

Methods Used in Romanian Schools to Increase Students' Interest in Learning Physics

Liliana-Violeta Constantin

“Elena Cuza” National College , Bucharest , Romania

E-mail: lilianaaa29@yahoo.com

Abstract. *This work presents a few of the methods that are used in Romanian schools in order to increase the students interest in learning physics.*

The methods consists in teaching , learning and evaluation.

The students work with the help of educational computer programs , real experiments , crossword puzzles and didactical movies. The evaluation is performed in modern way , the students are given tests that include various sorts of items , portfolios. They also present playworks , poetrays , drawings.

By using these methods we assure the development of numerous practical and intellectual abilities of our students.

Key words : *computer , creativity , experiment , teaching methods.*

1. Introduction

Modern education must base on creative learning and on using certain methods to make learning attractive to the student.

Therefore , within the project called “Hands on Science Network Romania” we tried to combine the traditional teaching , learning and evaluation methods with the modern ones , so as students acquire both knowledge and practical skills.

Evaluation is performed in such a manner as to avoid stress , as it happened with traditional rating methods , and to create permanent competition among students.

There is also emphasis on accomplishing interdisciplinary links as well as team work which develops students' responsibility , their receptivity to novelty and innovative behaviour , based on attempt-error , success-solution.

In the present paper we would like to emphasize a few work methods that have been tested with the students in “Elena Cuza” National College in Bucharest , Romania.

2. The use of real and virtual experiment during physics class

Society of the future will be a computerized one. That is why computer and education software are more used in schools , as they enable students to perform experiments that are difficult to carry out in laboratory , to check the solutions to various problems , or to identify the optimal conditions to perform a new experiment designed by students themselves.

The use of computer also enables students to go over provided materials in their own rhythm , to select information and to understand theory faster.

Education software allows students to get involved in learning process through differentiated approach of knowledge depending on each student's level.

Yet the use of computer may lead to a loss , in terms of practical , calculation and reality investigation skills as well as to a decay in human relationships. Moreover , education software cannot answer all unpredictable questions students might ask.

These drawbacks make it clear we cannot possibly give up live observation and lab experiments.

The students in “Elena Cuza” National College have performed both real and virtual experiments.

