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Animals in the lives of young Maltese Children

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Young Maltese children have experience and knowledge of animals. We explored the range of animal with which they are familiar and the origin of this knowledge. The children interviewed were in Pre School, aged 4 years, and in the first year of compulsory education, aged 5 years Verb l questions and photographs were used as the probe to access understanding and the sources of their learning. Different questions explored different concepts – effectively three groupings, animal knowledge, habitats, and source of knowledge. The animals photographed were from three areas that were established as popular with children, namely: pets usually found in homes, familiar animals such as farm animals and wild animals. Reduced sized colored photographs of the animals were used as a cue to encourage children to talk Children recounted instances where they have met animal pictures printed on books, charts and posters. The majority of children were familiar with the selected animals. Apart from the animals shown on the photo cards the children were able to mention a range of other animals the animals mentioned include a range of animals that are not found locally. The most two popular animals children mentioned were the tiger and the lion. Results show that these children possess a high sense of observing detail and interpreting visual material. They mentioned other materials where they have encountered animals, including toys, clothes, blankets, pillows and school stationery and often mentioned their favorite animal characters from the media

Keywords: Young Children, Malta, Animals, Knowledge Source

INTRODUCTION

Inquiring into children's ideas is an important step towards teaching them. Our work aims to identify the ideas that young Maltese children develop about animals, the range of common and less common animals with which these children are familiar and any difference across ages and gender. The amount of knowledge held about animals together with the influences on the child affect the knowledge they acquire. The sources of knowledge also contribute to their understanding.

Children are natural observers and inquirers of the world around them. They learn from their first hand

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experiences (Boulter et al, 2004). Children learn to identify an organism using a basic or everyday name of the culture in which they are living (Rosch & Mervis, 1975; Brown, 1958). Ryman (1974) showed that the inability of eleven year-old children to classify the biological exemplars they were given as members or non-members of a taxonomic group suggests that the children had no grasp of the defining attributes required to perform such a task. Moreover, Braund (1998) showed that children's thinking about animals in science lessons changes as they develop with the youngest children simply being concerned with shape, form and size. Prokop et al (2007) explored children's understanding of birds in their area whilst Prokop et al (2008) found that if children looked after pets, vertebrates or invertebrates, children had a better understanding of these animals. Tunnicliffe (1995) showed that when children look at animals as exhibits, they mention anatomical features such as the

Table 1. Number of children taking part in the study

	Kinder 2	Year 1	Total
BOYS			25
State School 1	2	3	
State School 2	1	1	
State School 3	6	7	
Independent School	2	3	
GIRLS			25
State School 1	3	2	
State School 2	2	1	
State School 3	6	6	
Independent School	3	2	
TOTAL	25	25	50

Table 2. Classification used to categorise children

Gender	5	Age Year 1
Boys	4-5	5-6
Girls	4-5	5-6

dimensions of the animal, its shape and its colour. Shepardson (2002) investigated primary aged children's ideas about insects and found that their ideas reflected understandings based on physical characteristics of size and shape, both arthropod and insect characteristics that they had learnt, human-insect interactions, their life story, feeding and type of locomotion. Tunnicliffe (1995) found that children of the same aged remarked most often about salient features of live and preserved animals in zoos and natural history museums. Whilst Tunnicliffe and Reiss (1999) found that, when grouping animals, the youngest pupils relied mainly on anatomical reasons. Older pupils still used anatomical reasons but were more likely also to use other reasons, such as those based on taxonomy, habitat and behaviour.

Moreover, children also acquire understanding and knowledge from the society in which they live, from carers and from various artefacts as well as from the technological media (Russell, 1993). The sources of information that provide children with information also often involve adult influences. Lucas (1981) drew attention to the informal construction of ideas by children through information gleaned from the media. Out of school experiences have a large contribution to children's understanding and knowledge (Tunnicliffe and Reiss, 1999). Moreover, keeping pets influences children's understandings of animals (Prokop et al 2007) and focused study on invertebrates in the primary classroom motivates pupils to being enthusiastic about learning about and being more caring towards invertebrates (Watson 2006). Thus, we, as educators, must be cognisant of these findings. However, once in formal education children are taught scientific concepts but they bring their ideas which they have built from the

earliest age (Driver 1985) and they show coherence towards their ideas (Osborne and Freyberg, 1985).

