BLOGGING AS AN EDUCATIONAL TOOL IN CHEMISTRY: WHY IT WORKS FOR SOME STUDENTS AND DOES NOT FOR OTHERS

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Abstract

In the recent BlogAut 2006 meeting in Madrid, some discussion was fostered on the use of blogs and wikis in higher education. Actually, someone wrote that blogs and wikis have become a new form of authority; moreover, while wikis bring about a convergent discussion, blogs carry divergent discussions.

The use of blogs as an innovative, educational tool is not at all new. However, their use in Universities is indeed not very widespread. Unfortunately, the Information Society has not reached yet enough some universities: not only are (student) blogs scarcely used as an educational tool, but it is quite rare to find a blog written by University professors.

The Department of Chemistry of the University of Girona has promoted the use of blogs among Chemistry students as a tool for improving written expression and also as a means of assessing their scientific knowledge and progression within their curricula.

This communication will explain the outcome of an experience with undergraduate students of the “Computerized Chemical Methods” (CCM) course corresponding to two different academic years, and how has blogging improved their writing, expression and chemical skills.

Actually, a few number of students have continued to write regular posts in their (academic) blogs after finishing this CCM course. This has led our Department to set up a Task Group on Digital Chemical Communication and Dissemination that gathers undergraduate students, graduate students and professors, and which extends to three different Catalan universities. Such an innovation experiment will also be tackled in this communication.

Keywords

1. INTRODUCTION

Science is difficult! The language of science may be concise, but the amount of words and techniques required to understand it well is quite large. Students must spend they valuable time trying to understand equations, trying to translate a physical world into a virtual, abstract world. However, there is no science without mathematics - and that is the problem with many students. Moreover, the difficulty of studying science and chemistry is further stressed by the present Society of Interruption. The peacefulness of the past has turned into constant interruption (cell phone, e-mail, phone) in the present. Science requires concentration.

However, Information Society brings about new, interesting ways of socialization and thus learning (opposite to a negative use of the Internet like the powerpointization phenomenon). During the last years, blogs have emerged as a powerful procedure to learn, to teach and to evaluate. Blogosphere is becoming an idea-wealthy part of the Internet. It has become clear, for instance, that blogs and interactive websites may turn a potential chemistry high school student into a prospective one. Wikis are also emerging as powerful collaborative tools and promise to play an important role in the future of learning.
This communication reports our recent experience on the use of blogs in a first-year classroom of Chemistry Studies at the University of Girona. Despite of the difficulties we found, there are also some successes, which help us to continue fostering the intelligent use of Information Technology in Higher Education.

2. BLOGGING AS AN EDUCATIONAL TOOL

2.1 Two key ideas

There are two main quotations which everyone should keep in mind. The fist one concerns the mission of the Educause website (http://www.educause.edu): “To advance higher education by promoting the intelligent use of information technology”.

The second one deals with the very Education - as written in plastic bags of the University of Georgia-Athens’ bookstore, "Education is not a preparation for life, it is life itself" (attributed to philosopher John Dewey).

2.2 Blogging discussed in the Cyberspace

In a recent book, Laviña and Del Rey [1] have reported the use of Information Technologies in the management of Spanish Universities. They provide a useful insight into the use of all possibilities of IT and the differences in their use among Universities.

Nowadays, the Internet and new technologies are providing us with a wide range of facilities. The use of blogs as an innovative, educational tool is not completely new. However, during the latest years people are starting to increase their use, although blogging has not expanded enough yet. Fortunately, in the recent BlogAut 2006 meeting in Madrid [2], a lot of interesting ideas were presented about these aspects, i.e., about blogging and wikiing.

It is becoming commonplace to use blogs and wikis among students and, despite the different opinions in this field, the results seem to be very positive [3]. Sometimes it is the difficult to control the quality and relevance of the information in wikis. However, the idea of the profit which can be obtained by its permanent development and never-ending editing is quite widespread. Emphasis is placed on the need of well-organized contents and good access to search engines in wikis and blogs. It is a common thought that using wikis and blogs in education is a way of building knowledge collectively. Likewise, some authors have pointed out the idea of a wiki as a space where one can learn not only concepts but also social behaviour - although there is not a general consensus yet. Furthermore, it seems that we have to start seeing an encyclopaedia like a dynamic form of knowledge and that, while wikis bring about a convergent discussion, blogs carry divergent discussion.

Using wikis and blogs in education bring a lot of advantages. In addition, it is an easy way of creating simple websites, so this fact allows students to spend more time concentrating on the content, and not focusing merely on the container. They let them establish a feedback, because they can add information and also they can correct or change it at any time. Using new technologies increases the attention of students, as they see them as something new, fruitful and entertaining. One must say also that they probably do not realize that at the same time they learn.

