How Can the History and Philosophy of Science Contribute to Contemporary U.S. Science Teaching

Friday, 07 December 2012

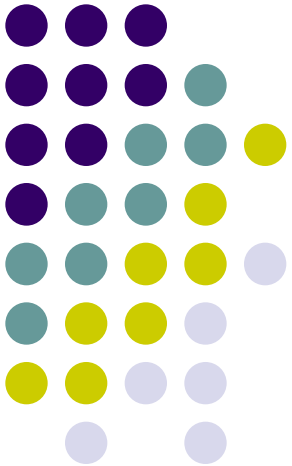
Sponsored by the National Science Foundation's Division of Research on Learning in Formal and Informal Settings under REESE grant 1205273. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Organized by the School of Education and the Center for Philosophy and History of Science at Boston University.

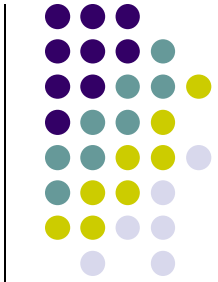
Science with a background

Fanny Seroglou
seroglou@eled.auth.gr

ATLAS Research Group
School of Primary Education
Aristotle University of Thessaloniki



science for non-experts



- teachers, pupils, non-expert adults

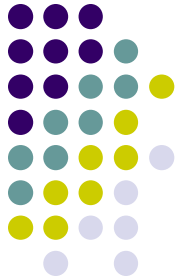
- need for a fruitful **background** to support, explain, give meaning to **science**
connect **science** to culture and society

history and philosophy of science

three examples

- a teacher-training course on **science and culture**
- a science course for 12-year-olds on **nature of science**
- an introductory science activity for 7-year-olds on **nature of science**

a teacher-training course on science and culture



- pre- and in-service teachers

  highly appreciate science teaching

  with a strong cultural perspective

as it offers them motive and inspiration to learn and teach science

in a way that encourages all students to participate in science learning

three thematic units

1.scientific events that have influenced culture and have been influenced by culture

2. legends and scientific explanations

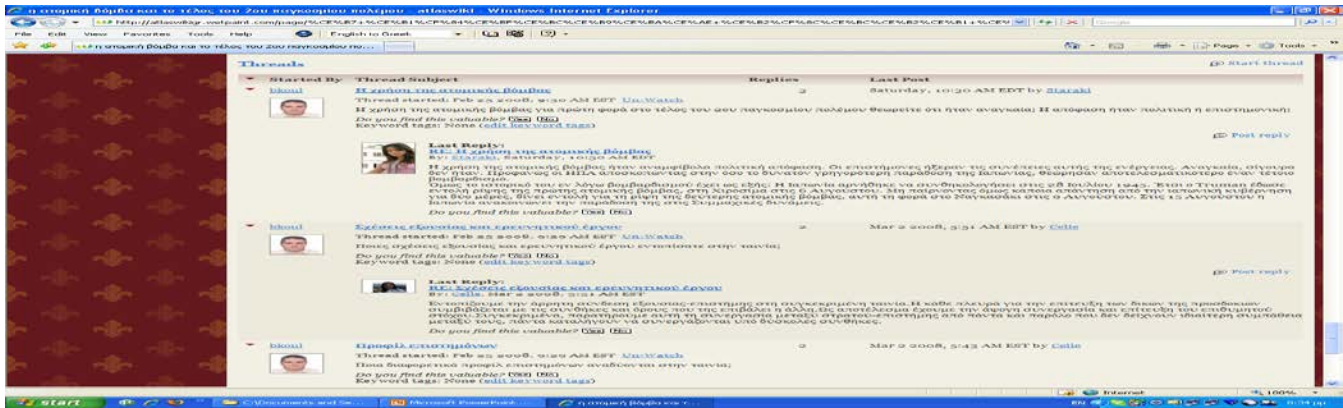
3. science and art

all supported by a series of films thoroughly selected

movies, documentaries, cartoons

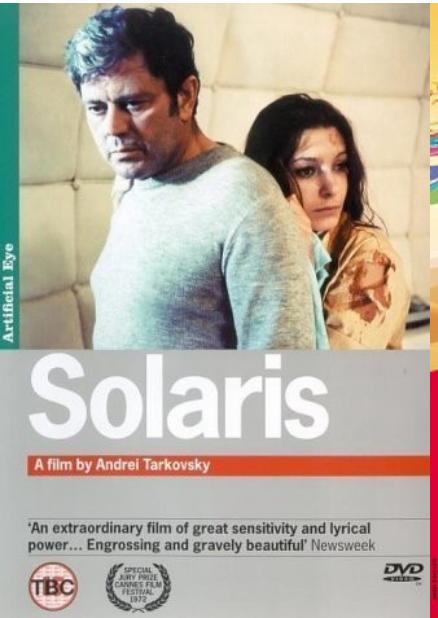
atlaswiki.wetpaint.com

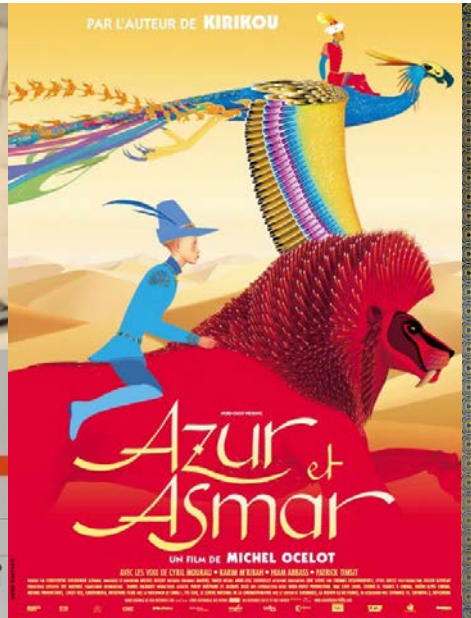
- an educational wiki offers the opportunity to
  - attend the course by distance
  - participate in discussions
  - develop related projects

