



# ASSESSING YOUNG CHILDREN'S LEARNING WITHIN AN INFORMAL SETTING BY MAKING USE OF DRAWINGS

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**ABSTRACT**—For conservation education programmes at zoos to be effective, a change in knowledge, attitude, and behaviour has to occur. By including evaluation in these programmes the change that is envisaged becomes measurable. Most constructivist studies use written or oral accounts to analyse children's learning. However, the evaluation of the impact of Foundation Phase programmes poses a challenge since many learners in this age group do not have the reading and writing skills to complete a questionnaire, and interviews are time consuming. The aim of this study is to evaluate the impact of the Foundation Phase holiday courses by means of analysing children's drawings. Two sets of drawings, before and after attending the course, were compared to establish whether an increase in pro-environmental knowledge and attitudes occurred. The interpretation and analysis of drawings demonstrated that it can be implemented successfully as a tool to evaluate structured non-formal programmes in an informal setting.

**Keywords:** Conservation Education, Evaluation, Drawings, Zoo

## 1. INTRODUCTION

Many conservationists maintain that the lifestyles of human beings and the deteriorating environmental conditions are the greatest threat to the sustainability of wild animals and places (Crowther, 2011:2; Rockström & Karlberg, 2010:257; Schultz, 2011:1080). The zoos in developed nations are some of the best vehicles for reaching those consumers, and for motivating them to embrace their responsibility towards conservation (Crowther, 2011:2).

Zoos as tourists' attractions in both developing and developed countries, have the potential to educate the public about wildlife conservation issues, as well as to bring about the behaviour changes needed to help conserve wildlife and their habitats (Hancocks, 2001:xviii; Hatchwell, Rübel, Dickie, West & Zimmerman, 2007:354; Packer, Ballantyne & Falk, 2010:12). Jackson (2010:40) indicated that with its vast protected areas, Africa should be able to offer an intimate wildlife experience that does not require the presence of a zoo; however, Africans have become increasingly isolated from nature due to urbanization. Taking poverty into consideration, the only connection many people are likely to have with Africa's magnificent animals is by means of a visit to a zoo. Zoos provide access to animals and the natural world that people would otherwise not have been able to experience (Hancocks, 2001: xviii; Jensen, 2011:94).

It is now the time for zoos to take on their role as passionate and effective advocates of wildlife conservation and ecologically sustainable economic development (Hatchwell et al., 2007:357). Biodiversity is our life-line, in that everything that we eat, drink and produce is in the end derived from biodiversity, and therefore the world economies are dependent on an intact and functioning biodiversity (Dickie, 2009:5). Zoos do not only exist to conduct research, to provide education, to entertain the public, or to promote economic activity. These are all vehicles to reach the end-goal, namely the advancement of animal and habitat conservation (Crowther, 2011:2). William Conway,

former Director of the Wildlife and Conservation Society (WCS) emphasized that zoos need to increase their commitment to field-based conservation, education and science if they and their animals are to fulfil their roles as ambassadors for conservation (Schaul, 2012:2).

Jensen (2011:94) found that the experience of viewing live animals can have a powerful impact on learners to construct a new understanding of wildlife, of the natural world, and of the role of humans intervening in this natural world. His research showed that visits to the zoo alone yield a statistically significant increase in scientific learning, and this impact can be increased by the zoo's educational interventions. This learning experience and the increase in knowledge can be enhanced by providing educational materials and presentations (Jensen, 2011:94).

Zoos are in a remarkable position to contribute to Conservation Education, they constantly have to evaluate their Conservation Educational efforts and the conservation messages they convey (Balmford, Leader-Williams, Mace, Walter & Zimmerman, 2007:121; Gwynne, 2007: 51; Mazur & Clarke, 2001:185; Sterling, Wood & Lee, 2007: 38). Falk, Reinhard, Bronnekant, Heimlich and Deans (2010:5) indicate that although zoos and aquariums do promote the importance of inspiring conservation action, yet very little has been done to assess the impact in this area. It is of the utmost importance that the Conservation Education programmes are constantly evaluated, but often do not receive sufficient attention. For education programmes to have a long-lasting effect, changes in knowledge, attitude, and behaviour have to take place. These aspects are all measurable, as long as the educators include evaluation as part of the programmes (Sterling, Wood & Lee, 2007:47; Lehnhardt, 2010:4; Bettinger et al., 2010:446). It seems obvious that to become creditable in respect of education and conservation, the zoo educators need to consistently evaluate and publish their work. Together with evaluation, the zoo educators will be able to move the field of wildlife education into the 21st century, to increase their credibility in both the conservation and education fields, and rest assured that their education efforts are making an impact on wildlife conservation (Lehnhardt, 2010:4).

