The Secondary chemistry teaching in Brasil

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Abstract

There is no doubt about the importance of Chemistry in current technological society. As a central science in technological processes, the chemistry level development is a fundamental indicative of a country economic relations. At the same time, and paradoxically, its study by new generations has become increasingly devoid of meaning. In Brazil the problems of chemistry teaching, pointed out by numerous researchers, are varied in nature, among them: (i) political and economic issues that determine how small is invested in education; (ii) lack of own goals; (iii) inadequate content selection; (iv) misguided visions of science in educational processes, and very especially; (v) issues associated to teacher training and related to the quality of educational aspects in initial training courses and to the necessary quantity to meet the country's demands. In addition to the problems mentioned, exists in Brazil a community of researchers in Chemical Education for nearly 40 years that has been strengthening this scientific research field with the political commitment to a relevant chemistry teaching to students and to the country. This community has created specific forums of socialization and validation of scientific production, producing quality instructional material and developing educational projects and publishing books and periodicals. This article intends to expose these chemistry teaching specificities in secondary school in Brazil in order to contribute to the improvement of teaching in the context of the country educational policy.

Key words: Chemistry Teaching, Secondary Education, Teacher Training.

The teaching of chemistry in secondary education in Brazil

When speaking in high school chemistry teaching in Brazil it is important, in the first place, to situate the education in a wide context of social-political character which, historically, shows: 1) lack of investment in education which can be seen poor physical conditions of the schools (lack of adequate laboratories and libraries), 2) the non valorization of teaching reflected in basic education teachers low wages (the high school teachers monthly wage is US $ 690.00) and yet there are many Brazilian States that do not fulfil this determination claiming lack of budgetary resources), 3) the non valorization of teacher training courses in the universities themselves. It is important to highlight that by the law named Diretrizes e Bases da Educação Nacional-LDB, 1996 [1], the high school teachers should be trained in universities or colleges. This means, for example, that in the same university/college course can be trained professionals for the technical area, academic research and to be teachers. The teachers usually are the less valued by their colleagues, 4) the lack of own goals given by the conditions of this level of education. Here it is worth to emphasize that less than 50% of young people between 13 and 17 years in Brazil is in high school [7].

Specifically about the chemical contents, the programs have been characterized by excess contents and classifications, which promotes the memorization and the repetition of exercises that contribute little to the understanding of the phenomena and the cognitive/intellectual development of students. At the same time a naive vision of science not linked to political, ethical e environmental issues is transmitted, which leads to a decontextualised education and the experimentation, when it happens, is merely illustrative.

Which chemistry teaching is advocated in this article? Aware of the central role of chemical science in contemporary society, we advocate the study of this knowledge field in high school, as part of a school that needs to break up with the situation so far presented. We advocate in favor of a chemistry education

that contributes to a wide students training, which allows the insertion of this students in the world of work in a critical and participatory way and also enables further studies. Within the framework of these objectives it is necessary to understand the development of the chemistry teaching in Brazil. Chemistry appears in the secondary education curriculum in Brazil in 1925 and until the 1970 decade it had a descriptive and "memorized" character. Only in the late 1970 some researchers began to discuss the teaching of chemistry, it appears the first papers and it began to form a new field of knowledge in the country: the research in Didactics of the Sciences [2].

In 1982 it took place at the University of Campinas (UNICAMP), the first national meeting of chemistry teaching (ENEQ). Since then this event brings together, every two years, teachers, researchers, graduate and undergraduate students. In 1988 it was created the Educational Division of the Brazilian Chemical Society (SBQ) and in 1999 the National Curricular Parameters for High School (PCN) was elaborated. This PCN synthesized the educators community discussions and proposals. Nevertheless there is another aspect that needs to be pointed out: there is a particular problem in Brazil which is the teachers training. Unlike many Hispanic American countries and for reasons linked to the history of education in the country, specifically the history of Brazilian universities, the first teacher training courses was created late in the 1930 and until 1965 there were only 13 training courses for Chemistry teachers [3].

