

KNOWLEDGE REPRESENTATION – IN EYE THROUGH EYE WITH BIRDS

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The paper draws from an understanding that every child has an insatiable intellectual curiosity and a touch of imaginative power. Understanding students' views are vital for meaningful learning. The paper reflects on outdoor observations and drawings as an instrument in developing skills, knowledge and appreciation for the natural environment. The paper also reports some interesting findings on knowledge representation through the bird module designed by the author that focuses on a target audience of eighth-grade students. Insights from the study can be directed towards implementing outdoor learning in Indian schools.

REVIEW OF LITERATURE

It is to be agreed upon that, knowledge represented through experience entails learning. Learning influences thinking. Thinking draws a pattern on attitudes from space which may project/reflect through behavior. Affective-behavioural relation of the learner's connect with learning through time has been an important basis for arguing the value of experience. Krishnamurti (1947) observed that every child is born with a natural curiosity. He argues that adults need to encourage children to grow and pursue a variety of subjects by reinforcing their own need to learn. Asserting the role of experience with learning, derived from being immersed in natural settings, Tagore (1917) greatly believed that nature is a child's best teacher. A child's harmonious development will only take place if the child is given unrestricted freedom.

In the Indian context, the Position Paper of the National Focus Group (2006) on '*habitat and learning*' highlights the lack of good quality documentation on some of India's greatest environmental facets and the potentials for building a resource database involving students. The Bird Module provides a framework towards learning through experience, as becoming more meaningful. The module revolves around topics like, the relation of education and experience, learning through experiencing, stimulating learning in outdoor environments, challenges in handling outdoor learning and, linking observational and experiential learning.

OBJECTIVES OF THE BIRD MODULE

(1) Providing an authentic experiential context to learning and scope for developing a behavioural appreciation of the natural environment. (2) Examining evidences that support and engage students in developing transformative knowledge and skills, and ecological sensitivities.

METHODOLOGY

The study followed an exploratory design sought to understand how children relate to their surroundings and reflect on their engagement with learning activities. The study aimed to gather insights and evidence of learning through the process of engagement in different activities like drawing a bird, observing birds from a distance in natural setting and questioning.

The site chosen for the study was an English medium school called St. Johns public school, a CBSE affiliated higher secondary school in Hyderabad. The study was conducted for six days during school hours. Each session was conducted by the researcher for 45 minutes depending on the availability of students. Students from the eighth-grade were the respondents for the study, which mainly involved the age group of 12 to 14 years. This age group marks the cognitive developmental maturation within the child to understand abstract concepts. At this age students are able to comprehend complex ideas and think independently. They develop abilities to identify, observe space and situations around them. Students are also able to reason and question the workings of certain realities and situations. Besides, at this age students are also able to communicate more productively, they are able to articulate, write, read and speak comfortably which is important for their expression of opinions and ideas.

Purposive sampling technique was used in this case. The selected age group was handpicked as the most suitable sample, serving the specific needs for this study (Cohen, Manion & Morrison, 2002). The sample selected represented students from both the rural and urban places, different religious backgrounds and socio-economic settings. Firstly, the outdoor sessions were conducted in the mornings, and the indoor (classroom) sessions were conducted in the afternoons. The school followed two medium of instructions i.e English and Telugu. The sample involved about 60 students, representing gender groups, which consisted of a greater number of girls (37) and fewer number of boys (23). In the outdoor setting students were randomly selected and divided into two groups.

DEVELOPMENT OF TOOLS

Lave & Wenger (1991) state that abstract representations are often related to the power of generality which can be irrelevant unless it is made relevant with a situation at hand. The tools used in conducting the study were designed in a way that could help probe students' ideas, thoughts and views. It was important to understand the way children think and reason. For example; Questioning, drawing, observing, writing, discussing were used as instruments to probe students to think, reason and develop new ideas. In the first two sessions, pictures and videos were used to familiarise and make students aware of the current situation and increase their curiosity.

