

# How to teach Chemistry? Is Chemistry a new universal language?

María del Mar López Guerrero<sup>(1)</sup>, Gema López Guerrero.

<sup>(1)</sup> *University of Malaga, Faculty of Science, Department of Analytical Chemistry  
Spain*

*mmlopez@uma.es; +34952137395*

**1. Introduction** — Chemistry has been developed greatly throughout the 20th century. Chemistry is included in the curriculum of elementary and secondary education. In general, students are not interested in science, and because of this, students tend not to make an effort to learn and understand the meaning of concepts and the chemistry language that are being taught to them. If we consider that there is a little bit analogy between chemistry and foreign languages, we should learn the symbols of the Periodic Table as symbols of an alphabet. The first knowledge that one needs to know when we are learning a second language is the new symbols of our new alphabet. It is necessary to learn more than 103 symbols, the chemical alphabet. After that, the students are ready to begin the formation of chemical words. In this case, learning the compounds names is easier when only two elements are involved, but when there are more than two, the chemical language is more complex.

The proposal of this study is intended to design and implement a teaching strategy for teaching and learning the chemical language, first of all the chemical alphabet, the Periodic Table and then, the language which it is built the chemistry. For this proposal, we will use some multimedia application (Information and Communication Technologies (ITC)), which consists in an interactive periodic table. Students will be able to push one element and they will be able to see the properties of this element and which other element will be able to combine with it, and furthermore, if this element will be able to combine with itself. When they know properly the simple language, they will be able to continue studying more complex words, in this case, the reactions. With this multimedia application, the students will be able to watch how the atoms will change, one atom changes to a new atom during a whole reaction. And finally, they will be able to watch how these new atoms have new properties, and they combine each one. With this Periodic Table, the students learn chemical formulas and equations.

**2. Experimental** - This study was created as a descriptive study in which the survey technique was used. The study was carried out during the course 2013/14. The sample consisted of 35 volunteer students from two different classes, at the first course of Mechanical Engineer degree at University of Málaga. But the vast majority of them were there, they did not love chemistry. Each student made one questionnaire about the utility of our multimedia application. The scale of the test was a five point Likert type scale with a range of five options. The positive items range from 1= Certainly Agree to 5 = Certainly Disagree.

**3. Results and Discussion** - Mostly the average of these statements showed an overall positive response statements. The majority of the each student average of the response statements shown are positive, more than 2.5.

After this study, we studied if there was some difference between the two groups studied and it can be seen that the mean and the standard deviation for the different variables according to the two investigated groups demonstrated that there was no significant difference in the level of interest or utility that they give to the multimedia application.

**4. Conclusions** - The results of this study are based on a survey purpose after the use of an interactive application in order to improve the learning process of the chemistry language. This information is valuable since students could watch these animations on a computer. This is based on the cognitive theory of multimedia learning, which assumes that learners process information through a dual coding capability involving an auditory/verbal channel and a visual/pictorial channel. Nevertheless, the vast majority of students recognize that chemistry knowledge is useful to interpret aspect of their everyday life, but not many of them express their wish to continue chemistry studies.

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