

# **ATTRACT THE STUDENTS' INTEREST WITH THE USE OF VIDEOS FOR THE TEACHING OF THE “ACIDS–BASES–SALTS” MODULE**

*Digest of paper<sup>1</sup>*

**Thysiadou A.<sup>1,\*</sup>, Solomanidou A.<sup>2</sup>, Christoforidis S.<sup>3</sup>**

*<sup>1</sup>Petroleum and Mechanical Engineering Department,  
Eastern Macedonia and Thrace Institute of Technology  
e-mail:thysiadou@hotmail.com*

*<sup>2</sup>Department of Chemistry, Laboratory of Physical Chemistry,  
Aristotle University of Thessaloniki  
e-mail:aggelina1984@hotmail.com*

*<sup>3</sup>Manager of Department ICT of Library of Technological Education Institute of  
Eastern Macedonia and Thrace, Kavala  
e-mail:sofo@teiemt.gr  
Greece*

**Abstract:** In the teaching of physical sciences, computers are a means of achieving educational goals. In this paper, a proposal is presented for the teaching of the chemistry module of “Acids-Bases-Salts” with the contribution of video recorded educational experiments. The visualization of phenomena is a useful tool in the hands of professors so that students are able to understand abstract and symbolic concepts about this specific subject matter.

**Key words:** acids, bases, educational videos, hot potatoes, salts.

## **1. INTRODUCTION**

In the teaching of physical sciences, computers can contribute in their own unique way to the more effective and at the same time a deeper understanding of both the laws as well as the principles governing the different phenomena, especially the chemical phenomena. Useful activities, when concerning teaching, are both the simulation of real situations as well as the modelling of different phenomena.

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<sup>1</sup> The full paper is proposed for including in the IEEE Xplore Digital Library

According to Cope-Kalantzis [1-3] the sovereignty of digital media raises the issue of literacy into new terms. Especially in the case of professors whose digital literacy has been a key issue over the last two decades, the ability to process elementary a video is essential [4].

In order to succeed in that, the professor must enlist and successfully utilize the potential offered by new technologies, which are particularly dear to the students due to the games and more generally, to the wide entertainment they offer. Although, for anything that concerns new technologies to achieve the purpose of its creation, it must be simple, understandable, accessible and easy in its use.

The Hot potatoes software is an open source software program that provides the ability to create exercises of various forms for use on the personal computer of the concerned user, or via the Internet, even on a computer network. The program is available free of charge (freeware) for educational purposes and falls under the rules of intellectual property of the Research and Development team of the University of Victoria Humanities Computing and Media Centre. This way, even though the student works "on his/her own", he/she literally works in exercises that are structured in advance by his/her professor, exclusively for the audience they are addressing. The student is therefore guided without obvious guidance, step by step, to exercises with increasing degree of difficulty, which can be repeated as many times as he/she wishes in order to achieve the teaching goals of each subunit.

This particularity of the freedom of movement offered by this software and at the same time the underlying guidance that the exercises imply gives the advantage of contentment. Because of the fact that it is permissible to achieve a goal, through the student's personal effort, his/her self-esteem increases. These characteristics are in complete accord with the basic profile of "Alternative Didactics. Proposals for a transition from the didactics of the object to the didactics of the active subject", which when concerning the student seeks to take into account the questions and interests of students, to harmonize teaching with their diversity and to promote the intellectual adulthood and responsibility in the school environment [5].

The main goal of this work is the creation of the video recorded educational experiments on the thematic module "Acids-Bases-Salts" derives from the fact that students during the teaching of this module find it difficult to distinguish acids from bases, especially when there is no hydroxyl in the basic compounds. Acids face some difficulties in their nomenclature due to the fact that there are both oxygenated and non-oxygenated. Another confusing point is to understand, which is the acid or base reaction from which the salts have been produced. Furthermore, there is difficulty in the distinction between the concepts of alkalimetry and oximetry and in finding the equivalent point because in most schools experiments are not performed. In that way, the opportunity is provided to both students and professors to understand the basic concepts of acids, bases and salts, responding to modern pedagogical- teaching requirements as well as technological developments.

## 2. METHODS

The effectiveness of the experiment for the promotion of the understanding of the concepts in the teaching and learning of chemistry is unquestionable. However, in some cases, it is advisable to video record the professor's experiments in order to save time and to avoid accidents for both the professor and the students in the science laboratory. In this study, a series of video recorded demonstration experiments with text, images and sound is proposed and presented with the help of the computer. These experiments show step-by-step procedures for the implementation of the experiment.

For the experiments were selected simple materials of everyday use, as they are described, in order to connect the knowledge with everyday experience. Video recorded educational experiments have a catalyzing role in the approach of the experiential dimension of learning. Furthermore, the corresponding educational material was created. The starting point for the creation of the activity was the difficulty of many students, even the diligent ones, to understand the school book concepts and phenomena without their visualization.

For the creation of these experiments, no special knowledge of software is required, and the necessary technical equipment, meaning a digital video camera or a digital camera capable of capturing video for 30 seconds or more, is neither difficult to find nor uneconomic, even though it is non-existent as equipment in public schools. Moreover, these experiments can be easily be copied by means of CD-Rs and used by students to study at home - and distributed to anyone else interested. Another important advantage of the contribution of computer use is the possibility to temporarily stop the video recorded educational experiment making it possible for the professor to give the necessary explanations where necessary and then to repeat exactly the same movement. In this chapter are listed the experimental procedures that were followed when recording educational videos as well as indicative snapshots of them. The incorporation of this material is a predominant part of the teaching of the module\_“Acids-Bases-Salts”.

## 3. RESULTS AND DISCUSSION

To compare the effectiveness of the educational videos for the academic year 2017-2018, two groups of students were examined. The two groups answered the nine questions, three simples, three semi-difficults and three difficults. The first group (group 1) answered, the questions of the test without using the educational videos, while the second (group 2) answered the same questions using the educational videos. The aggregated results for the two groups are depicted in Table 1. The maximum score is 180 points. Based on the results of the group 2 there was a steady improvement in the students' performance.

Table 1. Descriptives

		N	Mean	Minimum	Maximum
Basis	1	20	19,50	0	60
	2	20	47,00	0	60
	Total	40	33,25	0	60
Acids	1	20	27,00	0	60
	2	20	36,00	0	60
	Total	40	31,50	0	60
Salts	1	20	29,00	0	60
	2	20	44,50	10	60
	Total	40	36,75	0	60
Total	1	20	75,50	20	150
	2	20	127,50	50	180
	Total	40	101,50	20	180

The development of the theoretical material that frames the specific thematic module of “Acids-Bases–Salts” was based on the Chemistry curriculum, of the Sciences Orientation Group, of the third grade of Lyceum.

The complexity of the subject makes particularly important the educational presentation through specialized digital educational videos, aiming at achieving the educational goals and contributing to the more efficient functioning of the teaching process. Many of the experiments present suitable material for the demonstration of chemical phenomena in the context of scientific demonstrations or experiments that surprise and delight.

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