ATLAS TACTIL DE LATINO AMERICA
(TACTILE ATLAS OF LATIN AMERICA)

Topic 21: Maps for Handicapped People

D.R.F. Taylor

Professor and Director
Geomatics and Cartographic Research Centre
Carleton University
1125 Colonel By Drive
Ottawa, Canada K1S 5B6
.Fax: 613-520-2395; phone: 613-520-3979; e-mail: fraser_taylor@carleton.ca

ABSTRACT

This paper describes the production of Atlas Táctil de Latino América (Tactile Atlas of Latin America) that which was published in Ottawa, Canada in April 2000 (Taylor, 2000a). The Atlas was produced as part of the Digital Mapping and Geographic Information Systems Pilot Project, more informally called the Cybercartography for the Americas Project, funded by the Inter-American Development Bank and the Governments of Brazil, Mexico and Canada and administered by the Pan American Institute of Geography and History in Mexico City (Reyes, 2000; Taylor, 2000). The Atlas was produced using the Tactile Graphic Designer Series (TGD) developed by Don Parkes and Richard Dear of New South Wales, Australia (Parkes and Dear, 2001). This system allows the production of audio-tactile maps. The Atlas was produced by a team of individuals, with different national components being produced for Argentina, Brazil, Chile, Mexico and Peru. In each of these countries there was a national coordinator and a team of individuals involved in the production. An important element in the project was local capacity building and a one-week training workshop was held in Ottawa, Canada to introduce participants to TGD. This workshop was held in cooperation with the Canadian National Institute for the Blind. The instruction was given by the team responsible for the development of the TGD System. In addition to the Latin American participants a number of Canadians, including three blind people, attended the workshop. Of special interest was the involvement of a blind instructor familiar with the TGD System as part of the training team. Prior to the workshop each participating country was sent the TGD software and hardware. The objective was to have a common platform in each nation to facilitate the overall production of the atlas and to act as an ongoing resource for future work on mapping for the blind. Each country was asked to produce a series of maps and text on flexi-paper in either black and white or colour. These were sent to Ottawa for collation and production of the Atlas. This paper discusses the technical, administrative and bureaucratic problems in the production of the Atlas. Although there were some problems with the technology the major problems were of a non-technical nature.

INTRODUCTION

The Atlas Táctil de Latino America consists of 24 maps with accompanying text and legends in Braille. The scale of the maps varies from continental (see Figure 1), to national (see Figures 2 and 3) and local (see Figure 4). The total number of pages including maps and text is 48. Fifty bound copies of the Atlas on flexi-paper were produced. The direct cost of materials alone for each Atlas was around US $50.00. Although the originals of several maps included sound it was considered both technologically and financially unrealistic to reproduce these in the final version of the Atlas. To fully utilize such maps, including the sound element, would require each user to have the latest version of the system used to produce the maps, the Tactile Graphic Designer series software and hardware. The latest version of the system was used in producing the Atlas and at the time of production the system was still being beta tested and had not yet been widely distributed. In addition the Atlas was not designed to be a finished, definitive product. A major objective in producing the Atlas was to give the international team involved in its production experience with the new system. Of the national teams involved in the Atlas some, such as Chile, Brazil and Argentina, had considerable experience in producing maps for the blind. Others, such as Mexico and Peru, were totally new to the field. The quality of the final maps produced by each nation therefore varied. (see Figure 5)

THE TACTILE GRAPHIC DESIGNER SYSTEM (TGD)

Tactile Audio Graphics were first developed by Parkes and Dear in the late 1980's as a DOS system called NOMAD. Parkes (2001) calls these "tagraphics" which he defines as "sound-filled tactile pictures". They have all the properties of a traditional tactile graphic including Braille but also give a spoken or digital sound output when touched. Any language or any sound can be attached to tactile images making them useful for any subject where graphics are involved such as mathematics or economics, They can also be used for entertainment such as board games or to create greeting cards. They can be used for instructional purposes such as explaining how to use computer operating systems. Although designed for mapping, TGD has much wider applicability and the use of sound means that Braille is not always required. Although designed primarily for the blind they can, and have been, used by other special purpose groups and create a new teaching and learning methodology. Currently the main languages supported are English, Spanish, Portuguese and Swedish.

