

Investigating Primary School Learners' Knowledge and Awareness of Wild Animals and Their Habitat Before Visiting the Zoological Garden: A Case Study

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Abstract

This research paper examined primary school learners' knowledge and awareness of wild animals and their habitats before visiting the zoological garden. The study poses two research questions: 1) To what extent do primary school learners demonstrate knowledge and comprehension of wild animals prior to visiting the zoological garden? 2) What is the level of learners' awareness about wild animals' habitats before visiting the zoological garden? Using a phenomenological approach, the study explored the learners' knowledge and awareness of wild animals. Data was collected through qualitative methods, including drawings, from a sample of six learners aged 10-12 years old. The findings indicate that learners have limited knowledge and comprehension of wild animals and their habitats before visiting the zoological garden. The results also highlight the significance of teachers incorporating information about wild animals' behaviour and adaptation to their environment when teaching science. The study recommends that zoological gardens offer learners valuable educational opportunities to improve their understanding of these animals.

Keywords: Primary School Learners, Prior Knowledge, Science Learning, Zoo, Zoological Garden

INTRODUCTION

Informal learning environments, such as zoological gardens, are increasingly being recognised as effective learning settings among primary school learners (Baruzzi, 2022; Todd & Zvoch, 2019). Research shows that such environments have the potential to engage learners, encourage them to learn more, and most importantly, enable them to take responsibility for their learning (Chen et al., 2022; Pujiastuti & Haryadi, 2023; Rohali et al., 2023). This is particularly evident in science, where real-world experiences and hands-on learning can greatly enhance learners' understanding and retention of complex scientific concepts (Abadi et al., 2023; Coll et al., 2018; Vela et al., 2020). Studies have consistently reported that informal learning environments can significantly improve learners' performance in science-related exams, tests, and projects (Vela et al., 2020). However, scholars have highlighted the impact of learners' prior knowledge on their ability to learn in the zoological garden (Falk et al., 2013).

Literature has shown that learners' prior knowledge of wild animals can significantly affect their educational experience and learning outcomes when they visit the zoo (Godinez & Fernandez, 2019). According to a study by Falk et al. (2013), visitors' participation in zoo exhibits was strongly predicted by their previous understanding of animals. Those with more, correct prior knowledge were anticipated to spend longer at the exhibits and ask more questions.

Additionally, zoo visitors were more expected to remember details about the animals following their visit if they had higher levels of correct prior knowledge (Falk et al., 2013).

As demonstrated by Godinez and Fernandez (2019) study, visitors' views toward conservation were positively connected with their prior knowledge of animals, with those with more prior knowledge being more likely to express concern for animal welfare and support for conservation efforts. It is crucial to remember that learners' knowledge of animals can vary according to their age, gender, and socioeconomic level. For instance, a study by Hummel and Randler (2012) indicated that learners from lower socioeconomic origins had less prior knowledge than learners from better socioeconomic backgrounds and that younger learners had less about animals than older learners. However, this was not the focus of this current study, this factor could be explored further.

Research scholars have therefore emphasized the importance of considering learners' prior knowledge and the necessity to identify and correct any misconceptions that learners may have about zoo-related scientific subjects (Godinez & Fernandez, 2019). Prior knowledge is crucial to learning because it dramatically affects how learners perceive, interpret, and organize newly acquired knowledge. Depending on how well it connects with the recently provided content, a learner's prior knowledge may either promote or hinder their learning processes (Salmi et al., 2022).

However, in the literature, limited studies examine the long-term effects of zoo visits on learners' knowledge and understanding of wild animals. While studies on the immediate benefits of zoo visits, such as improvements in attitudes or short-term knowledge gains, may exist, there may be a lack of research on whether these effects are long-lasting. The effectiveness of zoological gardens as educational tools can be better understood by considering the long-term effects, which can also assist in guiding educational practices to improve learners' learning results (Alexandre et al., 2022; Salmi et al., 2022; Rowe et al., 2023). Against this background, this study aimed to address the existing gap in the literature by examining primary school learners' knowledge and understanding of wild animals and their habitats before visiting zoological gardens in South African primary schools. To achieve this objective, the study was guided by the following research questions:

1. To what extent do primary school learners demonstrate knowledge and understanding of wild animals prior to visiting the zoological garden?
2. What is the level of learners' awareness about wild animals' habitat prior to visiting the zoological garden?