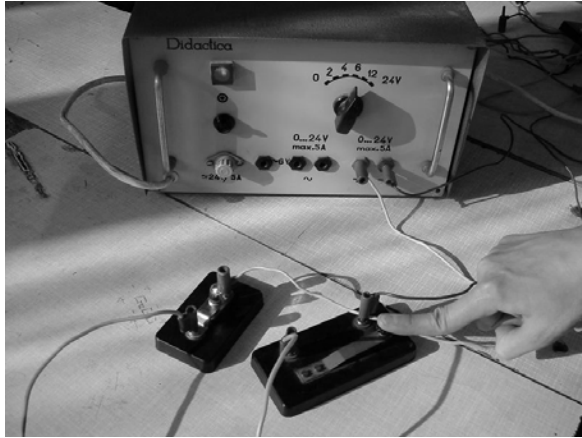


Figure 1. Real experiment-Simple electric circuit

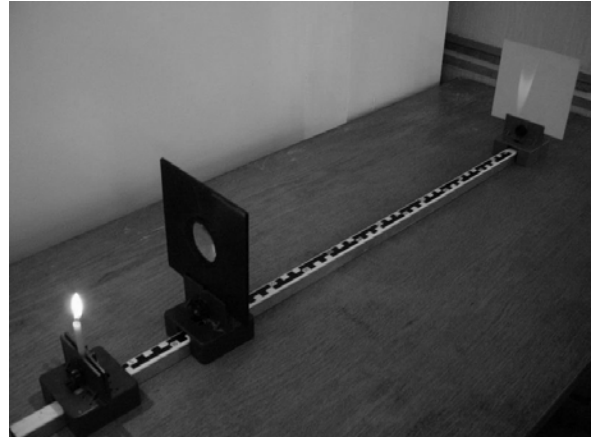


Figure 4. Real experiment-The image of an object through a lens

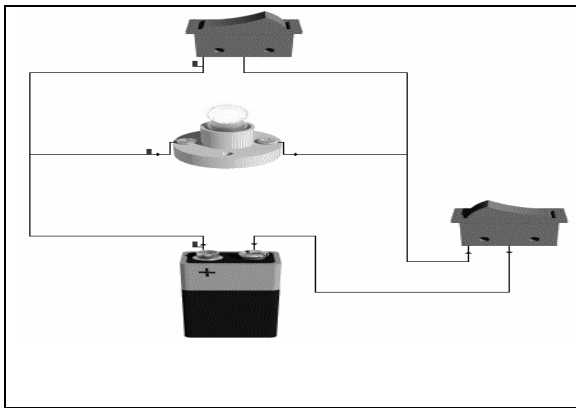


Figure 2. Virtual experiment-Simple electric circuit

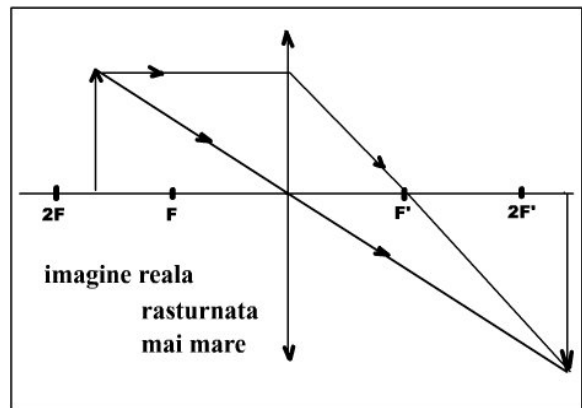


Figure 5. Virtual experiment-The image of an object through a lens

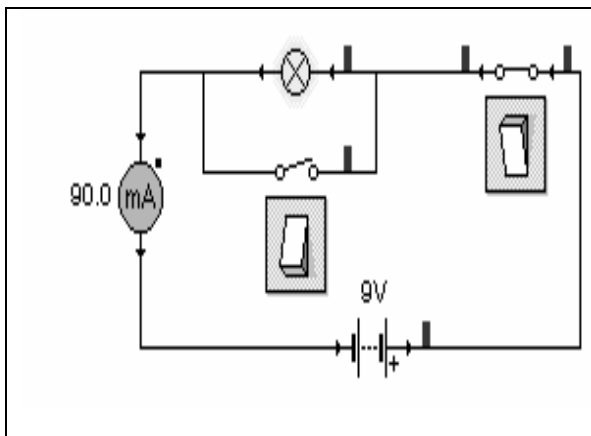


Figure 3. Virtual experiment-Simple electric circuit-symbols

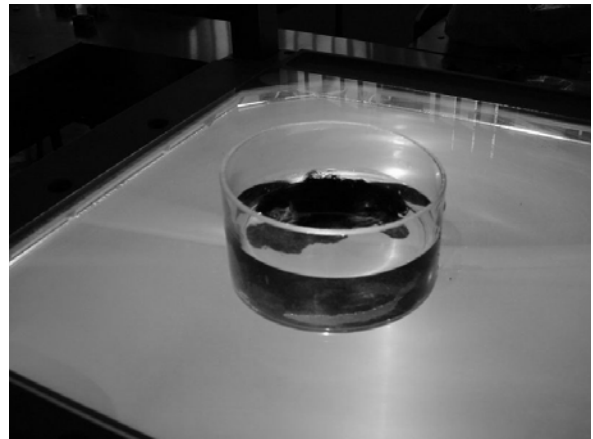


Figure 6. Real experiment-Diffusion

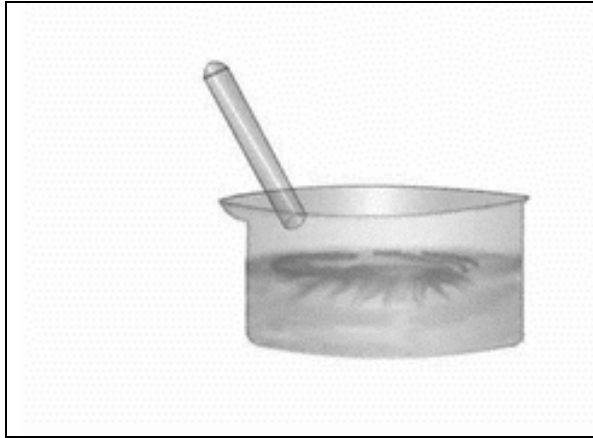


Figure 7. Virtual experiment-Diffusion

3. Creativity in teaching and educational process

Students creativity occurred even when they were suggested to make their own experimental devices to study physics using simple materials found in any household.