However, compared with adults, young children almost certainly possess a different set of concepts, which they map onto the word 'animal'. Furthermore, young children employ anthropomorphic terms in their explanations of both the form and behaviour of other animals (Carey 1985). Keil (reported by Carey 1985) found that five year olds used its appearance to define the category to which an object belonged, but by nine years of age they understood that the name represented a natural kind and thus the named object possessed certain properties that could be inferred from knowledge of the name of the object. Similar ideas about aspects of biology have been found amongst children of similar ages but from different cultures (Reiss, Tunnicliffe et al, 2001).

Children construct their own knowledge in trying to make sense of things around them (Gatt et al, 2003). They try to interpret new situations and guide their actions using mental models that they would have developed. Such mental models are in turn revised in the light of their encounter with a new experience (Von Glasersfeld, 1995). Cultural influences also have an impact and language forms an important part in cultural issues and everyday knowledge attached to experiences (Dawson, 1992). Moreover, personal and social influences cannot be separated as they occur one and at the same time, a fact we must accept (Solomon, 1987).

The research reported here probes the understanding of young children about animals, from what sources of information do children in Malta obtain this knowledge and are similar ideas acquired across ages and genders?

METHOD

This research focused on children either side of the transition from informal (pre school) to formal schooling in the first year of compulsory education.

Children in the preschool level (age 4) and in the first year of compulsory education (age 5) were included in the study.

The methods employed were are interview about instances (Osborne and Freyberg 1985), using questions and using photographs, drawings and words as the probe to access understanding (Boulter, et al. 2004).

The children were asked several questions as well as shown a series of photos of animals. The animals were chosen from three areas that the researchers knew from observation and discussion with parents and teachers were popular with children, namely: pets usually found in homes, familiar animals such as farm animals and wild animals. Reduced sized coloured photographs of the animals were used as a cue to encourage children to talk since it has been shown that when presented with pictures, even though images reduced in size from

Table 3. The whole range of animals and the percentage number of children mentioning them other than the selected ones

Percentage	Animals Mentioned by Children
34%	Tiger
30%	Lion
26%	Bird
18%	Crocodile, fish, cow
16%	Giraffe
12%	Snake, chicken, tortoise, rabbit, lizard
10%	Duck, frog, shark,
6%	Leopard, hamster, bee, turtle,
4%	Bear, pigeon , deer, cock, hippopotamus,
2%	Rhinoceros, hedgehog, lioness, penguin, butterfly, bull, chick, goat, mosquito, kangaroo, grasshopper, angel fish, clown fish, mammal, amphibian, dragonfly, calf, wolf, gorilla, dinosaur, mole

reality and two dimensional, children initially describe the picture as a means of orientation for themselves (Boulter et al. 2004). In this case, eleven photo cards were used- produced from photographs in included the animals: horse, sheep, dog, cat, elephant, dolphin, zebra, ladybird, spider and mouse.

Different questions explored different concepts. Effectively there were three groupings. Firstly animal knowledge secondly places where animals lived, and lastly source of the children's knowledge. The first three questions explored ideas about animals. One targeted children's knowledge on the range of animals they know about while question two introduced the set of animals used as the focus of the study. In the third question the children were requested to state whether or not they think that the image in the photographs were an animal or not and if they responded affirmatively explored the reasons behind this. Questions four and five were about places where animals live. Questions four, five and six probed the source of knowledge followed by a question seeking to elicit the salient features of the animal which caused the children to make the categorisation. A pilot study with four children was carried out. The questions were presented in Maltese to facilitate understanding and then translated into English. In the main study the conversations from 50 children from 4 schools were audio-taped and transcribed. The transcripts were read and re read and the main ideas of the children identified.

RESULTS

Apart from the animals shown on the photocards the children were able to mention a range of other animals. Table 3 illustrates the percentage number of instances (from the range of animals other than the selected ones) that each animal was named by the children coming from both samples. The animals mentoned include a range of animals that are not found locally. The most two popular animals children mentioned were the tiger and the lion.