By answering these questions, the study aimed to shed light on the potential of zoological gardens as a valuable informal learning environment for science education and contribute to the ongoing discourse on effective pedagogical practices in science education.

Learning at the zoological gardens

The role of zoological gardens has evolved from being purely entertainment institutions to institutions that prioritize science education, but this transformation is still ongoing and incomplete (Collins et al., 2021; Godinez & Fernandez, 2019). Consequently, the educational goals of zoological gardens have shifted from imparting short-term factual information to fostering long-term knowledge (Mellish et al., 2019). However, the impact of visiting zoological gardens on learners' learning is not always clear (Godinez & Fernandez, 2019; Moss & Esson, 2013) and some studies have reported challenges in establishing this impact. Additional research could be undertaken to further elaborate on this topic.

Research has shown that zoological gardens offer a distinctive and beneficial learning environment for learners of all ages, providing opportunities for hands-on, immersive, and interactive learning experiences (Spooner et al., 2021). Learners who visit zoological gardens can interact with animals and their habitats in ways that are not feasible in conventional classroom settings, fostering a greater understanding and appreciation of the natural world (Spooner et al., 2021). One way learners can benefit from learning at zoological gardens is by directly observing animals and their behaviors. Learners can get a more profound comprehension of animal behavior and ecology and the ability to make systematic, in-depth observations, spot patterns, and conclude by observing animals in their natural settings (Clayton et al., 2017; Saenprai et al., 2022). Through these observations, learners can also cultivate empathy and a sense of stewardship for the creatures and their surroundings (Spooner et al., 2021).

Additionally, zoological gardens provide a range of educational activities and programs for learners of all ages and interests. Examples of learning experiences that can allow learners to interact with animals and those who care for them while learning about their habitats, nutrition, and habits include guided tours, animal encounters, and demonstrations (Kimble, 2014). These opportunities can foster scientific inquiry abilities and a deeper understanding of animal care and conservation (Clayton et al., 2017). Furthermore, zoological gardens often offer interactive exhibits and displays that use technology, multimedia, and other tools to engage learners in hands-on learning experiences (Spooner et al., 2021). Visitors could engage in activities that illustrate scientific ideas like adaptation, ecology, and animal behaviour, or they

might be able to use virtual reality or augmented reality equipment to investigate animal habitats and behaviors (Collins et al., 2021).

The impact of zoological garden visits on learners' understanding of scientific concepts

The visits to zoological gardens have been demonstrated to improve learners' understanding of scientific concepts related to Natural Sciences. Zoological gardens allow learners to connect with animals and their habitats in a hands-on and engaging approach through interactive displays, guided tours, and inquiry-based programs (Moss & Esson, 2013). Learning this way can help learners better understand important scientific ideas like ecology, conservation, and animal behaviour (Coll & Coll, 2018). Research has shown that zoological garden visits can significantly impact learners' knowledge of scientific concepts. For instance, literature has revealed that going to the zoo and having a lesson about it afterward helps primary school learners learn more about animals and their environments (Mellish et al., 2019; Moss & Esson, 2013). Another study revealed that a zoo's inquiry-based curriculum successfully fostered learners' comprehension of animal behavior (Clayton et al., 2017).

In addition to promoting knowledge of scientific concepts, zoological garden visits can promote learners' scientific inquiry skills. A study found that a zoo visit effectively promoted learners' ability to engage in scientific inquiry related to Natural Sciences (Spooner et al., 2021). By providing opportunities for learners to observe, ask questions, and draw conclusions about animal behaviour and habitats, zoological gardens can promote learners' ability to engage in scientific inquiry (Koc, 2023).

Theoretical framework of Constructivism and informal learning

This study draws on constructivism and informal learning as a theoretical framework to guide the investigation. Constructivism, as developed by Piaget (1954), emphasizes that learners are active participants in the learning process rather than passive receivers. In this framework, learning involves creating an understanding of the subject matter through the interplay of new experiences with prior knowledge (Bowker, 2007, p. 77). Constructivist researchers such as Bruner (1966) and Vygotsky and Cole (1978) have further emphasized that learning is socially constructed and involves cognitive development where learners' new knowledge is built on their existing understanding and beliefs.

