

Learning effectively outside school with the help of a “Zoo School”

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Introduction

What would the learning process entail in an educational programme outside school that wants to address knowledge, emotions and attitude at the same time? Opinions about the relationship between knowledge on the one hand, and environmental attitudes and ecological awareness on the other hand, vary considerably. However, many researchers assume that an important positive relationship actually exists (Barraza and Walford, 2002; Bogner, 1998; Kaiser et al., 1999). The rationale behind this assumption is that ‘we can only protect what we know’. Furthermore, we can only miss a species if we have had some kind of attachment to it (Fawcett, 2002; Lindemann-Matthies, 2002). Precise knowledge about the biology and ecology of living creatures is especially important in order to create an emotional bond with plants and animals as well as to foster appreciation for the environment (Mayer, 1993).

Another important factor for an educational programme outside the classroom is the direct encounter with the animals. Direct contact with the living environment helps to enhance ecological awareness, positive environmental attitudes and a caring approach towards living creatures (Haase, 2003; Lock, 1998; Yore and Boyer, 1997). Winkel, a pioneer of environmental education, emphasized the importance of an emotional encounter with living creatures to promote environmental ethics even before the importance of sustainable development was discussed. He stated that the behaviour of human beings was only partially determined by knowledge, and that values, conscience and morale played an equally important role. While values and feelings cannot develop without knowledge, taking or avoiding action, caring for something and adopting a gentle approach are inspired by feelings that come from within – from the heart, so to speak (Winkel, 1995). Learning outdoors could be the most effective and, at the same time, the most pleasurable way to teach children about various species and biodiversity. This approach should, in fact, be adopted more often (Lindemann-Matthies, 2006). Furthermore, biology lessons can be made more enjoyable by studying living plants and animals at first hand (Barker et al., 2002; Lock, 1998).

With these ideas in mind, learning in the “Zoo School” is organised in such a way that students have the possibility to encounter, touch and handle different

animals (e.g. corn snake, dumpy tree frog, central bearded dragon, stick insect, giant millipede), and what they observe will be explained and put into context. Questions that arise from these encounters will be addressed immediately: e.g. evolution and relatedness, differences between vertebrates and invertebrates, home territories and natural habitats.

Some presented animals are -perhaps not only at first sight- associated with feelings of disgust and abhorrence. These negative emotions pose a genuine obstacle for an effective ecological education (Bixler et al. 1999) or education in sustainable development. Many species are essential for our ecological system, yet many of them are classed as endangered species or on the brink of extinction (Bixler et al., 1999; Wilson, 1987). The extinction of species has been dramatically accelerating, and it is difficult to predict the outcome (Rockström et al., 2009). There is an obvious need for an educational programme that raises interest in and knowledge of living beings, eradicating any negative emotions, such as disgust, along the way.

Some of the goals of the “Zoo School” (e.g. to expand knowledge of and to develop positive emotions towards different animals) were evaluated in this study. In previous studies it could be shown that learning outside school has short- and long-term effects on children’s attitudes towards especially small animals (like insects and other invertebrates), and motivates them to learn more about these animals (Drissner et al., 2008; 2010; 2013). This study investigates if the “Zoo School” as a learning forum creates similar long-term effects on emotions towards and knowledge of different animals (vertebrates and invertebrates).

Methods

Participants and design

210 secondary students (grade 5 and 6), 108 who had visited the “Zoo School” before (intervention group), were asked to write an essay about vertebrates and invertebrates. The instruction given was: “What do you know about the vertebrates and invertebrates? Please describe.” The students of the test group visited the “Zoo School” up to four months before (min. 2, max. 4 months). 102 students from the parallel classes (same school, same grade)

served as control group; that is intervention group and control group learned in the same school with the same biology teacher.

