



*ELENA – Experiential Learning and
Education for Nature Awareness*

539561-LLP-1-2013-1-DE-COMENIUS-CMP PROJECT

ELENA Project

International study and Comparative report on Biodiversity Education using Living Animals in Schools



Biosphärenregion
Berchtesgadener Land



The International study and Comparative report was developed by the partners of **ELENA (Experiential Learning and Education for Nature Awareness)** project that has been funded with support from the European Commission's Lifelong Learning Programme, in the framework of its Comenius sub-programme.

This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

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Special thanks to Martin Eiblmaier

February, 2015

Parts of the document may be adapted and translated freely by using the following form of citation: ELENA Project – International study and Comparative report, 2015. www.elena-project.eu

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Introduction

The present study compares the possible application of living animals within the extracurricular and curricular biodiversity education exemplarily in the countries Germany, Romania, Hungary and Georgia. This study is integrated into the research and developing study ELENA “Experiential Learning and Education for Nature Awareness“, promoted by the Comenius/Lifelong Learning Programme of the European Union. Herein partners joining from research and practice to proof the transferability and the implementation of the Bavarian “Tiere-live”concept in other European countries. ELENA project has a modular design. We started with national baseline studies in all countries to assess the legal and administrative framework for this new approach to Eco-Education. After having developed the national Baseline studies, the next step was to make a synopsis of all of them. The summary of this work is the International Study, which will present in the following pages the findings and implications for Eco-Educational work on an European level.

The study analyses the practical approaches and keyfactors, how to teach children in Europe a sensitivity for nature and how this knowledge can be integrated into life skills and business competencies. This process is of course very complex and involves loads of capacities and competences from the teachers to lead this task to success. This international study is the quintessence which legislative and educational frames are needed to support teachers all over Europe to contribute to a higher level of awareness for a sustainable use of nature and it’s ressources.

1. Legislative frame

1.1 Policy commitments

1.1.1 Education and sustainable development

Nothing provides a better reason for the development, quality assurance and importance of activities aiming to teach biodiversity conservation with live animals than the fact that the United Nations Decade of Education for Sustainable Development (DESD¹) 2005-2014 is coming to its end, while the United Nations Decade on Biodiversity 2011-2020² is well on its way. For the former, we need to account for the results we achieved, the failures we experienced and the shortcomings we discovered. For the latter, we need to participate as well and actively as possible in the ongoing works (Sandy-Varga et al., 2014³).

In the period 30 June - 9 July 2014 at the UN Headquarters, New York, United States of America, at the European Level, in the *Second meeting of the High-level Political Forum on Sustainable Development (HLPF-2) - “Achieving the Millennium Development Goals and charting the way for an ambitious post-2015 development agenda including the Sustainable Development Goals”* it is recognized at the point 10 of text document E/2014/CRP.1 that the ECE Strategy for Education for sustainable development will make children more aware and knowledgeable on sustainability issues and will encourage countries to include ESD in their education system in all forms from the primary to tertiary level including vocational and adult learning.

Point 10. The ECE Strategy for Education for Sustainable Development⁴ strives for education at all levels that will make children and adults more cognizant and knowledgeable on sustainability issues. It was considered an important tool that would contribute to changing behavioural patterns. The approach of the Strategy was to encourage countries to include ESD in their education systems, in all forms, from primary to tertiary, including vocational and adult learning (United Nations Economic Commission for Europe input to the High-Level Political Forum on Sustainable Development and the ECOSOC Annual Ministerial Review – published as background document E/2014/CRP.1

¹ UNESCO, 2005, *United Nations Decade of Education for Sustainable Development (2005–2014): International implementation scheme*. Paris: UNESCO <http://unesdoc.unesco.org/images/0014/001416/141629e.pdf>

² Convention on Biological Diversity. Strategic Plan for Biodiversity 2011–2020, <http://www.cbd.int/sp/>

³ Szandi- Varga P. et al., 2014, Baseline Study on Biodiversity Education using Living Animals in Schools in Hungary, ELENA Project Experiential learning and Education for Nature Awareness. www.elena-project.eu

⁴ “Learning for the future: Competences in Education for Sustainable Development”; ECE/CEP/AC.13/2011/6 http://www.unece.org/fileadmin/DAM/env/esd/ESD_Publications/Competences_Publication.pdf

<http://sustainabledevelopment.un.org/content/documents/4329CRP1%20ECE.pdf>

The current engine for socio-economic sustainable development worldwide includes biodiversity conservation supported by political commitments. They can be found in different “multilateral environmental agreements” (MEA) (Kim, 2013⁵)

To know natural resources for their sustainable and rational exploitation is a requirement for a country's economic future, particularly in the European context (Jones, 2005⁶; Tilford and Whyte, 2010⁷). Based on research results of Jones in 2005 the European Summit in Lisbon was a final benchmark for the EU economic development. In recent time is a more acute need, to raise the education threshold in the European context for reaching the proposed socio-economic targets (Tessaring and Wannan, 2010⁸). Based on the German study, biodiversity education is embedded in the "Education for Sustainable Development" and this is also the case for Hungary and Romania.

With the UN-Decade "Education for Sustainable Development (2005-2014)", the states of the UN tried to strengthen this concept (German Commission for UNESCO 2014). Biodiversity education with animals played a minor role in the context of education for sustainable development (BNE) in Germany. Biodiversity is equal to many other socially relevant issues like energy saving, waste avoidance, health and nutrition (Sturm et al., 2011).

1.1.2. Education and Multilateral Environmental Agreements (MEA)

Countries of the EU (i.e. Germany, Hungary and Romania) or accessing countries (i.e. Georgia) undertake, according to the Lisbon Strategy, substantial efforts to streamline educational processes for the development of new skills until 2020. A series of political commitments regarding the need for environmental education of countries participating in the project ELENA have been found either in the original texts of multilateral environmental agreements (MEA) or other decisions and resolutions.