The percentage of children able to classify the animal correctly increased with age (Table 4). Kindergarten children had difficulties in classifying spider, dolphin and ladybird with more than half of the children stating that they are not animals. Otherwise, there was no significant difference between the gender of the children and their ages in the content of their responses. The horse was the only example identified as an animal by all of the younger children. When asked to mention other animals, the examples cited most often were not endemic to Malta. In fact 34 % of responses mentioned a tiger, 30% a lion and 18% crocodile. The bird was mentioned as a super ordinate category but no species identified. Table 4 represents the selected animals as classified by the two samples as being recognised as an animal or not an animal.

The majority of children were familiar with the selected animals. All children coming from Kindergarten 2 and Year 1 recognised the horse as being an animal and the horse was the most popular animal to be recognised as being an animal by all interviewed students. Question 3 tackled directly the animal concept fostered by the interviewed children. When the children were shown each photograph they were asked to name the illustration and this was followed by a further probing phase where the child had to classify into an animal or not an animal.

The animal that was least recognised as being an animal by Kindergarten 2 children was the dolphin, since 64% of the group classified the dolphin as being a fish and not an animal. When asked to mention some animals at the beginning of the interview the same girl included the fish as being part of her list of animals. Similar thinking was found amongst other chdilren questioned.

Most pupils, particularly the younger ones saw animals as mainly the large terrestrial animals such as those found at home as pets, on a farm or in the jungle. These would be the first animals that they have come across and therefore their concept of 'animal' has remained restricted and influenced only by their first experiences that they encountered at home from stories told and other instances such as viewing animals on television. The animal that was least recognised as being an animal by Kindergarten 2 children was the dolphin.

Table 4. Is it an Animal?

Selected Animals (Photo Cards)	Yes				No			
	Kindergarten 2		Year 1		Kindergarten 2		Year 1	
	Number	%	Number	%	Number	%	Number	%
Cat	22	88	25	100	4	16	0	0
Dog	24	96	25	100	1	4	0	0
Dolphin	9	36	16	64	16	64	9	36
Elephant	23	92	25	100	2	8	0	0
Horse	25	100	25	100	0	0	0	0
Ladybird	11	44	12	48	14	56	13	52
Mouse	18	72	18	72	7	28	7	28
Pig	21	84	24	96	4	16	1	4
Sheep	22	88	25	100	3	12	0	0
Spider	10	40	16	64	15	60	9	36
Zebra	21	84	25	100	4	16	0	0

Children used different characteristics as indicators of animals. The children's criteria used for justifying their allocating the image presented as a member of " animals" or not are grouped into the following: appearance, noise production, size, habitat, any other personal experience the child might have had with a particular animal and further ambiguous responses. Sixteen percent used the number of legs possessed, especially when the animal had 4 legs. *Eight percent of the children referred to the tail while 4% looked at the fur by 4 %.* Six per cent percent of children stated that if something made a noise it were an animal and 16% categorised on size. One fifth or 20% of the children also referred to the habitat of the animal in deciding on how to classify the example in the photograph.

Sixty four percent of the group classified the dolphin as being a fish and not an animal. When asked to mention some animals at the beginning of the interview the same girl included the fish as being part of her list of animals. Similar thinking was found amongst other children. The least recognised as an animal by Year 1 children was the ladybird since only 48% stated that this is an animal b ut most children recognised the ladybird.

Two children from the whole sample gave responses that have been classified as ambiguous because of their unclear nature. When interviewed about how they knew that particular objects mentioned were animals these children gave explanations, which were not clear even though these children were probed further to, clarify their responses.

Children's personal experience and their encounters with animals were explored in Questions 4 and 5. The responses obtained from children included various instances from their personal life where they have met animals and also any other experiences they might have or have had directly with particular animals.

The sources from where children have obtained their ideas and information were retrieved from the responses given to question 6 and 7. The sources of information and the percentage of children citing each are shown in Table 5 and the representative percentage number of children.

