

## 1. Introduction

The development of scientific inquiry skills is considered to be the most effective way to create a society of scientifically literate citizens (1). It has been argued that 'if we want students to understand the nature of scientific inquiry teachers must have the experience as working as scientists' (2). There have been some reports about experiences where teachers were involved in research with scientists (3, 4, 5). This study intent to contribute to the development of a model of professional development for science teachers in Portugal through partnerships between teachers and scientists, in order to improve their understanding of how science is done and how scientists work.

## 2. Objectives

- 2.1. To involve a science teacher in research so that teacher can incorporate research into school curriculum.
- 2.2. To transfer the research experience to the classroom incorporating that experience into school curriculum through an inquiry-based methods of teaching and new experimental work.
- 2.3. To evaluate students learning, and appreciation of the experience by the teacher and the students.

## 3. Sample

Eighteen students from 8<sup>th</sup> grade, ages between 12 e 14 years old.

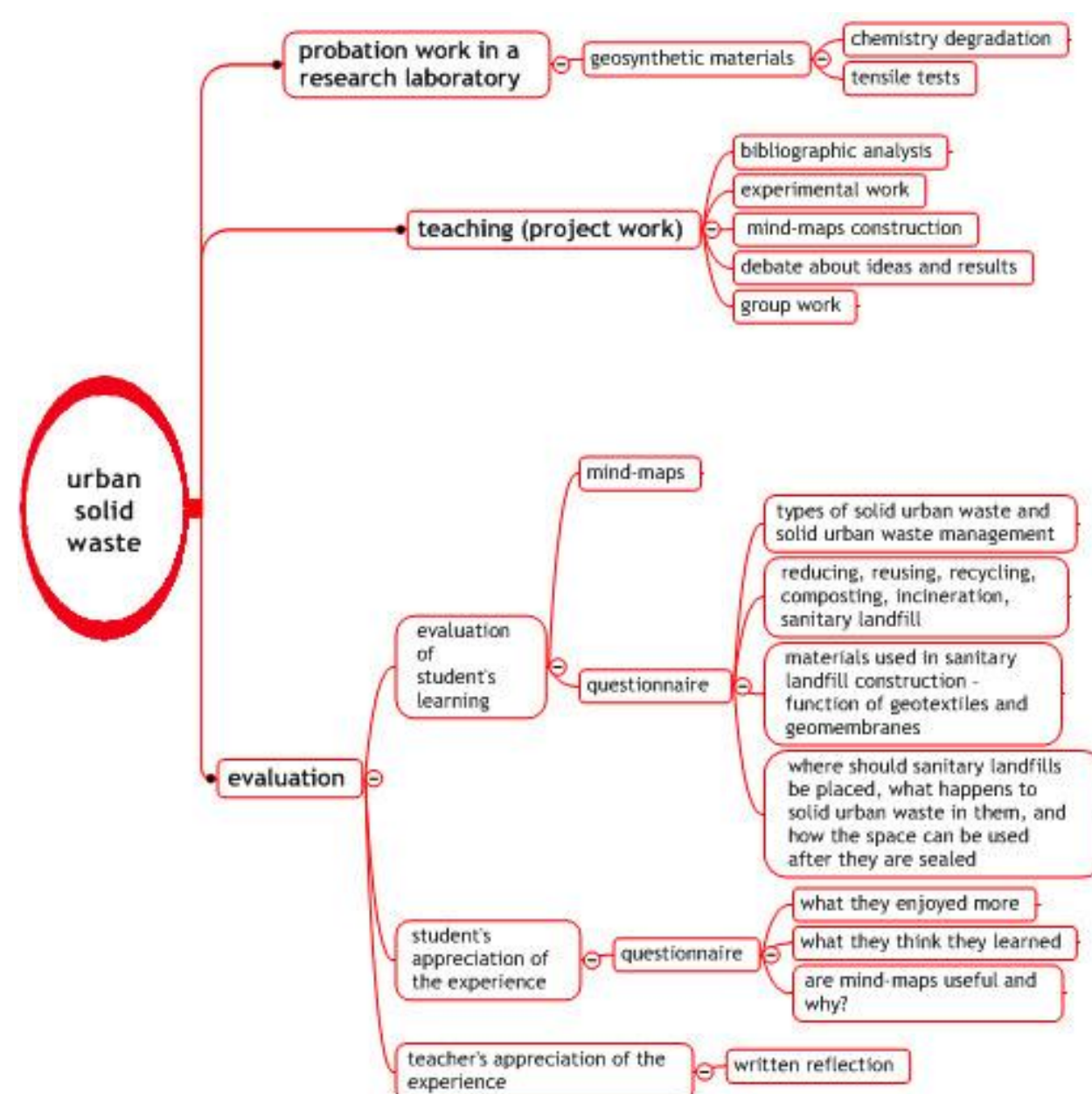
## 4. Methodology

The study has been developed in two parts. In the first part the teacher/researcher integrated a research team in a research laboratory, where she developed a series of special skills to analyse geosynthetic materials.

In the second part the teacher/researcher incorporated the experience obtained in the first part of the study in teaching about solid urban waste management.

The teaching methodology was oriented as project work and included oral discussion of ideas and results, group work, analysis of bibliography, experimental work, and construction of mind maps and finally the use of a questionnaire to evaluate student's learning and appreciation of the experience.

Action/research was the methodology used by the teacher to evaluate the process of teaching and learning all along, so that changes could be incorporated if needed.



## 5. Conclusions

- 5.1 The research results obtained by the teacher were valuable and were incorporated in the results of the research laboratory.
- 5.2 The development of a strategy based on project work and experimental work related to a theme relevant to ordinary life motivated students to learn. Students referred they enjoyed the experience and especially constructing mind maps and doing experimental work.
- 5.3. It was possible to conclude, generically, that there was a significant learning progress made by students in subjects like solid urban waste, solid urban waste management, reducing, reusing, recycling, composting, incineration, sanitary landfill (materials used in its construction – function of geotextiles and geomembranes, where they should be placed, what happens to solid urban waste in them, and how the space can be used after they are sealed).
- 5.4. According to the teacher/researcher's reflection she increased content knowledge, improved her confidence and innovation in science teaching, and developed skills that allowed her to propose activities for the development of experimental work that created opportunities to the development of scientific inquiry skills.

## Bibliography

- (1) National science education Standards, Washington, National academy Press, 1996.
- (2) Radford, D. L., 1997, Transferring theory into practice: a model for professional development for science education. *Journal of Research in Science Teaching*, Vol. 35, No. 1, pp 73-88.
- (3) Westerlund, J. F. et al, 2002, Summer scientific research for teachers: the experience and its effects. *Journal of Science Teacher Education*, Vol. 13, No.1, pp 63-83.
- (4) Gosselin, D., Levy, R. and Bonnstetter, R., 2003, Using earth science research projects to develop coloration between scientists at a research university and K-12 educators: insights for future. *Journal of Geoscience Education*, Vol. 51, No. 1, pp 114-120
- (5) Buck, P., 2003, Authentic research experiences for Nevada high school teachers and students. *Journal of Geoscience Education*, Vol. 51, No. 1, pp 48-53.