

Homeless people go to UFRGS Planetarium

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Abstract

Science divulgance, interdisciplinarity and accessibility represent great challenge to anyone who works with Science education. Probable the most important ability to be developed by researchers who communicate Science is to simplify the scientific language and to incorporate interdisciplinary concepts without generate misconceptions. Even more difficult is to present and discuss scientific knowledge with disable people or people who live in social vulnerability conditions, like the ones that live without a roof over one's head in the big cities. The Planetarium of Federal University of Rio Grande do Sul (UFRGS), in the south of Brazil, in order to celebrate the National Science and Technology Week, offers to homeless people planetarium sessions about the Solar System and many others astronomical contents. The program presented is followed by free discussions about themes they are interested in. Someone are: why the sky is blue; how one can identify planets in the dark sky; why there are Moon Phases; why some constellations can be observed at night in the summer but do not in the winter; and so on. One can affirm that, when homeless people have opportunity to learn Science in educational places like a Planetarium or Museum, they fell much better with themselves and they become a little bit more active. Science divulgance may help the promotion of the social inclusion.

Introduction

Brazil is the world's fifth largest country, both by geographical area and by population. It is the largest country in South America and also in Latin American area and it is the largest Lusophone country in the world, and the only one in the Americas.

Brazil is a country with many natural richness and singular beauties; the Brazilian people exhibit great ethnical and cultural diversity. But Brazil comes face to face with great challenges. For instance, to improve its educational system, to provide efficient public health to the people, to guarantee public security, to reduce social differences and so on.

Brazilian territorial area is divided into five regions: South, Southeast, Central West, Northwest and North. The population distribution is very unequal, as showed in figure 1. The Southeast and South regions have the largest population density, respectively 87 and 48 habitants/km², while the North and Central West have the lowest population density, approximately 4 and 8 habitants/km², respectively. In the Northeast region one has nearly 34 habitants/km². São Paulo, with almost 12 millions of habitants, is the most population Brazilian city. Rio de Janeiro and Salvador are, respectively, the second and the third largest cities by population.

Although Brazil has been considered one of the fastest growing major economies in the world, the Brazilian educational performance looks like to be unsatisfactory, mainly concerning to the scientific area. Brazil performs below the Organization for Economic Co-operation and Development (OECD) average in mathematics (58^o rank), reading (55^o rank) and science (59^o rank) among the 65 countries and economies that participated in the 2012 Programme for International Student Assessment (PISA).

Nowadays the very fast growing of the scientific knowledge become almost impossible to the fundamental and high school teachers to follow the Science development and to "translate" the new scientific ideas to their students. So, it is important to improve the teachers' education by giving them opportunities to learn Science continuously, by discussing the new ideas and scientific progresses. Also it is essential to help them to simplify the scientific language to their students and become them able to incorporate interdisciplinary concepts without generate misconceptions

(BAILEY and SLATER, 2004; LANGHI and NARDI, 2010; MARTINS and LANGHI, 2013).