We hereby present some of our students' works: scales , dynamometer , electroscope , electric power generator and electrolysis device.



Figure 8. Handcraft electroscope



Figure 9. Handcraft dynamometer

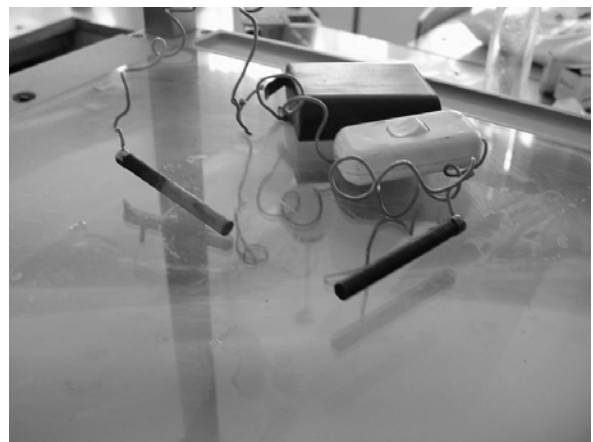


Figure 10. Handcraft electrolysis device

By means of their hand-made devices , the students were able to perform various experiments as well as to check out laws of physics. They have checked electrolysis laws using a device built with coal electrodes taken from an exhausted battery , wire , a glass , some CuSO_4 solution and a charged battery.

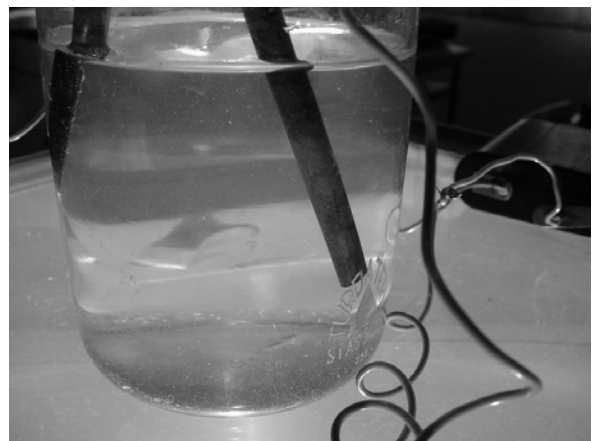


Figure 11. Verifying electrolysis laws with a handcraft device

The gains of such laboratory work consisted in enabling poor students to actively participate in the lesson , to ask questions and to acquire some practical skills .The students also realized that a lot of work and determination were necessary , as effort , information acquiring and experience are crucial.

Having encountered some difficulties in making their devices , the students started doing research and consequently their interest in physics has increased considerably.

Another way to revive students'interest in studying physics consists in acting in play with scientific background.

Thus , the 6-th grade students in our college acted in the play "Archimedes and emperor's crown".The script of this play was based on an episode recorded in the history of physics.The main idea of this play is eliciting the notion of body density , the starting point being well-known physical notions such as:weight , volume , inertia , body , substance , characteristics.



Figure 12. Students acting in the play "Archimedes and emperor's crown"



Figure 13. Students acting in the play "Archimedes and emperor's crown"

Besides its scientific value this play also has an educational dimension with an emphasis on the daily role of physics and on the fact that man is supposed to learn all his life.

4. Evaluation process in physics class

Evaluation is based on tests consisting of various items , crossword puzzles , games , drawings , posters , projects and portfolios , essays and graphs.

The students are divided into groups , each group having a leader.As soon as the topic is announced , the students are allowed some time to look for information.

When time is up , a round-table is organized and each group leader presents all participants'opinions , findings and results.The debates arise questions , create new ideas and establish interdisciplinary links.The teacher's intervention occurs whenever necessary without trying to impose his /her own ideas and opinion.The atmosphere is thus relaxed , and nobody is tense or nervous.The most original ideas are rewarded with high grades.