In addition to constructivism, this study also draws on informal learning theory, which recognises that learning happens in various settings outside the classroom, including zoological gardens (Koc, 2023). Informal learning theory emphasises that learners are active agents in their learning, and they construct their knowledge through their interactions with the environment and social interactions with others (Coll & Coll, 2018). In the zoological garden setting, learners

engage with animals, exhibits, and other learners, and this interaction is expected to enhance their understanding and appreciation of the natural world.

Constructivism and informal learning provide a robust theoretical foundation for investigating the learners' knowledge and awareness of wild animals and their habitat before visiting the zoological garden. This framework recognizes the active role of learners in constructing their knowledge and the importance of social interactions and prior experiences in this process.

METHOD

Method

This research paper used a phenomenological approach to explore learners' knowledge and awareness of wild animals before visiting the zoological garden. Research studies have shown that a phenomenological approach is mostly used when a study intends to investigate individuals' understandings and observations and when it emphasizes a specific phenomenon (Lincoln & Guba, 1985). In the case of investigating primary school learners' knowledge and awareness of wild animals and their habitat before visiting the Zoological Garden, a phenomenological approach would be appropriate because it allows the researchers to gather rich and detailed data about the learner's subjective experiences and interpretations. Additionally, using a phenomenological approach, the researcher can explore the learners' perceptions of wild animals and their habitat, how they have learned about them (either at home or in formal classrooms), and how they expect to experience them in the zoo. Furthermore, the researcher can also examine how the learners' prior knowledge and understanding of the animals and their habitat might influence their learning experiences at the zoo.

Data collection

This study used a qualitative approach to investigate learners' knowledge of wild animals and collected data from drawings from six learners aged 10-12. Through this method, the researcher could gain a rich and detailed understanding of each participant's thoughts and feelings (Creswell, 2014). The six participants were randomly selected from a population of learners who had visited the zoological gardens before and who attended three different primary schools in Gauteng, South Africa.

These schools were located in townships, known for their overcrowding challenges, poor infrastructure, and inadequate roads. Although these schools were selected based on convenience sampling, the researcher made efforts to minimize bias and enhance the sample's representativeness.

This study used learners' drawings and accompanying explanations to visually capture their knowledge and understanding of wild animals. Drawing is a common method of expression for children, and asking them to draw a wild animal in its natural habitat helped to elicit their knowledge of these animals in a non-intrusive and engaging way (Fan, 2015). In addition to the drawings, the learners were also asked to explain what they had drawn and why, which provided rich data on their thoughts and understanding of the chosen animals. This approach allowed the researcher to gain insight into the learners' cognitive processes and subjective experiences and provided a valuable means of understanding their perspectives on wildlife (McTavish et al., 2012). Table 1 below presents the participants of this study.

Table 1. Participants in the study

Pseudonyms	Age	Gender	Grade	School
Jabu	11	Boy	5	School A
Jimmy	11	Boy	5	School A
Mea	12	Girl	6	School B
Zee	10	Boy	4	School B
Ntokozo	10	Girl	4	School C
Patrick	10	Boy	5	School C

Data analysis

To analyse the data collected in this study, I employed content analysis. Content analysis was chosen as the most appropriate method for this study due to its effectiveness in examining learners' understanding of the environment, scientific research, and child-centred areas, as well as its applicability in situations where concerns exist about the future of our environment (Kalvaitis & Monhardt, 2012; Sorin & Gordon, 2010). For instance, Sorin and Gordon (2010) used content analysis to interpret learners' perceptions of the tropical landscape in their study, in which learners' drawings were used to identify themes that emerged from the objects depicted, such as trees, houses, and fences. Similarly, in this study, we identified emergent themes from the collected data.

RESULTS AND DISCUSSION

Learners' knowledge and understanding of wild animals prior to visiting the zoological garden.

The first research question of this study was to explore the learners' knowledge and understanding of wild animals before they visited the zoological garden. Before learners visited the zoological gardens, they were asked to draw animals they were looking forward seeing at the zoo and to include the habitat of that animal. The results of the first research question are discussed in this section and are based on the learners' drawings and their explanation. The

results are presented using two themes, namely; wild animal identification and personal preference.

