

Magiphy, How to engage high school students in Physics?

HOPE Forum 2014, Helsinki
29th August 2014

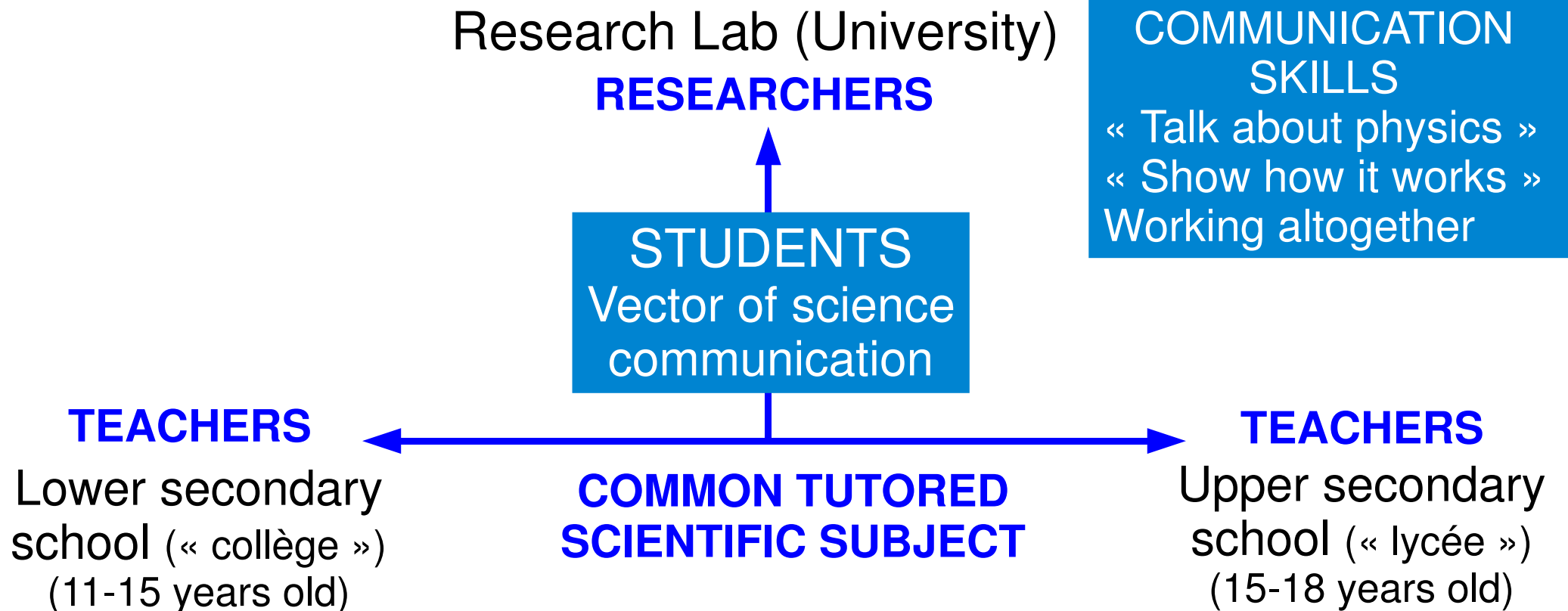
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- (4) Faculty of Physics, Alexandru Ioan Cuza University of Iasi (Romania)

Objectives

- To increase the motivation of students in physics
- To make physics more attractive (informal context)
- To develop an original method of approach to learn physics using a scientific methodology : students like researchers (same skills)

Methodology employed



Project in schools



Tournament



Magiphy ambassador
Exchange with citizens

EXAMPLE: COLORS OF BUTTERFLY

Once per week in schools (5 months) :

Lower secondary school Emile Zola (P. Barbet)

Upper secondary school Pasteur (P. Lelièvre)

Students exchanges between schools

Research tutor : Jean Cosleou (University of Lille)

Discussion with the researcher Serge Bertier
(Paris 7) specialist in the insects' iridescence

600 Euro and few hours for teachers (2 or 3)

Problem formulation - Hypothesis – Literature
search – Experiments – Analysis – Interpretation -
Magiphy notebook : labwork

➡ Participation of Magiphy to the festival of upper
secondary schools students - 30th April 2003



Newspaper Voix du Nord
2003/04/05





EXAMPLE: COLORS OF BUTTERFLY

7th May 2003

Science center

5 groups (lower + upper
secondary schools)

(16 students / group)

Oral presentation in front of a jury composed
of researchers, teachers, a non scientist, a
student chosen by its group.

