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YOUNG SLOVENIAN LEARNERS' KNOWLEDGE ABOUT ANIMAL DIVERSITY ON DIFFERENT CONTINENTS

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Abstract

This study examined young Slovenian learners' knowledge about animal diversity on different continents, which is important information conveyed during their education about different biomes on the Earth and about preservation of biodiversity. Altogether, 198 young learners 5 to 12 years old were interviewed via a questionnaire. They were asked to name three species of animals for each continent. In the second part of the questionnaire they answered questions designed to reveal their interest in plants, animals, and nature in general. Lastly, young learners were asked to name their most frequent source of information about animals. The study findings show that young Slovenian learners know animal species living in Africa and Europe the best. Mammals are the most commonly mentioned group of animals, particularly large mammals and pets. They possess several misconceptions about animal species ranges, such as those of penguins and tigers. Older children named more animal species than younger ones, and boys named reptiles more often and amphibians less often than girls. Television is the most important source of information about animals, followed by books and magazines, schools, and the internet.

Key words: Animals, Knowledge, Young learner, Continent, Diversity, Interest

Introduction

It is very important to understand learners' existing subject knowledge and the skills and concepts they bring to the learning situation. Examining the acquisition of learners' subject knowledge is important for designing an appropriate range of learning experiences (Palmer & Suggate, 2004). The literature defines and describes the term "environmental cognition" as the ability to imagine and think about the spatial world, encompassing general ways of thinking about, recognizing, and organizing the physical layout of an environment (Bell, Fisher, Baum, & Green, 1990). The development of spatial knowledge covers a range of space-related cognition, from the child's developing body image, to the location of objects in close space and understanding of space at the geographical scale, to the emergence of concepts about distant places (Spencer, Blades, & Morsley, 1989).

The decline of biodiversity due to human activity is one of the global concerns in which spatial knowledge might help in understanding various dimensions of biodiversity. Van Weelie and Wals (2002) pointed out that biodiversity is an abstract and complex construct that is difficult to teach, and so teachers give preference to species diversity as their focus when teaching about biodiversity. Similarly, Barney, Mintzes, and Yen (2005) recognized the value of species education for directing public attention toward conservation of the natural environment. Therefore, it is important that children and adults possess knowledge and experience of organisms and their environments.

Young learners have various relationships with animals in their everyday lives. They learn about animals in both formal and informal settings. Experience obtained in interactions with pets (Prokop, Kubiatko, & Fančovičová, 2007; Prokop, Prokop, & Tunnicliffe, 2008; Geerdts, Van de Walle, & LoBue, 2015), domestic, farm, and exotic animals, and through school field trips to museums, farms, zoos, and field/nature centres (Tunnicliffe, Gatt, Agius, & Pizzuto, 2008, Tunnicliffe & Reiss, 1999) has significant influence on young learners' attitudes and ideas concerning animals. Moreover, children also acquire understanding and knowledge from the society in which they live: from caretakers, various artefacts, and the media (Russell, 1993). Barbas, Paraskevopoulos, and Stamou (2009), for example, showed that nature documentaries have positive effects on students' knowledge of and feelings about insects. However, young learners also exhibit various misconceptions about living organisms. For example, turtles and reptiles are misclassified as amphibians (Yen et al., 2004) and penguins as mammals (Kubiatko & Prokop, 2007).

Interest in animals fades as students get older (Lindemann-Matthies, 2005; Prokop & Tunnicliffe, 2010). Preschoolers (5 to 6 years old) obtain information about the world around them from the media and other people. These children already know how to classify animals into two categories: good animals and bad animals (Kubiatko, 2012). Bruner (1983) found that students younger than seven do not specify animals by order, but they do use terms such as "birds" and "fish." Pupils are focused on their primary environment and happenings around them at the beginning of schooling (6 to 7 years old). Later when they reach 9 to 10 years of age, children are able to understand complexity and the use of natural laws. Adolescents (13 to 14 years old) are already aware of the role of humanity in nature and its negative impacts (Rejeski, 1982).

