



GLOBAL JOURNAL OF SCIENCE FRONTIER RESEARCH: E
INTERDISCIPLINARY

Volume 15 Issue 1 Version 1.0 Year 2015

Type : Double Blind Peer Reviewed International Research Journal

Publisher: Global Journals Inc. (USA)

Online ISSN: 2249-4626 & Print ISSN: 0975-5896

Modern Physics for High School Students

By Romualdo S. Silva Jr.

Federal University of Sergipe São Cristóvão - SE, Brazil

Abstract- This paper presents a brief modern physics teaching proposal for high school students, with a view to the importance of the use of experiments and simulations. With this is expected to facilitate the teaching and learning of students with respect to modern physics subject, which is not very well seen in high school, is of great importance to the education of the student. I also hope that this work will serve as an aid for teachers in order to view and teaching of modern physics in secondary level schools.

Keywords: learning, modern physics, high school.

GJSFR-E Classification : FOR Code : 020399p



Strictly as per the compliance and regulations of :



Modern Physics for High School Students

Romualdo S. Silva Jr.

Abstract- This paper presents a brief modern physics teaching proposal for high school students, with a view to the importance of the use of experiments and simulations. With this is expected to facilitate the teaching and learning of students with respect to modern physics subject, which is not very well seen in high school, is of great importance to the education of the student. I also hope that this work will serve as an aid for teachers in order to view and teaching of modern physics in secondary level schools.

Keywords: learning, modern physics, high school.

I. INTRODUCTION

After the scientific and technological advancement, Modern Physics aroused immense curiosity in the population, especially young people. This fact is related to the improvement in quality of life felt the same, arising through the use of electronic objects, and these are based on the Modern Physics.

However, modern physics teaching in high school has not kept satisfactorily this development. According to Leonel and Souza (2009) this fact is unacceptable as it undermines the scientific and technological literacy breaking the connection between physics and everyday life of the student.

Some authors such as Terrazzan and Domingui struggled and somehow inserted collections of modern physics content in high school. But the teaching and use of these materials differ from other materials, so unsatisfactorily addressed. In this regard, contained in the National Curriculum Parameters for Secondary Education (PCNEM) the following question:

You need to revisit which teach Physics to enable a better understanding of the world and the most appropriate training for citizenship. We all know that, therefore, there are no simple or unique solutions, or ready-made recipes that guarantee success. That is the question to be faced by teachers of each school, each social reality, seeking to meet the wishes and hopes of all participants in the educational process, meeting with a clear pedagogical proposal.

It is always possible, however, to signal those aspects that drive the development of education in the desired direction (BRAZIL, 2000, p. 23).

Therefore, it is important to worry about this issue, which leads us to think and innovate in the face of difficulty to enter the modern physics in high school

simply and significantly. In physics, it is natural to think that because of the complexity of certain issues, we have to break them gradually when taught to "lower" levels, and that the "higher" steps will deepen the problems and solutions thereof. In a way is idea is correct, but to a certain point of view. It is appropriate that these issues be given, not in a "higher" manner with great depth, but more simple and interesting way, what can be done, with a good methodology and effort from teachers.

However, we arrive at a situation we think of as modern physics teaching in high school with a targeted approach to meaningful learning? This is no easy task, but not impossible. I see you think of a condition related to the trial can be no doubt a major initiative to do so, it is always very easy to take students' attention when using simple and catchy experiments.

It is notable that high school students, even more current, that are fully connected to the technologies will learn better with the theoretical part of physics, which is essential if seek relationship with educational experiments, and are stimulative to learners for meaningful learning. When we talk about modern physics is impossible not to remember Albert Einstein, quantum mechanics, Schrödinger, particle physics and more. But what to say or show experiments on these subjects in high school?

You can teach through simple experiments and low cost, which are used as a methodological proposal for the Modern Physics teaching, for example: 1- emission spectrum, where you can use an old CD, a simple laser and a magnifying glass, where you can observe radiation wave as well as interference rings. 2- experiment to determine Planck constant, where you can use an LED, a pot and the meter requires a little more attention and can be observed emission band Led by determining the Planck constant. 3- experiment the photoelectric effect using a device LDR (light dependent resistor), where it depends on the light to vary the electricity that runs through it, and you can observe the photoelectric effect.

In addition to teaching experiments, an alternative is the computational resources of the Internet, which are often great teaching opportunities learning, such as computer simulations, animations or even educational games involving many particles, interactions of atoms, showing the constituents of the atom, among others.

The animations are able to refine a concept giving freedom to the visual need for us, to relate what

Author: Federal University of Sergipe/Department of Physics – São Cristóvão - SE, Brazil. e-mail: romu.fisica@gmail.com

we see with what we hear and try to understand. An animation provides freedom to the imagination, makes it more real, tangible, being able to give form to thought, being conducive to teaching and learning. A simulation is able to translate what is "impossible" to be done by words, and when it comes to modern physics, which deals with issues differentiated or difficult both for many, the simulations can reproduce what can not be done in lab. Thus, the high school student even being unable to make or understand the mathematical difficulties involved in a given experiment or phenomenon, can use computer simulation and understand significantly Physical submitted for the same.

Given the difficulty in teaching Modern Physics for high school students, it is expected that the experimental environment with simple equipment, but also the environment of computer simulations, with animations and fun games, is a way of creating own imagination and reasoning, which come from understanding the needs of modern physics teaching. It is important to note that this type of methodology to be followed to the letter, and in order to meaningful learning, on the contrary this will become just a simple fun for with students.

REFERENCES RÉFÉRENCES REFERENCIAS

1. Brasil. Ministério da Educação. Parâmetros curriculares nacionais: ensino médio. *Brasília: MEC/SEB, 2000.*
2. Domingui, L. Física moderna no Ensino Médio: com a palavra os autores dos livros didáticos do PNLEM. *Revista Brasileira de Ensino de Física*, v. 34, n. 2, 2502 (2012).
3. Leonel, A. A.; Souza, C. A. Nanociência e Nanotecnologia para o Ensino de Física Moderna e Contemporânea na perspectiva da Alfabetização Científica e Técnica. *IN: VII Encontro Nacional de Pesquisa em Educação e Ciências*. Florianópolis, 2009.
4. Maximiano, J. R.; Cardoso L.; Domingui L. Modern physics in textbooks: a counterpoint between PNLEM 2009 and PNLD 2012. *VIDYA*, v. 33, n. 1, p.97-115.
5. Terrazan, E. A. A inserção da física moderna e contemporânea no ensino de física na escola de 2º grau. *Caderno Catarinense de Ensino de Física*. Florianópolis, v. 9, n. 3, p. 209-214, dez. 1992.