⁵ Kim, R. E. (2013). The emergent network structure of the multilateral environmental agreement system. *Global Environmental Change*, 23(5), 980-991

⁶ Jones, H. C. (2005). Lifelong learning in the European Union: whither the Lisbon Strategy?. *European Journal of Education*, 40(3), 247-260

⁷ Tilford, S., & Whyte, P. (2010). *The Lisbon Scorecard X: The Road to 2020*. Brussels: Centre for European Reform

⁸ 20. Tessaring, M., & Wannan, J. (2010). *Vocational education and training: Key to the future*. Lisbon-Copenhagen-Maastricht: Mobilising for 2010

Crt. no	MEA	Georgia	Germany	Hungary	Romania
1.	CBD	1994/06/02; acs	1993/12/21; rtf	1994/02/24; rtf	1994/08/17; rtf
2.	CITES	1996/09/13; acs	1976/03/22; rtf	1985/05/29; acs	1994/08/18; acs
3.	CMS	2000/06/01; rtf	1994/10/01; rtf	1983/11/01; rtf	1998/07/01; rtf
4.	AEWA	2001/08/31; rtf	1999/11/01; rtf	2003/03/01; rtf	2000/10/01; rtf
5.	EUROBATS	2002/07/25; rtf	1993/10/18; rtf	1994/06/22; rtf	2000/07/20; rtf
6.	ASCOBANS	2001/05/31; rtf	1993/10/06; rtf	-	2000/07/17
7.	Wadden Sea Seals	-	1991/10/01; rtf	-	-
8.	Middle-European Great Bustard	-	2002/09/18; M	2002/10/07; M	2000/09/09; M
9.	Aquatic Warbler		2003/04/30; M	2003/04/30; M	
10.	Birds of Prey (Raptors)	Range state	2010/07/19; M	2008/10/22; M	2011/11/22 M
11.	Sharks	Range state	2011/11/22; M	-	2011/11/22; M
12.	ACAP	-	Range state	-	-
13.	Slender-billed Curlew	1994/09/10; M	-	1994/09/22; M	1994/12/02; M
14.	Central Asian Flyway	Range state	-	-	-
15.	International Whaling Commission	-	1982/07/02;adh	2004/05/01;adh	2008/04/09;adh
16.	UNCCD	1999/07/23; rtf	1996/07/10; rtf	1999/07/13; acs	1998/08/19; acs
17.	UNFCCC	1994/07/29; rtf Non Annex I	1993/12/09; rtf Annex I	1994/02/24; rtf Annex I	1994/06/08; rtf Annex I
18.	Ramsar	197/06/07; acs	1976/06/26; acs	1979/08/11; acs	1991/09/21; acs
19.	UNESCO	1992/11/04;suc	1976/08/23; rtf	1985/07/15; acs	1990/05/16; acs
20.	Bern Convention	2009/11/19; rtf	1984/12/13;rtf	1989/11/16; acs	193/05/18,acs
21.	Aarhus Convention	2000/04/11;rtf	2007/01/15; rtf	2001/07/03;rtf	2000/07/11; rtf
22.	Landscape Convention	2010/09/15 rtf	-	2007/10/26; rtf	2002/11/07; rtf
23.	Carpathian Convention	-	-	2005/10/06;rtf	2006/12/06;rtf
24.	Alpine Convention	-	1995/03/06; rtf	-	-
25.	Ecological networks	Emerald	N2000	N2000	N2000

Legend: acs: accession; rtf: ratification, suc: succession; adh: adhesion; M – memorandum of understanding.

Table no. 1. The status of ratification, accession, adhesion or succession regarding relevant Multilateral Environmental Agreements (MEA) for Georgia, Germany, Hungary and Romania in July 2014.

A number of MEA have as main objective to maintain ecological balance in the ecosystem with a particular focus on species conservation in their natural habitats (in situ) or outside their habitat (ex situ) conservation (Table no.1.).

The implementation of the CBD and related conventions

We emphasize that the most important MEAs which support the Communication, Education and Public Awareness (CEPA) (Hesselink et al., 2007⁹) is the Convention on Biological Diversity¹⁰.

All four ELENA partners adopted their national biodiversity strategies and action plans or NBSAPs, supporting the full CBD implementation. It is therefore a task of the curricular and extracurricular education to achieve these aims (Sturm et al., 2014).

1.1.3. Education and Animal welfare

As *Tiere live* model implies the work with living animals all four countries need to further comply to the requirements of the *European Convention for the protection of vertebrate animals used in experimental and other scientific purposes*. Analysing the ratification status among the four participant countries revealed that the Convention was ratified by Germany (1991) and Romania (2006), signed by Hungary (2008) and not signed by Georgia¹¹. In the European Union context, this Convention is implemented through the Directive 86/609/EEC which is specifically regulating animal species such as: mouse (*Mus musculus*), rat (*Rattus norvegicus*), guinea pig (*Cavia porcellus*), golden hamster (*Mesocricetus auratus*), rabbit (*Oryctolagus cuniculus*), non-human primates, dog (*Canis familiaris*), cat (*Felis catus*) and quail (*Coturnix coturnix*)

1.1.4. Education and The European Ecological Networks

All partners are members of the European Ecological Networks NATURA 2000 and Georgia is part of the Emerald network,¹² which is preparing the states for harmonizing their internal regulatory framework with the European ones. It can be considered that the objective of the ELENA project will also support the implementation of the Habitats Directive based on the last point in the Preamble stating that *education and general information relating to the objectives of this Directive are essential for ensuring its effective implementation*.