Young learners living in Europe have limited opportunities for direct interactions with animal species from other continents, except when visiting institutions such as zoos, aquariums, or natural history museums. Even in these cases, however, the quality of the experience is limited, because the organisms are not observed in authentic natural environments. Insley (2007) explained that natural history dioramas typically combine preserved organisms and painted or modelled landscapes. However, Genovart, Tavecchia, Enseñat, and Laiolo (2013) found that children recognize exotic species better than local ones. Children in developed countries know exotic species well, because they come in contact with them in zoos and outdoor centers (Patrick & Tunnicliffe, 2011). Palmer and Suggate (2004) examined UK children's responses to the question about what might live in rainforests and polar places. They found that children have some knowledge about distant environments as early as 4 years of age and there was a general increase in the number of children able to demonstrate accurate knowledge about animals living in distant environments of about 10% per annum. The average number of correct animals per child increased from 1.6 for the 4-year-olds to three for the 10-year-olds.

Research questions

This study examined young Slovenian learners' knowledge about animal diversity in Europe, Africa, Asia, Oceania, South and Central America, and North America. The study considers the following research questions:

1. Which animals from six continents are young learners familiar with?
2. Which groups of animals can young learners name?
3. What are the most common misconceptions about the origins of the animals named?
4. How does young learners' age affect their knowledge about animals?
5. How does young learners' gender affect their knowledge about animals?

6. What sources of information have provided the majority of their knowledge about these animals?

Methods and materials

Altogether, 198 young learners between 5 and 12 years of age were interviewed via a questionnaire: 99 boys and 99 girls. They were asked to name three species of animals for each of the six continents. The second part of the questionnaire consisted of five items designed to reveal their interest in plants, animals, and nature in general. In addition, young learners were asked to name their most frequent source of information about animals: the internet, books, and documentaries on television, and so on. Closed- and open-ended questions were used. The questions were presented in Slovenian. A pilot study with five young learners was carried out.

The face-to-face interviews were carried out by university students (Faculty of Education, University of Ljubljana) during their student teaching in preschools and schools. The questionnaire took approximately 10 minutes to complete. Interviews took place in winter 2012–13.

Descriptive and inferential statistics were used to answer research questions, employing the Spearman's rank correlation coefficient, the Shapiro-Wilk *W* test of normality, and the Mann–Whitney U test.

Research Findings

Table 1 shows the descriptive data regarding young learners' knowledge of species from different continents. Animals from Africa and Europe are the best known among young learners. Data presented in Table 1 also show that almost one-third of them did not give answers listing animals from South and Central America. On average they most often named mammals (71%, M=9.32, SD=3.50) from different continents. The mammals are followed by reptiles (13%) and birds (8%) (Figure 1).

The lion is the most commonly mentioned animal that lives in Africa. In addition to lions, young learners often mentioned elephants and giraffes (Table 2). They also often mentioned the tiger, which does not live in Africa. It is a carnivore that lives in Asia. The most frequently mentioned animals in Asia are elephants and snakes, followed by tigers and pandas. Some mentioned the cheetah, which lives in Africa. The bear is the most frequently mentioned European animal. Dogs, cats, wolves, and foxes are also frequently mentioned.

Table 1. *Young learners' knowledge of animal species by continent*

Continent	Number of animals named	Average number of animals named per person	Number of missing responses	The proportion of missing responses
Africa	560	2.77	2	1%
Asia	376	1.86	48	24%
Europe	532	2.63	11	5%
Oceania	447	2.21	17	8%
North America	384	1.90	47	23%
South and Central America	343	1.70	63	31%