Wild animal identification

The learners were able to identify the wild animals they drew, even though their knowledge about these animals seemed limited. This is consistent with previous studies that African learners are familiar with wild animals (Torkar & Mavric, 2016), however, this study contradicts the statements that these learners also have adequate knowledge about these wild animals (Photo, 2023).

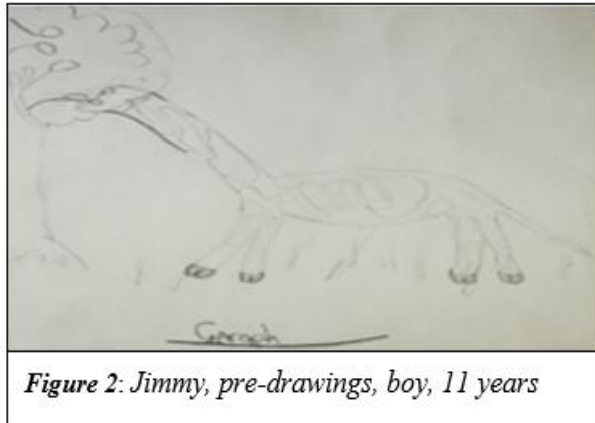
For example, Jabu drew a lion because he knew it was a wild animal, but his explanation for why he drew it (*because it does not love to run around*) shows that he may not know much about lion behavior or habitat. Jimmy drew a giraffe because he likes to see it running, but his drawing shows the giraffe eating a tree, which may indicate that he does not know much about what giraffes eat or where they live. In addition, Mea also drew a giraffe because it is her favourite animal, but she did not include any habitat or additional information to show what she knows about the animal. Furthermore, Ntokozo drew a fish near a tree and what looks like water, but she did not provide any information if indeed the fish were inside the water or elsewhere, we can only assume. This may show that she knows that fish can live in bodies of water that are near trees, but she did not provide any further info about the fish or their habitat. Therefore, the learners were able to identify the wild animals they drew, but their drawings and explanations suggest that their knowledge of these animals and their habitats may be limited. Below are some of these learners' drawings;



Figure 1: Jabu, pre-drawings, boy, 11 years

Researcher: *Which animal have you drawn that you want to see at the zoo?*

Jabu: *"I drew a lion because it does not love to run around".*



Researcher: *Which animal have you drawn that you want to see at the zoo?*

Jimmy: *"A giraffe. It is very tall and love to see it running".*

Figure 2: Jimmy, pre-drawings, boy, 11 years

Personal preference

This theme refers to the learners' choice of animals to draw being influenced by their individual likes and dislikes rather than any specific knowledge or understanding of the animals. The learners drew their favourite animals without providing any further information about them. For example, Jabu's explanation of the drawn animal was because he likes it. Mea described that she drew a giraffe because it was her favourite animal. While Zee drew fish because she liked how they swim. In addition, Ntokozo also drew fish because she liked them. Furthermore, Patrick drew a lion because he loves the animal. Learners drew these animals based on their individual preference; it had nothing to do with their knowledge and understanding of these animals. Some of these learners' explanations were as follow:

Researcher: *"What did you draw and why"?*

Patrick: *"Ke bophile tau ka gobane ke a e rata"* (I have drawn a lion. Because it is an animal that I love).

Ntokozo: *"Ngidwebe ifesi ngobanyana ngiyawuthanda"* (I have drawn fish because I like it).

Zee: *"Ke tadile hlaphi ka gare ga meetsi gobane ke rata ge e thutha"* (A fish inside the water because I like how they swim)

