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ORIGINAL ARTICLE

DEVELOPMENT OF TEACHING MATERIALS FOR CLASSES OF EXPERIMENTAL CHEMISTRY IN A PUBLIC UNIVERSITY OF AMAZONAS, BRAZIL

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Abstract:

The teaching of disciplines of Chemistry must be related to experimental activities, for which the learning by the students can be more effective. In this study, we aimed to the planning of experimental activities enriching the knowledge about the nature of science chemistry for the degree courses and bachelor's degree in chemistry and other higher education courses offered by the Federal University of Amazonas (UFAM), seeking the development of models of classroom practices through the preparation of manuals of lab to facilitate relate concepts acquired in the classroom to the laboratory practice and that the experiments were of easy implementation, without disregarding their didactic value. As methodologies used were made bibliographic surveys to draw up the new manuals respecting the specificity of menus for each of the disciplines.

KEY WORDS:

experimental classes, lab activities, course of chemistry.

INTRODUCTION

The story notes that the use of chemical knowledge comes from time immemorial, in more different civilizations, many "processes and technologies" were associated with the chemistry as we know it today (CHASSOT, 1995). At the beginning of the 19th century, D. João VI arrived in Brazil bringing materials related to science, as well as people with skills in the handling of these. In view of this, the first scientific institutions in the country. The large quantity of permits, decrees, laws, decisions, resolutions and kingly letter issued by D. João VI gave strong contribution to the advancement of science in the country, once again demonstrating that the science would be justified only if socially if, instead of being purely speculative and theoretical, had immediate practical applications, both to the increase in the wealth of the state as well as for the improvement of living and working conditions (SANTOS, 2004).

The chemical has been and always will be a science of character very experimental, however the reality of the courses of high school, and some Brazilian universities, shows disregard with respect to experiential activities. In practice the lab activities are almost always relegated to a background, often courses are purely theoretical, or better, based on Books (FARIAS, 2004). It is known that in the whole

course of chemistry, experiential activities related to theory arouse the interest of students , because they help to focus the attention on behaviors and properties of chemical substances and help, also, the development of knowledge, awareness, as well as the motivation of the students (ARROIO et al., 2006).

It is, sometimes, in teaching, the adoption of inappropriate methodologies, such as, use of laboratory classes to develop only skills to observe, measure, compare, annotate and draw conclusions; giving emphasis exclusively the product of scientific knowledge; and displaying an image of scientists as being endowed with superior intelligence, working alone in the production of a knowledge considered as absolute truth (LOBO & MORADILLO, 2003). This seems to be associated with the naturalness with which are assumed experimental activities, which are difficult to implement, in view of the reality of our laboratories (of devastation) within the Brazilian universities. However, for which the knowledge can be effectively acquired, it is essential that each practice become true project of scientific research, and not merely the mechanical repetition of experimental procedures, as normally occurs (GALIAZZI; GONÇALVES, 2004).

In this sense, the present work has proposed the production of didactic material, with the purpose of being used in experimental disciplines, respecting the specificity of its menus, offered by courses and chemistry of Federal University of Amazonas (UFAM).

DEVELOPMENT

For the implementation of this project were selected two students scholarship recipients of the degree course in chemistry through the Institutional Program of Scholarships to Extension (PIBEX) maintained by the vice deanship of extension and internalization of the Federal University of Amazonas (PROEXTI/UFAM), which operated in the project by two years. The teachers helped in the review of the literature search, in the selection and planning of experiments. Some experiments were tested in order to evaluate the viability of same and the reproducibility of the results, where issues such as cost, dangerousness, treatment of reagents and products were taken into account.

In addition to the manuals prepared for the experimental disciplines, it was still a manual enlightening regarding the safety and good laboratory practice. For the preparation of manuals proposed was done a bibliographic survey of chemical experiments taking into consideration the specificities of the menu of the disciplines by area: General, Inorganic, Physical-Chemical, Analytical, and Organic. It took into account as point of departure the experiments adopted in the department over the years, which were also tested and adapted

It was also a source of concern that the experiments were of easy implementation, however without disregarding their didactic value and which could be selected to suit the chemical laboratories of the Federal University of Amazonas (UFAM). The project also exercised the role of aid in the feasibility of new experiments, being proposed to the Department to purchase new materials and reagents. In this case, greater emphasis was given to the discipline of General Chemistry Experimental, justified by the fact that subsidize the majority of the disciplines of other courses, providing tools for the subsequent disciplines, since it provides an initial training on the fundamental principles of chemistry, essential for the understanding of content of the disciplines of inorganic chemistry, analytical, physical-chemical and organic. In addition, experiential activities developed in this discipline can help in the development of basic skills needed to work in the laboratory (ALVES FILHO, 2000). After the bibliographical review and obedience to the criteria already mentioned, were proposed manuals, respecting the content sequence established in theoretical disciplines.

RESULTS AND DISCUSSION

In General Chemistry topics basic techniques of laboratory and qualitative and quantitative aspects of chemical reactions, in addition to security concepts and introduction to the treatment of experimental data. In Inorganic Chemistry emphasis gives in macroscopic properties related to the electronic structure of atoms and related compounds, as well as aspects of the chemistry of coordination. In Physico-Chemical experiments are based on applications in chemical thermodynamics, chemical equilibrium, colligative properties and kinetics of chemical reactions, being offered an approach to the treatment of errors and methods of least squares. In Organic Chemistry are discussed methods of purification and separation of organic compounds, physical methods of identification of these compounds, modern syntheses of organic compounds and reactions of polymerization and saponification. Finally, in Biological Chemistry, we have the introduction to the practice of biochemistry, study of pH and buffers applied biochemistry, spectrophotometry, chromatography, electrophoresis, reactions of characterization of amino acids, among others. The manuals of experimental disciplines of analytical chemistry were

developed in a previous work by professor Dr. Genilson Pereira Santana (Santana & Souza, 2004).

Figure 1. Experiments being tested.

There was a need to standardize all manuals prepared for both was drawn up a standard in accordance with the guidelines of the department of chemistry at the UFAM. The project was completed with the printed manuals. This was only possible due to the financial support of the pro-rector's office of extension and internalization of the same university. With the production of manuals of chemistry laboratory, it is expected the improvement in experimental classes of chemistry at the Federal University of Amazonas, these manuals will be available for teachers to serve as support for their experimental classes.

FINAL CONSIDERATIONS

The production of manuals for the practical classes of different experimental disciplines of degree courses and bachelor's degree in chemistry, as well as for the other classes in experimental chemistry, have led to a greater standardization in these classes, even when taught by different teachers. it was also possible to allow teachers a source for experiments appropriate to each discipline relating theory and practice to promote students a scientific knowledge. However, these manuals, which have been drawn up taking into account the necessary content for training of chemical and, as already mentioned, respecting the specificity of menus of each discipline, may not be considered an end in itself and the teachers altar servers have the freedom to modify them As the need for each class, with the aim of achieving better results in the students' learning.

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