1.1.5. Needs for curriculum development

Introducing lessons for studying living animal species in their environment or in classrooms has to ensure animal welfare and also pupil safety. According to the Decade of Biodiversity 2011-

⁹Hesselink, F.J. et al., Communication, Education and Public Awareness, a toolkit for the Convention on Biological Convention, Montreal, 2007, <http://www.cbd.int/cepa/toolkit/2008/cepa/guide.htm>

¹⁰ Convention on Biological Diversity: <http://www.cbd.int/>

¹¹ <http://conventions.coe.int/treaty/Commun/ChercheSig.asp?NT=123&CM=&DF=&CL=ENG>

¹² Council of Europe, the Ecological networks and Emerald network
http://www.coe.int/t/dg4/cultureheritage/nature/econetworks/default_en.asp

2020 the importance of education for the awareness of biological diversity is identified as a central topic of interest (Sturm et al., 2014). Understanding the principles governing the organization of trophic levels, relationships between trophic links, top down ecological balance in the trophic pyramid, relations established in the trophic networks, are all arguments in supporting the development of entrepreneurial competencies in the social context as a concept developed in the early '80 by Bill Drayton and Ed Skloot (Light, 2006¹³). The education provided by *Tiere live* stimulates the ability to fully understand the mechanisms governing the functioning of the living world and how to maintain the ecological balance. In this regard, biology must find new models of education for the development of new skills (Mair et al., 2006¹⁴; Dees, 2007¹⁵).

1.2 Regulatory framework

Tiere live modules implementation into today's education system has to comply with a specific regulatory framework:

1. Education framework
2. Animal welfare regulations
3. Environmental regulations
4. Student health & safety regulations

1.2.1. Education framework

In terms of school curricula, *Tiere live* may be used in the extracurricular education with the aim to be implemented in a *proactive* manner into the national *core curriculum* for developing new competencies, as:

- [1] the care for the animal and assuming personal responsibility for it;
- [2] the observation and
- [3] experimentation (Sturm et al., 2014).

These objectives have been chosen carefully and are closely related to the development of the **competence in handling live animals** and **experimentation**. These are new concepts already adopted at the international scientific literature after 2000 and it was proved that the work with live animals improved positive emotions in further supporting knowledge gain or **construction of knowledge**, an extremely important aim for the success of education system

¹³ Light, P. C. (2006). Reshaping social entrepreneurship. *Stanford Social Innovation Review*, 4(3), 47-51

¹⁴ Mair, J., Robinson, J., & Hockerts, K. (Eds.). (2006). *Social entrepreneurship*. New York: Palgrave Macmillan

¹⁵ Dees, J. G. (2007). Taking social entrepreneurship seriously. *Society*, 44(3), 24-31

1.2.2. Animal welfare regulations

In the case of all Partners, there are already implemented regulations regarding [1] the protection of animals, [2] the protection of animals used in experiments and [3] the regulation for zoos and aquaria. According to Directive 86/609/EEC, the person in charge for working with living animals must have appropriate education and training and such actions may be implemented in appropriate conditions (Sturm et al., 2014).

In **Hungary** the legal background of bringing animals into the school for lessons, is represented by the Act XXVIII/1998 *on Animal Protection and Tolerance*. Other relevant connecting acts are as following Government Decree 41/2010. (II. 26.) on keeping animals for leisure purposes and on the trade of pets and the Joint Ministerial Decree 3/2001. (II. 23.) on the Regulation on the Establishment, Operation and Maintenance of Zoos and Animal Shelters (KOM-FVM-NKOM-BM) and Ministerial Decree 27/2009. (XII. 3.) on the regulation of the training, examination and applicability of assistance dogs¹⁶.

In **Romania** the main legal act for protecting the animal welfare is the Law 205/2004 which is making derogations for scientific purposes when the welfare of the animals are fulfilled. Also, these legal acts should be connected with other relevant such as the Law 471/2002 which is forbidding the use of wild animals listed in Habitat Directive in scientific experiments. This act is providing the regulatory framework for entering into force the Convention and the Directive 1986/609/EEC. Still, Romania like Hungary did not develop yet any guideline related to species or activities with living animals' education in schools.

In **Germany**, in accordance with the Protection of Species Order (Bundesartenschutzverordnung - BArtSchV) many animal species - interesting for the education - are particularly protected, including most wild mammals, birds, amphibians, reptiles, wild bees and dragonflies. Catch and attitude of protected animals is possible only with a special permission of the responsible nature conservation authority (Sturm et al., 2014).

