



Amphibians extinction risk A new learning and teaching methodology to preserve Biodiversity

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A Problem-based learning (PBL) model was performed to design a learning/ teaching strategy to make science studies more attractive (April-June 2009). The worldwide amphibians decline was tackled and analyzed by a class of 23 students (16 years old), at a secondary school, scientific area, within the European Euclides1 project (Enhancing the Use of Cooperative Learning to Increase Development of Science studies) which involved Italy, Bulgaria, Cyprus, Greece, Romania, Spain and Turkey.

The model was structured as follows: a) setting the rules to regulate the work group; b) scenario, an ill - structured situation for the problem definition; c) research path; d) evaluation; e) presentation.

The students investigated in the same way as scientists do on the amphibian decline (the problem). The questions to answer were: what do we know?, what do we need to know? what should we do? The teacher provided the didactic materials guiding them in the PBL process, facilitating a self-directed and independent learning. An on-line platform and Internet supported the project so improving communication between students as well as their social dimension and exchange of knowledge.

Four working groups studied specific aspects of the whole research (amphibians classification, biodiversity, anatomy; amphibians as bioindicators and threatened species; global warming and the chytrid fungus outbreaks; the frogs decline in Umbria). Regularly the students discussed their results within/among the groups to set the further developments.

The amphibians appear in the red list of IUCN. They are considered bioindicators in order to control the health status of our environment. Moreover they play a very important role in the ecosystems because they feed on potentially dangerous insects. The students analyzed the concept of the extinction of animal species as the frogs which live in the aquatic ecosystems (Rana Esculenta Complex, Trasimeno lake, Umbria). The disappearance of the amphibians give them the consciousness of environmental problems, such as: the global overheating, the pollution of the groundwater and the new related pathologies .

Their research focused some hypothesis about the amphibians decline:

- 1) the climate alteration caused by the greenhouse gases or others polluted substances produced by human activities;
- 2) the loss of amphibians habitat which is often altered by human activities such as agriculture, industry, building;
- 3) the diffusion of diseases among the species caused by particular pathogens;
- 4) the direct exploitation;
- 5) the invasion of other species and the following competition within the habitat.

Finally some solutions were proposed in order to protect the amphibian species:

- 1) the creation of specific habitat to aid their reproduction;
- 2) the reduction of the emissions of greenhouse gases or other dangerous substances;
- 3) the creation of frog farming;
- 4) laws which guarantee the protection of the species.

A field day was organized to study the habitat and the biological cycle of the amphibians. Moreover classical mythology and folklore about frogs were investigated (e.g. The second plague of Egypt, the Bible: the Exodus; The Frogs of Aristofane).

At the same time the PBL experimentation about the amphibian decline was carried out by the trainees in Science teaching at the Specialization School (Perugia University) during the workshop activities supervision.

At the end of the school year the students presented their research at the meeting “ Students talk about Science:

their experience working in the European Euclides Project” (IIS “L. da Vinci, Umbertide, June 9th, 2009).

1 Project Coordinator: Centro Studi e Formazione Villa Montesca, Città di Castello (Pg), Italy. Project Partners: Province of Perugia (Italy) University of Perugia, SSIS (Italy)