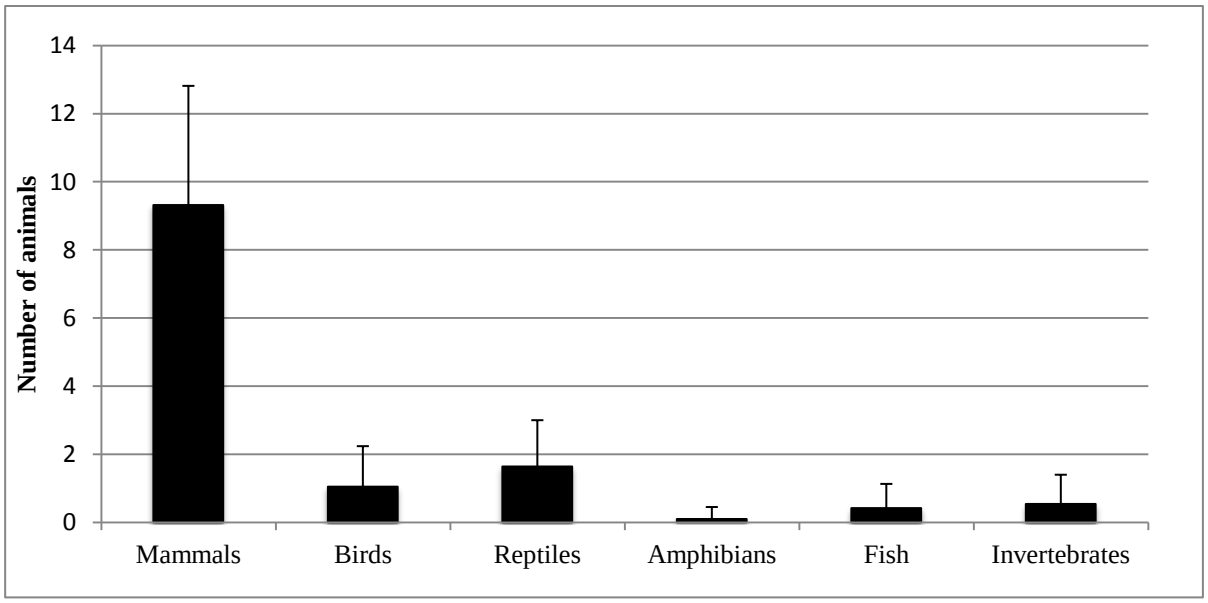

Figure 2. *Number of listed groups of animals.*

Table 3. *The five most frequently named animals on each continent*

Africa		Asia		Oceania		Europe		North America		South and Central America	
lion	20 %	elephant	15 %	kangaroo	32 %	bear	14%	polar bear	15%	snake	13%
elephant	17 %	snake	12 %	koala	14 %	dog	8%	penguin	9%	crocodile	7%
giraffe	15 %	tiger	12 %	crocodile	4%	cat	7%	bear	8%	parrot	6%
camel	7%	panda	10 %	snake	4%	wolf	7%	seal	3%	monkey	6%
tiger	5%	monkey	6%	panda	4%	fox	7%	whale	3%	bear	3%
others	37 %	others	46 %	others	42 %	others	56%	others	62%	others	64%

Pets are commonly mentioned animals for Europe. The kangaroo is by far the most frequently mentioned animal of Oceania, followed by the koala. Respondents also mentioned pandas and elephants, which do not inhabit the continent in question. The most frequently mentioned animal in South America is the snake, followed by the crocodile, the parrot, and monkeys. Elephants, grizzly bears, tigers, kangaroos, hippopotamus, gorillas, pythons, and alligators were wrongly classified as living in South America. Table 2 shows that young learners often chose the polar bear as a North American animal. This is followed by penguins and bears. It is evident that children have misconceptions about the home range of penguins, which inhabit the southern hemisphere.

The effect of young learners' age on the total number of known species on different continents was investigated (Figure 2). Age is weakly, but positively correlated to the number of known species ($\rho = 0.374$, $p < 0.001$). Older students name more animals than younger ones.