The pictures used displayed identification of the bird, various state birds in the country, identification of a male and female bird and the habitats of different birds. Each video was presented followed by a discussion on ecology and its relation to different bird species that probed students to ask questions and express their opinions and suggestions on how they relate to the natural environment. (For example, a short documentary

on ovenbirds was presented to the class. The video was used to give students a detailed visual representation on how birds build their nests). The video facilitated a discussion on the different types of bird nests and the different habitats that birds belong to. Throughout the sessions, students' doubts and questions were addressed, recorded and noted. Field observations were made by the students during the outdoor sessions. Students were also informed that the data would be collected after each session.

PROCESS OF DEVELOPMENT OF THE MODULE: ANALYSIS AND FINDINGS

The study was organised on the basis of three themes that helped in exploring students ideas and views before and after their engagement with the module. The themes are as follows: 1) Transitions noticed in nature of questions, 2) Exploring thinking through representations, 3) Evidences of conceptual progression. The themes were organised on the basis of commonality that was captured through students' responses. The findings are captured using examples of four cases, R1= Sheryl , R2= John, R3= Fatima and R4= Rahul, which have been analysed at all stages. This is done to help in mapping the shift in the data collected before and after observations.

Transitions in the nature of questions about birds

Questioning is an important tool in exploring student's current knowledge, and also helps in assessing student's understanding by encouraging them to think independently. The theme focuses on exploring the kind of questions and insights shared by students before and after their active engagement with the module. A set of subthemes like, myths and characteristics of the birds were arranged on the basis of the commonalities that were captured through the questions asked by students.

Myths and beliefs elicited in childrens' questioning

It was observed that students were able to express their views and queries freely. It was also interesting to see the difference in the kind of questions asked before the students' engagement in the outdoor setting and after. It was observed that students began to ask more specific questions after the outdoor activity. For instance, if we look at Sheryls (R1) nature of questioning before the engagement in table 1.1, she focuses more on understanding and finding answers to questions based on stories that she probably must have read or heard previously. Her question was a very interesting one as this example showed how students partly believe what they see or hear, but are also very curious in addressing the reason behind why certain things happen the way they do. The questions also highlight students curiosity to know the reasoning attached to a myth.

Notable changes could be seen through students questions after their engagement with the environment. Evidently, the questions also highlight the nature of details students attended to, when engaged in outdoor observations.

Students were more interested in understanding specific details and features of the bird, as illustrated in table 1.1. For example, R1 wanted to know how birds communicate, she was especially interested in knowing how woodpeckers communicate or how she could identify the sex of the bird or know when the bird is a male

| Themes based on commonalities | Questions asked before engagement | Questions asked after engagement |
|-------------------------------|---|---|
| | (R1) Sheryl | |
| 1) Myths | 1) <i>Is it true that if we touch a small or a big bird. the birds family will not be able to recognise it and they will kill the bird?</i> | 1) <i>How can woodpeckers communicate?</i> |
| 2) Features of the bird | 2) <i>Is it true that if we kill a bird or her babies the family will take revenge?</i> | 2) <i>How can birds drink water?</i> |
| | | 3) <i>How eagles can fly without swinging their wings?</i> |
| | | 4) <i>Why a hen cannot fly too high?</i> |
| | | 5) <i>Why can't other birds fly without swinging their wings?</i> |
| | (R2) John | |
| 3) Food and habitat | <i>My grandmother says, souls of the dead enter into the crows body and the crow will have to be fed for the dead soul. is it true?</i> | 1) <i>Why is the Indian paradise flycatcher called the bird of paradise?</i> |
| | | 2) <i>How reproduction occurs in birds?</i> |
| | (R3) Fatima | |
| 4) Gender reproduction | <i>Do birds also get headaches or stomach pain just like humans do?</i> | <i>What are the kinds of materials birds use to make their nests?</i> |
| | (R4) Rahul | |
| | <i>Why birds move their tail when sitting on a branch of a tree?</i> | <i>How can a bird be identified or known which bird it is once it has been spotted?</i> |

