



## A New Generation of Chemist Leaders for a Chemistry without Borders

On its 26<sup>th</sup> Annual Meeting, the Brazilian Chemistry Society - BCS promoted a round table entitled “Chemistry without Borders”, at which we raised several reflections we would like to share with the JBCS readers.

Despite many important issues still to be addressed, it is reasonable to say that the research in chemistry in Brazil is developing fairly well. So, let's put our research papers aside for a moment since, to conceive a “chemistry without borders”, we have to get rid of our academic mental frontiers.

Chemistry is a central science, but the chemistry professionals we have formed are, generally speaking, peripheral. Chemistry has not been attractive either as a science or a professional path.

Why do chemistry and chemists have such a faint image in society? Even worse is the association of chemistry with pollution, drugs and negative aspects of development. But chemistry can be a very interesting, beautiful and attractive science. This face, however, is not shown to the public in general. Even we, researchers, with wonderful and exciting projects with great impact in the chemistry frontier, fail to communicate and enchant the general public.

What does a chemist do exactly? Very often, even we, university chemistry professors, are not able to answer that in a simple and convincing way. Our role in the world is not clear even for ourselves. We are in a chronically identity crisis, which is certainly felt by our students, especially at the end of their course. For these and other reasons, we feel that many of our chemistry undergraduates have a fragile self-esteem.

How many teenagers are interested in chemistry? How many would see a career and a future in chemistry? How many of them “hate” chemistry?

A symptom of these feelings is the relatively fewer candidates for chemistry courses compared to chemical engineering, a related career.

It is our duty to change this image of chemistry in the society. When it starts changing, a virtuous cycle will be established and chemistry will be valued and repositioned in the world.

Based on several discussions we have been having on this issue, it seems to us that two chemistry professionals play a decisive role to build up the image of chemistry in the society: the high school chemistry teachers and the chemistry professionals who work for the private sector.

High school chemistry teachers are the driving force towards a major change of the chemistry image and the young people's interest for this science. But, not rarely, we tend to neglect the students interested in the teaching career.

The majority of high school students who decide for a chemistry career do so out of a high influence from their teachers. No doubt high school teachers are the most influential leaders to change the perception about chemistry in our society, for the best and for the worst. That is why we should give our future high school teachers special attention and demand from the Government better salaries and working conditions.

Another very important professional is the chemist entrepreneur with a leader profile who will be the decision taker in companies or organizations. The market evolution has made companies seek for professionals with skills that go much beyond the technical knowledge, that is, professionals capable of solving problems, managing people and innovating. Companies are looking for leaders.

Against this trend, in general, we are forming “employee-mind” chemists who will likely perform as mere technicians. The chemistry courses have apparently been unable to understand market evolution and show limited capacity to produce talented professionals to occupy leading positions, both in the public and the private sectors. Nowadays chemistry knowledge alone is not enough!

Chemistry is an intrinsically introspective science as it deals with abstract mental models (electrons, atoms, molecules). Consequently, during the chemistry course, we tend to get immersed in this imaginary mental world of models and apart from the “real thing” and its issues. We have to make an effort to (re)connect the students to the competitive market and industries of a complex modern world and prepare them to become modern and multiqualified professionals. However, how to do so if the great majority of our university professors rarely interacts with the industrial sector or is aware of the intricacies of that world?

Our chemists are a mirror for chemistry in our society. The lack of outstanding chemistry professionals in society ends up generating the fainted and distorted image mentioned before. The very limited presence of chemists in leadership and decision-taking positions also limits the opportunities of jobs and businesses in chemistry. We have to form a new generation of entrepreneurs to set up chemistry technology companies, provide jobs for our chemists, generate wealth, and very important, to be good examples of what chemistry can do for the world.

Rethinking and changing the profile of our undergraduates will result in much more competent and competitive professionals in chemistry. Such strategically rethinking is not easy. We should look beyond the borders of our academy and break some of the frontiers. In a way, we should reinvent ourselves.

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