We hereby present some of our students'accomplishments:

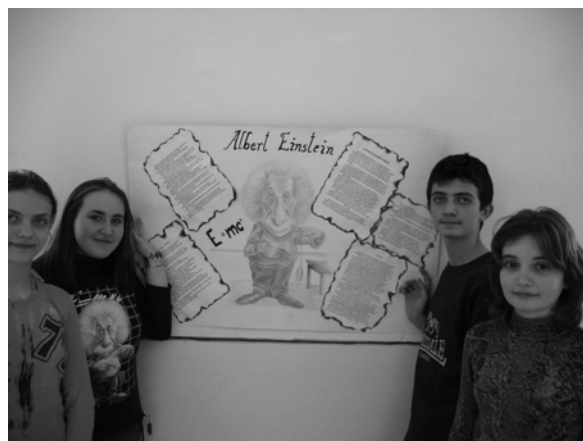


Figure 14. A poster made by our students



Figure 15. Poster exhibition organized by our students



Figure 16. Students projects

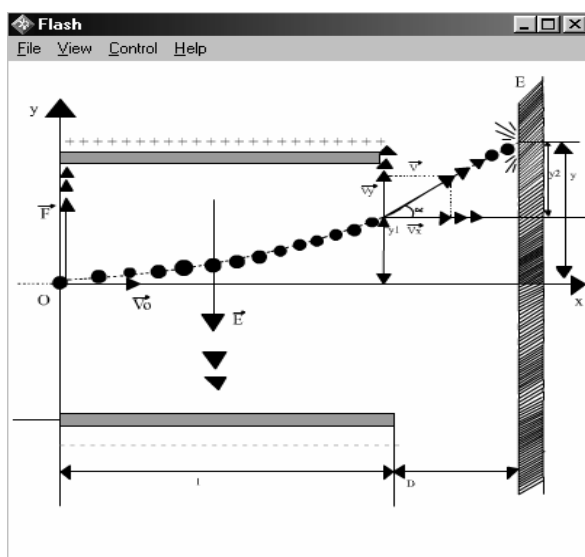


Figure 17. Education software devised by students

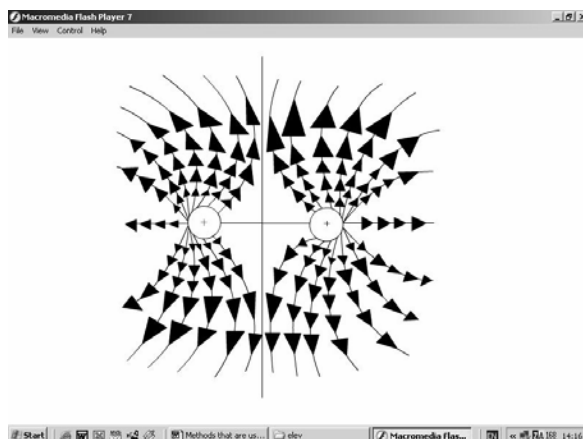


Figure 18. Graphs made by students

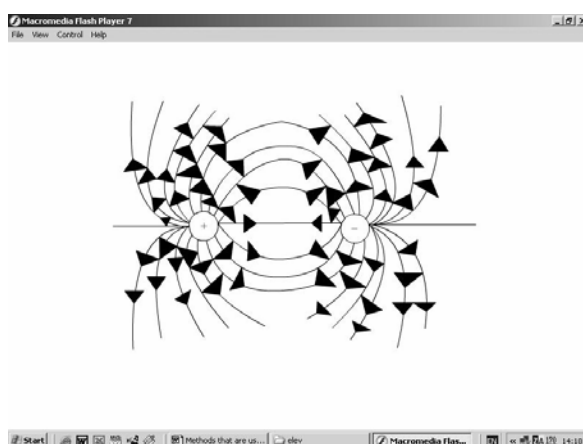


Figure 19. Graphs made by students



Figure 20. A crossword puzzle

5. Conclusions

The use of these methods in class has caused an increase in students' knowledge of physics, which has also been confirmed by their results in various school contests.

At the same time this approach has positively changed students' attitude towards school, study

, towards moral , cultural , and scientific values of society.

6. References

- [1] Bogdan Logofatu , Michaela Logofatu ,
Instruire asistata de calculator Crocodile Clip
3 , Ed. Credis, 2001
- [2] Leontina Nasta, Margareta Giurgea , Optica ,
Ed. Academiei,1998
- [3] Florin Macesanu , Probleme si teste in sistem
grila pentru gimnaziu , Ed.Corint 1999
- [4] Ion Moraru , Stiinta si filosofia creatiei , Ed.
Didactica si pedagogica , R-A Bucuresti ,
1995