The children mentioned a range of sources from which they learnt about animals but family were mentioned as the main source of knowledge One third of the children said they found out about animals from their mother, father siblings or other adults like uncle and aunt, grandparents. Television, videos, DVDs, CD roms, internet, books, pictures on posters, charts, toys, print on stationery or clothes and travel were also mentioned in lesser numbers. Table 6 shows the different types of sources mentioned by the children from the whole sample in more detail and the percentage number of children representing each mentioned source.

The children's sources of obtaining information pinpoint the adults' influence on the process of obtaining knowledge. As the results of the study show, family peaks high in statistic in being the most popular source of obtaining information for children. Along with different members of the family that children have referred to, one finds other significant adults in the child's life for example the teachers, uncles, grandparents etc in class and from the teacher. However, the number of children who referred to this context of science learning is very low and therefore insignificant when compared to other sources widely mentioned.

Table 5. The source of information cited by children

Source Type	%
Family	32.9
Media	26
Other significant adults	15
Printed Material	14.4
Others	6.2
Travel	5.5

Table 6. Source Types

Source Type	Number of children	%
Mum	27	54
Dad	16	32
Siblings	5	10
Teacher	10	20
Other Adults	12	24
Television	19	38
Videos/DVDs, CDs	16	32
Internet	3	6
Books	14	28
Pictures/Posters/Charts	7	14
Toys	6	12
Print on stationery/clothes	3	6
Travel	8	16

Twenty-six percent of the interviewed children referred directly to media sources as being ways of obtaining information about animals. The most popular medium was television followed by other encounters of animal characters on video, DVD and CD rom. This highlights the importance of media influence that present children are receiving continuously in the technological evolutionary world. Children made various references from contemporary cartoon animal characters and cinema films.

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Even though the percentage of the internet cited as being one of the sources mentioned is still significantly low when compared to other sources, the chances might be that future trends will encompass the internet as being a more popular source amongst future generations.

Children recounted instances where they have met animal pictures printed on books, charts and posters. Considering the young age of the children, this shows that they possess a high sense of observing detail and interpreting visual material. The children also mentioned other material where they have encountered animals. These include toys, clothes, blankets, pillows and school stationery. On many instances the children mentioned their favourite animal characters emerging from cinema as the animals being printed onto their belongings. Once again here the media influence re-emerges.

Six percent of the children interviewed mentioned their experiences abroad as being part of obtaining their knowledge on animals. These children gave a wider variety when asked to name the animals they knew. In their list they included exotic animals such as kangaroo, mole, hippopotamus, penguin and gorilla. When taking a deeper look into the nature of their responses, these children seem to give specific details about particular animals.

DISCUSSION

Different age groups were sampled in similar studies carried out by Bell (1981). The study carried out in New Zealand investigated 39 average ability pupils, ranging from 9 to 15 years and inquired the scientific concept of the word 'animal'. Results from this small study show that most children did have some conception of what an animal is. However, they overall possessed a limited scientific understanding of the concept 'animal' which they had acquired from various sources, which they encountered as well as from observations they made themselves in the natural world. We found that children had a personal set of criteria consistent with his/her process of classifying instances. The recognition of a horse by all the children is not surprising for it is big in size and represents the four-legged terrestrial animal widely used in children's stories, nursery rhymes and books It is the typical animal on Maltese farms, and one of the largest animals on the island Moreover, curricular experiences in Year 1 where the curriculum requires that children tackle the topic of animals formally in class as they learn more information about farm animals and their pets. Even if children recognised the ladybird, they did not classify it as an animal, indicating restricted use of the term in general public understanding (Bell, 1981). A number of children recognised the dolphin as an animal, but many responded 'no' to classifying it as an animal as they thought that it was a fish. As Carey (1985) found, marine life is isolated and distinguished from the other animals because of their natural habitat

in the sea.. The dolphin, being the animal least recognised by Kindergarten 2 students, is indicative of a common misconception of it being a member in the fish family but not an animal. In research conducted by Kubiatko and Prokop(2007) 30% of the pupils studied knew that dolphins brethae by lungs which also supports the view of the Maltese chidlren that a dolphin is a fish. This misconception repeated itself in the various responses given out by children. This conception may have arisen from the teaching about fish in a separate context rather than being members of the animal kingdom.