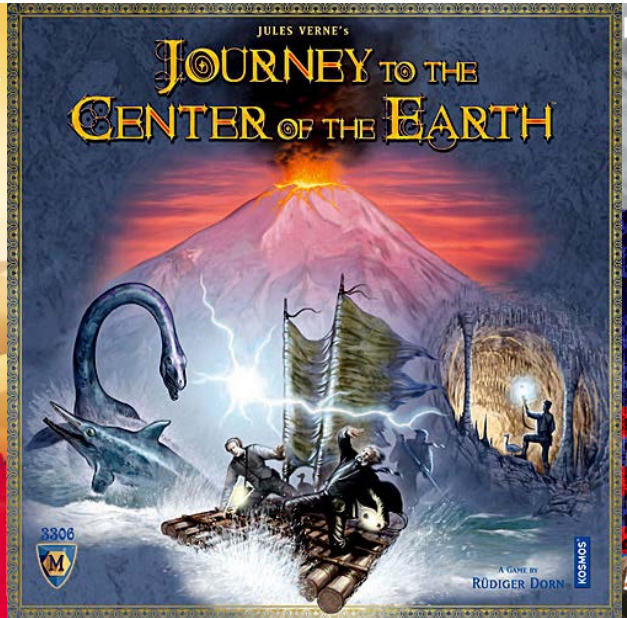


the films of the course

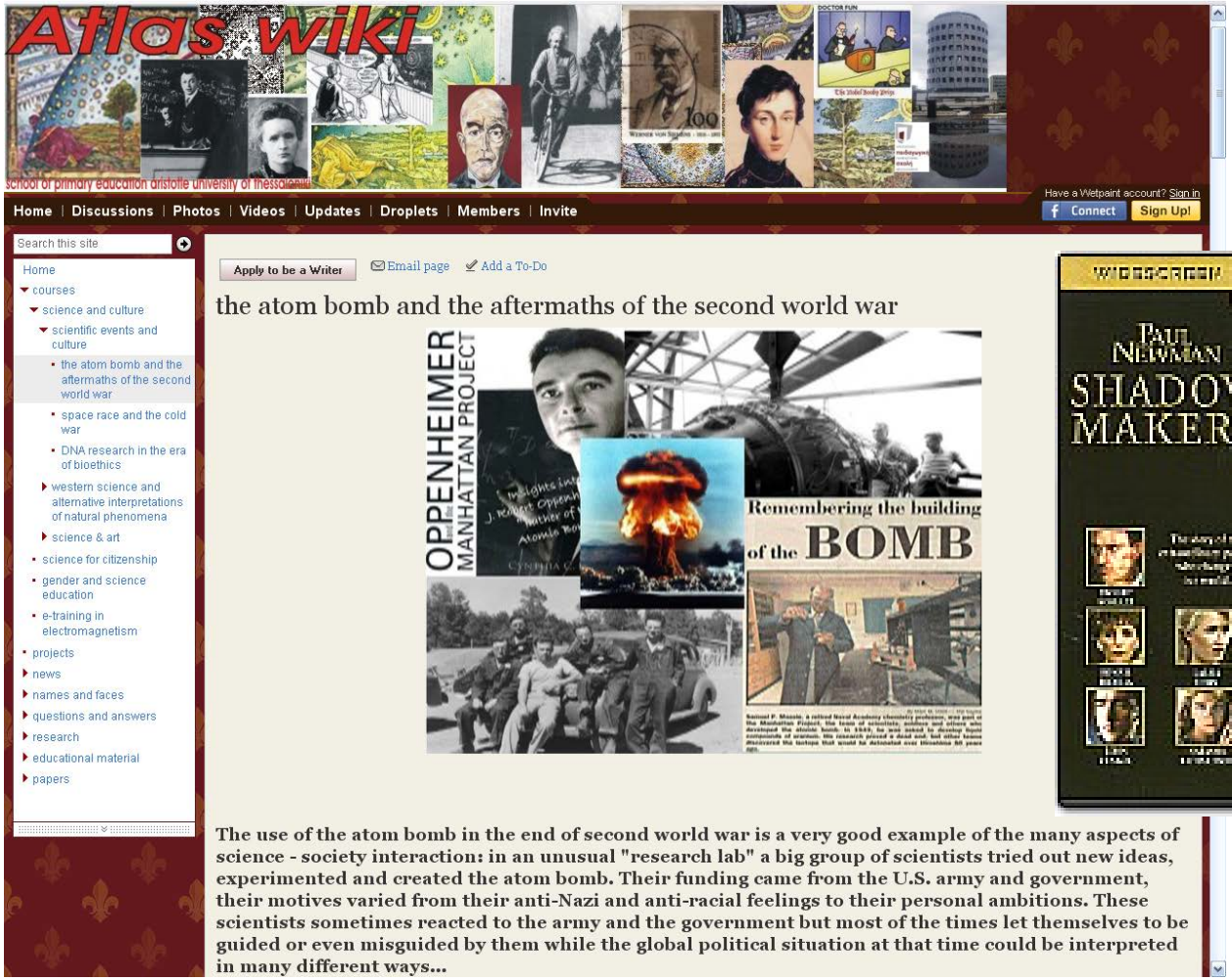
- state the main issues to be discussed
- trigger the involvement of pre- and in-service teachers in this approach of science education