For each group :

15 min for the presentation

5 min of questions by the jury

10 min informal discussion with the jury

Deliberation of the jury

→ winner group : Magiphy ambassador
during one scholar year

Poster

Experiments

Data analysis

Project in schools → Tournament → **Magiphy ambassador
Exchange with citizens**

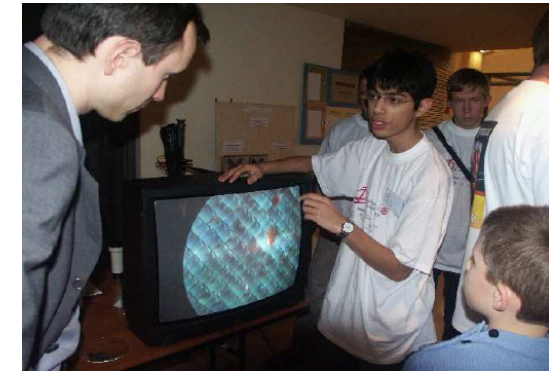
EXAMPLE: COLORS OF BUTTERFLY

Exposciences 14-18 May 2003, Loos

« Fête de la Science » (Hénin-Beaumont)
14-18 October 2003 (Ministry of education)

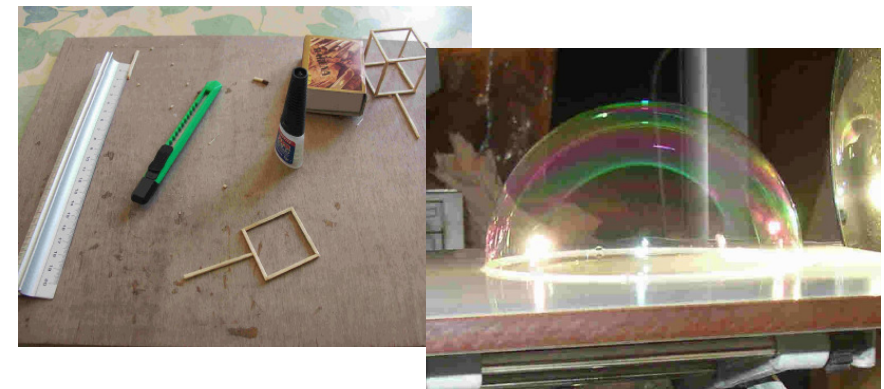
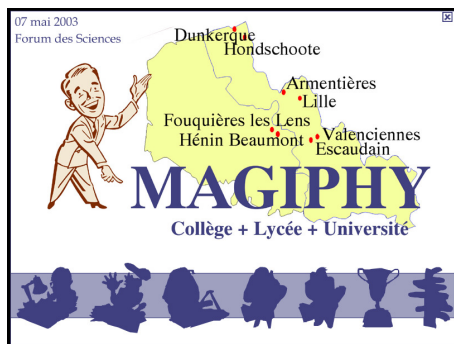
1st prize (1 000 Euro) National Physics
Olympiads (30/31 January 2004)

E2Phy 2004 (26 August 2004, 200 teachers)



National Physics
Olympiads 2004, Paris

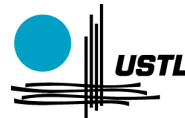
CD-ROM of capitalization



Pedagogical suitcase on
soap bubbles (color, shape)



BELGIUM (2007-2010)



INFOR SCIENCES
UNIVERSITÉ LIBRE DE BRUXELLES

4 tournaments
(French / Belgian)
In Lille

Participation of secondary schools from Belgium thanks to exchange days (project presentation by French winners of tournaments 2006 and 2007)



The French Magiphy group from Carpeaux and Escout schools showing the project to Belgium students (2007)

- Same methodology but schools worked with a science center located at ULB
- Diffusion in FR and BE after the tournament in schools and science events (« Fête de la Science » FR, Printemps des Sciences BE ...)
- Financial support mainly from the EU project
- Observers



