

What should Biodiversity Education be doing?

Looked like a nice clear topic – “Biodiversity education of ecosystems of low apparent value”. However, in considering this, annoying questions reared their heads at me! What is just “biodiversity education”? How are ecosystems deemed to be of ‘low apparent value’? Should we be encouraging children to take on board notions of such values, especially when most children live in urban ecosystems, not natural ones, and are sheltered from experiencing the range of values ecosystems may provide? What should biodiversity education be doing?

Biodiversity Education

The Convention for Biological Diversity (CBD, 2008) describes ‘Biodiversity Education’ as

“Teaching students about biodiversity, or the variety of life on Earth,”

This simple definition implies biodiversity educates about what the living things are. Unrestricted to wild or native life, domesticated ones can be included. (Would this affect its apparent value?)

In its glossary, the CBD (2008) has a more complex definition of biodiversity, and hence for biodiversity’s educational content.

“Biodiversity : the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic systems and the ecological complexes of which they are part of; this includes diversity within species (genetic), between species and of ecosystems.”

The International Union for the Conservation of Nature (IUCN) uses almost the same definition (IUCN, 2013).



United Nations Decade on Biodiversity

The CBD (2011) puts humans with other life forms in its United Nations Decade of Biodiversity (UNDB) logo above. Its slogan, below, could be seen as a goal for biodiversity education (CBD 2011).

Living in harmony with nature

The United Nations Educational Scientific and Cultural Organisation (UNESCO, 2014) gives reasons for including humans in its definition

“Biodiversity is the foundation for healthy ecosystems and sustainable human development. It touches on all aspects of our lives - from our security to our welfare, from our social relations to our health.”

So what if the definitions differ? Become more complex? Will it affect what biodiversity education covers? Will it affect how values might be assigned to ecosystems, and from there to choices about what content to teach? If biodiversity is just about diversity of life forms, a limited range may create a low apparent value. However, if how important those life forms are in interacting with people’s lives is a part of value, then their rating may be much greater than their simple numbers.

But do ecosystems operate alone? Aren’t they too in hierarchies, contributing at different levels to the global ecosystem Gaia? The IUCN (2013) definition of biodiversity at the global level reminds us of the challenge to see the whole bigger picture and educate for it too.

“Biodiversity is extremely complex, dynamic and varied like no other feature of the Earth. Its innumerable plants, animals and microbes physically and chemically unite the atmosphere (the mixture of gases around the Earth), geosphere (the solid part of the Earth), and hydrosphere (the Earth’s water, ice and water vapour) into one environmental system which makes it possible for millions of species, including people, to exist.”

Is it any wonder Tidball & Navarro-Perez (2012) when reviewing 20 years of ‘biodiversity education’ (since the CBD began), lamented that its approach, concept definition, and communication are still ‘ill-defined’, especially when faced with the growing ‘disconnect’ between people and

Nature? Does this matter for biodiversity education in its practice?

Do the definitions above show increasing complexity in defining biodiversity? Could this be useful in education? Putting them together, biodiversity education progresses in stages:

- 1 identification of living parts of an environment
- 2 recognition of the non-living parts and how connections between parts work in that environment as an ecosystem
- 3 awareness of humans within the ecosystem, benefits to us and impacts we make on it
- 4 action to improve the biodiversity, environment and ecosystem for the future.

Ecosystems

Two similar ecosystem definitions, from the IUCN (2013) and Moyers *Earth on Edge Report* (2001), support biodiversity education in my stages 1 and 2.

*“An **ecosystem**: a community of plants, animals and smaller organisms that live, feed, reproduce and interact in the same area or environment.”*

“Ecosystem - a community of species that interact with each other and with the physical setting they live in”

These could apply at different scales and types of environments:

- natural environments, e.g. rainforest,
- areas as tiny as the world outside your window,
- small scale areas, like an urban park,
- regional environments, like the Wimmera,
- national scale area/environments, like the ‘Great Barrier Reef.

The CBD (2008) *Glossary* detailed ‘environment’:

“Ecosystem : A dynamic complexity of plant, animal, and microorganism communities and their non-living environment interacting as a functional unit.”

“Environment : the circumstances or set of conditions—land, organisms and climate—that

surrounds where one lives or where a group of organisms or a community lives.”

These definitions enlarge biodiversity education, putting it in my stage 2 - from life forms (biosphere) to the rest of the environment on which they depend: the atmosphere (air), hydrosphere (water) and lithosphere (land).

It is rare now to find environments which have nil human impact. The Birchip Cropping Group (BCG, 2005) recognized this by including ‘humans’ in its ‘ecosystem’ definition.