Table 1: Shift in the nature of questions elicited from students questioning

or female. Similarly R3, the questions she asked before the engagement showed her interest and curiosity in understanding the world around her. For example, R3 wanted to know if birds get stomach aches and headaches, thus indicating that she was able to think and frame questions based on abstract ideas even before engaging with the activity. There seemed to be an evident shift in the kind of questions R3 asked after her engagement with the natural environment. She now wanted to know about the kinds of materials birds use to make their nests. This could be attributed to her observations and her attention skills to understand the detailing of the way nests are built and the kind of materials that support them. R2's question after his engagement with the environment was quite different from before. He was more curious in knowing more specific details on birds, for example; "how reproduction occurs in birds".

Exploring thinking through representations

Students use drawings to express their ideas of how they represent the world around them. Interestingly, it was observed that students created evident differences in their representations of birds before and after their outdoor engagement. The meaning drawn from the representations created by students also suggested the use of visual and conceptual analogies. Forbus, Usher & Tomai (2005) describe analogy as a powerful learning mechanism that captures the breadth of cognitive processing. During the second session, students were asked to draw/ sketch a bird through their understanding, experiences, knowledge of a bird with no further instructions on what should be highlighted or how the labelling should be done.

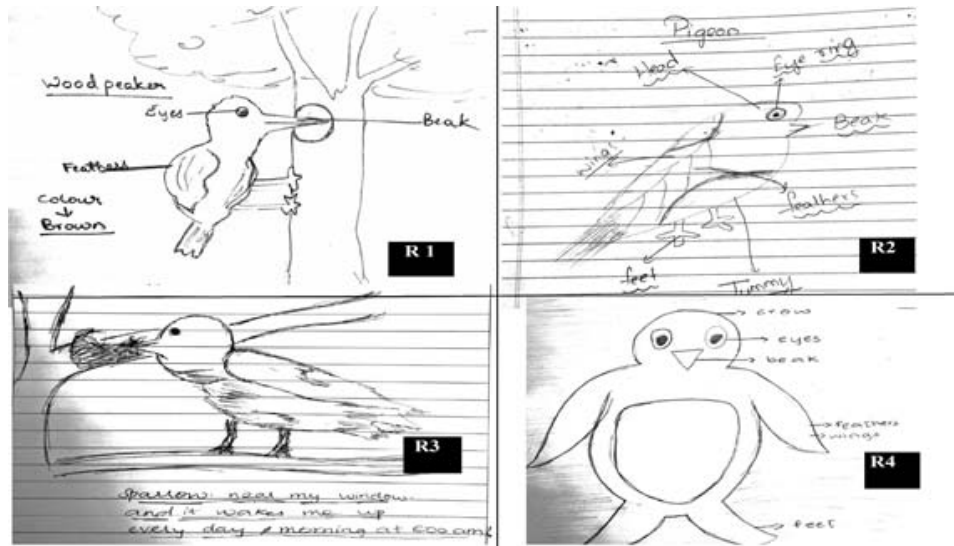


Figure 1: Examples of sketches made by students before engagement

Figure 1 depicts a few examples of the drawings made by students before their engagement with the environment. The sketch created by R1 suggests how the student was trying to connect the idea of bird in the context of doing something. For example; the sketch depicts an image of the woodpeckers pecking behavior. It can be noted that the students categorizing in this case is based on the activity that the bird is engaged in. This case is also a classic example of students trying to attach and depict a specific activity that a bird is usually associated with. The sketch created by R2 suggests that the child has culminated features from different species into creating the image of the bird. For example; in Figure 1 it is inferred that the student has created an image of a pigeon by using characteristics that are almost similar to fish scales or a leaf.

