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

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Science with a background

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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 inservice teachers in this approach of science education







The use of the atom bomb in the end of second world war is a very good example of the many aspects of science - society interaction: in an unusual "research lab" a big group of scientists tried out new ideas, experimented and created the atom bomb. Their funding came from the U.S. army and government, their motives varied from their anti-Nazi and anti-racial feelings to their personal ambitions. These scientists sometimes reacted to the army and the government but most of the times let themselves to be guided or even misguided by them while the global political situation at that time could be interpreted in many different ways...

pre-service teachers discuss about science

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City	3. en-	-us 14:	5 9.09%
System	4. en-	-gb 53	2 3.26%
Browser	5. en	1:	3 0.81%
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Service Provider	7. de-	-de	1 0.06%
Nabila	8. it-it		1 0.06%

pre-service teachers discuss about science



a variety of communication devices



Google Analytics bkoulountzos@gmail.com Settings My Account Sign out Standard Reporting Oct 3, 2012 - Dec 3, 2012 -Devices Advanced Segments Email Export - Add to Dashboard Shortcut BETA 🚢 Audience % of visits: 1.19% Overview Explorer Map Overlay Demographics Site Usage Ecommerce ▶ Behavior ▶ Technology Day Week Month **a** . Visits VS. Select a metric Mobile Visits Overview 4 Devices ▶ Custom 2 Visitors Flow S Advertising Oct 8 Oct 15 Oct 22 Oct 29 Nov 5 Nov 12 Nov 19 Nov 26 Traffic Sources T Visits Pages / Visit Avg. Visit Duration % New Visits Bounce Rate Content 19 3.32 00:02:24 42.11% 42.11% Conversions % of Total: 1.19% (1,596) Site Avg: 6.12 (-45.82%) Site Avg: 00:09:24 (-74.51%) Site Avg: 33.77% (24.68%) Site Avg: 20.80% (102.41%) Help Primary Dimension: Mobile Device Info Mobile Device Branding Service Provider Mobile Input Selector Operating System Other -The Mobile Devices Report Plot Rows Secondary dimension v Sort Type: Default v Q advanced 🔳 🕒 Ξ 🔍 💷 Help center Mobile Device Info Avg. Visit Duration Visits $\mathbf{1}$ Pages / Visit % New Visits Bounce Rate Search help center Go 1. HTC Desire ()) 3.00 00:02:06 11.11% 33.33% 9 ()) 2. Apple iPad 4 1.25 00.00.03 75 00% 75.00% 3. Samsung GT-P3113 Galaxy Tab 2 7.0 ۲ 3 9 00 00.08.43 33 33% 0.00% 2.00 00:00:24 100.00% 0.00% 4. (not set) 1 5. SonyEricsson ST15i 0 1.00 00:00:00 100.00% 100.00% 1 6. SonyEricsson WT19i Live 1 1.00 00:00:00 100.00% 100.00% Show rows: 10 🗸 Go to: 1 1 - 6 of 6 < >

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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









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
- comparative study of the narrative and implementation in the classroom







a comparative study





	G1	G2	G 3	G4	G5	G6	G7
narrative	2%	60%	2%	10%	11%	2%	13%
children	2%	57%	11%	8%	2%	1%	19%

ευχαριστώ! thank you!

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