Although primary school learners could recognise wild animals, the results of this study imply that their knowledge and understanding of these animals and their habitats may be restricted. Drawings and explanations by learners suggest that they may only have a basic awareness of wild animals, one that is a greater possibility to be developed through personal choice and limited personal experiences than by a comprehensive understanding of these animals. For example, some learners drew animals based on personal preference rather than specific knowledge. Jabu drew a lion because he likes it, and Mea drew a giraffe because it is her favourite animal. Similarly, other learners drew animals based on limited knowledge. For

instance, Jimmy drew a giraffe eating a tree, which may indicate that he does not have much knowledge about what giraffes eat or where they live. This finding is in line with earlier studies on children's knowledge of animals, which indicate that young children frequently know barely anything about animals beyond their basic physical traits and frequently base their understanding of animals on personal experiences or preferences (Fusaro & Smith, 2018; Selly, 2014). This research shows the potential for zoological gardens to provide learners with significant educational opportunities for improving their knowledge and comprehension of these animals, despite the possibility that learners' knowledge and understanding of wild animals may be limited (Baruzzi, 2022; Fallik et al., 2013). Learners can gain a deeper understanding of animal behaviour, habitats, and traits by observing and interacting with animals in zoos (Ballantyne & Packer, 2016).

Learners' awareness about wild animals' habitat prior to visiting the zoological garden

The second research question of this paper explored the learners' awareness about wild animals' habitat prior to visiting the zoological garden. Similarly, to the first research question, the results of this question are based on the learners' drawings and their explanation. The results are presented using three themes, namely; limited habitat representation, lack of details and limited understanding of animal behavior.

Limited habitat representation

Although some learners included elements such as trees, grass, and water in their drawings, the habitat was not fully represented. For example, Jimmy drew a giraffe eating what looks like a tree and there was grass near the animal, but there was no indication of the giraffe's natural habitat such as the savannah woodlands. Jabu and Mea drew the animals without any drawn habitat or context for the animal. Additionally, Zee drew what looks like fish swimming in water, but there was no detail to indicate the type of habitat they were in, such as plants or rocks. Furthermore, Ntokozo drew fish in what appears to be water, but there was no colouring to show the colour or depth of the water or other details that could provide a better idea of the fish' habitat. Some of the drawings are shown in Figure 3a and Figure 3b.

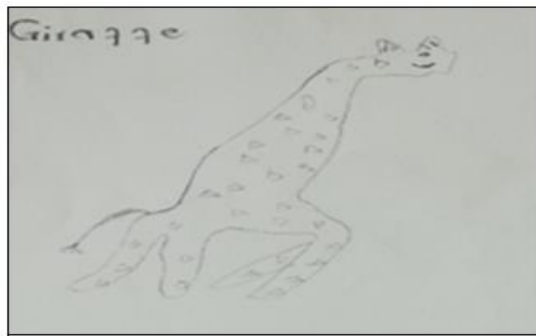


Figure 3a: Mea, pre-drawings, girl, 12 years

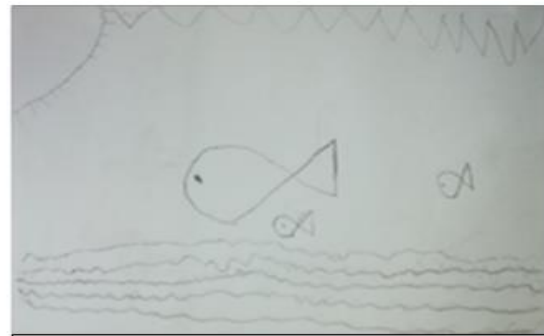


Figure 3b: Zee, pre-drawings, girl, 10 years

Lack of details

Most of the learners' drawings were not coloured, and there were no details provided about the animals' habitat. Most of the learners' drawings lacked any significant details such as environment or context that would suggest a deeper understanding of the animals they drew. For instance, Jabu drew only a lion with no habitat or context represented in the drawing. While Mea drew a giraffe with no surrounding habitat or setting. Additionally, Zee drew fish with only few lines to suggest water and no clear habitat or context shown. Furthermore, Ntokozo drew fish with no clear depiction of their habitat or context. These examples suggest that the learners did not have a strong understanding of the animals' habitats or contexts, and instead focused mainly on the animals themselves. Some of these learners' drawings are shown in Figure 4a and Figure 4b.