At the time of this study, the National Zoological Gardens of South Africa (NZG) was offering, amongst others, structured non-formal courses during school holidays to learners in all the school phases, including those in the Foundation Phase (6-8 years old). The goal of these courses is to provide opportunities for children to learn about animals and what they can do to help conserve wildlife. The evaluation of the impact of the Foundation Phase courses poses a challenge since many learners in this age group don't have the reading and writing skills to complete a questionnaire, and interviews are time consuming. The learners are also from different cultures and some of them are not fluent in English hence the use of pre and post drawing exercises become very useful. The aim of this study is to evaluate children's learning as a result of attending a one day "Meet our Mammal" course at the National Zoological Gardens of South Africa (NZG) by means of drawings, immediately before and after attending the course.

## **2. USING DRAWINGS AS AN EVALUATION TOOL**

The majority of constructivist studies use written or oral accounts to analyse children's learning. However, art can be seen as text with its own form of grammar, and the experiences of children are expressed equally well through art as they are through words (Bowker, 2007:76). Drawing techniques provide a relatively easy way to gather social information from children and about children. The use of drawing for evaluation purposes is a powerful tool, since most children tend to enjoy drawing without showing any sign of tension. While many children dislike answering questions, drawing tests can be completed quickly, easily and in an enjoyable way (Barazza, 1999: 49). An advantage of using drawing to evaluate children's learning is that it avoids linguistic barriers between groups of different languages and abilities (Chambers, 1983:255). Thus be a very useful tool for our multicultural South African zoo audiences.

Drawings can be used to explore a child's relationship with the natural world since they provide windows to both cognitive and emotional aspects of that relationship (Myers, Saunders & Garrett, 2003:307). According to Cox (2005:123) drawing is a form of language. Through their drawing, children are identifying and capturing those elements of their experience that will help them to classify and order it, creating structure and pattern in their thinking. In effect they are constructing the criteria which will enable them to conceptualize their experience. Similarly, they are experimenting with verbal language, using sounds and words as another symbolic form of representation.

Cox (2006:123) found that talk and drawing interact with each other as parallel and mutually transformative processes. Talk is important to clarify or supplement the meaning of the drawing. Furthermore, we should explain children's drawing in terms of what information they are trying to convey, rather than what they contain, and this is a social act. Meanings are constructed and negotiated in a social context. It is therefore important to combine drawing with oral comments in order to make meaning of the messages children want to convey with their drawings (Cox, 2006: 123). Drawings can be seen as one methodological implement when attempting to catch the thoughts of children concerning environmental issues (Barazza, 1999: 49).

### **3. THEORETICAL FRAMEWORK**

The Conservation Education programmes that form part of this study involve hands-on learning activities facilitated by a zoo educator. A change in pro-environmental behaviour is envisaged by these programmes by following methodologies that fall within the socio-constructivism and experiential learning perspectives.

The zoo educators assisted the learners' learning within a zone of proximal development, according to Vygotsky's social development theory. Vygotsky argued that there is a zone of potential assisted learning that can occur above and beyond the autonomous learning potential of a learner. Learning can be assisted by a 'more knowledgeable other', who can provide support and guidance through the learning process (Jensen, 2011:96-97). Jensen (2011:97) furthermore argues that viewing new animals in a zoo has the potential to result in a form of cognitive disequilibrium, as theorized by Jean Piaget. According to Piaget's theory, learning takes place when the learners are exposed to new situations that existing mental maps are not set up to process – thereby leading to cognitive 'disequilibrium'. To re-equalize, the learner must extend his or her existing mental maps. As a result, the learners are confronted with new stimuli and zoo animals they have never seen before. If facilitated effectively by means of interpretation and education, the re-equalising process has the potential to extend the pupils' thinking about animals (Jensen, 2011:97).