In the 1970 Decade, to solve this problem, the Federal Government created short courses that were criticized by the academic community. The 1980s was a Decade full of criticism and within the 1996 LDB it was instituted for the first time in Brazil's history the training of high school teachers in undergraduate courses, namely at the universities. The LDB requires full training at a undergraduate course level to the exercise of teaching profession at the high school level and because of this, since 1996 the number of teaching training courses has increased by 10 to 12 times, but until this moment the law can not be accomplished and there is a deficit of more than 200,000 Science (Chemistry, Physics, Biology) teachers in Brazil. In the State of Goiás, which is where the authors of this article work, only 15% of teachers who teach Chemistry classes, are trained in Chemistry [4].

It is important to say that because of the really low salaries even if the numbers of training teacher courses increases, when the teachers are formed they seek other activities more attractive than teaching.

From 2007/2008 onwards, the Federal university network was expanded through the Program for the Restructuring and Expanding of Federal Universities (REUNI). By 2012 it aimed to provide 267 more teacher formation courses than in 2008, as can be seen in Figure 1.

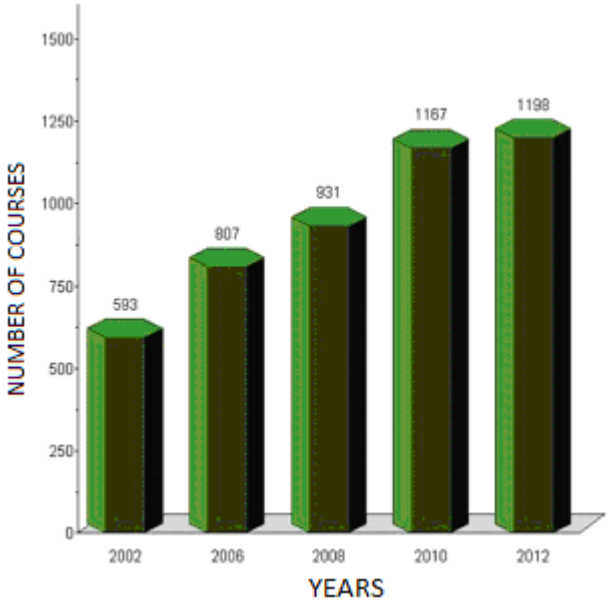

Figure 1 – REUNI - Proposals for the Expansion of teacher training courses Source: http://reuni.mec.gov.br/index.php?option=com_content&task=view&id=148&Itemid=8

In this respect, Federal Government Decree 3.462/00 encouraged the Federal Centers for Technological Education, now Federal Institutes of Education, Science and Technology (IF), to set up teacher formation courses [5]. In addition, the December 29, 2008, Law 11892 decreed that 20% of the courses set up by these institutions had to focus on teacher formation [6].
This Official decision was and remains questioned by the academic community which argues against it stating that the IF have no historic tradition in the training of teachers.

Concluding remarks

What is the current real situation in Brazil? It is possible to say that there is a community of chemists researchers/educators qualified and consolidated for more than 30 years of educational research, but it is importante to admit that the results of the surveys don't always come to the classroom neither materialize in public policy. It is also important to note that in recent years, there has been an expansion of teacher training courses. However government investment in education and teachers salaries remain low. In this way, and as pointed out at the beginning of this article, the chemistry teaching in Brazil can only be thought and questioned in the context of its complexity that involves historical, political, economical, cultural, epistemological and pedagogical aspects, among others.

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References

1. BRASIL; Lei de Diretrizes e Bases da Educação Nacional. Lei nº 9394 de 20 de dezembro de 1996.
2. SCHNETZLER, R. P. A pesquisa em ensino de química no Brasil: conquistas e perspectivas. Química Nova, 2002, n. 25, p. 14 - 24.
3. MESQUITA, N. A. S.; SOARES, M. H. F. B. Aspectos históricos dos cursos de Licenciatura em Química no Brasil nas décadas de 1930 a 1980. Química Nova, 2011, v. 34, p. 165-174.
4. DAMASCENO, D. ; GODINHO, Mariana da Silva ; SOARES, M. H. F. B. ; OLIVEIRA, Anselmo Elcana de . O Perfil da Carreira dos Docentes de Química da Rede de Ensino Pública do Estado de Goiás, Brasil: Uma Análise Multivariada. Educación Química, 2010, v. 21, p. 246-253.
5. BRASIL; Decreto nº 3.462, de 17 de Maio de 2000.
6. BRASIL, Lei n° 11892 de 29 de Dezembro de 2008.
7. BRASIL, 2009. Pesquisa Nacional por Amostra de Domicílios - PNAD/IBGE.