The Eurasia Proceedings of
Educational & Social Sciences (EPESS)
ISSN: 2587-1730

The Eurasia Proceedings of Educational & Social Sciences (EPESS), 2016

Volume 4, Pages 46-50

ICEMST 2016: International Conference on Education in Mathematics, Science & Technology

ENVIRONMENTAL EDUCATION THROUGH ORNITHOLOGY LIKE OPTIONAL CLASSES

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ABSTRACT: Students from the primary and secondary schools manifest a huge curiosity for nature and special high interest for the animals' life and behaviours. Unfortunately, the ordinary curriculum in *Biology* classes provides just summary information about animals' ecology, while data on their behaviour and complex interspecific relations established inside the ecosystems are completely missing.

The *Ornithology* classes can be included in the students' curriculum through the *curriculum in schools' decision*. The birds are very attractive through their plumage and songs, presenting a complex and very interesting breeding behaviour, but also a spectacular migration phenomenon. The birds are present near everywhere around us, populating a wide range of habitats, including the anthropogenic ones, which facilitate their study and observation. More than this, the birds are present any time during the seasons, even if their diversity is changing from one season to other. This allow us to identify the complexity of relations established between birds and their environmental, to understand the important position of birds in the trophic pyramids, to use these vertebrates like bio-indicators to assess the environmental quality and the trends in the ecosystems' dynamic.

Keywords: Ornithology, environmental education, birds, fieldwork.

INTRODUCTION

As we see during our classes, but also during our meetings in extracurricular activities, the students from the primary and secondary schools manifest a huge curiosity for nature and special high interest for the animals' life and behaviours. Unfortunately, in our country, the present ordinary curriculum in *Biology* classes provides just summary information about animals' ecology, while the data on their behaviour and complex interspecific relations established inside the ecosystems are completely missing. More than that, the number of *Biology* classes presents a negative trend in the whole curriculum starting from one or two hours per week during the primary and secondary school level till one or none per week in the high school level, especially in the last two years (thirteen years in this moment, from the primary school to ending of high school level). For this reason, our students have less and less knowledge in the environmental sciences and this situation becomes completely incomprehensible if we look to the profound and huge environmental crisis that takes its toll on our daily life.

In Romania, the *Ornithology* class can be included in the students' curriculum through the *curriculum in schools' decision* for the all pre-university education levels. One class of ornithology can sensitise the young students waking their desire to learn more about the birds, to discover their ecological necessities and the complexity of their behaviours, to understand the importance of birds inside the ecosystems, but also to learn how the people can help to improve the quality of birds' life and, finally, of their environment, too. Through the fieldwork activities, the students can learn also about the eco-tourism, traditional economic activities, including fisheries like friendly forms of local sustainable development in harmony with the biodiversity of one region.

The birds are very attractive animals through their plumage and songs, presenting a complex and very interesting breeding behaviour, but also a spectacular migration phenomenon. The birds are present near everywhere around us, populating a wide range of habitats, including the anthropogenic ones, which facilitate their study and observation. More than this, the birds are present any time during the seasons, even if their diversity and

- Selection and peer-review under responsibility of the Organizing Committee of the conference

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effectives are changing from one season to other. This may allow our students to identify the complexity of relations established between birds and their suitable environment, but also to understand the important position of birds in the trophic pyramids and ecosystems like whole. Our students can learn to use these vertebrates like bio-indicators to assess the environmental quality and the trends in the ecosystems' dynamic starting from the monitoring of birds' populations present in different types of habitats and their trends, by one side, respectively, the prompt response of the birds to the changes in their living conditions and the environmental degradation, too.

Step by step, following the discovery of bird life and the surrounding world, the desire for knowledge of our students can turn into a passion for the study and protection of nature, contributing to the formation of a responsible attitude towards the problems of the contemporary world.

METHODS and EDUCATIONAL STRATEGIES

We assumed that after completing the optional *Ornithology* class, our students will gain complex theoretical knowledge about birds and the ecosystems where these animals live and will develop their practical skills to explore the world around us. At the same time, the students will improve their communication abilities, solving skills to confront new situations and will develop the desire for an active involvement in the community life generally and in the projects regarding the nature's conservation in order to improve the environmental quality, especially.

