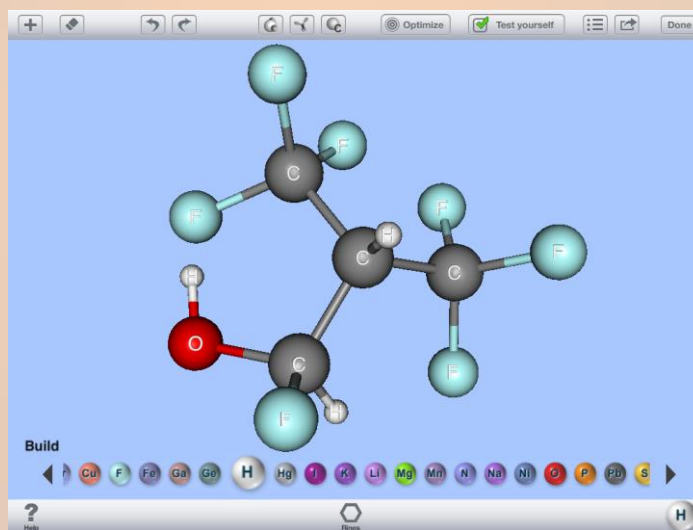


SUCCESSFUL EXPERIENCES USING IPAD AS A CHEMISTRY LEARNING TOOL



Antonio Jesús Torres Gil.
CECE. Spain.

Introduction

- In last years, crisis on science education has led to an increase in the use and research on ICTs.
- Most experts agree with the implementation of ICT in Science Teaching which develops intellectual skills and help teachers training.
- Mobile technologies in the classroom (iPad and tablets) allows the use of educational tools everywhere and every time.
- Some methodologies, as PBLs (Project Based Learning) and collaborative learning, are increased its efficiency with the ICT resources.

Using IPad in Chemistry lessons

Work environment description



- Our school: a secondary school placed in Granada, Spain.
- Our students use iPads in classroom since 2013 at 1st and 2nd levels of Upgrade School (16-18 year-old students).
- I will describe two activities using Ipad developed with a 35 students' group from 1st course of Upgrade School in the subject "Physics and Chemistry".
- I will show the evaluation of one of the two activities.

Using iPad in Chemistry lessons

Working with a molecular visualization app.

- The app that students worked with is called *3D Molecules Edit&Drill*. With it you can create organic and inorganic molecules and visualize its 3D structure.



Metodology:

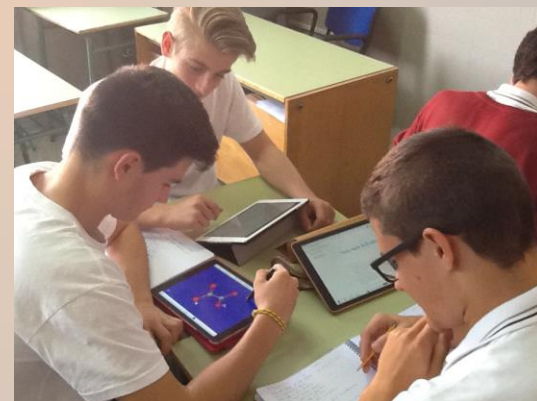
- This activity was carried out at the end of the didactic unit about organic chemistry and carbon compounds.
- Small groups with 3-4 students elaborated models in 3D of organic molecules based on their previous knowledge and their designs were uploaded in a shared folder in Google Drive.
- The students shared their models, discussed the weak points and made changes in the data collected on the folder.

Using iPad in Chemistry lessons

Working with a molecular visualization app.

Results:

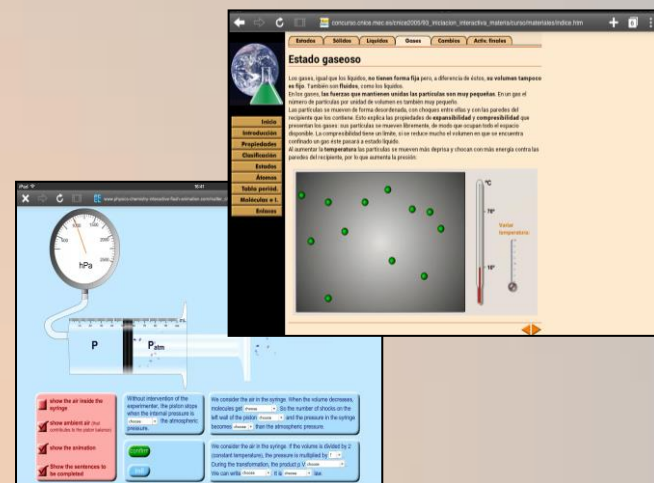
- It was possible to collect 3D models from 130 molecules (39 hydrocarbons, 71 oxygen-containing hydrocarbons and 20 nitrogenous hydrocarbons).
- 70% of the pupils who participated had positive marks in this activity
- This activity was positively assessed by 80% of students and the experience was qualified as “motivating”.



Using iPad in Chemistry lessons

Working with online simulators.

Our students worked with three online simulators designed in Flash about the kinetic theory and the early gas laws (Boyle's Law, Charles' Law and Gay-Lussac's Law).



Methodology:

- The didactic approach applied during the didactic unit was a traditional approach except in the contents about kinetic theory and early gas laws.
- The first and second applications was used instead of textbooks during the explanation of the contents about the kinetic theory and early gas laws.
- It was applied in two steps: 1) reading and visualization and 2) group discussion to share the most relevant aspects.
- The third application was used during a virtual laboratory session with small groups of 3-4 students.
- To evaluate the effectiveness of this methodology based on ICT applications, we set an exam and compared the results of both methodologies (traditional and ICT).

Using Ipad in Chemistry lessons

Working with a molecular visualization app.

		ICT question			Total
		A	B	C	
Control question	A	8 (22,86%)	5 (14,29%)	1 (2,86%)	14 (40%)
	B	3 (8,57%)	5 (14,29%)	4 (11,43%)	12 (34,29%)
	C	4 (11,43%)	3 (8,57%)	2 (5,71%)	9 (25,71%)
Total		15 (42,86%)	13 (37,14%)	7 (20%)	

Evaluation Results:

- We marked a control question (traditional approach) and a similar ICT question (new methodology) to compare them.
- We divided question results in A (good made), B(acceptable), C(wrong).
- Number of answers qualified with A and B for the ICT question is higher (80%) than control question (74,29%).
- Students with AA are about 22,86% (full agreement), while the pupils with AC and CA taken together account for 14,28 % (low agreement).

Conclusions

- The introduction of iPad in science teaching, allows to work in small groups, facilitates the exchange of data and discussion environment.
- New technologies applied in the Science Classroom, can increase students' motivation.
- Our students obtained higher qualifications with the methodological approach based on ICT than traditional teaching approach.
- Improvement of meaningful learning is helped by a non traditional teaching approaches and ICT resources applied together.

**Thank you for your attention.
Grazie per l'attenzione.**

**ajtorresgil@agustinosgranada.es
ajtorresgil@gmail.com**