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Making Complexity Accessible

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Sustainable development requires the simultaneous consideration of ecological, economic and socio-cultural issues. In addition to this complex challenge, students nowadays have to make more and more of their own decisions in less time, often based on conflicting information.

Is it possible to offer students basic concepts from the real world that are

- simple and yet accurate,
- illustrative and easy to place in their surroundings,
- transferable to different areas of their daily life?

This presentation offers three ideas on three different levels which are debated in Germany:

1. fundamental scientific rules on which all life on Earth is based,
2. syndromes of global change which help to realize non-sustainable behaviour,
3. key phenomena on the doorstep that are particularly suitable for discussing sustainability.

1. Fundamental Rules

Are there basic rules for all life on Earth that students should be aware of at any time?

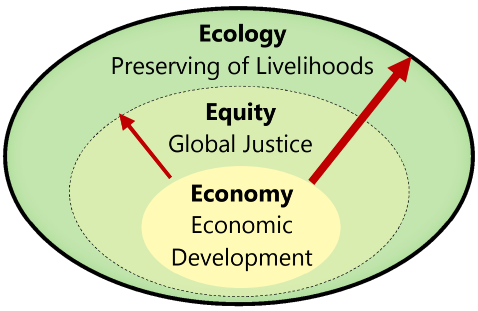

Figure 1. Limits of Growth

To understand the need for rules in this context, it is first necessary to accept that there are limits to economic growth. These are intentional social limits that have to do with our sense of global justice; these are also set natural limits that cannot be exceeded without putting the future of mankind itself at risk (Fig. 1).

To stay within these limits, Vester (1976, 2007) suggested considering eight fundamental rules. As an example, one of them will be briefly outlined: the necessity of negative feedback.

One classic case of negative feedback that could also be simply demonstrated to school classes is a valve steered by a centrifugal regulator, as it was used to control steam engines in past times. (Working models can be bought for little money at any toy shop.) The faster the engine runs, the faster the pole spins. The iron balls rise up and open a valve to release pressure and therefore to reduce the speed (Fig. 2). If we deactivated the centrifugal regulator (as we used to do as naughty kids), it would certainly become an outdoor activity: Pressure and velocity would constantly increase until the model flew apart at its weakest point. This would be a result of positive feedback – of constant growth – which is at the root of our economy.

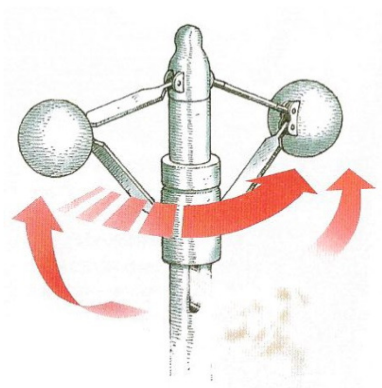

Figure 2. Centrifugal Regulator (Lovelock 1991: 60)

A new quality that appeared recently in our computer-driven world is that even the reason for collapse could not be reconstructed (as in the 2010 flash crash), because essential parts of our economic system continue to be driven automatically by system controlled algorithms which are much more complicated than our centrifugal regulator – and they allow as much growth as possible, constantly provoking its breakdown. To make it a true real-world demonstration, we would have to put our model into a black box before starting our experiment. But in that case, our students would not understand much more than our politicians appear to do on a broader scale.

Vester illustrated the relevance of his rules with striking examples from societies which neglected them. One prominent example was the development in the Sahel zone where, in the 1970s, more hungry people resulted in more herds that needed more water from deeper wells. So there was enough food – for more people that needed more herds… until the system finally broke down. Vester compiled a whole range of illustrative examples like this.

2. Syndromes

In "World in Transition: The Research Challenge" (1997) the German government's Advisory Council on Global Change (WBGU) stated that "complex global environmental and development problems can be attributed to a discrete number of environmental degradation patterns" (WBGU 1997: 112). WBGU summed up 18 such "syndromes" (the Sahel Syndrome being one of them) and proposed to take these syndromes as tangible starting points for dealing with the challenges of our time.

From the perspective of outdoor learning, such an approach makes sense if the syndromes and their underlying scientific concepts can be located on site. Although the destruction caused by our lifestyles tends to be moved into other continents, this is still possible: The Dust Bowl Syndrome, created through the overuse of agricultural land (as it was in the 1930s in the USA) can be understood in parts of Germany, where dust storms led to fatal accidents some years ago. And the devastation of areas as far as the horizon that is caused by brown coal mining in Germany, reminds to the ruthless exploitation of natural resources, as is typical in the mining regions of Central Africa (Katanga Syndrome).

