

SCIENCE AND CULTURE IN EDUCATION: A TEACHER TRAINING COURSE

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Resumen

“Science and Culture in Education” is a teacher training course attended by pre- and in-service teachers at the School of Primary Education at the Aristotle University of Thessaloniki. The course has a design inspired by the history and philosophy of science, uses narratives (movies from the international cinema, documentary films, cartoons etc.) to bring forward the main issues for discussion and is supported by an educational wiki. The three parts of the course focus on: a) scientific events that have influenced and have been influenced by culture, b) legends and scientific explanations and c) science and art. The study and analysis of the projects that pre- and in-service teachers develop and the discussions they communicate on the wiki reveals interesting parameters concerning their appreciation of the cultural interrelations of science and society.

Objectives

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 (Seroglou & Aduriz-Bravo 2007). This is the main aim of a teacher training course titled “Science and Culture in Education”. The course is attended by pre- and in-service teachers at the School of Primary Education at the Aristotle University of Thessaloniki. In the current paper the design of the course as well as the results coming from the application of the course and the evaluation of the final projects pre- and in-service teachers developed are presented.

Theoretical framework

The “Science and Culture in Education” course is based on the idea that science and culture are interrelated and interact influencing one another (Herbert 1985, Little Bear 2000). As science evolves and changes in time, also offers an evolutionary and innovative momentum to culture and society, providing to the new generations the field not only to seek for new answers to the old questions but furthermore to redefine some of the fundamental questions (Weinert 2005). Science is perceived as a social activity driven by the visions and values of society, while scientific concepts and theories reflect the social, political, ethical, financial and environmental conditions of their times (Hodson 1993, Seroglou 2006).

The design of the course is inspired by the history and philosophy of science as history of science provides the background to bring forward and discuss a variety of science and culture interrelations, while philosophy of science offers multiple perspectives to reflect on the cultural origins, effects and aftermaths of science. Each unit of the course has been developed in the context of a three-dimensional cognitive, metacognitive and emotional approach of the teaching and learning of science (Seroglou & Koumaras 2001, Seroglou & Aduriz-Bravo 2007) and has a main focus on raising issues concerning the nature of science focusing on a) scientific events that have influenced culture and have been influenced by culture, b) legends and scientific explanations, c) science and art, as these are the themes of the three parts of the course.

The backbone of the course is formed by a set of films (movies from the international cinema, documentary films, cartoons etc.) that state the main issues to be discussed and trigger the involvement of pre- and in-service teachers in this approach of science education. Narratives used in the course have been carefully selected and proven to become a powerful tool for meaningful science learning as they present touching, intriguing, memorable stories (Seroglou & Aduriz-Bravo 2007).

The course is also supported by an educational wiki (atalaswiki.wetpaint.com) that offers the opportunity to attend the course by distance, get additional information and continue by distance the discussions that start at the face-to-face meetings of the course. Here the attempt is using ICT infrastructures to provide to the pre- and in-service teachers a web-based learning environment with a wide range of new possibilities in supporting information sharing, access in too many sources, a polymorphic channel of communication and a computer supported collaborative learning (Koulountzos & Seroglou 2007).

Argument

During the first part of the course pre- and in-service teachers watch films and discuss about the Manhattan project, space race, DNA research and bioethics. In the second part they focus on getting to know and compare legends coming from a variety of cultures that exist prior or parallel to scientific explanations and theories. For example, they work on a parallel analysis of the scientific explanation of diseases and their mythical dimensions presented in legends and tales (e.g. vampires, Quasimodo). Or they compare the scientific theories and the legends from all over the world about the ‘creation’ of the world. In the last part, they are involved in the way science is presented in works of art (literature, painting, theatre, cinema, photography, poetry etc.) as well as they reflect on the way science is influenced by art and the effect of science and scientific theories on art. In this case, they work on cartoon films like “Azur & Asmar” where many nature-of-science issues are dealt in a children-friendly way, they design nature-of-science activities based on stories from children literature, they watch in a documentary film and discuss about Jules Verne’s “Journey to the Center of the Earth” and the way the writer was influenced by his contemporary scientific theories as well as the powerful impact of his writings to the research in many scientific field for decades

after.

In the first three applications of the course since 2007, many interesting data have been gathered concerning the involvement and interactions of pre- and in- service teachers with the science and culture content, narratives and discussions of the course. During the course pre- and in- service teachers attended the films and participated in face-to-face as well as by distance discussions on the wiki concerning science and culture interrelations. The discussions always carried powerful feedback and continued on the wiki not only the days between the face-to-face meetings but during vacations and holidays. These science issues were so interesting for the teachers that they went on discussing, searching, creating new wiki-pages with more information and designing instructional e-material to support the teaching of these topics in the classroom.

Pre-service teachers produced final projects attempting an in-depth analysis of a) the effects of scientific events on culture, society and education, b) the comparison of legends and scientific explanations and c) works of art presenting science and art interrelations. In-service teachers in their final projects developed wiki pages in the atlaswiki web-based learning environment focused on: a) gathering legends and myths from a variety of cultures from most of the continents about the "creation" of the world and b) selecting works of art presenting science phenomena, concepts and theories, bringing forward nature-of-science aspects as well as attitudes and values fostered by science. In all cases they used narratives in order to support their pages and to design instructional e-material and nature-of-science activities for the classroom.

Conclusions

The study and analysis of the projects that pre- and in-service teachers develop and the discussions they communicate on the wiki during the course reveals interesting parameters concerning their appreciation of science as a social activity, their ideas about the values reflected by society on science and incorporated by science in society, their understanding of scientific concepts and theories interrelating with the cultural, political, ethical, financial and environmental conditions of their times.

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