¹⁶ http://njt.hu/cgi_bin/njt_doc.cgi?docid=124322.178270

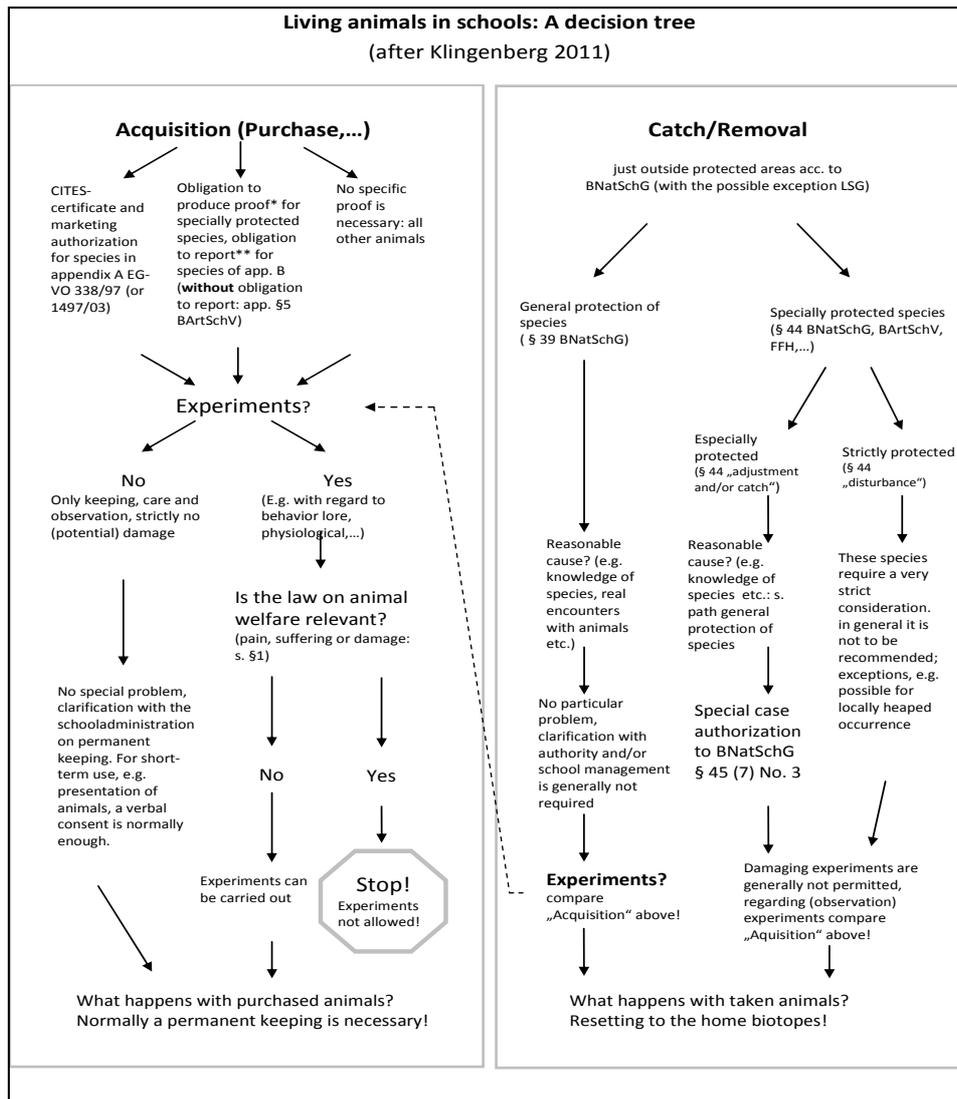


Fig. 1: Decision support for legal requirements in the application of living animals (Klingenberg 2011¹⁷).

1.2.3. Student health & safety regulatory framework

For all Partners this regulatory framework is ensured both by the main education and health regulatory frameworks. In all partners the health inspectorates ensures that pupils' needs in terms of medical safety are fulfilled.

1.2.4. Regulatory framework development

The German study gives an overview about the environmental education partners in Bavaria. In

¹⁷ Klingenberg, K. (2012): Lebende Tiere im Unterricht. Analysen – Studien – Konzepte. Logos Verlag Berlin

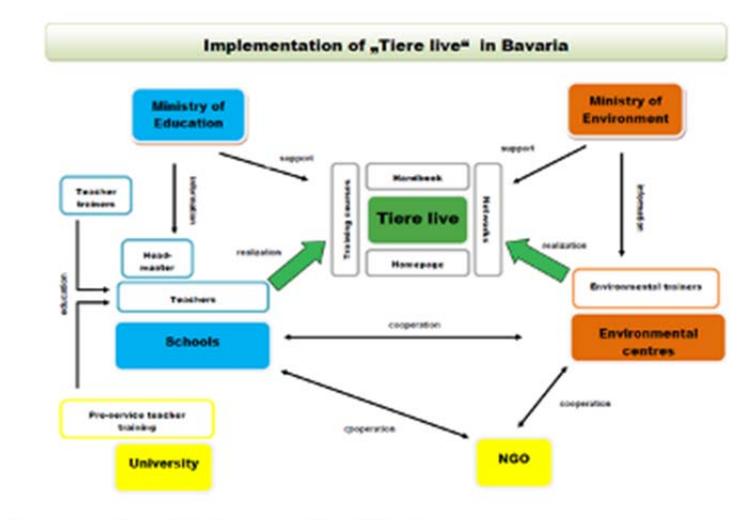


Fig. 2 Education network using the example of Bavaria to implement living animals in the lessons

The Association for Nature and Environmental Education (ANU) of the Federal State of North Rhine Westphalia defines itself as an umbrella organization for nature, forest and experiential education as well as global and regional environmental education in terms of sustainable development. There is a nationwide coordination office of extracurricular environmental education, in addition there is a newsletter ("ökopädNEWS") and publications ("ANU-Aktuell"). Extracurricular environmental education institutions form the core of environmental education. They are composed of biological stations (31), environmental centres (57), school farms (5) and forest adventure centers (23). Besides offering for school classes, they also offer advanced training and qualification of specialists in environmental education, thematic conferences and workshops as well as regular regional working groups (<http://anu-nrw.de/>). For the extracurricular environmental education the Ministry of Environment is an important contact. In Bavaria a department for extracurricular environmental education exists which supports the environmental educational institutions in Bavaria financially and coordinated. Extracurricular environmental education institutions play an important role as an extracurricular learning place with the possibility of outdoor activities (Sturm et al., 2014).

1.2.4. Networking opportunities for the partner countries

In Hungary, several civil society organizations, institutes and associations exist, which can easily be included in networking. Without the claim of being exhaustive, the following organizations come to mind from the professional and commitment points of view: [1] There are currently 10 national parks in Hungary; [2] Hungarian Ornithological and Nature Conservation Society; [3]

Hungarian Society for Environmental Education; [4] National Association of Educational Centres for Nature- and Environment Protection; [5] CSEMETE Nature- and Environment Protection Society; [6] Orpheus Animal Welfare Society; [7] Nimfea Nature Conservation Association; [8] National Forestry Association – Forestry Open-air Schools; [9] Hungarian Therapy and Assistance Dog Association Society; [10] Budapest Zoo & Botanical Garden; [11] Szeged Zoo; [12] University of Szeged, Juhász Gyula Teacher Training Faculty, Interactive Natural Sciences Knowledge Repository; [13] Hungarian Network of Eco-schools; [14] Hungarian Veterinary Chamber and [15] National Public Health and Medical Officer Service (ÁNTSZ) (Sandy-Varga et al., 2014).

In the Romanian case, only stakeholders related to a specific county have been identified and a general framework representing the development of the Tiere live communication scheme was proposed (Antofie, 2014). Based on the Romanian study the present stakeholder mapping is significantly increasing, following the German existing model and also the Hungarian hypothetical model. Thus, the Ministry of Environment and environment experts may have a strong input into the future partnership.

In Georgia, there is a good cooperation between the ministries of education and of environment. There is also an active involvement of international organizations and local NGOs who has a focus on environmental education. Partnership development between pilot schools and potential donors for expertise and education material seems to be the best option for all four partner countries.