Exchange dayg (secondary school Michelet) (2008)



**ROMANIA : MagicPHI
(2008 – up to now)**

5 tournaments
In Iasi

- Same methodology as Magiphy in France
BUT
 - more official application (project description examined by researchers) ;
 - tournament near university in the street or other public place (open to public) and organized during a national conference day about physics teaching
- Diffusion after the tournament in science events (Researchers night...)
- Support from the school administrative

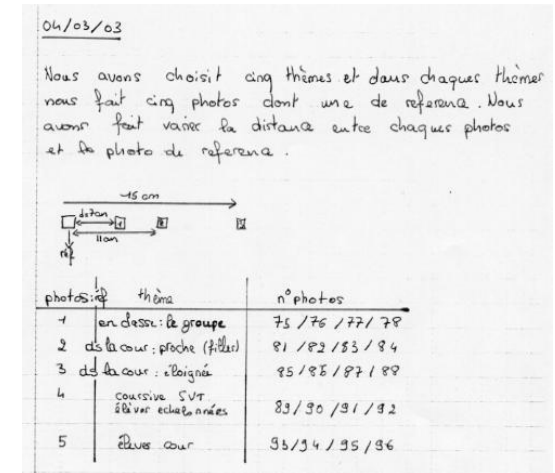
MagicPHI Award ceremony (2009
First Edition). Participant and
Member of the Jury



Students' feedback

What were the personal benefits of this activity?

- More confident in their competencies in doing experiments
- More aware in physics (funny way to approach physics)
- Feel more able to conduct themselves a scientific project and to defend their results
- Strong team work
- Like to fill of a lab work notebook
- Like to exchange with others schools



Example of a lab work notebook

What are the most positive points?

- Involvement of the members of the team
- Team spirit
- Involvement of the teachers and researchers
- Enjoy to be ambassador of their school in events and schools
- Combine work with pleasure

Students' feedback

Is that way for learning science useful for your school lessons?

- Very useful for understanding the theory
- Improvement of their general scientific culture

Do you believe that your participation to Magiphy could influence your further science studies choice?

More than 60 % of the participants do not consider that such activity changes or influences their further studies choice. But all consider that such a project has to be encouraged.

In Romania : some students think to professionalize in physics

What do you think about the idea of Magiphy?

- Very funny
- Make science popular
- Very good approach for learning science
- Good opportunity to see how physics is interesting

Teachers' feedback

Student side :

- Increase of students' autonomy, motivation and self-esteem
- Better language skills : able to explain physics to the public
- Increase of their intellectual curiosity
- Developement of skills like critical competency, argumentation, creativity, team work
- More familiarize with the scientific method
- Increase their scientific performance working with researchers and teachers
- Maintain students' interest in science and technology

Teacher side :

- More exchanges, discussions, reflection and debates compare to a formal teaching
- Opportunity to an hypothetico-deductive method
- To give enough autonomy to students (actor of their learning of scientific knowledge)
- Develop relationships with researchers