Having a blog or a wiki has become a tool which allows people to be a part of a community. It is because all blogs, indeed, are linked. Some teachers have included wikis and blogs as part of their classes. The students learn when they write, when they discuss about an aspect they see differently, or when they use their teacher’s blog as a complement to the explanations.

Blogs have entered universities, too. Certainly, they are not widespread enough, because it is quite rare to find blogs written by university professors or undergraduates. Although some universities are trying to involve students in the blogging world, it seems still to be an objective in the long-term. But the benefits of being a part of this world are starting to be a reality in the educational world.

The CIDUI conference held in Barcelona in the summer of 2006 [4] brought about a few interesting communications regarding the use of blogs and wikis in the classroom. It emerged clearly that
nowadays, the relations of interchange between people and contents have suffered a transformation. It is clear that Information Technology is required in classrooms. In present Higher Education, traditional classes are no longer valid enough, and innovation must be introduced through new activities like blogs and wikis.

Maintaining a blog has some clear advantages. You can use it as a way of increasing knowledge by yourself. As a lot of points of view appear about a topic, you can use them to build up your own opinion about one aspect. It will help you to be a more critical person. You will learn how to identify the relevant and valid information. You will also learn how to organize information and you will increase your writing skills. It is easy to create one, so you can concentrate on the contents. In addition, it is free. You can bring together a lot of information about a particular subject. You will be a part of a community because all the blogs are, indeed, linked. It is a good tool to “learn how to learn”. And last but not least, you will be able to see how your thoughts and opinions have evolved and changed during the months/years.

2.3 Science Blogs

Blogging is more common in some areas that in others [5]. Indeed, writing about Science, which requires a fair use of language, concise statements, and proven facts, is far more difficult that writing an opinion about a painting or about the effect of an economic issue.

There are more Science wikis that Science blogs. Actually, the main use of Science blogs is the public awareness of Science, so people can interact somewhat with the scarce number of scientists dedicating a small part of their valuable time to Science dissemination.

Actually, Science Communication is one of the missing tasks of many University Professors. Writing a scientific paper for a top-leading research journal is not at all easy, but writing a post explaining that science to the general public is even more difficult.

2.4 EduBlogs

Educational Blogs, coined Edublogs by some programs [6], have emerged as an interesting tool to enhance the writing ability of high-school and university students, and as such are a valuable resource of knowledge.

Actually contests are held on writing Edublogs. For instance, the University of Valencia is fostering the contact with High-school students through one of such contests.

3. SOCIAL PERCEPTION OF SCIENCE AND CHEMISTRY IS NOT IMPROVING

3.1 Recent facts

“Spanish students trail OECD in mathematics, science and reading” (El País, 7/12/2004 and special issue on 13/12/2004). The PISA report [7] started many alarms in Spain's education administration - even though it also allowed to assess the quality of Spain's educational system. The main conclusion seems to be that there is not enough expenditure in education and that results are far lower than European average.

Other key articles in the daily press do not allow either to be very optimistic about the public awareness of chemistry. We would like to draw attention to only a few articles appeared in the regional newspapers: "European solution in physics and chemistry" (La Vanguardia 31/3/2005), "Science is not enjoyable" (Avui, 13/11/2004), "Scientific, classic studies lose 40% of their students" (El Periódico, 20/12/2004), "Women are not attracted much to technology" (El Periódico, 20/12/2004).

The Spanish Foundation for Science and Technology (FECyT) reported in January 2007 its Third Survey on Social Perception of Science. One of its main conclusions was that the interest in science news is quite low, much below other interests like economy, sports, etc. Moreover, most surveyed people state that their scientific formation was not enough, even though they also say they actually do
not care very much about science news. Actually, science is not perceived as an activity which should be prioritized in budget allocation.

Furthermore, the Spanish Ministry of Education is currently fostering a change of the curriculum of compulsory High School. Starting in 2007/08, Physics and Chemistry will no longer be compulsory in the 4th (and last) year of ESO (compulsory secondary education). Thus, the stakes of a student choosing the scientific-technological itinerary in Baccalaureate (two years, non compulsory, preuniversity) will decrease, and hence the number of tentative students for Chemistry will even decrease further. We may have a problem.

3.2 Let's react!

Indeed, the presence of science in our society is steadily decreasing. Such a decreased impact brings about a lower number of students entering the last two years of high school (Baccalaureate) by registering for a scientific-technological itinerary. This lowering is further increased by the decrease in birth rate in the second part of the 80s, which translates into few 16-year old students. Moreover, more male students than female ones among those following a scientific-technical itinerary end up in technical schools, thus leading to sex-biased scientific classrooms. Thus, science in general and especially chemistry seems to proceed backward - in its prestige and also in its image among society.

