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**The Role of Environmental Education  
in Conservation Biology**

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*Around the United States, students are being taught legends, exaggerations and parts of the truths about environment (Sanera and Show 1999)*

Understanding environmental education is a keystone component in order to achieve the ultimate goal, conservation biodiversity. Therefore, it is important to distinguish between environmental education and science. Environmental education, as defined by Arai and Sprules, is education that concentrates on the relationship between humans and their environment (Arai and Sprules 2001). Another definition by Wilke, environmental education is “a learning process that increase people’s [students] knowledge and awareness about the environment” (Arai and Sprules 2001, np.)

On the other hand, science can be considered as an effective tool and one approach of knowing the environment. Lack of science will no doubt negatively affect better understandings of the environment. For instance, in his article, Cobb states that, “authors of ‘Science for All Americans’ pointed out serious efficacies in science literacy and methods of science instructions for American students” (Cobb 1998, np.). He continues, environmental science needs to be integrated with social science - e.g. biology, chemistry, and geology with economics and politics - in order to create new ideas of how environment works as well as how things interact with one another (Cobb 1998). Environmental issues and science education are very complex to be addressed in a single course. Thus, efforts must take place in early age and continue through all levels of education.

Having such a complexity, the need to include environmental education in some curriculum, if not all, is very important. Arai and Sprules say, “ environmental education should be interdisciplinary and actually included across the entire curriculum and in all subjects” (Arai and Sprules 2001, np.). Students, through environmental education, will be able to develop

appropriate solutions to important environmental issues, think in critical ways, take suitable actions, and participate effectively in both local and global environmental problems. Learning environmental education will provide students with the opportunity to exchange various opinions and ideas about the main concepts and skills that are very important in the society. Moreover, environmental education enables students to understand details and connections that they discover rather than memorizing of solid facts and concepts in classrooms (EETAP, Environmental Education Training Partnership 1999).

### **Misinformation Factors:**

Factors lead students to misinformation about their environment may include one or more of the following:

#### **1. Curriculum:**

There are several factors that might contribute to environmental misinformation. One of the central factors is curriculum. I think that curriculum is the key component through which students communicate with one another and interact accurately with their environment.

Curriculum can influence students' attitudes toward environmental issues either positively or negatively. Sobel says that fourth grade children should not experience serious problems in their environment because that would disappoint them and paralyze their enthusiasm (Sobel 1999).

Adler reveals that many texts show "haunting visions" of the environment (e.g. acid rain, species loss, and global warming) (Adler 1993). Thus, selecting appropriate topics for elementary curriculum that deal with environment is significantly important. Improper choices may lead to undesirable outcomes. For example, Germans implemented a national curriculum. Their goal was to enhance the awareness of elementary students about environmental issues and how to effectively participate in solving them. However, it turned out that contradictory results

happened. It was obvious that those students were given more than what they could possibly control and solve (Sobel 1999). In addition to curriculum, one important issue is the quality of the classroom's materials. The absence of the appropriate tools that are very essential in dealing with environmental issues leads both teachers and their students to misunderstanding the environment because teachers do not have alternate choices to approach environmental issues in the classrooms (Adler 1993).

Another situation is how many environmental topics are given to students. The amount of environmental education that is included in the classroom completely depends on the teachers. However, it is not a large amount of subjects and materials. In a study conducted by Arai and Sprules in British Columbia in 2001, teachers were asked, "Do you incorporate environmental education in your classroom?" The responses were 88% of the teachers incorporate environmental education. However, when they were asked, "How often do you incorporate environmental education in your classroom?" Thirty-three percent of the responses were monthly, 27% weekly, and 11% daily (Arai and Sprules 2001). Moreover, students learn hideous things about the environment. For instance, "children learn that ozone causes cancer", "global warming will melt the ice and flood coastal cities", and "oil will run out before they get old" (Sanera and Show 1999).

Environmental educators think that it is imperative for environmental education to have more attention throughout curriculum (Arai and Sprules 2001). In his article, Adler states that even though there are environmental messages directed to students, they are not learning enough about the environment (Adler 1993). Insufficient hands-on activities and information designed for students and teachers contribute to misinformation. He continues by insisting that the

students will understand better when they are given more adequate science and history (Adler 1993).

To draw a general conclusion, curriculum has been contributing to some extent to the miseducation of students in K-12. Therefore, I believe that misinformation about their environment leads to the insufficient understanding of the real world around themselves.

