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Overcoming 'Earth Science Blindness.' Earth Science in Action in Natural History Dioramas

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Abstract. Children are born into this world into a place and environment, and immediately start developing a personal 'sense of place'. Through their gradual awareness of the immediate environment their knowledge and sense of this place extends. In the beginning, the 'place' is dependent on the earth science of our planet as has created the original environment in the area which is the child's place, real or conceptual.

Increasingly the deleterious effect on the environment, where own species has destroyed or otherwise changed the landscape, our place, has led to our era in our world being named the Anthropogenic [1].There is an imperative need in this time for we humans to understand how to interact with their surroundings evolved over time and became instinctive, people knew the seasons of the year, the changes in daylight hours, they understood cloud patterns and much more. Scientific Literacy, in terms of the understanding basic scientific processes and information, has become important for preserving what we have for our future.

Earth Science is as vital a subject today as it was necessary for survival in the past. The soil and the sky are two naturally occurring phenomena all around us, thus are part of a child's world, which they notice. I have coined the phrase 'earth science blindness", an extension of the phrase first proposed by Wandersee and Schussler [2]. Children have 'earth science experiences' when young but people possess an apparent ', earth science blindness' not noticing the environment which is determined by earth science. Earth science is the key to understanding our world and the living components, which create habitats, influenced by the substrate and the climate and thus inhabitants Biogeography depends on the Earth science phenomena. These factors are represented in natural history dioramas.

The recorded spontaneous conversations of visitors in natural history museums at dioramas reveal that few comments are made about earth science as well as other features and objects in natural history dioramas. Visitors focus on identifying the specimens and commenting on the attributes of the animals. The earth science elements, the substrate, the meteorology depicted and the flora and fauna which are all depended to the earth are largely ignored We suggest strategies to focus attention on earth science in these exhibits.

Keywords. Museum, science, diorama.

1. Introduction

As scientist specialising in education we are aware that learning in incremental and experiential. It involves skills, process communication and conceits. We can summarise as The How, the What. It also involves memory of observations and experiences from the past, which we use to make sense of that which we observe. Moreover, we also know increasingly recognise that young children are intuitive scientists [3] and have skills of investigating, recognising outcomes and considering evidence and interpreting it within their understanding [4] Moreover, it so also now recognised that children buddy up or contract their leaning, Piaget talked about accommodation. The translation of Vygiosyksy's work introduced the notion of constructivism which is now regarded as more effective when it is socially constructed. Driver wrote her seminal book Pupil as Scientist in 1983 which focused thinking on the traditional transmission of facts more leading to the development of theta inquiry approach and less dictation recipe following in practical work. It is important to recognise both science knowledge and the way of science discourse and how information is exchanged.

A diorama is a window on nature that invites the visitor to discover organism and habitus, frozen at a memento in time, often of an authentic recorded photographically and in field notes, and hence interlinked in the manner which they are in nature through listening to spontaneous out loud comments of visitors we can establish that which an individual or social notice and interpret from their knowledge and skills of perceiving within the diorama to satisfy them. Further interaction such as interviews or questionaries' can invite the visitor to provide

fighter insights which a researcher is able to probe their understanding further.

Do they comments and aspects of science in item widest sense including earth science? Or do they focus on the obvious or unusual and seek to identify, as they do at animals and plants in exhibits in zoos, botanic gardens and natural history museums [1,5,6]. The imagination of visitors is important in this interpretation too [7]. In the case of natural history dioramas drawing on their biological visitors also employ their environmental understanding as well as their biological [8].

Earth science is fundamental to understanding the surface of our planet. The biomes and ecosystems in which living organisms have evolved. Specific features have appeared and meteorological patterns are planet-derived adaptations of organisms which are all derived from the Earth. So what do visitors notice? How do they interpret the dioramas? What is the entry agenda and knowledge? We can find out by analysing the captured voice of the visitor.

2. Methodology

We had the permission of the museum to collect conversional anonymously. We sought permission of the school of the school groups or the parents of children in family groups or asked adult singletons to comment and the ensuing conversations are captured. Then they were transcribed, read, categories identified and then analysed.

We report here as an exemplar, a small pilot study Rowland Ward Dioramas which were in a special pavilion on the first floor of the Natural History Museum London were essential tools for the learning of science. They no longer exist there were three dioramas of African Scenes in the pavilion. The rain forest depicted was Ituri in the Congo where the Okapi was first identified in 1902. The other dioramas were depictions from Angola.

Visitors were asked, ”what is the story”, hence they were cued into looking. This approach was unlike in most of my research in which I am seeking baseline data with no cuing, in other words the visitors’ voice elicited through viewing the diorama and making sense of it from their personal knowledge.