In the last years the Department of Chemistry of the University of Girona has developed a series of activities to promote science in general and chemistry in particular to the Girona society, its local environment, both for secondary education and general public. Such a promotion consists of participation in the Science Week, organization of The Saturday of Chemistry, participation in Open University Day and University Research Day, a Chemistry Preuniversity Research workshop, and also in research dissemination by means of local newspapers. Furthermore, the Department of Chemistry led the initiative that conferred a Doctorate Honoris Causa to a leading Catalan chemist, with wide social feedback.

Chemistry professors at the University of Girona have been analyzing the actual reasons of this situation and try to provide some solutions. Thus, they have met a few times with high school teachers and organized different round tables, like that on "Society, Chemistry and Girona" in late 2004. These words constitute one of the slogans to communicate and disseminate science within our local territory.

It is of utmost importance that a University promotes all disciplines so they are perceived at a similar level by high school students that are entering their final two years, i.e., registering for the Baccalaureate - they must choose among a wealth of optional courses. Furthermore, it is also appealing to reach adult populations and, of course, take into account the needs of senior citizens, who request for more information and knowledge. This is actually a new goal of universities - public awareness.

The members of the working team on the secondary-higher education bridge, named by the Department of Chemistry, proposed the "Society, Chemistry and Girona" line of work to have a first phase consisting of the project "Chemistry among us: discover chemistry in Girona". Due to financial, resource and time limitations we thought initially of four actions:

- Printing appealing material on the research of the five chemical research groups in the Department of Chemistry.
- Providing promotional gifts: periodic table with chemical logos related to Girona (e.g. chemical chimney); year calendar with 12 sheets with chemical motifs and UdG material.
- Building (and especially maintaining) the website "Chemistry among us: discover chemistry in Girona" using a suitable CMS (Content Management System), later renamed "LaQuimica.Net".
- Creating a series of videos on research and chemistry with destination high school students - a series of imaginative episodes and interviews with local chemical researchers.

At present the third action is well advanced, while the first two are in the process of find proper financing, and the fourth one is waiting for proper financial sources.
The aforementioned ideas evolved later into project "LaQuimica.Net" (http://laquimica.net), which is an integral plan to disseminate chemistry, to build up relation with the surrounding Girona society, and to increase overall interaction with secondary education. We chose this name because not only actual activities are held, but also virtual activities are proposed through a suitable Content Management System via a website and the Internet.

Here are some activities held so far, during the three academic years 2003-2007:
- The Saturday of Chemistry
- Chemistry Fair
- Workshops with high school teachers
- Dissemination of chemistry through the website "LaQuimica.Net"
- High school research prizes in chemistry
- Laboratory sessions by high school class groups in department facilities
- Nano!Reacciona! Preuniversity Research Workshop

The Department of Chemistry collaborates in more general activities like UdG's Open-Access Day, tutoring of high school research works (Botet i Sisó fellowships), UdG Research Faire, or Science Week. Furthermore, new activities are planned regularly.

4. OUR CASE STUDY ON BLOGGING IN THE CLASSROOM

Known as “Computerized Chemical Methods” (Mètodes Químics Informatitzats in Catalan), characterized as an optional course, and taken at the University of Girona as part of the Chemistry degree with a length of four months, this subject not only intends that the students are introduced into the digital world, but also aims for them to learn different aspects of some programs. It consists of five ECTS credits and it is divided between practical hours and theoretical hours. Moreover, its contents are designed with the purpose of being able to include different aspects of Information Technology applied to Chemistry, all of them related, such as how to build a website, how to use some programs or how to create and edit a blog. Attendance to this course was ca. 20 students.

Blogging (using a free service in the Internet) was required for the students as a part of the course's grading. As a consequence of being an obligatory part of it, a large number of them started a blog. However, one of the most important points is to wonder how many of them have continued it and what they think about this activity and the subject in general. So, as a normal fact after doing a survey, the views are very diverse.

Regarding the students’ opinions on this course, most of them are satisfied with having done it, because they notice that they have learnt important aspects about the Internet and basic programs. Furthermore, they admit having used in other occasions the knowledge acquired during the classes. On the other hand, some students are unsatisfied, while some suggest practising more with actual chemistry applications. However, the overall balance, in general, is positive.

As far the actual editing of the blog, there has been a variety of opinions. On one hand, it is necessary to emphasize the fact that only a very few undergraduates have continued to update regularly their blogs. In addition, some of them consider that blogging has no point at all and it is useless. On the other hand, some of those who have discontinued their own blog say that they usually visit other blogs. Probably the professors have not been able to persuade students enough on the benefits and interests of building a blog.

The positive points which have been mentioned by the students in reference to this activity are, firstly, that making a blog has allowed them to improve their writing on scientific issues. Secondly, they say they have more interest now in scientific news than before, and some consider the activity as a complement to their personal education. Those who have continued the blog feel satisfied, stating they are learning a lot and point out that they are going to continue it because they like it. This notwithstanding, though, the truth is that students continuing their blog are scarce.

