



## Effective learning with the help of animals

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### Abstract

International studies show that children, when asked to list different species, generally talk about animals that are not found in their own environment. Remarkable and extraordinary vertebrates, especially mammals, are mentioned whereas small animals (invertebrates and insects) are hardly ever discussed. An insufficient awareness of invertebrates seems to be culturally universal and can be found in different countries and continents. Experiential learning and a direct animal encounter are suggested as a means for a modern environmental education to address issues of biodiversity.

In this study we assessed attitudes towards animals of 57 students before and after a presentation of living animals which was undertaken during their lessons. We compared the answers they gave in their questionnaires with those of 50 students from a control group. Results suggest that the presentation of animals leads to more positive attitudes towards the listed animals.

**Keywords:** Vertebrates; Invertebrates; Insects; Attitudes towards animals

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## Introduction

Research indicates that children may be more and more separated from nature and have a low level of taxonomic literacy (Frobel and Schlumprecht, 2014 [1]; Louv, 2005 [2]). Furthermore, several studies have clearly shown that when asking children to list the animal-species they know, these children mainly mention remarkable and extraordinary vertebrates, especially mammals, whereas small animals (invertebrates and insects) are hardly ever listed (Drissner et al., 2013 [3]; Patrick et al., 2013 [4]; Snaddon et al., 2008 [5]). This identification of animals as mammals could have various reasons: mammals are usually larger and more often in the media, whereas the behaviour and the appearance of invertebrates seem to be strange and untypical for human beings (Lindemann-Matthies, 2006 [6]; Patrick et al. 2013 [4]; Piper, 2014 [7]). Very worrying is the reason that children sometimes are not sure if invertebrates are animals (Patrick et al., 2013 [4]). Worse still, the small animals are often associated with negative emotions. Transnationally, animal-species could be categorised as fear-irrelevant, fear-relevant and disgust-relevant species (Davey et al., 1998 [8]).

One should keep in mind that many animal-species are rare and classified as endangered species; the extinction of species has been dramatically accelerating, and it is difficult to predict the outcome (Rockström et al., 2007 [9]). Especially animals could be a suitable and important instrument, a vehicle so to speak, to create a consciousness for the worth and importance of the environment, because children are aware of animals (Patrick et al., 2013 [4]). Scientists point to the danger that certain animal-species could disappear from people's consciousness before they are actually physically endangered (Fawcett, 2002 [10]). A direct animal encounter is suggested as a means for a modern environmental education to address issues of biodiversity.

## Materials and Methods

Therefore, we assessed attitudes towards animals of 57 students before and after a presentation of living animals which was undertaken during their lessons. We compared the answers they gave in their questionnaires (see Table 1) with those of 50 students from a control group (no presentation). The following species were presented: Madagascar hissing cockroach (*Gromphadorhina portentosa*), giant millipede (*Archispirostreptus gigas*), African giant snail (*Achatina achatina*), Chilean fire tarantula (*Grammostola rosea*), dumpy tree frog (*Litoria caerulea*), bearded dragon (*Pogona vitticeps*), royal python (*Python regius*).

Table 1: Semantic differential to assess the attitudes towards animals

	1	2	3	4	5	6	7	
boring								fascinating
dangerous								safe
useless								valuable
disgusting								cute
uninteresting								interesting
unnecessary								necessary
bad								good
morbid								natural
repulsive								appealing
uncool								cool
dull								funny
weird								harmless



worthless								precious
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## Results and Conclusion

The intervention group (with animal presentation) showed a significant improvement on eleven of the 13 bipolar attitudes. After the presentation of the animals the students rated these animals for example more fascinating and interesting, cuter, better, cooler, more harmless and more precious than before (see Table 2). While intention of the setting was to bring about such differences, it cannot be taken for granted that the experience with the presented animals must necessarily bring about these positive changes. An educational programme that helps to improve the attitudes 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 [6]; Snaddon et al., 2008 [5]; Wagler and Wagler, 2011 [11]). These results support a previous study with students who visited a "Zoo-School": 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. In this study 210 secondary students, 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." 102 students from the parallel classes (same school, same grade) served as control group. The students who visited the "Zoo School" wrote more scientifically correct statements, showed better knowledge of and more positive emotions towards vertebrates and invertebrates than the control group (Drissner et al., 2014 [12]).

The positive results noted in the intervention group but not in the control group are remarkable considering the duration of the program (needs about two hours). This is extremely short-term participation. Such effective, short-term programs can be easily integrated into the curricula and they can be reflected accordingly by the students within the classroom setting. As pedagogical approaches and curricula are created the just mentioned ideas should be considered.

Table 2: Means and p-values, pre and post-test of attitudes towards small animals for intervention and control group

		Bonferroni Test			
(n=107)		1	2	3	4
		5,04	6,40	4,65	4,29
Test	fascinating		0,000	1,000	0,082
Test	fascinating	0,000		0,000	0,000
Control	fascinating	1,000	0,000		1,000
Control	fascinating	0,082	0,000	1,000	
(n=107)		1	2	3	4
		4,82	5,91	4,55	4,65
Test	safe		0,001	1,000	1,000
Test	safe	0,001		0,000	0,001
Control	safe	1,000	0,000		1,000
Control	safe	1,000	0,001	1,000	
(n=107)		1	2	3	4
		4,09	5,35	3,73	3,71
Test	cute		0,000	1,000	1,000
Test	cute	0,000		0,000	0,000
Control	cute	1,000	0,000		1,000
Control	cute	1,000	0,000	1,000	
(n=107)		1	2	3	4
		5,49	6,56	4,71	4,49



Test	interesting		0,000	0,062	0,006
Test	interesting	0,000		0,000	0,000
Control	interesting	0,062	0,000		1,000
Control	interesting	0,006	0,000	1,000	
(n=107)		1 5,14	2 6,00	3 4,69	4 4,63
Test	good		0,002	0,761	0,497
Test	good	0,002		0,000	0,000
Control	good	0,761	0,000		1,000
Control	good	0,497	0,000	1,000	
(n=107)		1 5,68	2 6,37	3 5,78	4 5,47
Test	natural		0,019	1,000	1,000
Test	natural	0,019		0,186	0,007
Control	natural	1,000	0,186		1,000
Control	natural	1,000	0,007	1,000	
(n=107)		1 4,91	2 5,82	3 4,76	4 4,57
Test	appealing		0,000	1,000	1,000
Test	appealing	0,000		0,002	0,000
Control	appealing	1,000	0,002		1,000
Control	appealing	1,000	0,000	1,000	
(n=107)		1 5,23	2 6,12	3 4,61	4 4,12
Test	cool		0,001	0,213	0,001
Test	cool	0,001		0,000	0,000
Control	cool	0,213	0,000		0,276
Control	cool	0,001	0,000	0,276	
(n=107)		1 4,30	2 5,91	3 4,24	4 4,45
Test	funny		0,000	1,000	1,000
Test	funny	0,000		0,000	0,000
Control	funny	1,000	0,000		1,000
Control	Funny	1,000	0,000	1,000	
(n=107)		1 4,40	2 5,89	3 4,57	4 4,43
Test	harmless		0,000	1,000	1,000
Test	harmless	0,000		0,000	0,000
Control	harmless	1,000	0,000		1,000
Control	harmless	1,000	0,000	1,000000	
(n= 107)		1 5,33	2 6,30	3 4,90	4 4,71
Test	precious		0,000	0,925	0,260
Test	precious	0,000		0,000	0,000
Control	precious	0,925	0,000		1,000
Control	precious	0,260	0,000	1,000	



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