3. Results

Firstly I will provide illustrations of the diorama and examples of the comments.

Figure 1. Angolian Desert

A five year old girl voiced the following at the diorama of the Angolian Desert (Figure 1): “It’s similar to that one but got different colours leaves on the trees I see deers and the antelope and really big kind of goat (Sable Antelope) and that mound type of thing.” (Termite mound)

A five year old bot looked intently and remarked, “A cow (bongo) and a goat and leaves and trees and that one (Water Chevrotain) and leaves and trees”.

A nine year old girl remarked, “It’s green and that animal horse thing (okapi) and that little thing (Water chevrotain) and a lot of those leaves and a kind of mushroom things and a mushroom with a white skirt and kind of a lot of sticks, just leaves and tree.”

Figure 2. The Rain forest diorama in situ

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Figure 3. The Waterhole

A Five year old boy said: “I can see a giraffe and some birds and a little giraffe and some monkeys. They’ve come to drink and eat. I can see some clouds and the sky and the grass.”

A 10 year old girl made these observations at this Waterhole diorama: “There’s rock, big giraffe, got its head down. There's a deer. It has birds on it and there’s a baby monkey with its hands up and some monkeys. Dirty water and ducks”.

The categories in this simple analysis from a read re-read iterative process in which they emerged were as follows: arranged in a hierarchy from the overarching category to the major living things group.

Superordinate:
- African Natural History dioramas

Ordinate categories
- Earth Science Biome
- Organisms Other

Subordinate categories
- Plant origin
- Animals
- Fungi

Mention was counted only once in each conversation, and not the number of instances of an exemplar in each. Had we been seeking to establish the variety of members of one subordinate category, for example animals we would have counted the instance of that name being used, but again only once because people often repeat a category when they notice that member again, as the girl does in the above conversation remarking several times about leaves, which were a predominate feature of that diorama, a rain forest. A total of fifty three conversations were collected on two separate afternoons. The majority from primary school aged children between: 5 yrs. And 11 years, several were lower teenagers.

The number of instances of Earth science categories observed and mentioned in the dioramas was twelve referred to an element categorized as earth sconce with twenty eight instances. All conversations mentioned an organism of which nine specifically mentioned fungi, which are displayed din the rain forest diorama. Organisms were the highest number of comments and were in the Organisms cattery Animal’s were mentioned in fifty two of the organism references and plants or plant origin such as twigs twenty eight times. The categories were not mutually exclusive. Children list as they notice things, the first observation being the type of biome when they did mention that.

The names used to refer to Constituents of Natural History Dioramas were as follows:

Earth Science
Water, rock, sand, dirt, clouds, footprint, stones, anthill, pond

Biomes
Rain forest, desert, savannah

Names used for living organisms

Plants
Hay, straw, logs, plants, Trees, leaves, grass

Animals
Deer thing, beetle antelope, little animal, bird, scorpion, Cleaning birds

Fungi

Mushroom

4. Discussion

Earth science comments were used for reference as locators for locating organisms, particularly animals. We maintain there is great potential in developing learning approaches and materials that could highlight the earth science inherent in Dioramas. First the earth science needs identifying. Secondly the voices of visitors need ascertaining. Hands on

materials can enhance the interpretation by visitors and provides a tangible item to hold and manipulate. Providing for a cue sheet through a laminated photographs or line drawing of the dioramas with a key to the identify of various elements. Stand alone interactive computers such as those in the National museum of Scotland at the dioramas presenting the evolution off the fauna and fauna of Scotland since the sat age examples of such.

Cueing strategies or prompts are crucial in my opinion. For example the view-workshop view again technique is effective if the museum has facilities for such where learners can handle specimens of rocks and learn characteristic features before returning to the galleries and re-looking at the diorama. Immediate activities such providing single isolated elements of the diorama, such as storm cloud, a cliff face, a boulder, sky colour, ground covering such as snow, cut out from a photograph of the diorama, to match with the actual representation in the diorama, Accompanying questions can be used, self administered or from an accompanying adult or museum facilitator. Interactive displays at a diorama with these activities can enhance this but low tech can be used in whatever setting and far less expensive.

Pre visit access to books, sheet, on line virtual tours can brief visitors as advanced organizer and are effective in similarities in promoting a richer, in terms of what is observed, observation capability during a visit to such dioramas. Additionally, planned mention of earth science in physics, geography and aspects of relevant science when taught in both primary and secondary schools might contribute to open the eyes of learners to the earth science manifest in our world. However, inherent curiosity and interest in the subject provides access to the story of a diorama which an individual brings to their visit

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