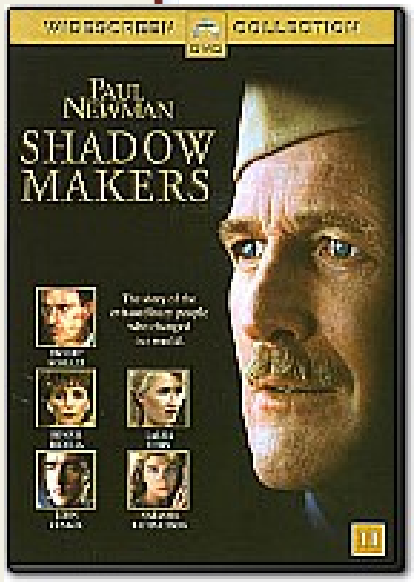




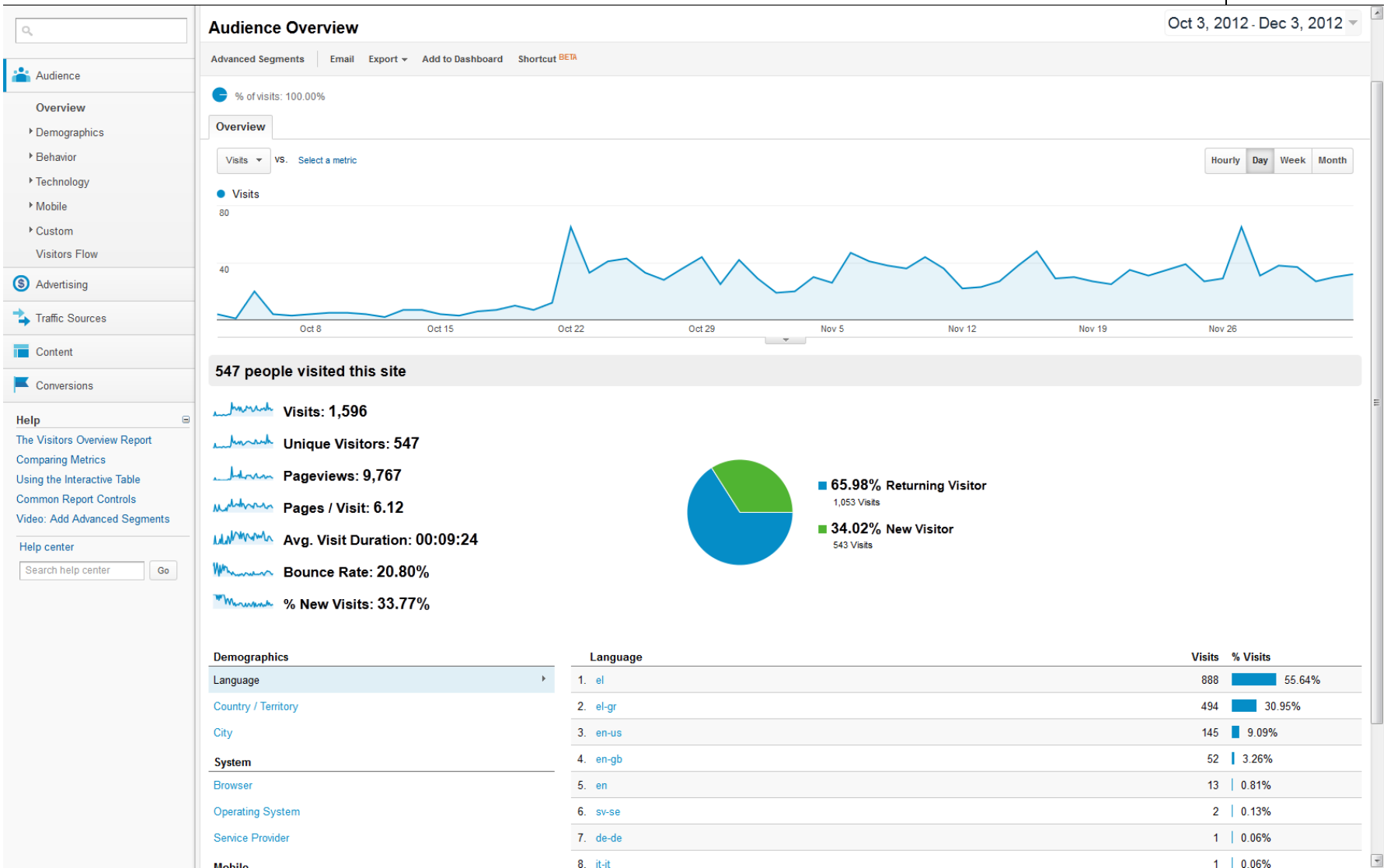


teaching about the atom