Such misclassification may also be indicative of the narrow use of the term 'animal' by the majority of people to describe mammals (Bell 1981) although Villabi and Lucas (1991) showed that such misclassification could be the result of semantics in a particular language. None the less, children's understanding of the concept animal is narrower than that used in science. According to Bell's study (1981), the criteria used by children to describe the characteristics of some animals are not characteristics owned by all animals. Bell (1981) argues that when used as criteria these characteristics limit the range of concept examplars and result in the restriction of the scientifically accepted concept. These arguments apply for this study as the interviewed children mentioned similar characteristics to that of Bell's study. None of the interviewed children used scientific characteristics of living things (for example: respiration, growth, reproduction) as being the characteristics of animals. This finding may be due to the fact that the primary curriculum lacks scientific concepts related to animals. Another reason might be that the messages that children obtain throughout their personal life experience has a very limited scientific orientation.

Contributing to misconceptions held by children as to the meaning of animal may be the confusion between the scientific meaning of the word 'animal' and its common meaning. According to Bell's (1981) summary of interviews' findings, the common meaning appears to refer to the restricted category of four-legged terrestrial mammals. This implies that pupils might find difficulties when challenging their common concept attributed to the word animal with scientific meanings. Barnes (1969) refers to this difficulty while emphasising the barrier that exists between teachers' language and children's meanings. The most common influence was coming from thier home environment when they recalled that they had animals kept as pets. As Solomon (1987) points out a greater amount of information is culled from the media in an incidental, unintentional casual fashion where there is exposure to information through watching television programmes. Moreover, Lucas (1986) distinguishes informal instruction, which is intentional from that which is to be found in fiction and advertisements, children in today's world are exposed to informal science, which unlike formal taught science the vast majority of this information is highly attractive.

Furthermore Russell (1993) indicates, children interpret the world and physical phenomena and hold various representations that might have varying degrees of 'goodness of fit' and serve as long as their predictive and explanatory utility is still useful to the child. The responses given by the interviewed children portray their ideas that they have recalled from their everyday life encounters with animals. This implies that each individual constructs personal meanings of experiences and the understandings held by each individual vary. Gunstone (1990) identifies that, children's science is made up of a type of reasoning linked with the individuals' already existing knowledge and beliefs.

Tunnicliffe and Reiss (1999) found home to be one of the most important sources of information about animals for primary aged children. Children interpret the world and physical phenomena for themselves and hold various representations that might have varying degrees of 'goodness of fit' which and serve as long as their predictive and explanatory utility of such ideas is still useful to the child Russell (1993). The children's sources of obtaining information pinpoint the adults' influence on the process of obtaining knowledge. As the results of the study show, family peaks high in statistic in being the most popular source of obtaining information for children. Along with different members of the family that children have referred to, one finds other significant adults in the child's life for example the teachers, uncles, grandparents etc. Solomon (1987) argues children construct meaning about different scientific concepts that are influenced by agents present in their socialisation process. Indeed, some of the interviewed children mentioned that they obtain information about animals directly from schools, in class and from the teacher. However, the number of children who referred to this context of science learning is very low and therefore insignificant when compared to other sources widely mentioned.

The responses given by the interviewed children reveal their ideas that they have recalled from their everyday life encounters with animals. This is turn implies that each individual constructs personal meanings of experiences and the understandings held by each individual vary. In line with Gunstone's findings Gunstone (1990)

The children, even at as young an age as 4 and 5, were found to hold personal alternative frameworks about the meaning of the concept 'animal'. They will bring these ideas with them to school and may interfere with learning about simple science concepts. Teaching young children about animals requires that their already existing ideas be taken into consideration. In particular, teachers need to be sensitive to the potential ambiguity

of the term 'animal' and the features that children consider as indicators of animals. . In many cases, teaching about animals often involves displaying a variety of examples. Learning about animals, however, is more complex. Teachers need to help children to explore their reasoning about what features they consider in deciding whether a specimen is an animal or not. Even from a very young age, it is necessary to allow children to explore and compare their understanding if one is to promote similar practices of reflection and construction of knowledge at an older age. In this increasingly environmentally poor society (Louv, 2006) teachers need to b e aware of what   ideas and encounters children entering school have experienced and hold before their formal education in biology and the environment begins.

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