

A INTEGRATED CURRICULAR PROGRAM OF ENVIRONMENTAL AND HEALTH EDUCATION IN SECONDARY SCHOOL THROUGH AN ACTIVE SCIENCE MODEL WITH PROBLEM BASED LEARNING

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Resumen

In this paper we explore some obstacles to introduce active learning approaches to treat socio-environmental issues in secondary school during earth and life sciences lessons. Teachers' point of view and student's behavior, answers and comments through an active learning approach are analyzed. General aims of this work is to find the best way to adopt the ICP model in the Italian secondary schools situation; also explore if PBL can be an effective method to integrate environmental and health themes with curricular topics in a active learning way; and, at the same time, to increase student interest, motivation, abilities and awareness on the science topics.

PRESENTATION

In this paper we explore some obstacles to introduce active learning approaches to treat socio-environmental issues in secondary school during earth and life sciences lessons. Teachers' point of view and student's behaviour, answers and comments through an active learning approach are analyzed. General aims of this work is to find the best way to adopt the ICP model in the Italian secondary schools situation; also explore if PBL can be an effective method to integrate environmental and health themes with curricular topics in a active learning way; and, at the same

time, to increase student interest, motivation, abilities and awareness on the science themes. The main question of this research are followed: would ICP be an effective method to integrate environmental and health key themes with other science curricular topics?; would PBL be a effective method to increase student interest, autonomy learn, abilities, participation and motivation during sciences lessons?; would key themes treating help in developing contemporary environmental and health competencies in students?

CURRICULAR INNOVATION IN THE CLASSROOM

During spring 2008, secondary students of six classes in different Italian schools experienced a problem-based learning (PBL) approach to deal with scientific and socio-environmental issues related to aspects of water in natural and human systems. A PBL approach was never used before by teachers in these classes, and hydrosphere module was not taught previously. In a first group of three classes students were given a text with a scenario based on a socio-environment water issue, followed by a dialogue containing experts' perspective on how to deal with this issue. In a second group of other three classes students were given the text with only the scenario but no dialogue.

Nine teachers of six different classes in Italian schools agreed to dedicate two hours by four weeks to treat a curricular module introducing it with a socio-environmental problem. We started working with the classes with a problem regarding water supply with the aim to treat hydrosphere and the related socio-environmental problems. We interviewed teachers and gave questionnaires to students. According to evidences from interviews, questionnaires and teachers observations we decide change a bit the PBL approach. A problem regarding "the water and the hydrosphere" was given to students. It was a text where key words were explicit in a dialogue: "In the little town Montalto during summer water supply was interrupted several times. The town council asks to prepare a booklet to explain to the families why it is important to save water and how to reduce its consumption. What do you consider important to be written in the booklet?"

During fall 2008, we started working with the same classes with a problem regarding smoking with the aim to treat respiratory and circulatory systems. In this stage we also had the opportunity to work with pre-service teachers in comparing their point of view about ICP-PBL and, in general, active learning approaches used for integrating environmental and health issues in natural sciences secondary school curriculum. The same questionnaires was administered to pre-service teachers to compare their ideas about if and how integrate socio-environmental issues in earth and life sciences programmes. In this work, in-service teachers' and pre-service teacher' points of view with regard to the obstacles there are for the introduction of such issues trough an active learning approach are presented.

CONCLUSIONEvidences from the preliminary phase: reading PBL text students did not make a lot of effort to find out key words; students found difficulties in looking for reliable information; student are not used to analysis and synthesis of texts (they often copy and paste entire documents); there is not enough time to let everyone explain what they

have found during a session; students pay less attention while another student is speaking; students mainly know only the aspects they were searching for about; the role of tutor and observer overlap and sometime observations cannot be written down; division in two groups tutored by two different person introduce another variable, moreover this would not be the normal situation in secondary school where usually only one teacher per hour is available (in this phase this phase was adopted to develop the PBL in a situation of small group as similar as possible to the PBL standard). These evidences and other reflections lead to change the method to better fit in the secondary school situation. This was done keeping the main characteristic of PBL, i.e. the problem will be given before the argument will be treated by the teacher and students have to look for information and share them by themselves so that the process remain student centred and active learning. During the second phase, the differences from the first one were: classes were not divided into 2 groups; the researcher was tutoring the entire class; the text of problem was shortened and included only the introduction so that key words were not explicit; during the first session students read the problem and wrote in a paper what they would consider important; the discussion took place with the entire class; there was no division of arguments and all the student had to research information about the same matter; starting from the second session, information were compared, first in small groups, and then within the entire class. This was done in other 3 first classes of 2 different technical secondary schools (students 14-15 y.o.), one of these classes were a difficult one. Evidences of second preliminary phase: students were able to list 80-90% of the key words even if they were not explicit; during small group work time students tend to do things not related with the assignment; with the same amount of hours less aspects could be treated but everyone had to dedicate to them. Moreover in this curricular innovation some difficulties should be taken in account: teachers are available to use just little time for experimental activities; students usually are not autonomous in looking for information, analyse and synthesize them; scheduled sessions sometimes cannot be carried out because of unexpected school activities. Sciences teaching process in secondary school cannot ignore important environmental and health issues to be taught. We can usually include these issues in what we call education ecology, education for sustainability, environmental education, health education and their synonymous. All of the related subjects will be hereinafter referred to as, "key themes". These key themes are not covered at all during traditional lessons or they are taught marginally, just at the end of a chapter. I believe that these key themes have to be integrated in the secondary school natural sciences programme. They can be even used to stimulate interest in students using them at the beginning of more curricular natural sciences topics. Thus could lead to treat both curricular and key themes, integrating them together, using an active learning approach. References Colucci, L., Camino, E., Barbiero, G. and Gray, D. S. (2006). From scientific literacy to sustainability literacy. An Ecological framework for education. *Science Education*, 90, 2, 227-252. Colucci, L., Gray, D. S., Marchetti, D., and Camino, E. (2007). Science learning for civic society in a complex world. ESERA Symposium.

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