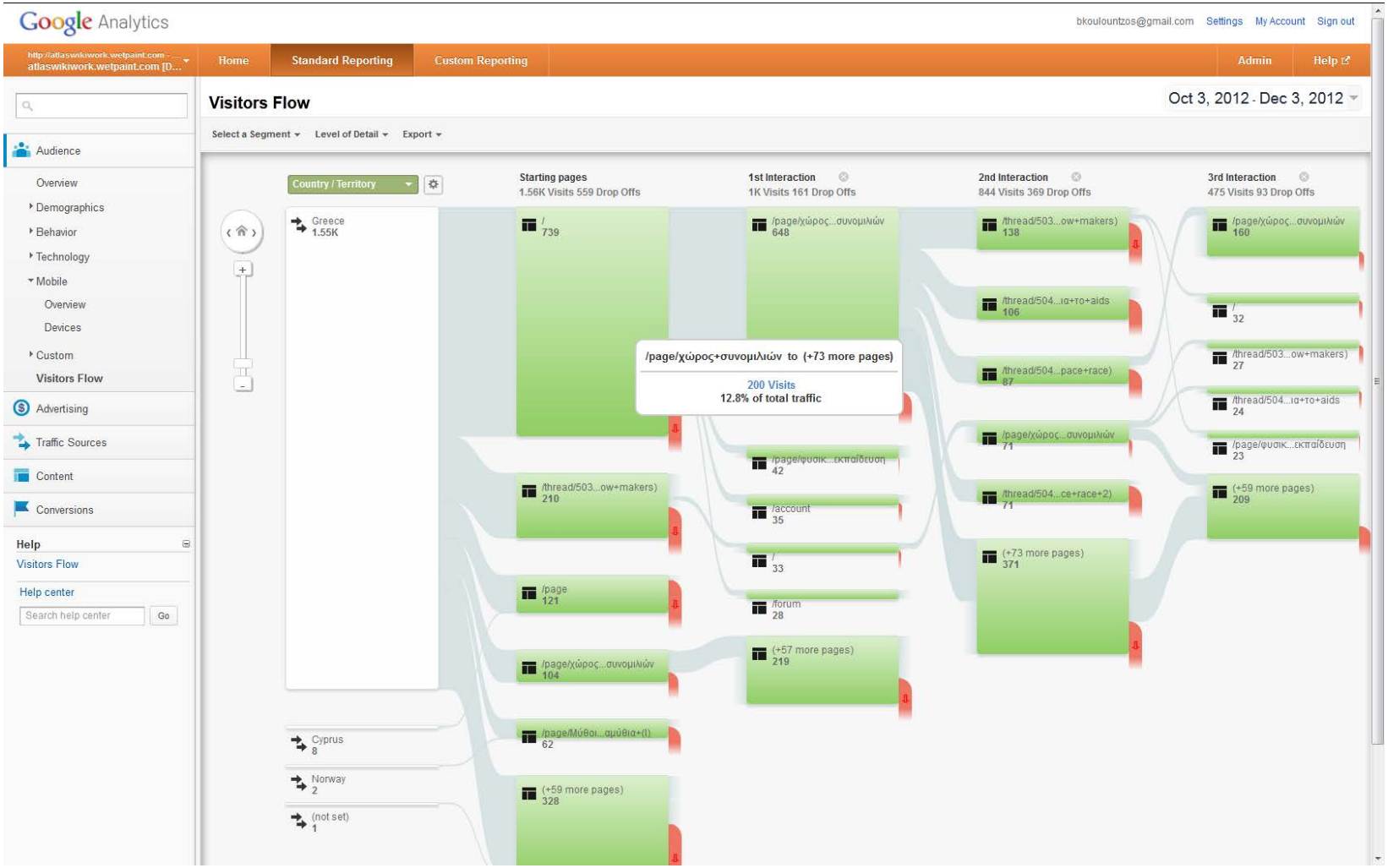




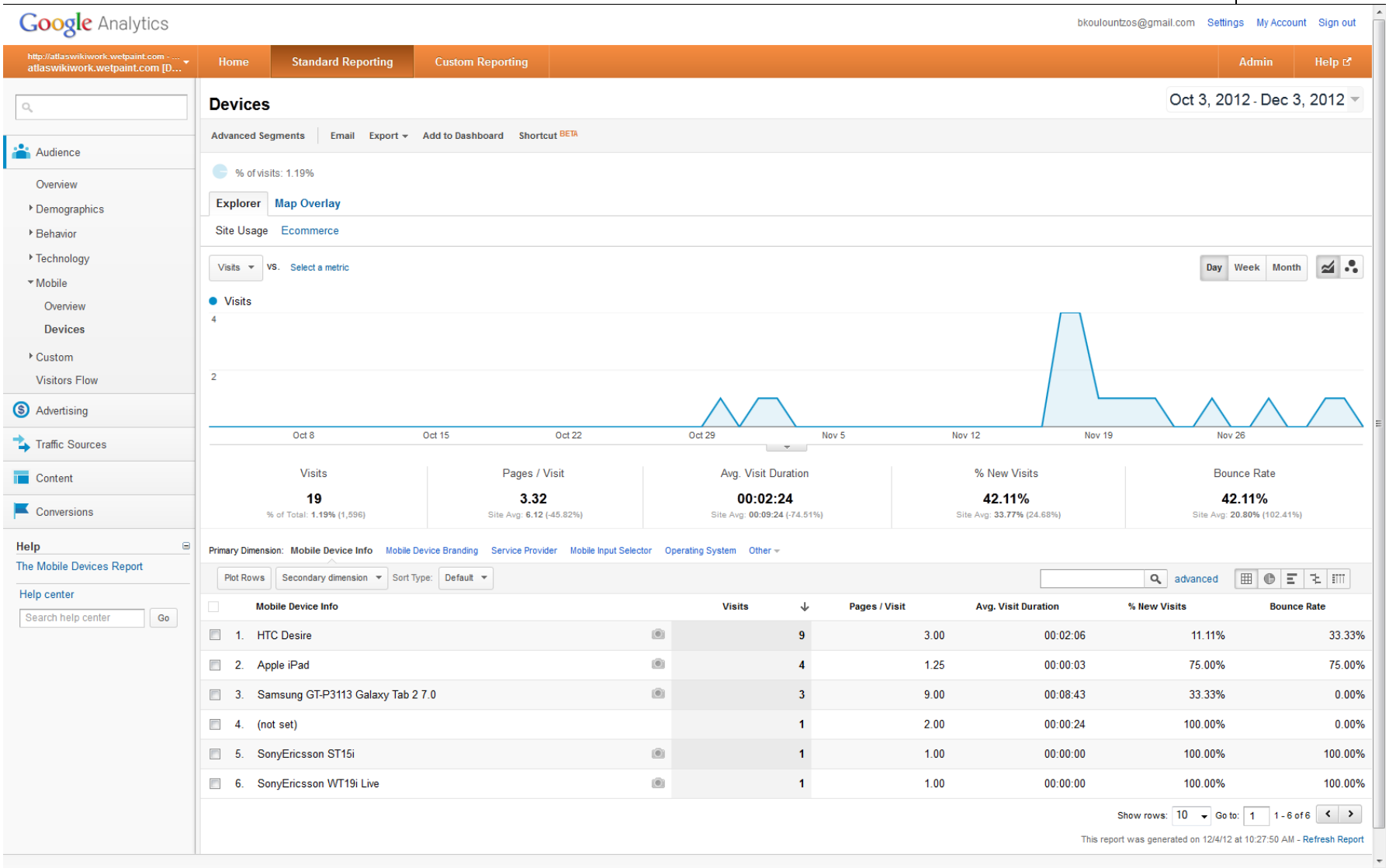
pre-service teachers discuss about science



