

A Suggestion about Environmental Education Using the Five Senses

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In the past, the enclosed coastal sea provided a popular and familiar resource for us. But, we have been prevented from getting access to enclosed coastal seas by reclamation work. For that reason it has been difficult to go seashell digging. At present, children's contact with animals and plants that live on the seashore has been decreased.

The author believes that the starting point of environmental education is experiential contact with the unlimited natural coastal seas, experiencing with the five senses called proto-experience. Especially the experiences with the five senses such as touching with the hands and smelling, eating living things that dwell in coastal seas are important. These kind of experiences will develop a sense of importance and longing for the seas after one enters adulthood. If provided with such rich experiences, the concept of preserving the ecosystem will become fixed. Then correct perceptions about maintaining and utilization of coastal seas will develop both reason and sensitivity. In order to advance environmental education efficiently, it is necessary to experience the coastal seas with all five senses.

Especially in the tideland area of enclosed coastal seas like the Seto-inland sea often times shellfish collecting was popular and it was a source of proteins. On the seashore and sand beaches children played and enjoyed collecting starfish, sea anemone, hermit crabs and other small creatures. By that activity children through their actual experiences could learn the relationship between living organisms and their habitats and also the diversity of living creatures. But as a result of economic development these tideland areas have been reclaimed and no more can we enjoy shellfish gathering and other activities on the sea shore. It's very difficult for us to have easy access to the waterfront. Citizens of Kobe City can no longer enjoy shellfish collecting or seashell digging these days. For those limited number of citizens of Kobe who still remember their experiences of playing on the seashore and sand beach, it is pleasant to recall memories of the smell of the sea and sound of sea waves.

We were interested to determine to what extent children living in the city of Kobe had experience in directly playing or exposing themselves to living creatures. Kobe City Institute for Educational Research conducted a study to determine to what extent primary school and junior high school children in the city of Kobe had direct experiences with plant and animals on the seashore. We used a colour questionnaire sheet to see to what extent they could recognize the names of living creatures and plants. In regard to seashore creatures we picked barnacle, sea louse and sea let-

tuce. The percentage of students responding "Yes" to whether or not they have ever touched barnacles was about 40% for the 7th grade in a junior high school. For sea louse about 40% and for sea lettuce about 70%. These figures were much higher than the figures that we had expected. Maybe the reason why we received higher percentages than we expected resulted from the format of this study. Even if the respondent has only touched or seen these living creatures and plants once or touched them many times in both cases they are counted as those who have ever touched the living creatures on the seashores. And also given the lack of direct association between these students and seashore living creatures and given the low popularity of the names of these living creatures those children could not really give proper responses to the living habitats for these creatures. For example in the case of barnacle only 6% correctly perceived the habitat of the barnacle. In the case of sea lettuce only 3% of the respondents gave a correct response in regard to the habitat area of sea lettuce. Even when they knew the names they didn't know where these barnacles or sea lettuces grow. This indicates that association of these children with seashore living creatures is very minimal compared to the relationship to land creatures.

Well, the significance of environmental education has been pointed out for many years in other countries and environmental education is regarded as an important element of science education. Professor Emeritus of Chiba University, Dr. Numata, says that the two major pillars of environmental education are nature education and environmental conservation education. The most important element for environmental education is to enable children to grasp the real existence of the nature as it is. Also in thinking about the way to view the environment and to make proper use of the environment, the correct understanding of the reality of the nature is necessary. And further I should say that a direct relationship and direct exposure to the sea water and sand and living creatures on the seashore is very important. As mentioned earlier, children of today only have direct experiences to expose themselves to the seashores living creatures. In another words the basic foundations that support the growth of environmental education is being reduced.

Dr. Yamada of Hyogo University of Teacher Education says that it is very important to have proto-experiences with nature utilizing the five senses including smelling and tasting and touching. In order to perceive things it is essential to touch, to smell, to taste, to see and hear. Especially the three senses: to touch, to smell, and to taste, constitute the receptors to chemical substance, and even protozoas have these basic senses. From a phylogenic perspective the three senses: to touch, to smell, to taste, are possessed by almost all living creatures from lower species to higher species, so they are the most fundamental senses for the survival of living creatures. On the otherhand, to see and to recognize a pattern and perceive sound are only possessed by a higher species from a phylogenical perspective, so they are rather accessory rather than fundamental elements of those creatures. In this way to touch, to smell, and to taste are deeply related human perceptions and often times

the experiences that appeal to these three senses are stored in the paleocortex for a long time so from a cerebrophysiological perception this is very important. Therefore, Dr. Yamada has argued about the importance of proto-experience. So in the future in school and other learning institutions we should put more concentration on the importance of these three senses.

Again, the definition of the proto-experiences are as follows; a personal experience in which living things and other natural matter are perceived, or experienced as natural phenomenon brought about by the five senses--the sense of touch, smell, taste, hearing--which influence the subsequent perception of things and phenomenon. As I argued earlier the starting point of environmental education comes from experiences using the five senses exposed to nature and preschool days are the most suited to gain such experiences because children at this developmental level show very strong interest in animals and plants. Of course, in primary schools and junior high schools we should provide those children with opportunities to expose themselves to natural elements. In that way only knowledge becomes real. In the tide pool children can enjoy collecting fish, hermit crab, starfish or they can play with sea anemone or they can bake oysters that they have collected. In the past these things have not been considered educationally significant. But today we need to have a different perspective. The smell of the sea or the sound of waves constitute important elements of the memory. If we are indifferent to pollution in the sea we cannot really enjoy these experiences. Therefore, proto-experience is very important as a foundation of environmental education.

Proto-experience when combined with school knowledge becomes most effective. For example, those children who have ever collected living creatures in the tide pool on the seashore can through their experience understand where these creatures live. The kind of crab which lives on the rocky seashore cannot live on the sand area or razor clam which lives in the tide pool cannot survive if the tide pool disappears. If they have such proto-experiences they can come up with concrete images of the habitats like the tide pools and seashores but if they do not have such experiences they can have only a vague image of the sea.

In order to effectively utilize sea coast areas and resources by protecting and conserving the sea environment, we should actively promote environmental education from infant to adulthood dependent on each group's developmental level. In more concrete terms for smaller children or lower grade children in primary school we should actively bring them outdoors and we should enable them to have very free activities outside and expose themselves to living creatures. For higher grade children in primary schools and junior high school students who can think and discuss logically we should teach about the ecological system and maybe we should encourage the students to dissect bonitos or sharks. And to understand the concept of the food chain student can examine the contents in the stomach of these fish. And from these activities we can enable students to understand the human's part of this food chain. For senior high school students we should encourage them to think in abstract terms

about the importance of consumer activities. In this way we should set up appropriate educational facilities for enforcing environmental education. We should develop curriculum and we should develop teaching personal. And educational facilities have to be accessible to all kind of children in the local community through children's organizations, schools, and kindergartens.

In the Hyogo prefecture we still have a natural coast line in some parts. If we can established educational facilities which I think is our responsibility and duty in that way we can leave our beautiful sea coast environment as a legacy for our decendants in the 21th century.