General conclusion

All four partner countries are highly committed for ensuring biodiversity conservation and the implementation of sustainable development principles. They all have a national regulatory framework, specifically working for curriculum development and implementing proactive measures for testing into extracurricular education.

2. Educational frame

The second chapter is addressing implementation issues related to the education system. It shows the needs and gaps for the partner countries compared to the Bavarian model. The classical education system is based on three target groups: teachers, students and parents. In case of Tiere live modules implementation, it was identified a fourth target group: “Extracurricular partners”.

2.1 Education and teaching

For more than 40 years there are worldwide attempts in scientific publications how to change and develop school curricula. Probably the integrated curriculum model first proposed in 1986 and discussed later by VanTassel-Baska and Wood (2010) may be used for developing the core curriculum and adding the values gained through the implementation of Tiere live modules. Society is evolving and also teaching should evolve and develop according to the needs of society. Tiere live is working for the biodiversity conservation as well as for sustainable development, which is in line with the current strategy of the European Union. The need for excellent and dedicated teachers understanding and applying moral virtues of courage, honesty and justice is recognized (Carr 2011). Teachers use many resources to assist their students in the process of learning. In the case of biology class there are plenty of published scientific papers discussing the development of specific competencies due to living animals in education. Thunncliffe (1987) is questioning the need for developing activities related to living animals based on analysing existing core curricula. Such core curricula for biology exist in our European countries and they refer to **constructing knowledge** as: [1] differentiation between living animals, [2] their senses and [3] reproduction and breeding. Based on this old experience the author considers that the visit to a farm is more effective compared to a zoo, because of the “display” of animals. In turn the school visit to a zoo is more effective, than is a family visit to the same site. Public and private education systems, all over the world, are usually based on national curricula. In the context of European Union, it is very important to harmonize education aims.

2.1.1. Tiere live and national curricula

For all four partners countries the existing regulatory framework is ensuring the further development of the national core curricula. Thus, following the German model, it is convenient to adapt Tiere live modules first in extracurricular activities.. Based on the experience, an integrated curriculum can be developed, where modules or activities originating from Tiere live and ELENA become part of the official curricula.

From the perspective of the curriculum reform in Romania (National Curriculum for compulsory education, 1998, p 13 are in force the following forms: [1] the core curriculum C.N. (common curriculum) - the minimum number of hours for each discipline which is compulsory foreseen in the educational setting; it ensures the equality of opportunity in education in the public school system, regardless of region of the

country, branch, field, training field; the basic education is acquired through further development of key skills pursued in compulsory education system; it ensures the continuity between kinder garden -primary education – secondary school – and high school education; It is the only reference for assessments and examinations conducted nationwide and [2] the school based curriculum SBC may be the [a] in-depth core curriculum, [b] extended core curriculum and [c] school developed curriculum that is elaborated into the school and proposed to the Ministry of Education. SBC covers the difference of hours between the core curriculum and the minimum / maximum no of hours/ week and / school year, provided in the educational setting framework. It represents all educational processes and learning experiences that each school directly proposes to its students in the curricular offer.

According to studies realized in Georgia, Hungary and Romania Tiere live modules may be adapted to National Core Curricula for extracurricular activities. In Hungary and Romania Tiere live may also fit in the field of environmental studies, natural history, biology and philosophy. In Romania it raised the idea of studying first the core curricula for biology in the gymnasium schools, to find the best opportunities for Tiere live integration referring to the experience gained by extracurricular activities. Based on the discussions between the partners it can be underlined, that a similar structure in curricula development exists in the four participants' countries.

2.1.2. Tiere live modules implementation

In Germany the implementation of Tiere live modules required the development of specific guidelines related to the animal species that is part of education activities in schools. Standards for the qualitative and quantitative evaluation of the results were developed. Based on the german study there are no official statistics, regarding the extent of using living animals in teaching. In Bavaria teachers, that used living animals in the teaching process, were mostly located in elementary schools (over 90%).

Still based on the national study analysis, the Germany-wide implementation of biology educational standards in 2004, is the basis for the implementation. Thus biology lessons promote an environmentally orientated sense for individual and social responsibility (Sturm et al., 2014).

The four areas of competence of the subject biology are specialized knowledge, knowledge discovery, communication and evaluation. In the objectives of the area of competence "evaluation" is spoken of "the appreciation (of students) for an intact nature", of "understanding of decisions in terms of sustainable development", and of a "responsible behaviour (...) towards

the environment" (KMK 2004). When evaluating of options for action, students put these options in relation to ethical values and thus complement the scientific perspective.

Experience with living animals in lessons already implemented in the school systems in Georgia, Hungary and Romania are not respecting the same scientific standards for the qualitative and quantitative evaluation of the results, as in Germany. Therefore the transfer and adaptation of these standards is required for the consistency and coherency of data, resulting of ELENA project implementation.

2.1.3. Students' competencies gain

In the German model, based on **specific standards developed for the quantitative evaluation** a series of competencies are expected to be implemented with "Tiere live" modules. In this regard standard questionnaires for the quantitative evaluation of students were elaborated and already tested. They include students competencies like *the respect for life and the careful handling of life*.

The four competence areas identified during "Tiere live" modules implementation in Bavaria are: [1] specialized knowledge, [2] knowledge discovery, [3] communication and [4] evaluation. Even in Georgia, Hungary and Romania live animals are used in school teaching. The standards are different and there is a great need to harmonize the standards between the piloting countries in order to obtain consistent and coherent results during the implementation phase of the ELENA project.