However, such areas are not usually within the reach of school classes and so teachers need more accessible sites to make (non-)sustainable practices visible and comprehensible.

3. Key Phenomena

One tool to locate sites that are relevant for Education for Sustainable Development (ESD) is the key phenomenon model (Fig. 3). In heritage interpretation (an educational approach developed in protected areas) such ESD key phenomena are supported by striking themes that aim to touch their visitors. A historic charcoal stack could be an example of a site that could fulfill all demands of an ESD key phenomenon. And: "At that place, children suffered because of the growth of distant markets" could be an example of a theme that students could verify at that site.

To put ESD into practice, it needs such key phenomena that illustrate global change syndromes and that can be traced back to fundamental rules.

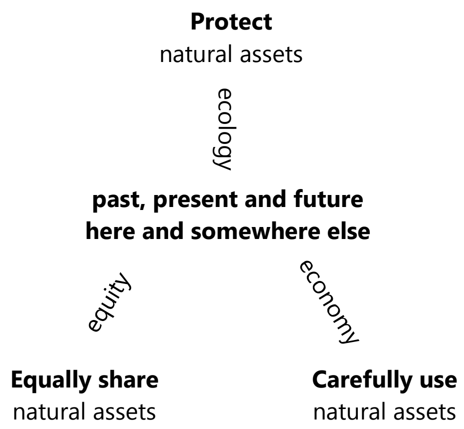

Figure 3. Attributes of ESD Key Phenomena (Ludwig 2012: 9)

Little Minimum

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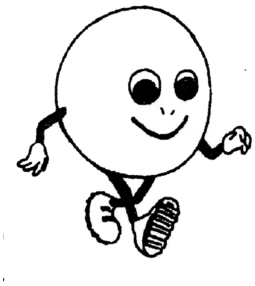
One of Vester's fundamental rules is the principle of recycling, and one example of putting recycling as basic idea into practice out of doors is the day programme "Little Minimum", which is part of the school programmes of the German Sächsische Schweiz National Park since 1992 (Ludwig 2003).

The idea behind the programme:



Little Minimum lives with lots of other tiny creatures in the rocks, plants and animals of the park. It is only happy when it is travelling, and it invites the students for a visit. During that visit it tells stories describing its adventurous journeys – e.g. through a root into a leaf, from the leaf into the stomach of a roebuck, from there through the antlers into a mouse, and so on. The students search and detect traces of these journeys. After a while they notice that Little Minimum and its friends tend to travel in circles. And they realize that it is possible to jump from one circle to the other. They find out that Little Minimum is happiest when ending up in compostable objects – and saddest when ending up in tins or plastic bags, where its big journey cannot continue. Back at school, teachers can use four different curriculum-based one-week extension packages about cyclic processes to continue the topic, and the class can join a Minimum Contest with a range of tasks.

The programme is designed for third graders. It is one of four thematic primary school programmes about growth (1), symbiosis (2), cycles (3) and interrelations (4), and it begins with a starter kit that teachers use in school one week before they arrive at the site. The day programme itself takes seven hours. Half of that time students are separated into three working groups for hiking through the park. At each of five stations they listen to the story, look for traces, take part in an activity, receive a reminder and a part of a circular puzzle. After that, they come together to perform Little Minimum's song and dance and to discuss their conclusions.

Up till now, more than 15,000 students have participated in the programme. It is run every year from April to October by seasonal staff: university students who live in the education centre of the park, who develop a lot of supporting exercises and materials, and who are trained in week-long sessions at least twice the year.

List of References

Lovelock, James (1991) GAIA – The Practical Science of Planetary Medicine. London: Gaia Books

Ludwig, Thorsten (2003) Basic Interpretive Skills. Werleshausen: Bildungswerk interpretation

Ludwig, Thorsten (2012) Quality Standards in Heritage Interpretation. Werleshausen: Bildungswerk interpretation

Vester, Frederic (1976) Ballungsgebiete in der Krise - Urban Systems in Crisis. Stuttgart: Deutsche Verlags-Anstalt

Vester, Frederic (2007) The Art of Interconnected Thinking. München: MCB Publishing

WBGU - German Advisory Council on Global Change (1997) World in Transition - The Research Challenge. Berlin: Springer