*“**Ecosystems** are a dynamic complex of humans, other species & the non living environment, interacting as a functional unit.”*

This takes ‘biodiversity education’ to my stage 3. Interactions between living things and humans and their modifications to environments, like infrastructure, can become an aspect of biodiversity education now. What step is needed to reach action, my stage 4?

Valuing Ecosystems.

Is it necessary for us to value something before we will act? Does it happen intrinsically or can it be learnt by tools for ecosystem valuation? Some audits are for student use, but most are for managers to use in allocating resources. The web shows plenty of methods for this, e.g. at <http://www.ecosystemvaluation.org.htm> They can be at global, national or regional levels, and for professional, community or school uses. They can quantify various aspects of an ecosystem, derive overall scores, and be used for comparisons and rankings.

How valid are ecosystem values then for educational uses? Do they reflect, or create, prejudice? Will experience or culture affect valuations of ecosystems? Below are a couple of photos to stimulate your thinking about these questions, with hopefully unfamiliar environments and ecosystems for you to value. Give an ‘apparent’ rating - low, medium, high - for these ecosystems based on their photos. Then reflect on your basis for this rating before reading the comments.



The left photo is of a woodland mountain ecosystem. It is in the Orrika Valley in the Atlas Mountains, in Morocco. (Your rating was? Based on?) A Moroccan rating this might appreciate:

- the coolness of its local climate,
- the valley sides with their green colours among the red rocky slopes
- the shade of its trees,
- the local wildlife- monkeys on the rocky slopes, above waiting for the people to leave and to scavenge their rubbish,
- the sound of bird calls in the gorge
- the short climb up the gorge to its refreshing waterfalls,
- (but they might not notice the straggly plants growing between rocks on those slopes!)
- the trickling water cooling drinks for sale to the climbers,
- the importance of the water taken from the river for irrigation further down the valley,
- (but they may not have known about the dragon fly nymphs that I found in the water)
- the flat space to accommodate many people in this natural environment an hour from the heat and noise of Marrakesh.
- The sound of the running water as they sit in and beside the river, relaxing under umbrellas

The Marrakesh staff at my riad held this valley in very high esteem. They were so keen for me to get out there and I was glad I did, because it also gave me a new perspective about how people value, utilise and adapt natural environments in a world of ever-increasing urbanisation.

The right photo is of a farmland ecosystem, an olive grove on the outskirts of Marrakesh. A Moroccan might appreciate:

- its proximity to Marrakesh,



- the space to relax with family and friends
- the shade – note the family camped under a tree for the afternoon
- the green colours
- the birds in the trees
- the irrigation water that had left scattered puddles
- the frogs chirping under the puddles
- (but they might not have noticed algae in those puddles)
- the olives that would come from the trees

How did you rate these ecosystems? Did you include values like the Moroccan's? Was your rating based on a complete enough knowledge of the ecosystem, including people's interactions with it? Did you discover some bias in yourself? Has this valuing activity produced any desire for action here?

Probably not! So how do I think valuing ecosystems might lead to my stage 4- action? I expect it to come intrinsically. As depth of knowledge of the complexity of an ecosystem is developed, some value of it becomes apparent, and from that caring, and then action. If you don't find values in the environment and ecosystem, why care? Why act to improve it? OK, money! But beside that?

What should biodiversity education do?

Ignoring any apparent value held by others, and regardless of it being a global world, I believe that biodiversity education should be embedded in 'home'. As people come to know and appreciate what is going on in their local ecosystem, they are most likely to find values in it, care about these, and act to support some living things, what supports it, and how it functions .

How best start this process? I would suggest developing students' confidence to observe, record and identify what is in their local (home) environment. 'Home may be poorly recognized as being part of an ecosystem. It may be lowly valued for its biodiversity education values. All the more reason to use it! Raise its profile! Improve it! Show that every part in the whole does matter!

Given the complexity and challenge of understanding ecosystems and their biodiversity, its needs, benefits, and threats, the advantages of going local, drawing on background knowledge, using a smaller and probably less complex environment, might just be what is needed to engage children and community.

From there, encourage them to journey on, elaborate what they notice in their environment, explore its interactions more, and understand functional linkages so they can explain interconnections. Then evaluate the interconnections with, benefits to, and impacts from, humans. So that finally they might find some act to improve their local environment, its biodiversity and ecosystem, and improve their '*living in harmony with Nature*' there, in an ecosystem they belong to.

Then the attitudes, knowledge and skills developed will be ready to transfer to other environments and ecosystems, and further improve our '*living in harmony with Nature*', in other places, inspired by the UN Decade of Biodiversity. This is a grand vision for what biodiversity education could do!

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