Following to propose one optional class in the curriculum, first of all, the professor must establish the principal setting goals and some reference targets. The first ones are:

- ✓ development of interest for knowledge and discovery of the living world;
- ✓ correlating of the specific ornithology knowledge with other sciences (physics, chemistry, geography, mathematics etc.);
- ✓ development of creativity and skills to analyse, scientific interpret and process the observations on the surrounding environment;
- ✓ training and development skills of involvement and practice action to protect the environment's quality;
- ✓ training and development of eco-civic attitudes and behaviour.

In order to achieve these goals, the contents of the optional *Ornithology* class follow like reference targets for our students: to learn and understand the knowledge, concepts and methods specific to ornithology; to develop the skills and abilities to explore the nature around us; to develop their abilities of communication and one eco-civic behaviour.

The syllabus of the optional *Ornithology* class is structured in order to provide the covering of three stages: initiating, development and deepening of knowledge and practical skills. The learning activities performed with the students are specific for each topic and stage of learning process, combining classical and modern strategies of teaching and learning (lectures and discussions, direct and indirect observation, field trip and bird-watching activity, experiment and modelling, learning through discovery, solving-problem, simulation, learning through play, game-contests etc. – Costica. 2008), following an active involvement of students, but also the involvement of their parents in the development of educative process. For the end of each section of the optional *Ornithology* class, we planned a summary activity that allows the evaluation of acquired knowledge and the progress to the next section.

We designed also some activities with contest character providing different motivations and stimulations for our students, including the participation in some regional summer ornithological camps organised with the logistic support of the Branch Iasi of the Romanian Ornithological Society/SOR Birdlife Romania, while the most active students will be awarded with a participation in the ornithological national summer expedition organised by SOR/Birdlife Romania inside the perimeter of the Biosphere Reserve Danube Delta, during the summer holiday, in August.

The assessment of knowledge was provided for each level of learning, using the principles of formative and summative assessment.

RESULTS and DISCUSSIONS

We present our experience in teaching an optional *Ornithology* class for the secondary and high school levels, but also for the biologist students in the third year of university education level. We had no direct experience in teaching optional *Ornithology* class for the primary school level, but we worked with children under ten years old during our practical activities in field scientific trips or ornithological summer camps. The structure of contents is similar, but the difficult level of knowledge is different from one age to other, considering the

common level of previous accumulated knowledge and the existing ordinary practice skills. If for the theoretical knowledge we noticed a slight increase in the capacity of assimilation and understanding reported to the age of our students, for the practice skills and abilities in ornithology field we can mention the strong influence of long-time practice. Nor once we met students from secondary schools level that proved bigger abilities in birds' observation or identification than our university students if the first ones were involved in summer ornithological camps starting from early ages. More than this, the interest towards the birds and nature is not decreasing if the children start this kind of activities at 8 – 10 years old and don't give up it during the secondary and high school level of education, despite an eventually diminution of intensity in their direct participation during the puberty period. Perhaps, it worth emphasis the fact that the most qualified students selected like phD students in the doctoral school from our university during the last five years are coming from the children involved in ornithological activities starting from their ten – twelve years old through the optional *Ornithology* class or in the events and ornithological camps organised by the Romanian Ornithological Society/SOR Birdlife Romania.

The first part of our proposal optional *Ornithology* class in the stage of initiating is related to the achievement of the reference target regarding the learning and understanding the knowledge, concepts and methods specific to ornithology field using the Romanian or foreigner references (Ciochia. 2007, Ion & Stanescu. 1992, Brooke & Birkhead. 1991). First of all, we teach element of birds' morphology, anatomy and physiology. Our students learning to correlate these structural and physiological elements to the lifestyle and ecological niches occupied by the birds inside the ecosystems – for example, the flight features in birds and other living organisms (insects and bats, for example), terrestrial or aquatic locomotion of birds, high metabolism rate and special features of respiratory apparatus and it physiology, food resources and how the birds acquire their food, the nests, refuge and wintering necessities. The teaching means and materials consist in living or naturalised birds, atlases, birds' field guides and charts, slides and short documentaries movies.