Jensen (2011:97) argues that viewing new animals in a zoo has the potential to result in a form of cognitive disequilibrium, as theorized by Piaget. Jensen came to the conclusion that the assimilation of new ideas into a learner's existing mental map (for understanding animals and habitats) can be significantly enhanced through assistance from a more knowledgeable other, (in this case the zoo educator).

According to Jensen (2011:97), "This theoretical model of zoo learning places zoo educators in the role of toolmakers, fashioning the most effective concepts and explanations possible and provisioning pupils with these concepts for them to use to leverage themselves into a higher level of learning".

### **3.1 Socio-constructivism**

The socio-constructivism perspective regards students as active learners who are responsible for developing their knowledge in a specific social setting. Learning takes place through the learners' experience, knowledge, habits and preferences. This understanding of learning goes back to the work by Piaget in 1954 that described knowing as a balance between what is familiar and what is novel. We organize the world by ourselves, and according to our existing knowledge and experiences we 'construct' our own knowledge. The term cognitive constructivism designates this perspective, which was developed further by Vygotsky. He emphasized the importance of the social context for learning, and introduced the term social constructivism (Stauffacher, Walter, Lang, Wiek & Scholtz, 2006:257).

The socio-constructivism learning perspective involves that the learners are being confronted with a problem, and are being given the opportunity to construct their specific views of the situation (Stauffacher et al., 2006: 58).

### **3.2. The experiential perspective**

Experiential learning is a process whereby the learners shape their understanding, expertise and interpersonal skills through affective and cognitive experiences with their bio-physical or social environment. By engaging in these experiences, the learners construct meaning, integrating the cognitive, emotional, and physical aspects of learning (Oxendine, Robinson & Wilson, 2004:1). Dewey's theory, namely 'Experience and Education' (1938) serves as a foundation of experiential learning. Dewey asserts that all human experience is social, and involves contact and communication. Thus, humans are social beings who only exist within a social environment. According to Dewey's Experiential Learning Theory, people live in a world surrounded by other people and things that are the result of previous human experiences. These collective experiences construct knowledge as we know it (Roberts, 2003:2).

According to Roberts (2003:7-9), Dewey proclaimed that experience is the foundation for everything in life, and that people learn from their experiences, which allow them to shape their future experiences. He believed that learners should be involved in real-life tasks and challenges which should be based on their abilities and readiness. Upon completion of an experience, the learners have the knowledge and the ability to apply it in different situations. Consequently, they will have created new knowledge and are at different levels of readiness for continually gaining and constructing new knowledge (Roberts, 2003:7-9). Furthermore knowledge is organized by the teacher into logical content pieces. The teacher, (in this case the zoo educator), also facilitates the learners' experience with the content, based on the learners' readiness (Roberts, 2003:2). Experiential learning, as part of Conservation Education, restores the relationship with natural environments, and inspires, soothes, and offers new and unfamiliar stimuli (Comité de Valorisation de la Rivière Beauport. n.d.:2).

In this study the learners were involved in Conservation Education programmes where socio-constructivism learning and experiential learning were applied in hands-on activities, and facilitated by zoo educators.

## **4. METHOD**

### **4.1 Research Design**

The research design for this study was that of evaluative research. Evaluative research is primarily concerned with the assessment of the strengths and weaknesses of programmes, policies, personnel, products and organizations in an effort to improve their effectiveness (Miller & Salkind, 2002:8). Furthermore, evaluative research is involved in making judgements about the value or

merit of a programme and the evaluation researcher studies social processes to determine if a programme or project is accomplishing what it is intended to accomplish (Miller & Salkind, 2002:5).

#### **4.2 Data Collection**

Convenience sampling as a non-probability quota sampling method was used in this study. The limitation implies that the results cannot be generalized. The target group was the eight learners that attended the “Meet our mammals” holiday course. All the learners that attended the course participated in the study. The ages of the learners that participated in the study varied from 6 – 8 years old.

Qualitative data in the form of drawings were used to evaluate the impact of the educational programmes of the participating zoo with regard to knowledge, attitudes and values in connection with conservation and the environment. Fictitious names were used to protect the identity of the learners. No social or personal information would be collected from the learners. No psychometric testing was done. Written consent was obtained from the parents that their children may participate in this study.