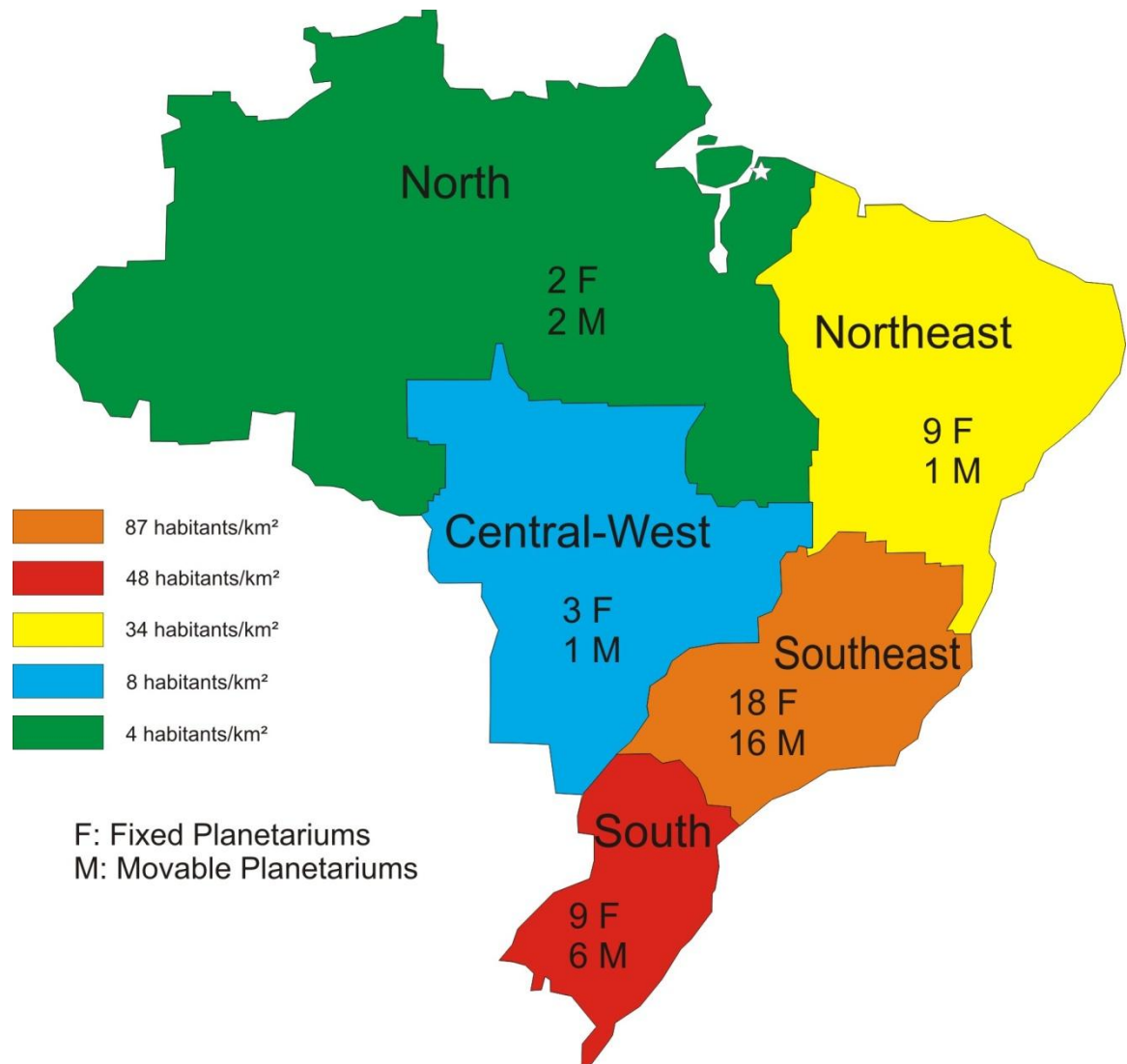


Figure 1: Population density and number of Planetariums (F: fixed; M: movable) in each region of Brazil.

Another great challenge is to present scientific knowledge to disable people or people who live in social vulnerability conditions, like the ones that live without a roof over one's head in the big cities. For blinded persons one can find papers that suggest strategies to teach some scientific contents like ORTIZ-GIL et al ((2009).

Methodology

Non-formal educational centers, like museums, science centers, botanical gardens, zoos and planetariums, can support science learning. These are places where people can pursue and develop science interests, engage in science inquiry and reflect on their experiences. In each region of the Brazilian map (figure 1) one can see the number of fixed (F) and movable (M) planetariums. It is interesting to mention that if one displays the museums and science centers in a Brazilian map, one will see almost the same distribution as showed in figure 1 for planetariums.

Educational researchers point out the need for coherence and integration of informal or non-formal environments and classrooms. It requires a reflection about distinction between assessment and evaluation. Assessment can be considered the set of approaches and techniques used to determine what individuals learn from a given instructional program; yet evaluation is the set of approaches and techniques used to make judgments about a given instructional program, approach, or treatment, improve its effectiveness, and inform decisions about its development.

Planetariums, as non-formal settings for science learning, typically do not use tests, grades or other kinds of educational instruments to evaluate the learners. But it is very important to characterize what participants learn about science in informal or non-formal environments. It is necessary to have in mind that assessment requires plausible evidence of outcomes. These outcomes can be described as a particular type of knowledge, skills, attitudes, feelings and behaviors.

One can identify some typical planetariums outcomes:

- 1- Planetariums visitors are people of all ages and of all scholarship levels;
- 2- Education researches show that science learning involves everyday experiences for human beings from the earliest ages;
- 3- People excitement and motivation to engage in activities that promote learning about the natural and physical world;
- 4- How scientific knowledge is constructed;
- 5- How learner's ideas changes.

So, it is important to provide a careful analysis of the goals and objectives of learning science in non-formal or informal environments and to provide assessments of the activities, particularly in planetariums.

In the last years the presence of disable people in museums and planetariums increased a lot. Unfortunately the same does not occur with socially vulnerable people.

Results

In order to celebrate the National Science and Technology Week, promoted by Brazilian Science and Technology Ministry since 2004, the Planetarium of Federal University of Rio Grande do Sul (UFRGS), in the South of Brazil, offers sessions about the Solar System and others astronomical contents to homeless people. It began in 2010, the International Year of Astronomy, when a program about Solar System was presented to a group of almost one hundred persons that live without a roof over one's head in Porto Alegre, Rio Grande do Sul, Brazil.

The planetarium sessions were followed by free discussions about themes they were interested in. Some were: why the sky is blue; how one can identify planets in the dark sky; why there are Moon Phases; why some constellations can be observed at night in the summer but do not in the winter; and so on.



Figure 2: Matter published in the newspaper “Correio do Povo” (19th October, 2010).

Available

at:

<http://www.correiodopovo.com.br/Impresso/?Ano=116&Numero=19&Caderno=0&Noticia=210750>

Discussion and Conclusion

Science divulgence, interdisciplinary and accessibility represent great challenge to anyone who works with science education. Probable the most important ability to be developed by researchers who communicate science is to simplify the scientific language and to incorporate interdisciplinary concepts without generate misconceptions.

Brazilian schools have no enough science teachers and, usually, most of the teachers are not able to use the new technology of information in their classes. In general, there is no science laboratory in the schools and the teaching-learning process is reduced to repeat what is written in textbooks.

Visits to planetariums, museums or others science learning environments may stimulate students to learn science. Furthermore, it is important to take into account that the collective scientific knowledge of a population is part of its cultural inheritance and, therefore, science cannot be disassociated from culture. This kind of interdisciplinary treatment of science and culture is the way planetariums work in. So scientific divulgence centers play an important role; they help teachers to learn and to teach new scientific subjects.

Although mostly of the schools and educational centers do not have adequate professionals to attend and to assist disable people to learn science, it is essential to realize the inclusion of the disable and the socially vulnerable people in all educational system - formal, non-formal and informal. So, it is necessary to promote training courses in order to qualify the professionals of science centers to work with disable and/or socially vulnerable people and help them to learn.

One can affirm that, when homeless people have opportunity to learn science in educational places like planetariums or museums, they feel much better with themselves and they become a little bit more active. Science divulgence may help to promote the social inclusion.

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