We teach this theoretical part in the same time with some practical activities related to the activity of birds' feeding and birds' observation. For this, the students learn to build and manage one artificial feeding place for birds organised in the green areas around or from the immediately vicinity of school (Munteanu & co. 2000). They learn about the variety of food eaten by the birds, to use the binocular, telescope and a field guide in order to identify and recognize the birds (Bruun & co. 1999), but also how we can observe the birds without disturbing them and to complete a field observation sheet. We use to organize our students in small teams with different responsibilities in the practical area of our optional class and to achieve a periodical rotation of the teams in order to involve each student in the all practical activities. As we recorded during the years, these activities permit developing of individual work skills and of the teamwork abilities, too.

The second part of this segment of Ornithology class represents an introduction in the ecology (Ion & Stanescu. 1992, Parvu. 2001, Bennett & Owens. 2002) and ethology of birds, too (Ion & Stanescu. 1992, Cociu. 1990, Krebs & Davies. 1991). The students start by learning generalities about ecosystems and it components – the biotope and the biocenosis. Starting from the achieved knowledge about the food regime of birds, the students understand the mechanisms and complexity of the trophic relations existent in every ecosystem, discovering the manner of how each living organism represents a link of the food chains, producing and consuming organic substances. In this way, the students can understand the position and the importance of birds inside the biocenosis, the strong inter-relationships between very different living organisms, too. By continuing the practical activity of monitoring at the artificial birds' feeders, the students can discover the seasonal presence of the birds in our country and the existence of one seasonal dynamic in the qualitative composition of bird fauna's in one territory, the birds belonging to different phenological categories. From this point, we can teach about the birds' migration phenomenon (causes, preparations and development of migration, navigation). In the same time, we can pass to the introduction in the study of birds' ethology, starting with the territoriality and mating display, going to the breeding season (nests, incubation, hatching and parental care). In this section, like new practical activity, during the winter time, the students learn about the artificial nests for birds (Munteanu & co. 2000); in the late February - early March, they build and install artificial nests in the green spaces surrounding the school's area and in some large parks or gardens from the city (for example, in the Botanical Garden). Starting from the middle March, we organise the students in working-teams that survey the occupation of artificial nests by different bird species.

The contents and practical activities for the development level of the optional *Ornithology* class can be described like a transition to the applied ornithology. Our students begin to discover the differences between the bird fauna in different ecosystems and habitats from their area and our country, but also to identify the main ecological categories of birds starting from their preferences for food and habitats. In the second part of this level course, the teaching and learning activities follow the diversity of birds on the Earth, connecting the birds' presence with the main biomes and ecosystems from the rain-forests to the polar areas. In this section, the students learn theoretical aspects of the birds' conflicts and manner to solve its, territories, mating systems and incubation strategies, social behaviour and systems of communication using visual signals and sounds in the birds' world.

For the practical part of this section, we continue the previous monitoring activity – we stop to assure food supplying in the artificial feeders, but the students focus their attention on the artificial nests collecting information about the bird species that occupies the nests, the birds' activity and behaviour. They complete special observation sheets. In the same time, we teach about the methods for birds' study and monitoring (Munteanu. 2000). After this, we organise one-day field trips to observe, identify and recognise birds in the Botanical Garden from the city and in one wetland from vicinity. The students are organised in working-teams with different responsibilities, each of it doing a specific part of the practical survey – for example, during our field trips, we used to pay our attention for the physic and chemical parameters of biotope, vegetation and habitats, insects, amphibians and reptiles, respectively, birds. We elaborated or adapted some field observation sheets that each team must complete with the collected information during the trip. After the trip, the students learn to organise and analyse the collected information in order to assess different aspects of birds' presence and dynamic, but also their relationships with the other components of biocenosis in the investigated sites. Finally, they learn to write and present an ornithological report. All these activities assure to our students the development of abilities to organise one correct scientific investigation project, an obviously increase of their capacity and skills to focus their attention on the main aspects in one field research approach, to assume specific responsibilities inside one working-team and to establish correct connections between the observed facts, analysing the biological aspects of biocenosis' components and their inter-relationships, writing a first scientific report.