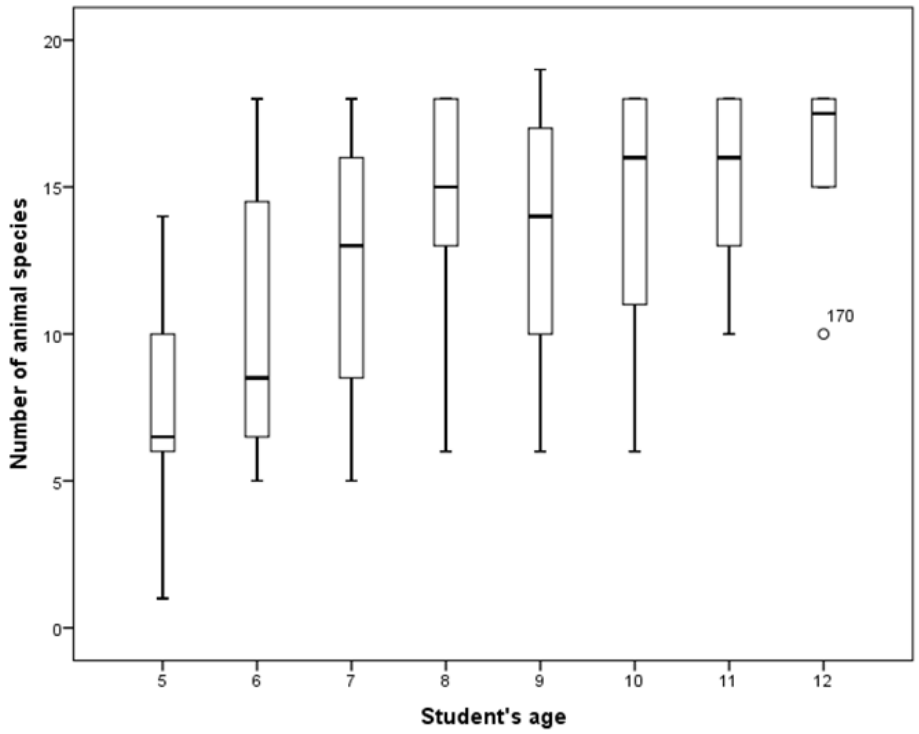

Figure 2. *The average number of named animals.*

Gender differences are presented in Figure 3. The Shapiro-Wilk W test showed that the variable distributions are different from normal. The nonparametric test for independent samples showed statistically significant differences between boys and girls in their knowledge about reptiles (MW = 4072.00, p = 0.034) and amphibians (MW = 4497.00, p = 0.045).

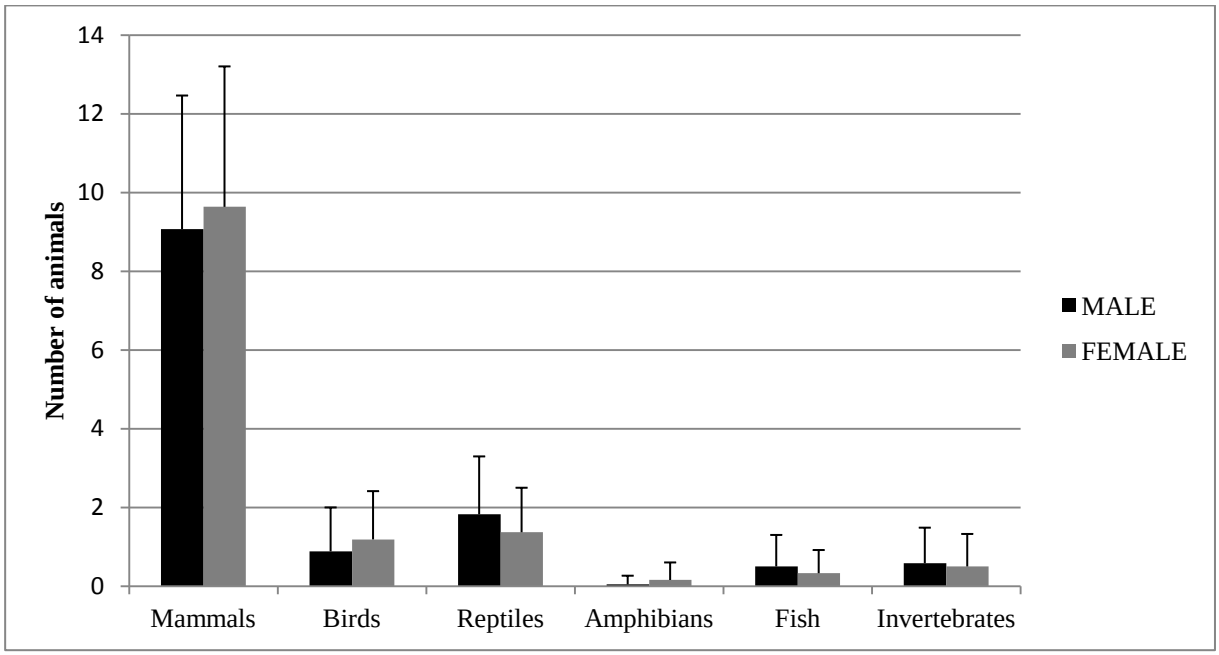

Figure 3. *Number of listed groups of animals by gender.*

Figure 4 clearly shows that they learned the most information about animals from the television (32%). They also indicated magazines and books (25%) and school (23%) as an important sources of information.