The data was collected during the June/July school holidays 2014 and consists of drawings made by learners before and after attending the course. The “Meet our mammals” holiday course is a structured non-formal Conservation Education programme. These are learning programmes offered at an institution outside the established school system where learning is assisted by a ‘more knowledgeable other’, for example a zoo educator, who provides support and guidance throughout the learning process (Jensen, 2011:96).

The objective of the “Meet our mammals” course is to learn about the characteristics of mammals in a fun and interactive way. This was a one day course, and the learners were attending a structured non-formal programme for about six hours. Various activities were followed, including building puzzles, art activities, play, work sheets and observing the animals in their enclosures. The learners were asked to draw a mammal of their choice before the onset of the course. The purpose of this was to determine the learners’ prior knowledge of mammals. The learners were given the same task at the end of the day when the course was completed in order to evaluate the impact of the course on the learners’ knowledge and attitudes about mammals.

#### **4.3 Method of analysing the drawings**

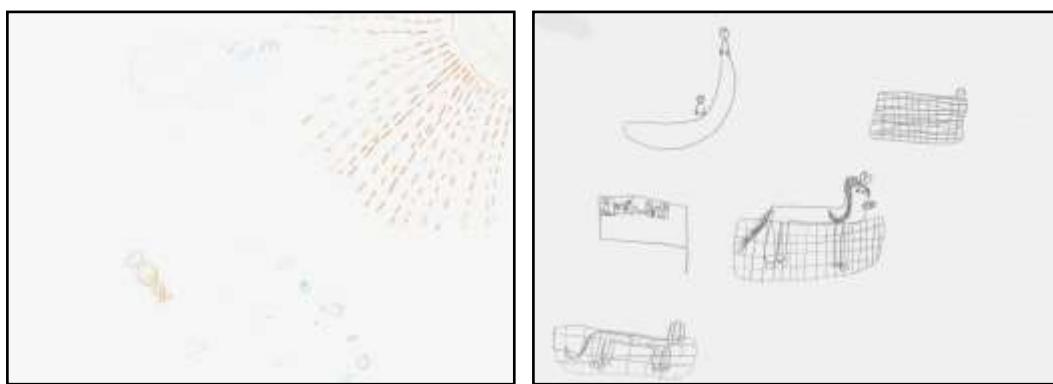
The drawings were analysed qualitatively by viewing them individually and noticing similarities and differences in the drawings the learners made before and after attending the course (Alerby, 2000: 210). The two sets of drawings were compared to establish an increase in knowledge about mammals and also about their attitudes towards the animals immediately before and after the learners attended the course.

### **5. RESULTS**

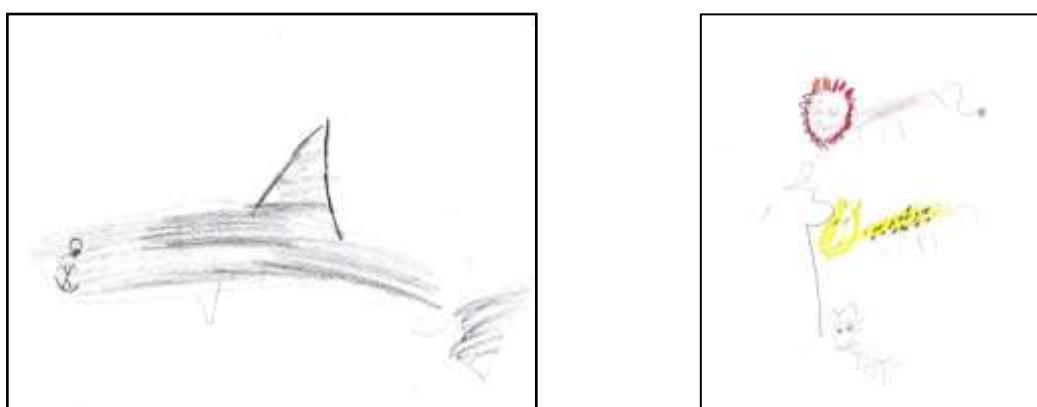
The learners’ drawings are depicted in figures 1 – 8 below. The drawings on the left hand side were done before the course starts for pre-knowledge assessment, and those on the right hand side were done after the learners attended the course.