The third level follows the deepening of knowledge in ornithology field. For this reason, we designed the contents and practical activities through one multidisciplinary approach, taking account both by the ornithology knowledge and human ecology domain, too. By one side, our students can learn about birds as very sensitive and valuable bio-indicators, giving us information - through their diversity, effectives and trends - about the habitats and ecosystems' alteration, sometimes for apparently invisible or unknown causes. By other side, they identify the anthropogenic activities with low to very strong impact on the birds and biodiversity, understanding the mechanisms of this impact. Looking for the other countries experience and cultural approach, the teaching and learning process confront our students with different manners of environmental issues' management and with the real possibility of human communities' development in harmony with the surrounding environment by encouraging the traditional agricultural, fisheries and animals' husbandry, eco-tourism and rational long-term exploitation of the natural resources. We present also the ecological restoration like a very new approach for the rehabilitation of the profound damaged ecosystems that exist in our country, sometimes in the immediately proximity of the school. In the section dedicated to the birds' protection, we teach about international and national environmental legislation, presenting some action plans elaborated and implemented with the goal of saving from extinction or to improve the present situation of threatened bird species present in the Romania's bird fauna, too. Finally, we teach our students to read the mythology, legends, ethos creations and other traditional practices through one ornithological lecture, identifying the elements that generated ancient and present beliefs regarding some bird species.

For the practical part of this level class, we proposed to our students projects on two different topics: using birds as bio-indicators in order to assess the environmental quality in one territory, respectively, using birds as bio-indicators in order to assess the success of one ecological restoration programme. The first topic was applied with students from secondary and high-schools, organising the birds' monitoring in some green areas inside the city or in the surrounding cultivated lands in the rural areas. The second topic was designed for the students from specialisation biology-chemistry in high-schools and with university students in their third bachelor year or in the master degree level (the last one, like practical activity for the discipline *Ecological Restoration* in the curriculum of two specialisations – Biodiversity Conservation, respectively, Environmental Consultancy). The students form teams with different tasks, working from the documentary step, through the project elaboration and development, to the writing and public presentation of one final report. The teacher is the coordinator and supervisor for the all teams not only for the field and office working for analysing, processing and interpretation of collected information in order to finalise the scientific report, but also is the manager and moderator that encourage the communication and exchanging experience between the members of each team, respectively, between the all teams.

For the all three teaching and learning levels designed for the optional *Ornithology* class we established criteria and periods for the formative and summative assessment of the accumulated knowledge, but also different manners of motivation and stimulation the students' active participation in the segments of theoretic and practical activities in this class. For example, we organised informative panels inside the classrooms with periodically updating, related to the events from the ecological calendar. Using the field observation activities around the artificial feeders and nest boxes, respectively, the information collected during the one-day field trips, the students learn to compile and write scientific reports that they can present in different scientific meetings and symposiums organised at regional or national level, sometimes with contest character. We organised also contest-exhibitions related to different events, our students presenting original drawings or photos inspired by birds' life or behaviour and the habitats where the birds are living. The students that achieved the best results

were awarded with a free participation in summer ornithological camps organised with the logistic support of the Romanian Ornithological Society/SOR Birdlife Romania.

Our students appreciated positive the possibility of learning out-side of classroom and regarded like very important the possibility of working inside one team for one project, but also the meetings with invited ornithologists from which they could discover one interesting and yet unusual job in Romania. The participation in the summer ornithological camps and in the ornithological national summer expedition organised by the Romanian Ornithological Society/SOR Birdlife Romania every year during the summer holiday, in August, inside the perimeter of the Biosphere Reserve Danube Delta, was regarded like a big challenge and opportunity by all the participants.

Finally, we can notice also the interest and active support that we received from our students' families that found the optional *Ornithology* class like an useful and very attractive manner to take away their children from one sedentary lifestyle that becomes a dangerous habit in the present very high-tech society.

CONCLUSIONS

In Romania, the *Ornithology* class can be included in the students' curriculum through the *curriculum in schools' decision* for the all pre-university education levels, meeting the curiosity related to the nature of students.
The syllabus of the optional *Ornithology* class is structured in order to provide the covering of three stages: initiating, development and deepening of knowledge and practical skills.
The scientific contents are correlated with the previous level of knowledge and experience of the students.
We designed specific practical activities for each level of teaching and learning process, increasing the complexity of practical component step by step.
For the theoretical knowledge, we noticed a slight increase in the capacity of assimilation and understanding reported to the age of our students, while for the practice skills and abilities in ornithology field, we can mention the strong influence of long-time practice.

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