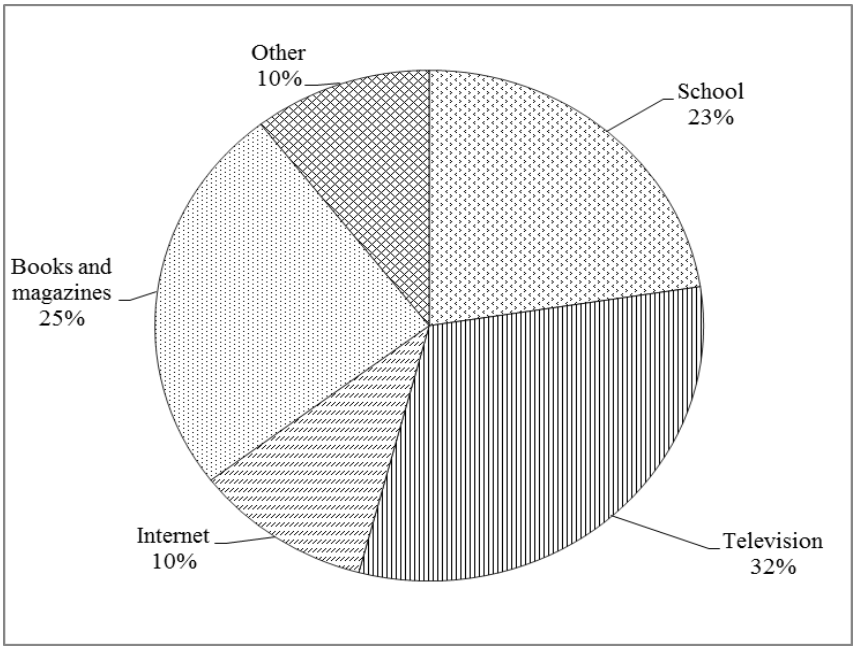

Figure 4. *Shares of sources from which students obtain information about animals.*

Respondents were asked to answer five true-false statements asking about their interest in learning about animals and nature in general (Figure 5). The majority of respondents would like to know or visit meadows, forests, rivers, and lakes, and observe nature (question 1), would like to visit a zoo or farm with animals (question 2), and would like to watch a show or read books about animals (question 3). Only one-fifth of all

respondents do not like plants (question 4). Three-fifths of the respondents prefer to learn about animals and plants more than other school topics (question 5). There were no significant differences in levels of interest in learning about animals and nature depending on learners' ages ($\rho = 0.007$, $p = 0.927$).