pre-service teachers discuss about science

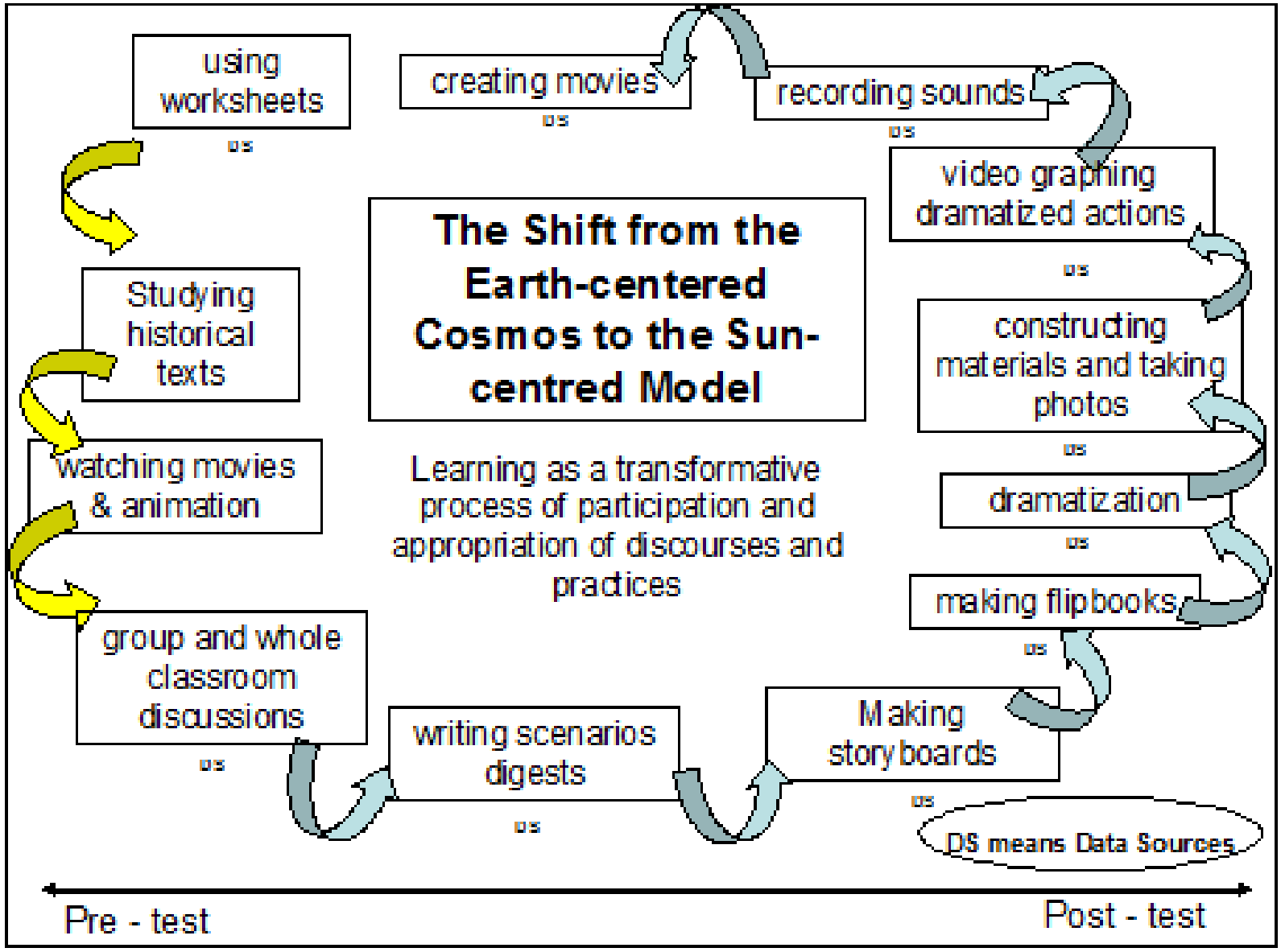


a variety of communication devices

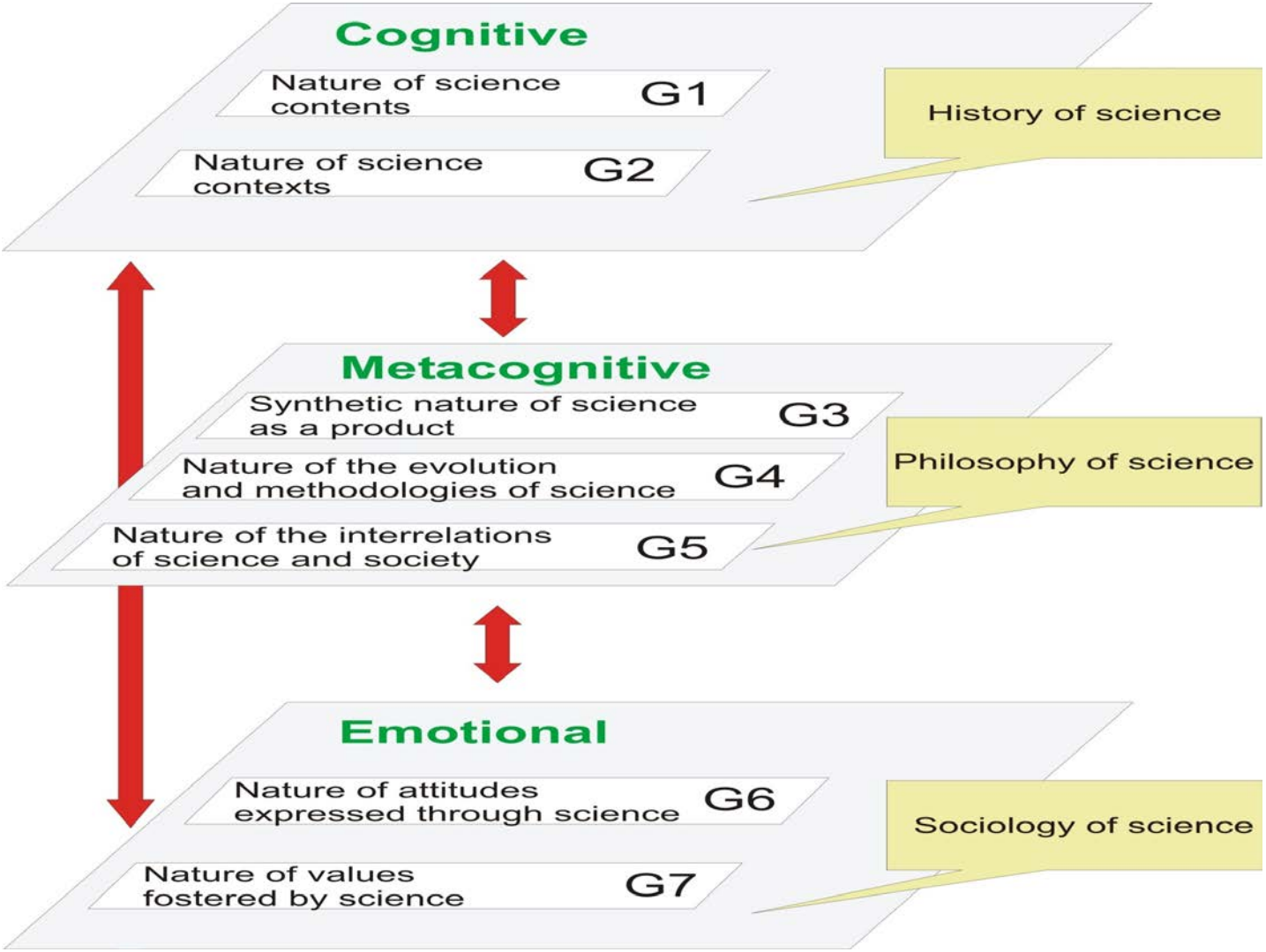


a science course for 12-year-olds on nature of science

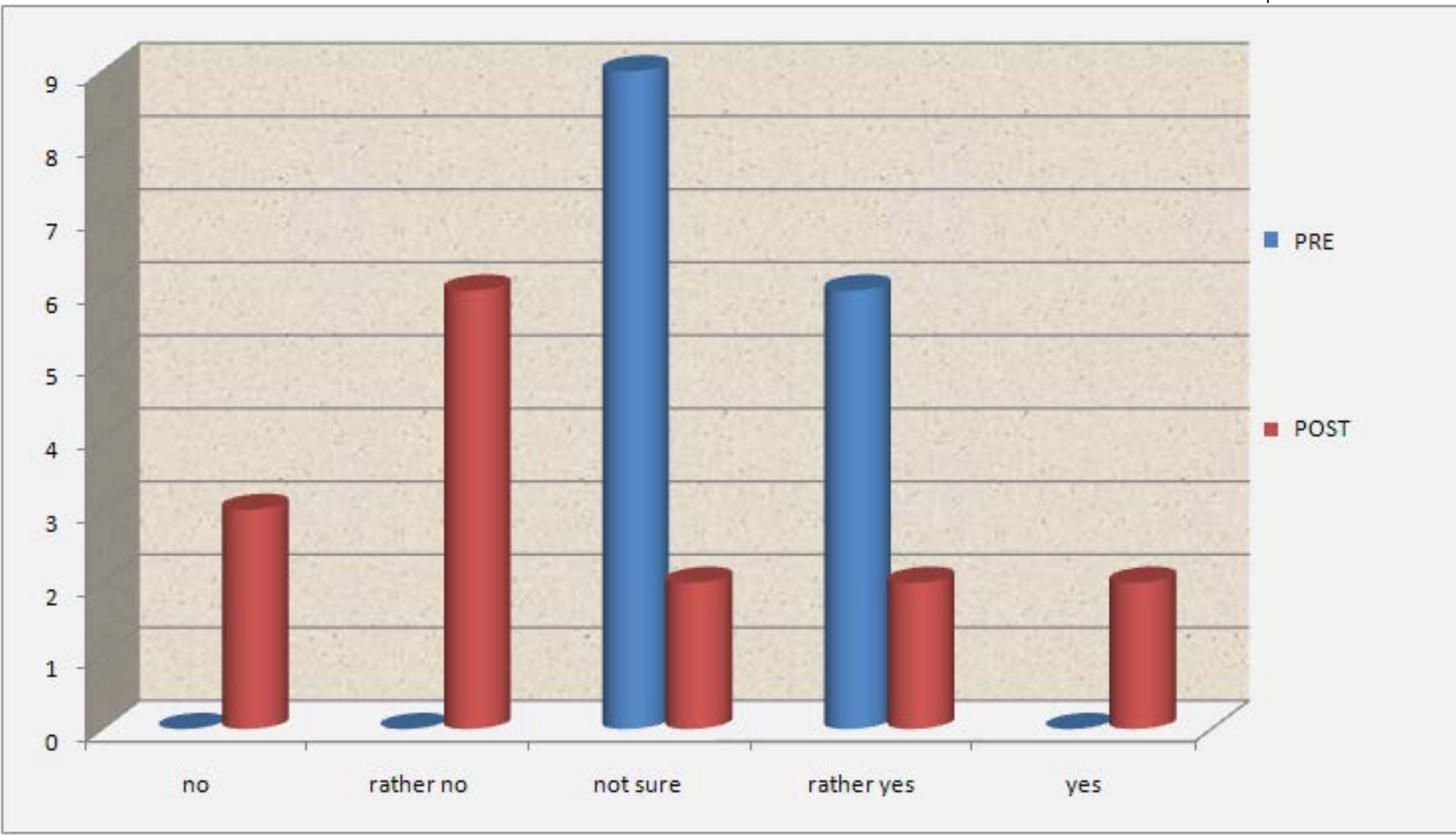
- pupils develop animation movies
  - inspired by the history of astronomy
  - commenting on aspects of nature of science
  - presenting how science works


using worksheets
DS
creating movies
DS
recording sounds
DS
video graphing dramatized actions
DS
constructing materials and taking photos
DS
dramatization
DS
making flipbooks
DS
Making storyboards
DS
writing scenarios digests
DS
group and whole classroom discussions
DS
watching movies & animation
Studying historical texts
The Shift from the Earth-centered Cosmos to the Sun-centred Model
Learning as a transformative process of participation and appropriation of discourses and practices
DS means Data Sources
Pre - test
Post - test