Competencies are described as a compilation of knowledge, skills and attitudes. The knowledge part is covering biodiversity issues and other parts mentioned in ELENA competencies as follows:

- Observation of nature
- Identification of natural phenomena and description of the processes
- Collecting data, observation, providing simple experiments, using various sources of information
- Asking questions about the issues
- Classifying objects according to their characteristics
- recording quantitative data, organizing them and presenting them in variety of ways
- Protection of environment

2.1.4. Teachers training needs

The experience gained in the implementation of education standards shows, a high need for teacher training in the area of competence evaluation. Within the scope of "*Tiere live*" more than

800 teachers could be trained in Germany and an evaluation model of the practical applications of living animals in school lessons is given in chapter 5: "Practical examples" (Sturm et al., 2014). As in Georgia, Hungary and Romania the *Tiere live* model was not yet implemented, the need for teacher training is obvious. Not only for handling animals, but also for implementing the scientific standards needed for the appropriate evaluation of the results.

In **Hungary** it is considered that pedagogues graduated in natural sciences (i.e. teachers for biology, natural history-environmental studies, chemistry and physics) should attend the trainings. The teachers for biology and natural history-environmental are regarded the most suited ones.

In **Romania** the results for curriculum implementation regarding *Tiere live* can be complementary and supporting the development of education in Gymnasiums following the subjects: [1] Mathematics and environment exploring (school class, class I and class II); [2] Natural Sciences (Class IV); [3] Biology (Class VI and Class VII); [4] Health education (classes I- VII) and [5] Plant biology and comparative zoology (X grade).

In **Georgia** training courses for Biology are not focused on biodiversity and live animals. Thus there is an urgent need to train teachers that will take a lead role in multiplying their experience.

2.1.5. Types of schools identification

The project "*Tiere live*" (see also under practical examples) is suitable for all types of schools. It can be implemented in primary schools and in secondary schools based on the German experience. Due to the wide spread of topics and the selection of 14 animals groups it is ensured that the proposals have access to all curricula. For example, the subject "birds" is to be found in all levels of education in the curricula. The contents fit especially on the subjects of biology and environmental education. Due to the adaption of the curriculum most contents of the project "*Tiere live*" are realizable in the regular compulsory education as well as in voluntary activities, such as working groups. An important target group are the biology teachers. The contact with the living animal is a successful and popular method to build interest in students as a positive emotion and make the subjects come alive.

In Georgia, Hungary and Romania the "Tiere live" modules may be implemented both in pre-school education and elementary and secondary education as well. There are pre-schools,

elementary schools (primary and middle schools), secondary schools (gymnasium), secondary vocational schools and vocational schools.

In Hungary exists a favourable situation for implementing Tiere live modules as there are already pre-school institutions which integrate the basic principles of sustainability and environmental education as an organic unit into their pedagogical program. These are the so-called **green pre-schools**. The main difference between an eco-school and a regular school is that the principles of environmental education and sustainability pedagogy do not only prevail in education, but in every aspect of school life, such as the operating of the school, the meals of students or the organization of camps. These institutions consider the organized involvement of local communities' as a key factor for the realization of their goals. In Romania are a series of Non-Governmental Organizations assisting the regular schools in implementing environmental lessons. These are important resources which may be accessed for the successful implementation of the Tiere live modules.

2.2. Extracurricular partners

The most important aspect in capacity building for "Tiere live" modules implementation is finding extracurricular partners in supporting the teaching process.

2.2.1. Partners

Based on the German experience with the project "*Tiere live*" the aim was also pursued to better integrate and networking extracurricular expertise in respect to the protection of biodiversity in environmental education. The networking of the nature conservation activities and stakeholders on site with activities in the environmental education at schools also improves the acceptance and support of nature conservation measures.

In Germany, extracurricular environmental educational institutions are combined in the Association for Nature and Environmental Education (Arbeitsgemeinschaft Natur und Umweltbildung - ANU). It is an umbrella organization of about 1200 environmental centers, initiatives and other individuals who are active in the extracurricular environmental education. The ANU offers an online database of all environmental educational institutions in Germany: www.umweltbildung.de. Furthermore, associations (e.g. beekeepers association, poultry farmers association) are usually willing to support schools and teachers with their know-how, because cooperation and knowledge transfer

on specific subjects (e.g. importance of bees, information about poultry keeping and poultry races) through schools is an important way in the active association work.

The Hungarian study also recognized that it is essential to include external groups of experts and partners for the feasibility of the project (i.e.: CSEMETE (Nature Conservation Society of Csongrád County; Hungarian Society for Environmental Education; Hungarian Ornithological and Nature Conservation Society; Nimfea Nature Conservation Association; Orpheus Animal Welfare Society; Hungarian Veterinary Chamber; Inspectorates for Environment and Water). Among the state institutions are Hungarian Veterinary Chamber and Inspectorates for Environment and Water. Based on the Hungarian study the expertise and specialization of these extracurricular partners can help with the following ten issues: [1] transfer of increased environmental consciousness, knowledge and responsibility; [2] they can provide strong points for knowledge related to animal health care, animal keeping and the development of methods; [3] transfer of animal care and animal welfare knowledge; [4] they can be arenas for dissemination; [5] they can provide the starting point for the involvement of local communities and strengthen cooperation; [6] development of decision-making skills; [7] development of the skill of critical thinking; [8] development of conflict resolution skills; [9] sharing and conveying experience and [10] development of conscious perception.

In Romania the *Tiere live* modules implementation involves teachers and experts for living animals on one hand and other resources on the other (i.e. financial, tools, kits, equipment). Thus, promoting partnerships and working with experts on biological diversity to protect animal wildlife can help a lot. Among the partners are: National Colleges, Gymnasium Schools from Sibiu county: 13; Environmental Non-Governmental Organizations such as Milvus and WWF; EPA Sibiu at the schools level - partnership for experience exchange; Zoo from Sibiu; City hall from Sibiu and from Sibiu county; Teacher Training House (TTH); Lucian Blaga University from Sibiu; Experts for biodiversity conservation and Natural History Museums from Sibiu.

2.3. Adapting and developing the handbook „*Tiere live*“

2.3.1. German experience

All animal groups offered in the action manual are suitable for the implementation in Bavaria based on years of experience. In the curricular of all school types livestock and domestic animals are named as subjects.. Due to the frequent demand, the manual was extended by a chapter about chickens.