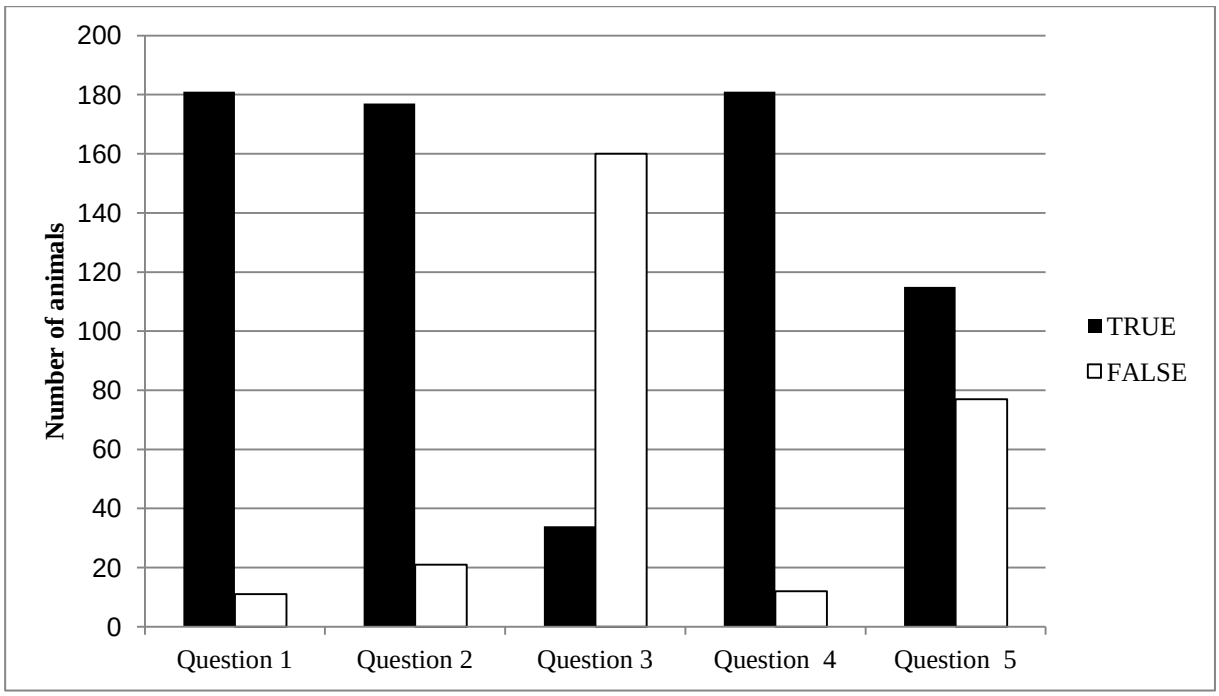

Figure 5. *The number of responses to each question.*

Discussion

This study examined young Slovenian learners' knowledge about animal diversity on different continents. Young Slovenian learners named more animals from Africa and Europe than from other continents. On the other hand, taking into consideration that they named many domestic animals and pets for Europe, these findings confirm those of Genovart et al. (2013) to a certain extent. It was discovered that children recognize exotic species better than local ones. Young Slovenian learners know exotic animals from Africa better than local wild animals.

The animal group most often mentioned was mammals. This applies to all the continents except South and Central America, where the most mentioned group of animals was reptiles. Palmer and Suggate (2004) and Genovart et al. (2013) also found that there are significant differences in students' knowledge about various groups of animals. The most well-known group was mammals. The reasons could be students' greater affection for mammals (Torkar, Kubiatko, & Bajd, 2012; Prokop & Tunnicliffe, 2010), more frequent

contact with them (Pagani, Robustelli, & Ascione, 2007), mammals' charismatic nature (Torkar, Praprotnik, & Bajd, 2007; Barney et al. 2005), or some other factor.

The study showed that young learners have many misconceptions about species origins. For example, they often placed the tiger in Africa, where many different species of large carnivores live. They associate North America with cold Arctic areas and that is why penguins are second out of the animals most often mentioned for North America, even though penguins live in the southern hemisphere. It is interesting that the most commonly referenced animal species in Europe were carnivores. Clucas, McHugh, and Caro (2008) found that charismatic species such as bears and wolfs are often used for education and knowledge transfer, because they arouse the attention of the lay public. This might be also the reason they were often mentioned by young learners.

The study showed that girls more often mentioned amphibians and boys more often mentioned reptiles. Prokop and Tunnicliffe (2010) and Randler, Hummel and Prokop (2012) showed that boys are more interested than girls in dangerous animals, animals that transmit diseases, or animals that pose a threat.

In general, young learners are very interested in learning about animals and nature overall. The study showed that older learners named more animal species, which was observed also in the study by Palmer and Suggate (2004). Prokop and Tunnicliffe (2010) found that as learners grow older their interest in animals decreases. These study findings show no significant differences in interest in learning about animals and nature by learner age.

Young Slovenian learners reported obtaining the most information about animals and plants from watching TV, followed by reading magazines and books. Only the third most frequent answer was schools. Surprisingly, the internet is not a major source of information about animals and nature. Similarly, Prokop, and Tunnicliffe (2010) found that children's better knowledge of certain species is affected by personal experience, reading books, and watching documentaries. Genovart et al. (2013) indicated that foreign children's books can contribute to increased knowledge about charismatic exotic species such as lions and elephants.

Conclusions and Implications

These study findings lead to the following conclusions. The first is that young Slovenian learners know animal species living in Africa and Europe the best. They have limited knowledge about geography and species ranges. They possess several misconceptions about

species ranges, such as those for penguins and tigers. Mammals are the most commonly mentioned group of animals, particularly large mammals and pets. Also, older children named more animal species than younger ones. Compared to girls, boys more often named reptiles and less often amphibians. Lastly, television is the most important source of information about animals for one-third of young learners, followed by books and magazines, schools, and the internet.

These findings are important to consider when young learners are educated about various biomes on Earth and the conservation of biodiversity. They try to make a sense of the issues presented to them. Because young learners have limited knowledge about animal species from distant places, they should be encouraged to visit zoos and natural history museums, watch documentaries, read books and magazines, and so on. Young learners' interest in large mammals should be taken into account when choosing case studies for textbooks or teaching strategies for improving the understanding of efforts for biodiversity conservation in various biomes.

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