## **2. Teachers' negative roles:**

Like curriculum, teachers' negative roles are one factor that contributes to misinformation about the environment. There are several things that may cause such negative roles. For example, teachers may argue that they have a limited time to cover the required curriculum rather than spending time on some environmental issues. Inadequate training is another example. Such teachers either do not receive appropriate trainings during their previous teaching preparation in colleges or pay no attention to the importance of environmental issues. Moreover, they may not have enough information and guidelines that enable them to dedicate some times for environmental issues. In light of these roles, students are detached from the world around them, so they are restricted to what being taught in classrooms. However, teachers differ from one another in terms of teaching environmental education in their classrooms. In Arai and Sprules's study, some teachers reported that they never incorporate environmental education in their lessons. Also, since new teachers are busy preparing for their lessons, they tend to not include more environmental education in their classrooms (Arai and Sprules 2001). Some teachers tend to teach certain topics such as rainforests rather than forests because rainforests are much tidier to be taught (Sobel 1999). Teachers often concentrate on specific topics, which are seen as adequate. However, their lack of training and insufficient knowledge in science and math as well as old versions of textbooks and teaching methodologies lead to these problems (Cobb

1998). Furthermore, ineffective teachers have a tendency to rely on teaching for structured questions and answers rather than motivating students to explore and discover for understanding and reasonable criticisms.

### **3. Attitudes:**

Students' understanding of and attitudes toward environmental issues are among the significant factors for learning success in terms of environmental conservation (Bradley et al. 1999). Most people believe that the foundation of their relationship with the environment is formed during the childhood ages (Chawla 1999). However, essential consideration that must be taken into account is a student's age. Generally, students begin to build on their attitudes toward their surrounding environment at an early age (Bradley et al. 1999). Thus, the critical age stage is between seven to eleven years old where changes can take a place (Sobel 1999). For instance, some environmental issues that are appropriate for middle school students may not be suitable for elementary school students. Sobel emphasizes the importance of the age appropriate curriculum and the convenience of the including environmental topics in the process of selection the curriculum. Furthermore, he believes that young students – kindergarten through fourth grades – should not experience ghastly environmental problems because it would be difficult to encourage them to provide reasonable solutions to make better changes to protect the environment (Sobel 1999). Therefore, dealing with large environmental problems in lower grades will no doubt build negative attitudes and prevent those students from taking positive actions both in class and later in life. As a result, those students will be misinformed about their environment in the future. However, students in fourth grades can learn, as the Indiana Academic Standards suggests, how different organisms satisfy their needs in their environment, interact

with one another in various ways, and describe how waves, wind, water, and glacial ice shape and reshape the earth (Indiana Academic Standards 2000-2001)

Sobel explains when thinking of designing environmental curriculum, it is necessary to have a clear perspective of the association between the natural world and the development of the students. Also, he sees that the most proper age to introduce basic environmental problems in elementary grades is the fifth and sixth grades (Sobel 1999) where their attitudes have not solidified yet (Eagles and Demare 1999). Students at the age of twelve years old will be shortly entering a new developmental stage, adolescence. By this age, students will have acquired the foundational knowledge that enables them to understand and formulate some environmental issues (Bradley et al. 1999).

### **Avoiding Misinformation:**

Having discussed some of the important factors that lead to misinformation, there are various possible ways to prevent or at least lessen such miseducation about the environment. The following factors are considered by several studies as solutions for misinformation in K-12:

#### **1. Knowledge:**

Thinking of remedies, there are several ways to keep students away from environmental misinformation. One way is consistent knowledge. Many studies show the positive effects of knowledge on students toward their environments. A study conducted by Bogner reveals that there is a positive relationship between knowledge and attitudes toward the environment, which leads to better environment quality (Bogner 1998). Another study by Bradley et al. (1999) shows that there is a statistically significant correlation between attitudes and knowledge. The study finds that “students scoring higher on the knowledge inventory tend to have more favorable environmental attitudes even before exposure to the environmental science course” (Bradley et

al. 1999, np.). Further, the study concludes that greater knowledge might help students improve their environmental attitudes (Bradley et al. 1999). Cobb mentions that one of the objectives for the environmental education established at the Tbilisi conference was knowledge, “*help students to acquire a basic understanding of how the environment functions, how people interact with the environment, how issues and problems dealing with the environment arise, and how they can be solved*” (Cobb 1998, np.) (Emphasis added).

## **2. Combination:**

Having discussed the positive effects of knowledge, combination of science and environmental education is seen as one of the main factors that can diminish misinformation about the environment. Cobb says, “we need to mix up the education milieu a bit more, but only with careful selection and monitoring of components will the mixture be effective” (Cobb 1998, np.). In miscibility, environmental education would be concerned with the environmental issues, whereas science is responsible for scientific knowledge. Therefore, there would be no need to additionally load the overcrowded curriculum. Cobb, for instance, explains that in a physics class, the teacher can merge both environmental education and scientific knowledge (e.g. melting of ice caps and greenhouse, erosion/flooding and Stefan-Boltzmann law). Then he concludes his article by emphasizing that combination of environmental education and science is the method that should be taken to promote students’ understanding of environment in all education levels (Cobb 1998). In combination, the teachers’ role is very important to effectively achieve better understanding.