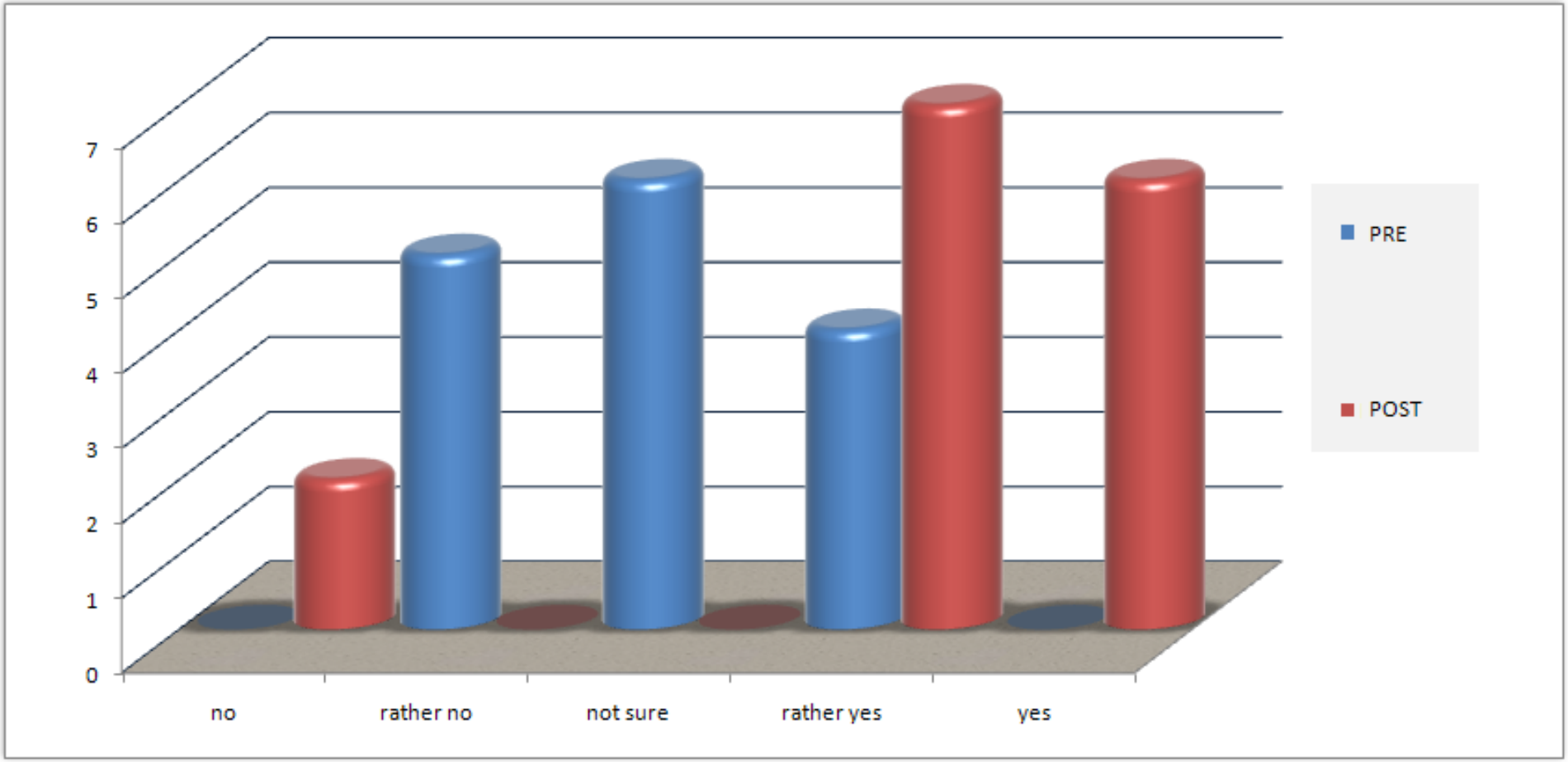
GNOSIS research model



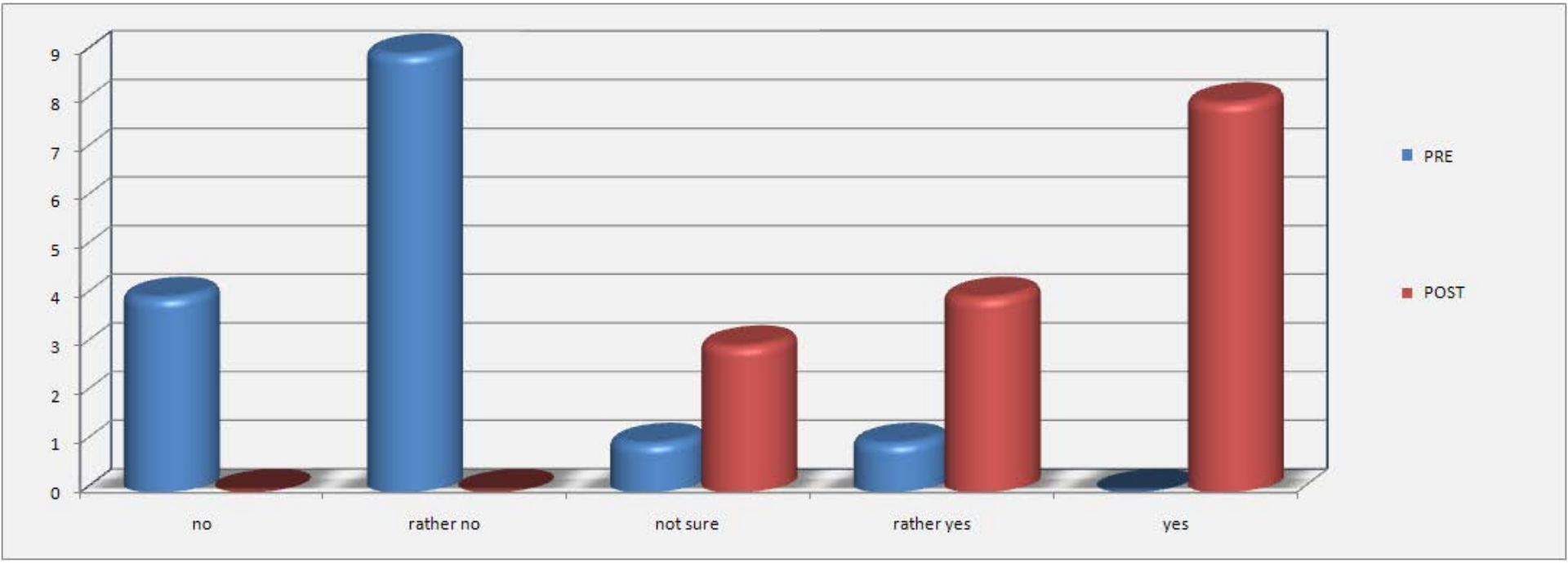
truth does not change in science



scientific explanations may change in time



Scientific explanations may be completely replaced by new explanations if new evidence supports that



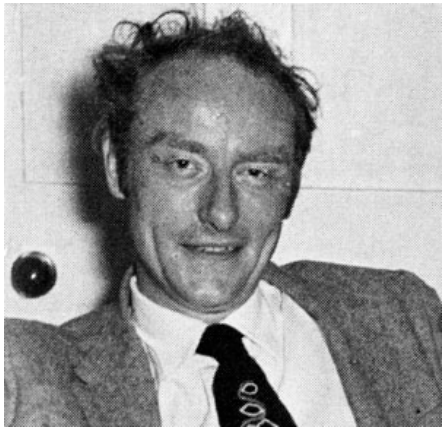
an introductory science activity
for 7-year-olds on nature of science

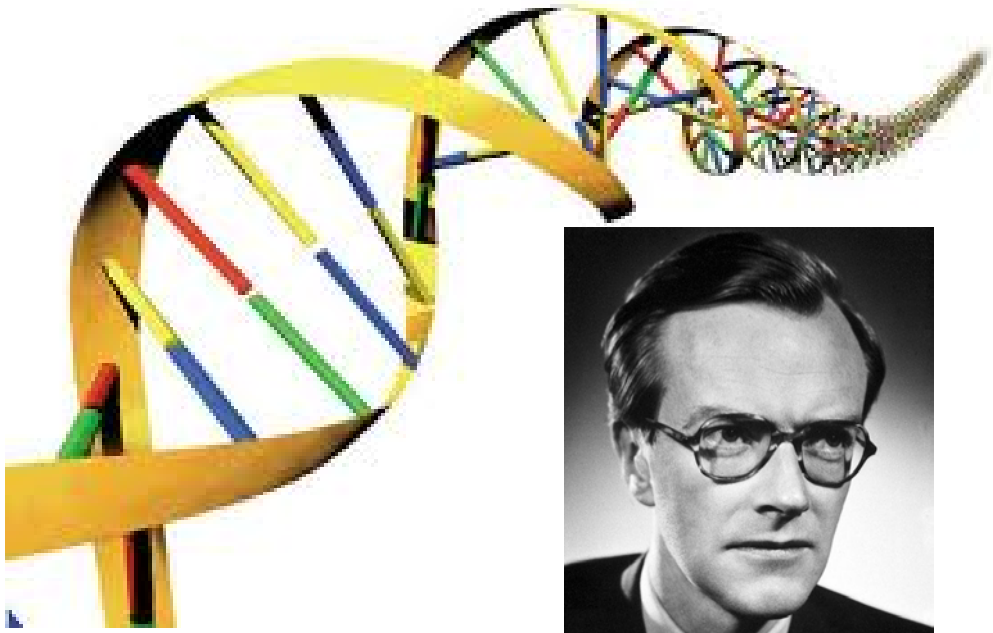
the "stolen ladder"

