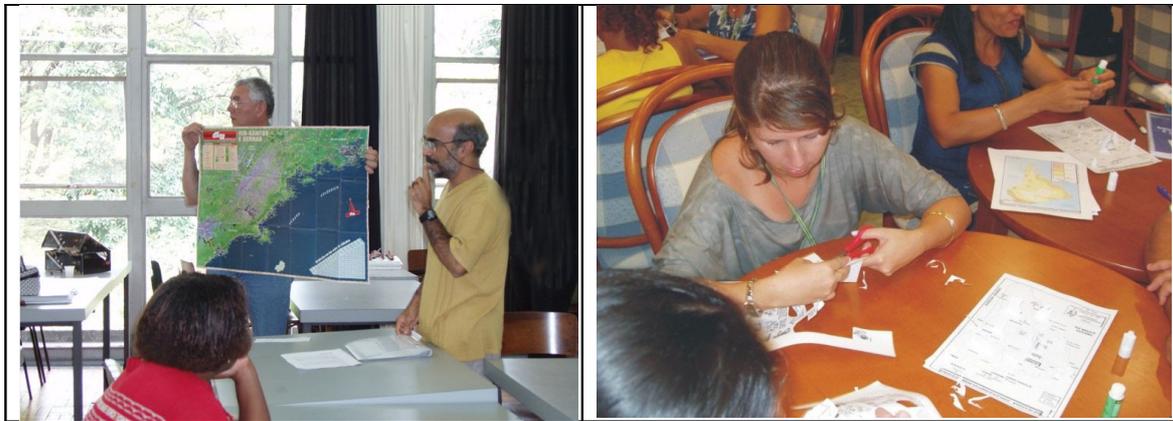


Figure 5. – School teachers at the tourist cartography workshop. Fiori, 2008.



Figure 6 - Game designed to introduce tourist cartography at schools. Fiori, 2008.

Conclusion

The results of previous work done by the author showed some important facts, such as:

1. School teachers recognize the relevance of cartography in geography education and at school in general, and they would increase its role in education if possible;
2. Map content and design should address users needs and interests. For example, leisure and tourist cartography enhances students' and teachers' motivation to learn and work with maps when used in a location where tourism is economically strong;
3. Technology can build up the interest in teaching and learning cartography, but economic and social restraints are still a barrier for Brazilian public schools. Their use of computer and internet resources, such as Google Earth, is limited for several reasons e.g., the small number of available computers, lack of good internet connection, large number of students in classrooms, and this greatly interferes with their geographic and cartographic education.

Nowadays, digital technologies are bringing new possibilities to improve cartographic education of school teachers and children. These innovative resources have changed the current state of cartographic education and open up future challenges in the field of cartography. Cartography for minority groups should involve cultural mapping and recognize the social context, presenting the language of maps in multi-sensory and multicultural ways to depict geographical space. The author strongly believes that cartographers should participate and create alternatives to improve school teachers and children cartographic knowledge both in map theory and practice. Digital and conventional media are covering those new scenarios related to all sorts of maps, an example was a request from a newspaper in São Paulo to prepare an activity for a classroom using cartography and Google Earth (Figure 7).

It is a fact that students can no longer learn without digital, dynamic and interactive resources. Cybercartography, as proposed by Taylor (2005), can be an alternative as it involves all senses, not only visual, and works with all sorts of maps, from physical space to virtual reality. Considering the three experiences discussed in the paper, it is clear that cartography as a communication system can still bring light to research as they confirm the relevance of evaluating map design and use and its efficacy.]Regina I do not understand what you are saying in this last sentence}

In all cases, the essential issue is always the preparation of people involved in the cartographic process (map makers and map users). All teachers and not only geographers should be mapmakers and must improve the teaching of cartography in all levels of school. This means including computers and the internet as didactic resources, developing games and new strategies such as problem solving methodology, finding ways to motivate young people to become map makers and users. Technology is building virtual spaces, transforming geography at school and it has been a bridge to improve special needs learning, including the continuing education of teachers.