Figure 4a: Ntokozo, girl, pre-drawing, 10 years



Figure 4b: Patrick, boy, pre-drawing, 10 years

Limited understanding of animal behaviour

The results showed that there was limited understanding of animals' behaviour on learners' drawings. The drawings showed that learners' lacked knowledge about how animals behave in their natural habitats. In the drawings, there were no indications of the animals' natural behaviours such as, hunting, grazing, sleeping, or playing. This suggests that the learners

have limited knowledge of what animals do in the wild. For example, Jabu drew a lion but only stated that he drew it because it does not like to run around. This statement does not provide meaningful insight into lion behaviour in the wild. Similarly, Mea drew a giraffe and simply stated that it was her favourite animal. However, this statement does not provide any information about the behaviour of giraffes in their natural habitat. These learners' drawings are shown in Figure 5a and Figure 5b.



Figure 5a. Jabu, pre-drawings, boy, 11 years

Researcher: *Which animal have you drawn that you want to see at the zoo?*

Jabu: *"I drew a lion because it does not love to run around".*



Figure 5b. Mea, pre-drawings, girl, 12 years

Researcher: *Which animal have you drawn that you want to see at the zoo?*

Mea: *"I drew a giraffe because it is my favourite animal".*

The results of the second research question revealed that most learners had limited understanding of wild animals' habitats prior to visiting the zoological garden. The learners' drawings lacked details and context, with most focusing solely on the animals themselves rather than their habitats. The habitat representation was not fully represented, and most learners did not have a clear understanding of the animals' natural behaviours. This finding is consistent with studies that have highlighted that some learners visit informal learning environments such as the zoological garden with limited knowledge of wild animals (Photo, 2022; Torkar & Mavric, 2016). For example, while some learners included elements such as trees, grass, and water in their drawings, the habitat was not fully represented. Additionally, learners' drawings lacked details such as environment, context, or behaviour that would suggest a deeper understanding of the animals they drew. Similarly, the limited understanding of animals' behaviours shown in learners' drawings suggests that learners have a limited knowledge of what animals do in the wild. For example, learners did not indicate the natural behaviours of animals, such as hunting, feeding, resting, or playing in their drawings. This finding highlights the significance of science teachers incorporating information about wild animals' behaviours and

how they adapt to their environment when teaching about animal education (Sammet & Dreesmann, 2017).

According to previous research, effective teaching and learning of animal education at the zoological garden requires an understanding of learners' prior knowledge, attitudes, and interests (Ahied et al., 2020; Coleman et al., 2023). Additionally, the findings supports previous research that highlights the importance of providing learners with appropriate representations of animals in their natural habitat (Turner, 2018). For instance, Turner's (2018) study discovered that exposure to zoos and aquariums by learners was linked to improved knowledge and awareness of conservation initiatives. The study highlights how crucial it is for zoos and aquariums to provide suitable habitats and contexts for animals in order to improve visitors' comprehension and appreciation of animals (Ballantyne & Packer, 2016; Counsell et al., 2020).

CONCLUSION

In conclusion, this study has shown that primary school learners' knowledge and understanding of wild animals prior to visiting zoological gardens may be limited. Learners' drawings and explanations revealed that their knowledge and understanding of wild animals and their habitats might be restricted to basic physical traits and personal preferences. However, zoological gardens have the potential to provide significant educational opportunities for improving learners' knowledge and comprehension of these animals (Blandford et al., 2023). The findings of this study also suggest that learners have a limited understanding of wild animals' habitats and natural behaviours prior to visiting the zoological garden. This highlights the significance of science teachers incorporating information about wild animals' behaviours and habitats when teaching. Efficient teaching and learning about animals at the zoological garden require an understanding of learners' prior skill, views, and concerns (Ahied et al., 2020; Coleman et al., 2023). Additionally, informal learning environments such as the zoos must provide appropriate representations of animals in their natural habitats to improve visitors' comprehension and appreciation of animals (Fitriana et al., 2022; Tuner, 2018). Furthermore, this study highlights the importance of zoological gardens in providing learners with significant educational opportunities for improving their knowledge and understanding of wild animals and their habitats. Therefore, integrating zoological gardens into the curriculum can play a pivotal role in achieving the objectives outlined in the CAPS syllabus for Natural Sciences and Technology education. However, it is important to acknowledge the limitations of this approach, including the potential challenges of accessibility and sustainability of such environments. In summary, the study did not consider the influence of socio-economic and

cultural factors on learners' knowledge and understanding of wild animals, which could be explored in future research.

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