transforming
the history of science
into narratives for children

a series of books for children

an introduction to DNA research and values in science



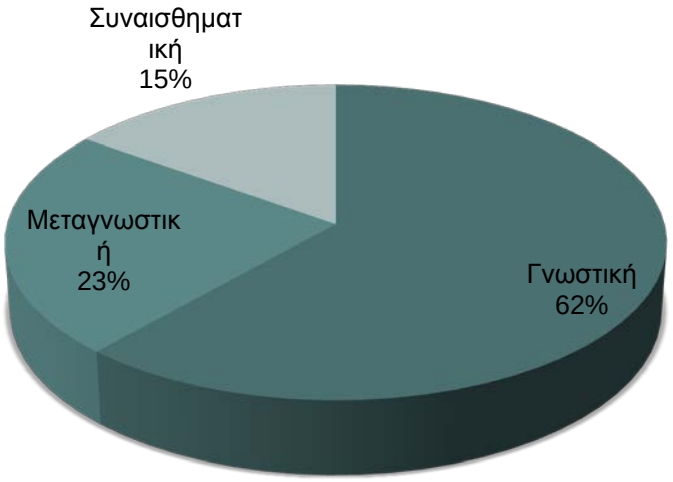


six steps to narratives

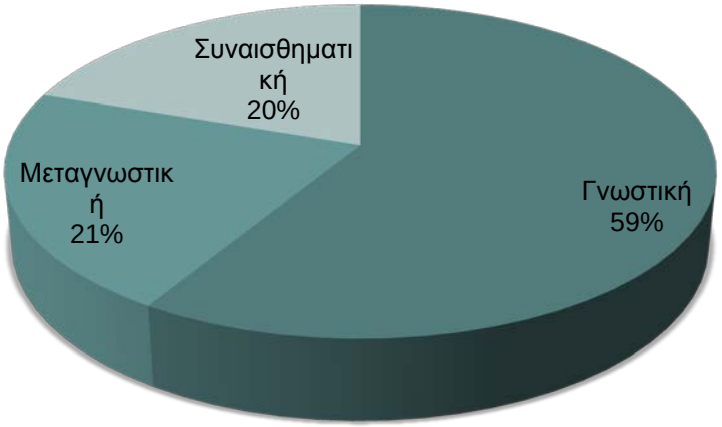
1. focus and analysis of an episode from HS
2. transforming HS into key-elements of the story
3. development of a children-friendly narrative
4. designing NOS activities
5. implementation and research in the classroom
6. comparative study of the narrative and implementation in the classroom

a comparative study

narrative

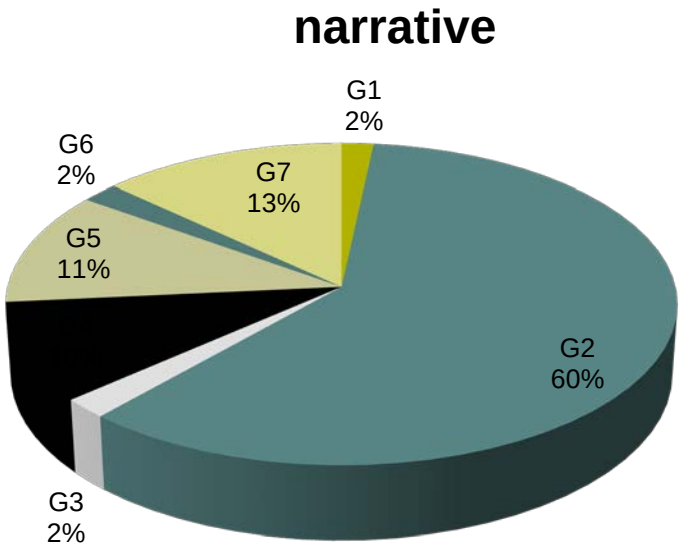


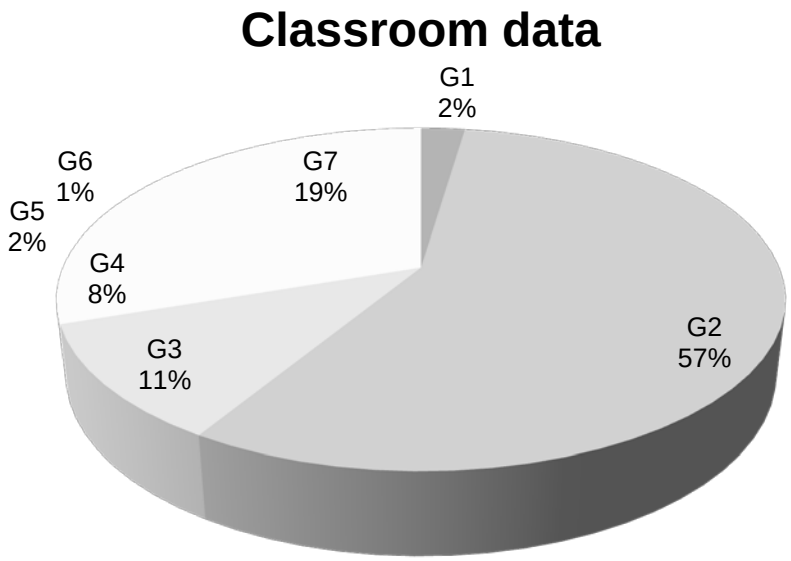
alassroom data



	narrative	children
cognitive	62%	59%
meta-cognitive	23%	21%
emotional	15%	20%

a comparative study





	G1	G2	G3	G4	G5	G6	G7
narrative	2%	60%	2%	10%	11%	2%	13%
children	2%	57%	11%	8%	2%	1%	19%

ευχαριστώ! thank you!

seroglou@eled.auth.gr

http://users.auth.gr/seroglou

http://atlaswikigr.wetpaint.com

http://atlaswiki.wetpaint.com