TGD requires a computer, a tactile graphics pad, a tactile image enhancer, thermo pens and flexi-paper for output. The system utilizes the Microsoft SAPI4 speech engine and the Microsoft speech recognition engine (Parkes and Dear, 2001). There are five main software programs:

- QIK TAX (Quick Tactile Graphics) is designed for sighted users who wish to make hard copy graphics quickly and easily
- TRACE ME, is also designed for sighted users and is a drawing program specifically designed for freehand sketching or tracing photographs, line drawings, scanned images, etc. into tactile form
- AUDIO CAD (CAD = Can't Anyone Draw) allows users to create their own graphics. Software speech directs the user through the operations. By the end of the one-week workshop

for the Tactile Atlas of Latin America blind participants with no previous experience were producing their own simple graphics. To produce a map takes longer but it can and has been done. About six weeks of training are required to reach proficiency depending upon the individual user.

- AUDIO PIX is for sighted viewers and is the program that which allows the addition of speech or digital sounds to the tactile entities within a graphic. The program comes with a number of synthesized speech and sound files but with microphone input any language and any sound can be embedded to create a multimedia "tagraphic". Three levels of sound detail can be attached to any entity. For example, if the tagraphic is a large scale town plan and the symbol represented a concert hall is touched, the first level of sound could identify and describe the concert hall. The second level could describe the upcoming performances and the third level could provide excerpts of the music playing in a concert performance.
- AUDIO TRIP allows the creation of a tagraphic which allows a blind person to plan and take a trip, for example around a town centre, with real time audio descriptions accompanying the map. AUDIO TRIP can also be used to preview an upcoming trip.

TGD was the system of choice for the Tactile Atlas of Latin America and the English, Spanish and Portuguese versions of the system were used. All participants were sent a full suite of TGD software and hardware as a common platform to produce maps for the Atlas.

TECHNICAL PROBLEMS

The system performed well but was not without its problems. The version of TGD used was very new and there were the inevitable minor bugs in the system. Most of these were resolved by e-mail with Dr. Parkes and Richard Dear but language difficulties created some problems as several participants spoke only Spanish and the responses they received were in English. In some countries Internet connections were inadequate, expensive and unreliable making communication difficult. AUDIO PIX was the main program used for the Atlas. Producing a few maps in black and white is relatively easy. Producing fifty copies of the same map for the bound version of the Atlas, especially if colour is used, proved much more problematical. This was a labour intensive process as individual sheets had to be fed into the Tactile Image Enhancer one by one by hand. The enhancer also tended to overheat further slowing the production process. The system has a colour capability but utilizing any colour other than black poses additional problems. Colour can be useful for low vision users but the length of time for such colours to dry on the flexi-paper is excessive and smudging can take place. Flexi-paper costs around US $1.00 per sheet and mistakes can be costly. The production of one atlas took an estimated 15 person hours. Improvements in the system are required for mass production. The overall cost of the hardware and software is reasonable (around US $2,000) but he operating costs are high.

CAPACITY BUILDING

This was the most successful element in the Atlas project. A one-week workshop was held in Ottawa in cooperation with the Canadian National Institute for the Blind (CNIB) attended by representatives from Argentine, Brazil, Chile, Mexico and Canada. Canadian participants

included several blind individuals and representatives of both CNIB and Natural Resources Canada who installed A TGD system for use by the Canadian Federal Government. The four person instructor team led by Dr. Parkes and Richard Dear included the distributor in the USA, David Scrinavek and Patrick Neazer, who is himself blind. The team of instructors came to Ottawa at their own expense and made a valuable voluntary contribution without which the project could not have been successful. In any project in Latin America personal relationships and networking are the sine qua non of effective capacity building and the workshop consolidated these relationships. The involvement of the designers and the participants as an integrated team was of special importance. The blind Canadians played a very special role. Not only did they learn to use the AUDIO CAD system and produce their own simple graphics, but they also provided valuable help to the Latin American participants in the form of feedback on the graphics produced by these sighted participants. Joint workshops of blind and sighted participants pose special problems but they have distinct advantages. The two groups were learning different software packages and this posed problems for the instruction team in terms of timing and the need for individual attention. In retrospect it would have been better to split the group into two initially for instruction purposes. The sighted and blind participants had different objectives. Patrick Neazer played a very special role in instructing the blind participants. His own blindness was an asset in this respect. The blind leading the blind was a very positive experience. For the purpose of the Atlas, having blind individuals knowledgeable about the system was an invaluable asset in terms of giving feedback on the effectiveness of the graphics.

