

Chapter 9

The Use of Applets in an Engineering Chemistry Course: Advantages and New Ideas

B.M. Trigo

Polytechnic School of the University of São Paulo, Brazil

G.S. Olguin

Polytechnic School of the University of São Paulo, Brazil

P.H.L.S. Matai

Polytechnic School of the University of São Paulo, Brazil

ABSTRACT

This chapter deals with the use of Applets, which are examples of software applications, combined with a specific methodology of teaching, based on Paulo Freire's education concepts. According to his methods, co-creation between its participants is fundamental for the effectiveness of learning process. In that way, to promote a cooperative learning, the Applet should have interactive features. The Chemistry course of Polytechnic School of the University of São Paulo, in which students take in the first semester of the first year of the engineering course, was the case study. First, a research with the teachers of the Chemical Engineering Department was carried out, to identify the main problems and difficulties teachers and students face. Then, a topic was selected to be explored with the Applet, which was developed and applied to a small group of students. To identify the success of this experiment a questionnaire was created and the results are presented in this chapter. Some conclusions were drawn and the interactive features of the Applet received a positive feedback.

INTRODUCTION

Since the sprouting of the personal computers, around 1980, computer science has been gaining importance, becoming a supporting instrument for other daily activities of ours. With the introduction

of computing in a certain area or activity, barriers and difficulties can be overcome. Consequently, new paradigms, possibilities and challenges are created.

In education it is not different, computing is more and more present, assisting the learning process in a variety of ways, creating new challenges

DOI: 10.4018/978-1-61520-659-9.ch009

that compel us to re-think the way education is performed, considering new delivery methods instead of only the traditional chalk-and-talk method. “While we may feel comfortable with traditional approaches, the new technologies provide us with the tools to challenge these positions, and open up the teaching/learning questions for some rethinking” (Roy & Lee, 1999).

With the sprouting of the Internet, it was created what we today understand as the web-based teaching, a method that brings innumerable benefits and challenges for the educators. There are many reasons and motivations to develop new processes of learning and teaching. One of the most important ones are:

- To provide an environment where the student can have access to the studying material and develop his learning in his own pace and in his own environment.
- To provide to the professors quality resources to improve the quality of teaching and learning.
- The increasing growth of the Internet will promote new possibilities. However, what educators must inquire themselves is how to use this new media so that its application doesn't consist, only, of a substitution of the current media.

TEACHING METHODOLOGIES AND TECHNOLOGIES IN EDUCATION

To achieve those goals, we have to understand the problems we are dealing with. Following this thought, different ways of transmitting knowledge have been searched before. According to Freire, “the communication is the relation which becomes effectuated by the co-participation of the subjects in the act of knowing. It is considered that the educative process is a particular form of communication. In the social relations among the learning subjects, a dialectic synthesis happens,

as moments of a communicative and educative process, in a given socio-cultural context, which comprehension requires considering its inter-subjective nature, or either, the active participation of the subjects of the process” (Aragão, 2004). For being a mean of communication, we cannot overlook the new communication technologies. Their development modifies, however, the education, when seen as a media. Or else, today, the formation is directly related to the way in which the professor uses the media. Paulo Freire's vision is clear in what concerns the active participation of the student in the learning process. Without this participation, the learning process becomes a reproduction of events, cases and facts, previously lived deeply by the student, what, according to Freire, can be considered a banking education. This term comes from the fact that the student becomes a “bank deposit”, where the professor “only deposits” the knowledge. Therefore, it becomes of full responsibility of the professor “to nourish” the deposit and the student only needs to absorb the maximum of what is presented to him, for future reproduction.

We know that it is not possible to present all the knowledge to a student, especially nowadays, where the barriers of the knowledge are being broken in a higher and higher speed. But what happens when this “banking student” comes across a new and challenging situation? The answer is simple: he simply cannot face this difficulty, for this knowledge has never been deposited on him. Following this line of thought, an education where the student participates actively, treading his way, seems more reasonable. Thus, a new perspective of education would be an active, interactive, dynamic education to build a better learning in spite of the traditional pedagogical approach, based on the transmission and reproduction.

“The Digital style produces, obligatorily, not only the uses of new equipment for the production and apprehension of knowledge, but also new behaviors of learning, new rationalities, new percipient stimulus” (Aragão, 2004). Many

9 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/use-applets-engineering-chemistry-course/44731

Related Content

Learning by Simulations: A New and Effective Pedagogical Approach for Science, Engineering and Technology Students in a Traditional Setting

Tukaram D. Dongale, Sarita S. Patil and Rajanish K. Kamat (2015). *International Journal of Quality Assurance in Engineering and Technology Education* (pp. 13-25).

www.irma-international.org/article/learning-by-simulations/134874

Development of Digital Game Environments Stimulating Creativity in Engineering Education

Alexander Alimov, Olga Shabalina and David C. Moffat (2019). *Handbook of Research on Engineering Education in a Global Context* (pp. 368-378).

www.irma-international.org/chapter/development-of-digital-game-environments-stimulating-creativity-in-engineering-education/210335

Proposing a Feedback System to Enhance Learning Based on Key Performance Indicators

Anders Berglund, Johannes Blackne and Niklas Jansson (2014). *International Journal of Quality Assurance in Engineering and Technology Education* (pp. 1-14).

www.irma-international.org/article/proposing-a-feedback-system-to-enhance-learning-based-on-key-performance-indicators/104665

Online Automated Essay Grading System as a Web Based Learning (WBL) Tool in Engineering Education

Siddhartha Ghosh (2010). *Web-Based Engineering Education: Critical Design and Effective Tools* (pp. 53-62).

www.irma-international.org/chapter/online-automated-essay-grading-system/44727

Spectral Algorithms for Signal Generation as Learning-Methodical Tool for Engineer Preparation

Vladimir V. Syuzev, Elena V. Smirnova, Kirill Kucherov, Vladimir Gurenko and Guren Khachatrian (2019). *Handbook of Research on Engineering Education in a Global Context* (pp. 254-272).

www.irma-international.org/chapter/spectral-algorithms-for-signal-generation-as-learning-methodical-tool-for-engineer-preparation/210325