The essays were evaluated in line with the methodology developed by Drissner et al. (2008) by categorizing for the following aspects (examples given are actual answers of the students):

(1) number of scientifically correct statements (conceptions): e.g. fishes, amphibians, reptiles, birds, mammals are vertebrates; invertebrates have an exoskeleton

(2) number of misconceptions (scientifically incorrect statements): e.g. most invertebrates have a smooth integument; the corn snake has an exoskeleton

(3) number of positive emotions: e.g. vertebrates are extraordinary; invertebrates are fascinating

(4) number of negative emotions: e.g. invertebrates are disgusting and slimy

Some statements and written sentences could show how exactly students are able to describe the activities at the "Zoo School":

"During the lessons we had the possibility to touch various animals; the giant millipede seemed to be tough compared with the dumpy tree frog." (girl, grade 6, test group),

"We could touch living vertebrates and invertebrates; one could feel the exoskeleton of the giant millipede and also the endoskeleton of the corn snake" (boy, grade 6, test group).

Results

The students who visited the "Zoo School" wrote more scientifically correct statements (conceptions), showed better knowledge of (difference between correct and incorrect statements) and more positive emotions (difference between positive and negative emotions) towards vertebrates and invertebrates than the control group.

The study also showed that the boys as well as the girls of the test group wrote more scientifically correct statements (conceptions) and showed a better knowledge of the animals than their peers (control group).

Discussion and Conclusion

The children who attended the "Zoo School" displayed in an essay about animals (vertebrates and invertebrates) a better knowledge of and more positive emotions towards them. While intention of the programme was to bring about such differences, it cannot be taken for granted that the "Zoo School"-experience must necessarily bring about these positive changes. An educational programme that helps to improve the knowledge of and the emotions towards various animals is very important in light of the increasingly smaller number of children estimating the value of different animal-species correctly (Lindemann-Matthies, 2006; Snaddon et al. 2008; Wagler and Wagler, 2011).

These results support a previous study with older students and a similar design: Drissner et al. (2008; 2013) could show that differences in knowledge and emotions of students who did or did not visit the "Green Classroom" - also a learning forum outside school in the Botanical Garden of Ulm - could be found years after the visit. In that study, the essays of 119 and in a second study of 102 secondary students were evaluated using the same criteria as in the present study. The students who had visited the "Green Classroom" demonstrated better knowledge of and more positive emotions towards the animals, even though it had been five years since the visit for some of the students.

The positive results (e.g. better knowledge and emotions towards animals) noted in the intervention group but not in the control group are remarkable considering the duration of the visit. The students only attended the "Zoo School" and also the "Green Classroom" for half a day. This is extremely short-term participation. According to other studies conducted to date, short-term participation takes at least a few days, possibly even weeks, in order to have any impact (e.g. Bogner, 1998; Haase, 2003); this is a considerably longer time length by comparison. So far, it has been assumed that environmental programmes aiming to change attitudes need to be continued for at least several days. The fact that some positive changes not only in knowledge but also in emotions have been recorded from a half-day teaching-programme could reflect the importance of the educational work in a learning forum outside school. One should note that such short programmes can be more easily integrated into the curricula, and they can be prepared for and reflected on accordingly by the students within the classroom setting. In Germany, it is rather unlikely that schools and teachers can find the time to spend more than one half-day outside of the classroom investigating just one phenomenon. For these reasons, it was interesting to see if a programme of such short duration has any impact on the knowledge and opinions of the students.

The results of this study suggest that the outdoor setting of an educational programme can have a valuable formative influence, helping to expand long-term knowledge and to develop emotions towards specific animals that could lead e.g. to a more positive attitude towards these animals and their importance.

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A new logo for IZE

We are delighted to have adopted a new logo for IZE.

Our previous 'rhino' logo served us well and so the IZE Board were very careful in putting forward a brief to modernise and update our image and retain some of our previous identity, and be a logo that can be reproduced in colour and black and white.

A number of designs were created and the Board drew up a shortlist to present to the Association's membership for comment and selection.

The new logo, as you can see, still features a rhino but has the addition of a fish to illustrate that we are an association for education about all taxa represented through zoos, parks and aquariums. The colours chosen represent life, water, plants and the interdependence of these and wildlife. The design also 'references' the WAZA logo, and hopefully thereby illustrates our connection into the world zoo and aquarium association.

So, we ask that all of our members, and associations that reference IZE, use our new logo when updating information websites etc.