Public feedback

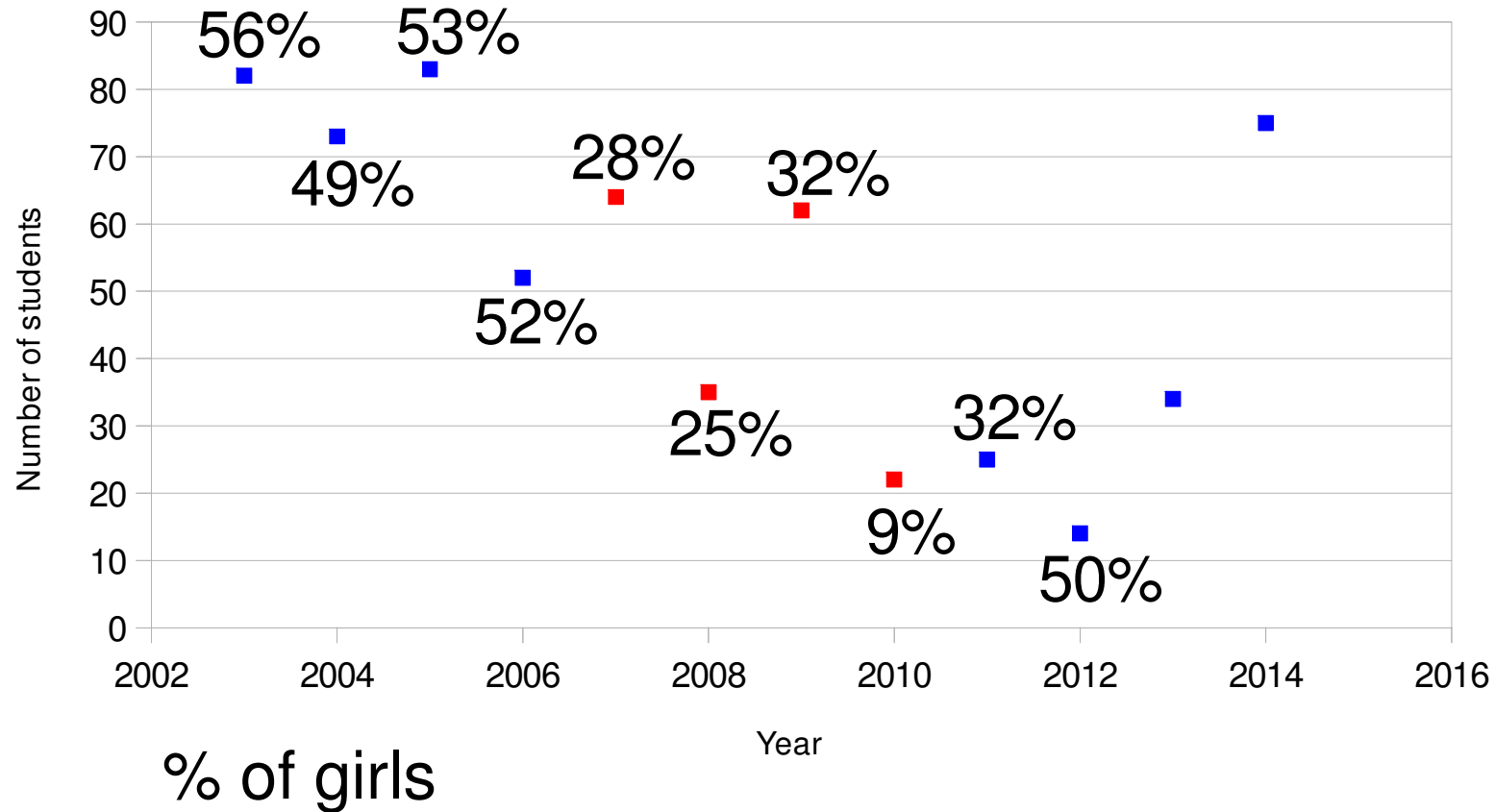
The public appreciate the effort of the pupils, teachers and organizers and consider Magiphy (France / Belgium) or MagicPHI (Romania) as a very good initiative.

BUT some constraints

- Parents prefer to do not push their child in the hard works that long project request (Romania)
- Lack of support (especially financial support
- Teachers not recognized in their professional career about their involvement in such informal science project
- In France difficulty to continue to group a lower and a upper secondary schools on the same project

Statistics

One example : France and Belgium



And now

No more Belgian schools in Magiphy tournament (lack of financial support)

Romania should continue (lack of schools enrolment)

Magiphy became « Faites de la Science » (Have fun in doing science) 2 years ago :

- enlargement to others science domains
- supported by 30 French universities
- regional tournament (fellowship of 300 euro per group)
- national tournament (winners of the regional tournaments)

At that time no more diffusion in science events and schools

For more information

ROMANIA: MagicPHI

http://ftem.faculty.ro/english_l7.html

<http://stoner.phys.uaic.ro/magicphi.html>

Contact: Caltun@uaic.ro

FRANCE:

Magiphy

<http://magiphy.univ-lille1.fr/>

Contact: daniel.droz60@gmail.com

Faites de la Science

<http://www.univ-lille-nord-de-france.fr/?q=culture-patrimoine/culture-scientifique/concours-faites-de-la-science>

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THANKS FOR YOUR ATTENTION