ADMINISTRATIVE AND BUREAUCRATIC PROBLEMS

These far outweighed the technical and capacity building issues and caused serious delays and frustrations for all concerned. Without a doubt customs regulations and procedures were the most frustrating. Each national group was to receive TGD software and hardware purchased using Canadian International Development Agency (CIDA) funds[1] from the sole distributor in the United States and shipped directly to them as a donation. This was much easier said than done and customs delayed the delivery of equipment by months. Even when delivery took place key elements often went missing. In the case of Peru the equipment was not released by customs until after the Atlas was produced! Maps of Peru had to be produced in Canada rather than in Peru. Money had been set aside to cover reasonable shipping and customs charges. Shipping was easy and within budget as the shipping agent spoke Spanish and was familiar with Latin America. Customs, however, was quite another thing. It was assumed that donations of equipment could enter duty free. This did not prove to be the case. In Argentina the duty was 100% of the original costs and the import of some of the computer equipment was theoretically impossible. Argentinean Customs insisted that to qualify as a donation the Argentinean recipients had to produce a letter from the Argentinean Embassy in Ottawa certifying that this was, in fact, a genuine donation. The serial number of each individual piece of equipment and a detailed description of the software was required. The project administrator approached the Embassy for such a letter only to be told that no such procedure was necessary in Argentina - Catch 22! The personal intervention of the Ambassador herself was required to generate the letter but this process took several weeks. Customs finally released the equipment but parts of it could not be found in the Customs storage shed. No duty was to be charged but Customs

[1]The support of the CIDA for this project is gratefully acknowledged.

required the payment of storage charges for the time they had held the equipment which exceeded the proposed original duty! At the time of writing (April 2001), a year after the project was completed, additional documentation is still being required by Argentinean authorities who are still pursing the Argentinean recipients for additional payments. The Argentina case was the worst, but Peru was not far behind and the delays there were even longer. In both Brazil and Chile customs problems were less severe as experienced participants took the system in as part of their personal luggage! Even between Canada and the United States there were unanticipated costs. Under NAFTA there is free trade but Canadian Customs charged a $50 handling fee for a package of flexi-paper. When a defective batch was sent back for replacement a further $50 was charged for the replacement package.

Communications were problematical. E-mail and fax were used but in both Argentina and Peru both proved to be unreliable and often ineffective. Added to this was the problem of language. Not all participants were trilingual in Spanish, English and Portuguese and, as a result, misunderstandings were inevitable. Most participants could read English well but were less functional in terms of speaking and comprehension. Instruction at the workshop was in English with a variety of different accents making comprehension of complex technical details which were completely new to the Latin American participants very difficult. Translation by bilingual participants helped but slowed down proceedings.

The final version of the Atlas was produced mainly in Spanish although the Brazilian maps and legends are in Portuguese. Although a native Spanish speaker was used for inputting the text the word processing package he used was in English and lacked the correct accents for the Spanish resulting in inadequate text in some sections of the Atlas.

The various delays outlined above condensed the timelines for Atlas production both in individual nations and especially in Ottawa. The final Atlas production was therefore rushed and the production team had to find innovative ways of dealing with unanticipated eventualities. Equipment failures were often resolved by using duct tapes and hair dryers! The situation was not helped by the fact that the production time for the maps was three times as long as anticipated even when everything was working perfectly.

CONCLUSION

The Tactile Atlas of Latin America is the first of its kind for the region and it has demonstrated the exciting potential of tactile audio graphics and built a capacity for producing maps and graphic for the blind in new and exciting ways. It was featured the special issue of the magazine América produced for the Quebec Summit (George and Kiernan, 2001). Considerable progress has been made, especially in Argentina, Brazil and Chile where TGD builds on a solid based of tactile graphic production for the blind which has been going on for a number of years. In Mexico, as a result of the project, the Ministry of Education is paying unprecedented attention to maps for blind children. Progress in Peru has been slower. To move production of “tagraphics” out of the university laboratories poses additional challenges and only some of these are technical.

The success of the project is primarily due to the vision and efforts of an dedicated team of individuals in Australia, Argentina, Brazil, Chile, Mexico, Peru and Canada. The group numbers over 30 people and is too large to identify individually in this paper. The author gratefully acknowledges their individual and collective contribution to the production of the Atlas Táctil de Latino América.

REFERENCES

George, B. and Kiernan, P. (2001) "An Atlas with a Sense of Touch", Américas, March, pp. 54-55.

Parkes, D. and Dear, R. (2001) "Tactile Graphic Designer", www.tactile-audio.com.

Reyes, C. (2000) "Informe Final de la Gerente de Proyecto Piloto en Cartografía Digital y Sistemas de Información Geográfica". Pan-American Institute of Geography and History (Internal Report).

Taylor, D. R. F. (ed) (2000a) Atlas Táctil de Latino América (Tactile Atlas of Latin America for the blind and visually impaired), (member of editorial committee), Ottawa: Pan American Institute of Geography and History, pp. 48.

Taylor, D. R. F. (2000b), Digital Mapping and Geographic Information Systems Pilot Project Final Report, Inter-American Development Bank Contract Emd.8.043.00-C, Final Report of Technical Manager.