## **3. Teachers’ positive roles:**

Personally, I believe that teachers are the backbone in the educational process. Effective and knowledgeable teachers can play a major role in affecting and enhancing students’

understanding of the environment. Sobel points out an excellent psychological issue. This issue is love and knowledge. Burroughs in Sobel says, “knowledge without love will not stick. But if love comes first, knowledge is sure to follow” (Sobel 1999, np.). Thus, it is obvious that this message is aimed at teachers in the first place. To avoid inaccurate information about the environment, teachers should allow opportunities for all students to love the natural world, and then learn about it.

Through environmental education teachers have the opportunity to encourage their students to learn, inquire, analyze, decide, communicate, and participate. As a result, students will become effective thinkers as well as positive action takers in their environment, and at the same time, they construct their own knowledge (Wilke N.D.). In addition, Cobb explains that teachers should concentrate on two important things. First, they should improve their students’ knowledge in terms of scientific concepts and inquiry. Second, they should allow sufficient time for their students to apply such concepts to the real world situations. Third, they need to create the most appropriate atmosphere for learning to occur either indoor or outdoor classes (Cobb 1998). Therefore, to achieve such goals, I believe, as Cobb clarifies, that one technique is cooperation. Effective teachers work collectively, exchange ideas and opinions, come up with appropriate environmental problems for their students, and monitor one another.

Effective teachers, through environmental education, work very hard to build loyal student citizens to the environment. A study accomplished by Chawla finds that environmental teachers are expected to prepare students to be successful citizens as well as leaders who will be able to take affirmative actions in behalf their environment (Chawla 1999). Being strong citizens, the students understand and acknowledge their duties and responsibilities toward their environment. Environmentally concerned teachers can integrate the value of citizenship in their

curriculum. For example, Wisconsin's curriculum model for environmental education stresses " 'perceptual awareness' and 'knowledge' as prerequisites for instruction citizen action" (Wilke N.D., np.). One of the model's findings is that students feel and believe that they can thwart and resolve environmental problems (Wilke N.D.).

#### **4. Family and school:**

It is considered that both the family and school can put a great deal of attention to the environmental values. In a study by Chawla, responses of 33 out of 43 report affirmative influences by their family members (Chawla 1999). There are three items that can help teachers and parents to select the appropriate activities, which are based on the child's age. They are the following: (a) *Empathy* (3-7 years) where children are being emotionally impassioned to the natural world by songs, stories, and games, (b) *Exploration* (7-11 years) where children are being plunged into the physical and natural world (e.g. creating a small imaginary world, taking care of animals, and gardening the earth), and (c) *Social action* (11-14 years and beyond) where children are being involved in more difficult social tasks such participating in school expatiations, passing town ordinances, and testifying at hearings (Sobel 1999).

In addition, personal experiences are part of the family and school. Many studies suggest that immediate experiences increase environmental concerns (Bogner 1998). Experiences come from either home or the school. From home, as previously mentioned, most people indicate that their good attitudes toward the environment are formed in their childhood (Chawla 1999). For instance, the experience energy is one of the most environmental concern issues. This concept can be taught at home by locating all possible sources that can provide it such as electricity, battery, and fuel power (Heimlich 1994). On the other hand, the school can form experiences through outdoors programs.

## **5. Environmental education programs:**

The states of Arizona, Florida, Iowa, Pennsylvania, and Wisconsin are among the states that have passed laws for improving environmental education in local school districts (Cobb 1998). For environmental education programs to be successful, these programs must be designed in a manifest understanding of the students (EETAP, Environmental Education Training Partnership 1999). All environmental education programs increase the students' understanding and awareness of the environment in American students. One of the environmental education programs implemented by the state of Wisconsin. Wisconsin's model aims to integrate environmental education into curriculum and develop assessment as well as better trainings for teachers (Cobb 1998). In addition to this model, Wisconsin's model academic standards for environmental education emphasize the ability of the students to identify, investigate, and evaluate various environmental problems. The students also are expected to focus on both critical thinking and understanding as an approach for effective learning (Fortier et al. 1998).

By and large, outdoors programs improve conceptual understanding, develop social skills, increase environmental consciousness (Chawla 1999), enhance affirmative enthusiasms, and influence students' behavior (Bogner 1998). Furthermore, several studies conclude that family, friends, organizations, programs, media, and reading have a great impact on students' understanding about the environment (Chawla 1999), (Sanera and Show 1999), (Eagles and Demare 1999), (Sobel 1999).

### **Conclusion:**

Obviously, there are exigent needs for environmental education in the K-12 classroom to be done. Curriculum should be designed in a way that helps students to develop strong positive attitudes toward the environmental issues. Further, teachers are required to improve themselves

to reflect the importance of preventing the horrible problems to save the environment. Teachers should receive sufficient training in environmental education.

Teachers, parents, researchers, politicians should work hand in hand to create a proper sense of the environmental for all students in all levels of education both inside and outside their classrooms. However, ignoring that would cause a great deal of injustice not only to students but also the environment.

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