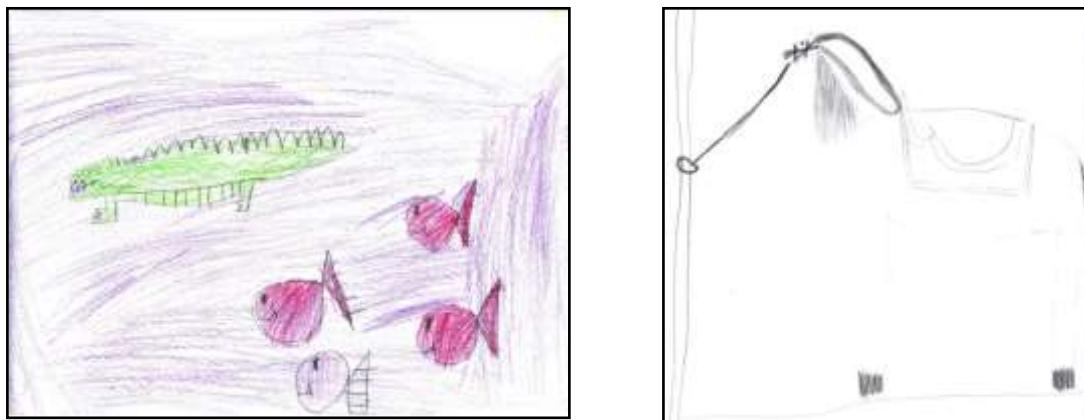
**Figure 1:** Kagiso drew a shark, a snake and a bird before the course and after attending the course, a lion.



**Figure 2.** Nedine seemed to be struck by the fact that the animals in the zoo are inside enclosures – her pre-course drawing illustrated a rabbit hopping around between clouds, while her post-course drawing showed different animals in enclosures.



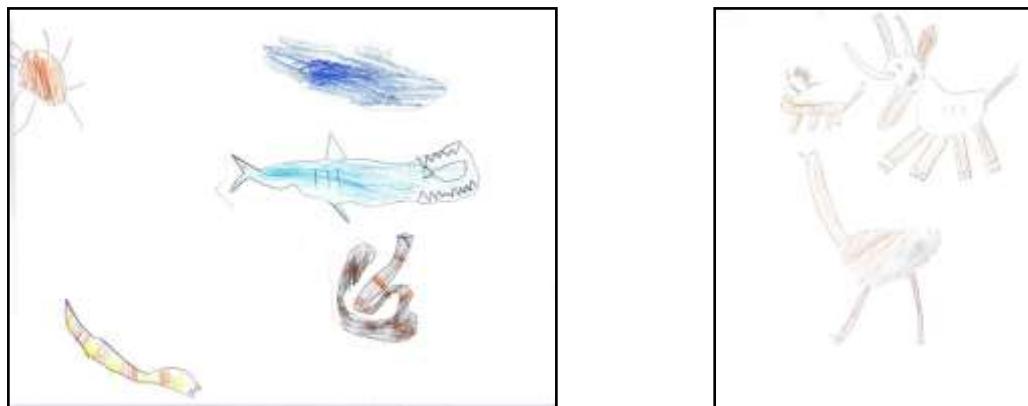
**Figure 3:** Lerato first drew a shark before attending the course, and after completing the course, a lion, a leopard and some other animals that I could not identify.



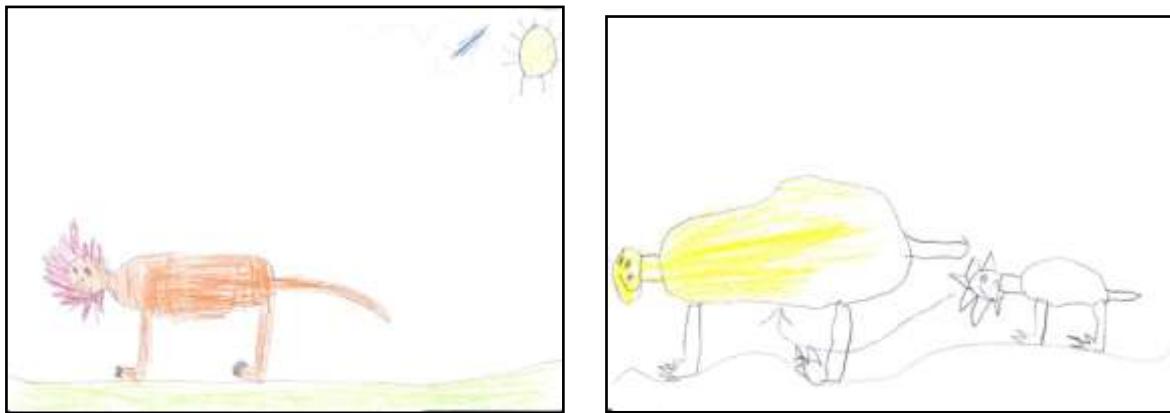
**Figure 4:** Sarah drew a crocodile and some fish before attending the course, and afterward a horse.