With the newly developed chapter on chickens, the biological diversity of livestock, the appreciation of animals as well as the products derived from them, farming methods of

livestock or consumer behaviour related to food can be treated. The application of chickens in school offers many opportunities. Many students are fascinated by living animals and willing to deal with chickens. Not only expertise and knowledge methods with the subject chickens can be mediated, also personal and social skills such as trust, responsibility and concentration can be optimized.

2.3.2. Partner countries opinion

During the adaptation of the project, in Hungary the following subjects on live animals will be implemented [1] common earthworm; [2] ants and the wolf (or dog) as a common lesson with all partners. In analysing the existing curricula it was considered that specific elements of the core curriculum are : [1]the characteristic body composition of vertebrate and invertebrate animals (similarities and differences); [2] general build of animals (ie. worms, insects, vertebrate animals); [3] living conditions of animals (nourishment, lifestyle, habitat, body composition); [4] life cycles of animals (active movement, nourishment, reproduction, behaviour) and [5] biodiversity (Sandy-Varga et al., 2014). Furthermore there will be extra activities developed not only focusing on the selected animals but also bridging the gap between environmental and entrepreneurial, business education, aiming to develop skills necessary to acquire environmentally responsible attitudes in the students' everyday life.

For Romania lessons for: [1] ants, [2] reptiles and [3] wolf (dog) will be implemented. In this respect, the manual recommends that the translation from German into Romanian and subsequently achieving minimum standard activities is required providing the necessary information. It is also considered that the learning unit should be permissive enough to allow adoption in the classes.

2.2. Conclusions

The practical experience in Germany for living animals used in teaching shows that all 14 chapters of "*Tiere live*" module can be used. Simple actions with less preparation time and less complicated procurement of the respective animal groups are preferred. Each country had to develop at least one new module and implement a common module (wolf lesson with activities implying dogs).

3. Training needs analysis for teacher trainings

3.1. Organisation

In Germany, as well as in Georgia, Hungary and Romania the teacher trainings are not uniformly regulated. For the teacher training in Germany there are institutes of the federal states, which are generally subordinate to the Ministries of Education. Due to the heterogeneous structure the organisation "Deutscher Verein zur Förderung der Lehrerinnen- und Lehrerfortbildung (DVLfB)" (German Association for the promotion of teacher training) was formed in Germany 30 years ago. It has become established nationwide. In many federal states there are independent qualification and support offers (from collegial consultation and exchange groups through coaching and supervision offerings up to specific training opportunities). In Hungary initial teacher trainings are conducted by higher education institutions, as, colleges, universities, pedagogical institutes, foundations and non-governmental organisations (like Junior Achievement Hungary), which offer accredited trainings). In Romania teacher trainings are realized by universities. An alternative may be to train teachers working in the non-governmental organizations which can cascade the training needs at the national level. For ELENA project the cooperation with local Partners already identified will be required for testing the success of training. In Georgia the main actor for teacher service trainings is the „National Center for Teacher Professional Development. The Trainings take place in all regions of the country. For public school teachers the training are for free. Duration of the trainings is between 2 – 6 days.. Environmental education plays a minor role, as there are only two modules. One module is for sustainable development, another one for geography and global problems.

3.2. Target group of the training

The "*Tiere live*" project especially appeals to biology teachers of all school types. It is advantageous if the teachers already have experience in the field of environmental education. Thus the trainings will focus on teachers for biology, but are not restricted only for this discipline. A voluntary participation has proven successful. A group of 10-15 people ensure an intensive exchange. A multiplication must be prepared separately and requires an extra training module.

3.3. Teachers trained as multipliers

The trained teachers should act as multipliers and train other teachers. Based on the German study, a promotion of multipliers by government funds is ideal. Depending on financial

resources, the size of the country and the kind of the training system, the number of multipliers has to be adapted.

4. Conclusions

To guarantee a wide distribution of the project in the extracurricular and curricular environmental education, multiplier training courses must be supported by central and local authorities. In the trainings, important groups of the school system, like seminar teachers, ministerial and extracurricular networks representatives. (environmental educational institutions or school camps) must be involved. For each event a sufficient budget is necessary. The amount that is needed varies due to country specific income levels (i.e. in Germany: up to 1500 euros/training day, in Romania 800 euros/training day). Based on the analysis of the four countries, the most valuable is the experience Bavaria gained during the implementation of “Tiere live”. Since 2010 “Tiere Live “has been implemented in many public schools and this helped a lot to support the sustainability of the process. It is quite unique that such a learning system could be implemented in such an organized and standardised way. A fact the Partners countries can profit from.

References

1. Aguirre, V., & Orihuela, A. (2010). Assessment of the impact of an animal welfare educational course with first grade children in rural schools in the state of Morelos, Mexico. *Early Childhood Education Journal*, 38(1), 27-31.
2. Antofie M.M., Sava C., Mara D., & Gheoca V., 2014, Studiu național privind introducerea modelului de educație în școli cu animale vii în România /Baseline Study regarding the implementation of Biodiversity Education using Living Animals in Schools in Romania, Publishing House Lucian Blaga University Sibiu – produced in the Comenius project ELENA <http://elena-project.eu/index.php/results-and-downloads/studies>
3. Carr, D. (2011). Values, virtues and professional development in education and teaching. *International Journal of Educational Research*, 50(3), 171-176.
4. Convention on Biological Diversity. Strategic Plan for Biodiversity 2011–2020, <http://www.cbd.int/sp/>
5. Convention on Biological Diversity: <http://www.cbd.int/>
6. Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, consolidate text, <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:01992L0043-20070101>
7. Council of Europe, the Ecological networks and Emerald network http://www.coe.int/t/dg4/cultureheritage/nature/econetworks/default_en.asp
8. Dees, J. G. (2007). Taking social entrepreneurship seriously. *Society*, 44(3), 24-31
9. Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds, consolidate text of the Directive 409/79/EEC: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0147>
10. European Commission, 2011, “Learning for the future: Competences in Education for Sustainable Development”; ECE/CEP/AC.13/2011/6
11. http://www.unece.org/fileadmin/DAM/env/esd/ESD_Publications/Competences_Publication.pdf
12. González-Redondo, P., Caravaca, F. P., Castel, J. M., Mena, Y., Delgado-Pertíñez, M., & Fernández-Cabanás, V. M. (2010). Using live animals for teaching in animal sciences: students' attitudes to their learning process and animal welfare concern. *Journal of Animal and Veterinary Advances*, 9(1), 173-179.
13. Hammann, M., Phan, T. T. H., Ehmer, M., & Grimm, T. (2008). Assessing pupils' skills in experimentation. *Journal of Biological Education*, 42(2), 66-72