The negative points they find are all related. None of the students have created a new, different blog, and the main problem of its discontinuation involves the time and the effort it involves. Being students, most of them mention the fact of not having enough time to spend on maintaining the blog. Some say...
that they actually did not understand how it worked. Moreover, a few of them point out another problem - the fact of not knowing what to talk about when they have to update the blog. So, in consequence, some suggest eliminating this activity from the program of the subject.

When undergraduates were requested to start and maintain the blog, it was not required to write about a specific topic. So, as a result, different subjects emerged. A lot of students updated their blog with topics related to science or by using the information they received during the traditional classroom sessions, but some of them included personal aspects. Those who have continued blogging said they have innovated it a little bit, by making some changes or by talking about issues that differ from topics they tackled at the very beginning.

Why have only a few students continued to post on a regular basis? Perhaps not having enough time is the main reason - but sometimes this can be just an excuse. It is true that it requires time and effort, but it is well known that if you enjoy doing something, you can always find some minutes to spend on it. Some students defend discontinuing their blog by saying that it was only a part of a course, so the activity finished when the course ended. By reading this thought we can ask ourselves if the objective of the activity was reached in the case of these students. The activity was intended not only to be a part of a subject, but also to introduce students into the blogging world and to make them feel more interested in this field. In addition, it tried to offer them the possibility to improve their scientific skills.

Sometimes people have other spaces in the Internet where they can store photos or post ideas, but having a blog is different. It means becoming involved in it, being constant, and seeing it as something that can bring you a lot of profit. People might discover then how interesting and big the world of blogging is.

5. THE TASK GROUP ON DIGITAL SCIENCE COMMUNICATION: INNOCIÈNCIA

The authors of the present communication, together with other members of the Department of Chemistry of the University of Girona and the Universitat Autònoma de Barcelona, met recently to found the Digital Science Communication INNOCIÈNCIA (http://innociencia.net), whose mission is to divulgate and disseminate electronically relevant science news. In particular, the group has four main objectives:

a) Managing communication of the activity of interested Catalan Theoretical and Computational Chemistry research groups.
b) Electronic dissemination of the outcome of the Theoretical and Computational Chemistry Network in Catalonia.
c) General Digital Science Communication, in particular Simulation in Science, and relevance management.
d) Stimulation of scientific skills and contribution to positive perception of science and chemistry among society and high-school students.

Activities of this Group were started on December 2006 and are planned to steadily increase along 2007. Several projects have been presented to Educational Administrations, funding is well advanced, and hence the results are likely to be reported in future meetings.

6. CONCLUSIONS

Blogging as an educational tool in chemistry is just starting its way. The few experiences reported elsewhere so far contain mixed feelings. Our experience shares similar problems. Students do not realize yet the power of blogs and wikis as an educational tool. The problem, however, is not in the students’ perception of Information Technology, Science or Chemistry - the problem lies in the inadequate perception of the new Social Tools provided through IT by teachers and professors - actually by the very Universities.
This notwithstanding, like with all new tools, one must have hope in the future. We think that the mixed opinions of our students provide us with energy enough to repeat and extend this experience in the same course of the 2006/07 academic year, and also in other undergraduate, upper courses.

We will report the outcome of those new experiences in further publications.

7. BLOGGING IN THE CLASSROOM: LEARNING 2.0

The interesting blog CreamosElFuturo [8] in its Education section, has recently published appealing posts. In a recent entry, it comments an article entitled "Professors 2.0" [9] by Peña, Córcoles and Casado, who teach in the UOC (Universitat Oberta de Catalunya). The title (and interesting content) of this paper recalls the term "University 2.0", which has been used for some time. In the case of Spanish Higher Education System, where important, key changes are about to happen within the Bologna Process, one may be prone to consider that we are really in front of version 2.0 of the University.

Serendipity has led us to actually find category University2.0 inside Cyberspace in a PedagBlog (note: one may combine prefix Edu with suffix Blog -or other affixes- and build up new words... Edublog, ChemiBlog, EduChemiBlog, EduTube, etc.). The post therein "A day in the life of Web 2.0" is really noteworthy [10]. This post emphasizes the use of blogs and wikis in teaching and research of university personnel. One may wonder whether there are professors with version 1.0, 1.1 or 2.0. Or even more importantly, are there universities with version 2.0? Is the Bologna Process a transition from version 1.1 to version 2.0? We hope so.

8. LET'S BLOG!

Miquel Duran is a professor at the Department of Chemistry, while Laia Guillaumes is an undergraduate student formerly enrolled in the "Mètodes Químics Informatitzats" 1st-year Chemistry course. Both authors keep active blogs, namely Edunomia and ReAcClONa, respectively [11].

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