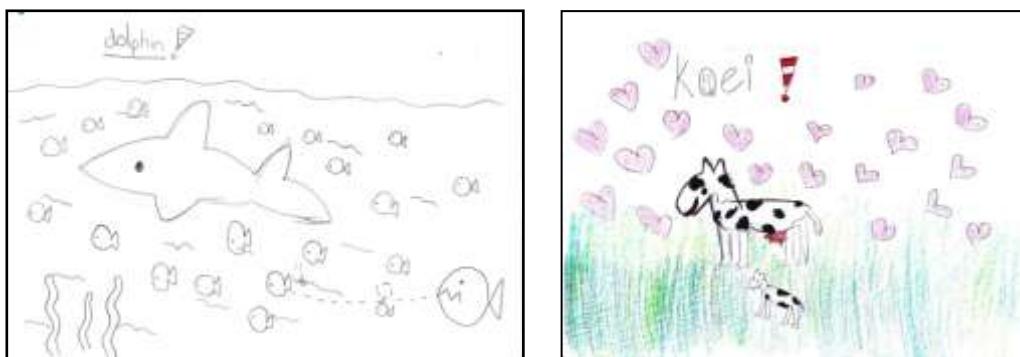
**Figure 5:** Erhardt's first drawing consisted of a crocodile and a snake, and his second drawing a leopard, monkey and an ostrich.



**Figure 6:** Letabo drew snakes and a shark before attending the course, and afterwards an elephant, some kind of carnivore and an ostrich.



**Figure 7:** Armstrong clearly indicated in his second drawing that he learnt that a lion cub is fed on its mother's milk.



**Figure 8:** Wilma clearly indicated that she knew a dolphin is a mammal in her first drawing, and after attending the course she drew a cow and a calf.

## 6. DISCUSSION

Three out of the eight learners that were evaluated were able to draw animals that are classified as mammals, before attending the course. After attending the course, six learners correctly drew mammals, of which two also indicated that they knew that mammals produce milk to feed their babies. The results indicate that there was an increase in knowledge concerning mammals and their characteristics. Similarly, Bowker (2007: 94) concluded that, given the opportunity, children can reveal what they know and understand through drawings.

One of the learners illustrated negative emotions concerning the animals in the zoo by emphasizing the animals inside of enclosures in her post-drawing, and another one decorated her drawing with heart shapes, which may indicate that she had a positive experience at the zoo.

Cox (2005: 116) recommended not to collect the children's' work, but rather to make detailed notes of it since the children always expected and wanted to take their artwork with them. Another option will be to scan or to take pictures of it and hand it back to them.

Making use of drawing to evaluate an increase in knowledge about mammals and also about the learners' attitudes towards animals proved to be valuable in the multi-cultural audiences that attend

the conservation education programmes at the NZG. This method overcomes the problem of assessing learners that speak different languages in one group. However, misinterpretation of their drawings may occur. A better approach will be to ask the learners to explain their drawings verbally and to make notes or voice recordings. Furthermore, procedures need to be developed to minimize bias (Coe, 1989: 8). A scoring rubric may be of value to evaluate a change in knowledge and attitudes (Bowker, 2007: 86).

## 7. CONCLUSION

The results indicated that the “Meet the Mammals” course was effective in increasing learners’ knowledge concerning mammals and their characteristics. The interpretation and analysis of drawings demonstrated that it can be implemented successfully as a tool to evaluate structured non-formal programmes in an informal setting. Research using a bigger sample and incorporating the lessons learnt in this study, namely to include oral comment, making use of a scoring rubric and returning the drawings to the learners, is recommended in order to further develop the method used in this study.

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