14. Hesselink, F.J. et al., Communication, Education and Public Awareness, a toolkit for the Convention on Biological Convention, Montreal, 2007
15. <http://www.cbd.int/cepa/toolkit/2008/cepa/guide.htm>
16. <http://conventions.coe.int/treaty/Commun/ChercheSig.asp?NT=123&CM=&DF=&CL=ENG>
17. http://njt.hu/cgi_bin/njt_doc.cgi?docid=124322.178270
18. <http://www.europarl.europa.eu/document/activities/cont/201107/20110718ATT24270/20110718ATT24270EN.pdf>
19. Hummel, E., & Randler, C. (2010). Experiments with living animals-effects on learning success, experimental competency and emotions. *Procedia-Social and Behavioral Sciences*, 2(2), 3823-3830
20. Jones, H. C. (2005). Lifelong learning in the European Union: whither the Lisbon Strategy?. *European Journal of Education*, 40(3), 247-260
21. Kim, R. E. (2013). The emergent network structure of the multilateral environmental agreement system. *Global Environmental Change*, 23(5), 980-991
22. Klingenberg, K. (2012): *Lebende Tiere im Unterricht. Analysen – Studien – Konzepte.* Logos Verlag Berlin
23. KM-Homepage: <http://www.km.bayern.de/lehrer/unterricht-und-schulleben/sicherheit.html>
24. Knapp, J.V, 1996, Creative reasoning in the interactive classroom: Experiential exercises for teaching George Orwell’s animal farm. *College Literature*, 23 (2): 143-156.
25. Light, P. C. (2006). Reshaping social entrepreneurship. *Stanford Social Innovation Review*, 4(3), 47-51
26. Lordkipanidze, M., Brezet, H., & Backman, M. (2005). The entrepreneurship factor in sustainable tourism development. *Journal of Cleaner Production*, 13(8), 787-798
27. Mair, J., Robinson, J., & Hockerts, K. (Eds.). (2006). *Social entrepreneurship.* New York: Palgrave Macmillan
28. Mueller, M. P. (2009). Educational reflections on the “ecological crisis”: Ecojustice, environmentalism, and sustainability. *Science & Education*, 18(8), 1031-1056.
29. Ratiani, M., Rukhailai A. (2014) Baseline Study on Biodiversity Education using Living Animals in Schools in Georgia, ELENA Project Experiential learning and Education for Nature Awareness. <http://elena-project.eu/index.php/results-and-downloads/studies>
30. Reichert, K. (2007). „Ich wünsche mir ein Tier...“- Urteilskompetenz in der Grundschule fördern am Beispiel Haustierhaltung. In: Pfeiffer, S., Hrsg.: *Sachunterricht im 21. Jahrhundert – Bestandsaufnahmen – Herausforderungen – Visionen.* Oldenburger Vordrucke 564: 38 – 48.

31. Stadelmann, M., Persson, Å., Ratajczak-Juszko, I., & Michaelowa, A. (2014). Equity and cost-effectiveness of multilateral adaptation finance: are they friends or foes?. *International Environmental Agreements: Politics, Law and Economics*, 14(2), 101-120.
32. Strategic Plan for Biodiversity 2011–2020 and the Aichi Targets “Living in Harmony with Nature” <http://www.cbd.int/doc/strategic-plan/2011-2020/Aichi-Targets-EN.pdf>
33. Sturm P., Adelman W., Berthold T and Stettmer C, 2014, Baseline Study on Biodiversity Education using Living Animals in Schools in Germany on the example of the State of Bavaria. ELENA Project Experiential learning and Education for Nature Awareness. <http://elena-project.eu/index.php/results-and-downloads/studies>
34. Szandi- Varga P. et al., 2014, Baseline Study on Biodiversity Education using Living Animals in Schools in Hungary, ELENA Project Experiential learning and Education for Nature Awareness. <http://elena-project.eu/index.php/results-and-downloads/studies>
35. Tessaring, M., & Wannan, J. (2010). Vocational education and training: Key to the future. Lisbon-Copenhagen-Maastricht: Mobilising for 2010
36. The Council of the European Union, 2013, Council Conclusions on investing in education and training - a response to ‘Rethinking Education: Investing in skills for better socio-economic outcomes’ and the ‘2013 Annual Growth Survey’, 2013/C 64/06: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52013XG0305%2801%29>
37. Tunnicliffe, S. D. (1998). Down on the farm: The content of conversations generated by school children viewing live animals as exhibits and on a farm. *Journal of Elementary Science Education*, 10(1), 1-17.
38. Tilford, S., & Whyte, P. (2010). The Lisbon Scorecard X: The Road to 2020. Brussels: Centre for European Reform
39. UNEP/CBD/COP/12/2, 2013, Report of the Subsidiary Body on Scientific, Technical and Technological Advice on the work of its Seventeenth Meeting: <http://www.cbd.int/doc/meetings/cop/cop-12/official/cop-12-02-en.pdf>
40. UNESCO, 2005, United Nations Decade of Education for Sustainable Development (2005–2014): International implementation scheme. Paris: UNESCO <http://unesdoc.unesco.org/images/0014/001416/141629e.pdf>
41. VanTassel-Baska, J., & Wood, S. (2010). The integrated curriculum model (ICM). *Learning and individual differences*, 20(4), 345-357.
42. Tiere live project: <http://www.umweltbildung.bayern.de/partner/index.htm>