

The use of simulations and videos in order to improve the learning of REDOX reactions in Engineering Degrees

Abstract:

Many students from secondary schools to universities in many countries struggle to learn chemistry and many do not succeed. Many high school and university students experience difficulties with fundamental ideas in chemistry [1]. Despite the importance of the foundation of chemistry, most students emerge from introductory courses with very limited understanding of the subject [2]. Chemistry had been regarded as a difficult subject for students by many researchers, teachers and science educators [3-4] because of the abstract nature of many chemical concepts, teaching styles applied in class, lack of teaching aids and the difficulty of the language of chemistry.

Information and communication technologies (ICT) have fundamentally changed the practices and procedures of teaching Chemistry at University Degrees. In general, the use of ICT in education lends itself to more student-centred learning settings. Furthermore, and due to the fact that the globalization is becoming more and more important, the role of ICT in education is becoming more and more essential.

The presence of ICT in the interactive educational environment can help to develop thinking skills and make classrooms an environment for educational growth. ICT also helps students to develop new thinking skills which may transfer to different situations which may require analysis and comprehension skills, and consequently critical skill development.

ICT has become an increasingly popular technological tool within an educational context. Even though, the potential of ITC use in increasing student interactivity and collaboration has been explored by many educators, the research conducted on the effectiveness of these tools use in an educational context is still quite limited.

In this work a study to investigate the use of ICT in the teaching and learning of Chemistry at Malaga University was conducted between 2015/16. The study participants were two classrooms of the 1^o level of Mechanical Engineering Degree.

In the present work, a positive attitude towards learning has been accompanied by a motivated behaviour. This could be seen as the use of the simulation and some videos (ICT).

The present study investigated whether computer assisted instruction, simulation and videos were more effective than face-to-face instruction in increasing student success in chemistry. This study aims to investigate the effectiveness ICT as an educational tool in an undergraduate course for students.

The results of the Mechanical Engineering Degree study is based on surveys purpose after the use of an interactive application and videos in order to know, if they think the use of these ITC have improved their learning process.

On average, the students find the use and application useful, overall because they are able to transfer from macroscopic level to microscopic or/ and symbolic level. Several concepts and conceptual relations covered in the chemistry or science courses were provided in a concrete way, the help of computer simulations improved the student success significantly.

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