> pais & mestres

Sugestão de aula: Geografia

Mapeando a comunidade

EDUCOMUNICAÇÃO

1 - Sabóites
Para os estudantes de ensino fundamental, trabalhar com mapas digitais é uma ótima maneira de trabalhar com o conteúdo de Geografia. Os mapas digitais são interativos e permitem que os alunos explorem o mundo de uma maneira diferente. Eles podem clicar em um ponto no mapa e obter informações sobre aquele local, como o nome, a população e a localização. Isso ajuda os alunos a desenvolverem habilidades de pesquisa e análise de dados.



2 - As Brinquetas
O projeto "As Brinquetas" é uma iniciativa que visa promover o uso de brinquedos tradicionais e artesanais. O projeto é liderado por uma equipe de voluntários e tem como objetivo preservar a cultura e o artesanato locais. Os brinquedos são feitos com materiais locais e são vendidos em feiras e eventos. Isso ajuda a gerar renda para os artesãos e a promover o turismo local.



MAPAS SENSORIAIS
Os professores de ensino fundamental podem usar mapas sensoriais para ajudar os alunos a aprender sobre o mundo. Os mapas sensoriais são mapas que usam diferentes materiais para representar diferentes aspectos do mundo. Por exemplo, um mapa sensorial pode usar diferentes cores para representar diferentes tipos de clima ou diferentes tipos de vegetação. Isso ajuda os alunos a desenvolverem habilidades de observação e análise de dados.

SOCIA DE PASSOS
O projeto "Sociedade de Passos" é uma iniciativa que visa promover o uso de passos tradicionais e artesanais. O projeto é liderado por uma equipe de voluntários e tem como objetivo preservar a cultura e o artesanato locais. Os passos são feitos com materiais locais e são vendidos em feiras e eventos. Isso ajuda a gerar renda para os artesãos e a promover o turismo local.



INTRODUÇÃO
O uso de mapas digitais é uma ótima maneira de trabalhar com o conteúdo de Geografia. Os mapas digitais são interativos e permitem que os alunos explorem o mundo de uma maneira diferente. Eles podem clicar em um ponto no mapa e obter informações sobre aquele local, como o nome, a população e a localização. Isso ajuda os alunos a desenvolverem habilidades de pesquisa e análise de dados.

ESCALA
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LEITURA
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LOCALIZAÇÃO
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PRODUÇÃO
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Professores trocam experiências no CCB
O Centro de Estudos e Pesquisas em Educação, Cultura e Ação Comunitária (Cebecap) realizou um encontro para que os professores trocassem experiências e conhecimentos. O encontro foi realizado em um ambiente descontraído e permitiu que os professores compartilhassem suas ideias e experiências. Isso ajudou a fortalecer a comunidade de professores e a promover a troca de experiências.

Madeiras serão tema de oficina para professor
A oficina "Madeiras" será realizada em uma data ainda a ser definida. O tema da oficina é a madeira e o uso sustentável dela. A oficina será ministrada por um especialista em madeira e terá como objetivo educar os professores sobre o uso sustentável da madeira e a importância de preservar as matas. Isso ajudará os professores a transmitir esse conhecimento para os alunos.

Site de 'Nova Escola' traz outros do 'JT'
O site de "Nova Escola" traz outros conteúdos do "JT". Isso inclui artigos, vídeos e outros recursos que ajudam os professores a melhorar sua prática pedagógica. O site é uma ótima ferramenta para os professores que buscam novas ideias e recursos para suas aulas.

Sobersa localiza 'so' cretifer e termo gões de esta local parte da vida dos pessoas. Mas pas no pres em o mundo 'do'?
Este texto parece ser um fragmento de uma notícia ou artigo. Ele menciona "Sobersa", "cretifer", "termo gões", "esta local parte da vida dos pessoas" e "pas no pres em o mundo 'do'". O contexto é pouco claro, mas parece tratar de algum assunto relacionado a geografia ou ciências.

Sesc realiza palestras sobre o universo
O Sesc realizou um ciclo de palestras sobre o universo. As palestras foram ministradas por especialistas em astronomia e foram muito interessantes. Elas abordaram temas como a formação do universo, a vida em outros planetas e a busca por vida extraterrestre. Isso ajudou a despertar o interesse dos alunos pelo universo e a ampliar seus conhecimentos.

Figure 7 - Mapping the Community with Google Earth: theme for a geography class. Almeida, Regina A. September 19, 2006. Jornal da Tarde, São Paulo.

<http://www.usp.br/nce/educomjt/paginas/comunidade.pdf>

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