The second inference made here was that the student attempted to draw a visual equivalent to understand that the bird is camouflaged due to the presence of leaves around it. R2 seems to have focused on enhancing features like, the wings of the bird, the beak and its feet. R2 also highlighted the stomach of the bird which suggests the student is trying to connect the prominent features of a human body to a bird.

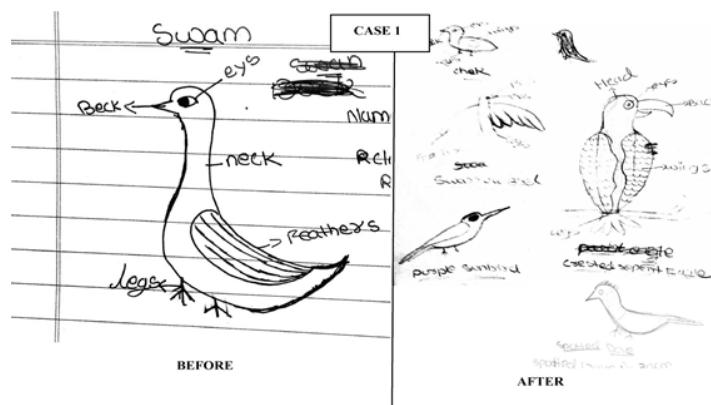


Figure 2: (Case 1) Drawings made before and after observations

Figure 2, case 1 displays the drawings made by Sheryl. There was an evident shift in her drawings from before and after the engagement where her observations showed up in her drawings. Some change was also observed in the way she has highlighted specific features of the bird after observations. A striking evidence was seen in the shift of the diversity of bird species included in her drawings from nature. She also seemed to have conceptualized the idea of size by portraying the relative size variations of the birds. She also described her observation by the colour and the size of the bird, the number of birds of the same species she sighted and the time at which she saw the birds. She also commented, “I did not know the name of the bird, it was jumping from one branch to another, the second bird I observed was also an unfamiliar one”.

Evidences suggesting a shift in students representation of bird species after engagement

This study was an attempt to understand the difference in students’ views about bird species (represented in drawings) before and after the outdoor observation-based activities.

| Before observations (Day 1) | | After observations (Day 3) | |
|--|--------------------|-----------------------------------|--------------------|
| Name of the bird | Number of students | Name of the bird | Number of students |
| Sparrow | 12 | Paradise Flycatcher | 14 |
| Peacock | 9 | Indian Robin | 5 |
| Pigeon | 6 | Spotted Dove | 8 |
| Parrot | 4 | Red Whiskered Bulbul | 4 |
| Crow | 4 | Drongo | 4 |
| Other birds’ category enumerated: Hen: 3 Kingfisher: 3 Puff throated bulbul: 1, Weaver bird:1, Humming bird:2 , Ostrich:1 | | | |

Table 2: Evidences suggesting a shift in students representation of bird species

One of the major findings in the study was the shift in students’ representations of the bird species. Table 2 shows a significant increase in the number of birds and the diversity of species observed and represented by students after their engagement with the module. During the initial stages that did not involve any observations, students represented species that were most commonly seen. These included familiar bird species such as Sparrows which were sketched by 12 students, pigeons as sketched by 6 students, Peacocks by 9 students ,Crows and Parrots by 4 students respectively. Whereas the observed species after the engagement included a more diverse array of birds which students were previously unaware about. These birds included the Paradise Flycatcher, Spotted Dove, Indian Robin, Red whiskered Bulbul and Drongo. In Table 2, “The other birds category enumerated” suggests the constancy in the names and sketches of birds represented and the number of students who sketched the birds.

Another interesting reflection was the change in the use of language by the students to describe the birds. The terminology shifted from the usage of generic terms like black birds, blue parrot and attributive adjectives like the elegant crow, colourful peacock, queen bulbul to more specific and accurate bird names for example, Spotted Dove and the Paradise Flycatcher.

CONCLUSION AND IMPLICATIONS

The thrust of the paper is to facilitate a child's connection to knowledge, through transformative experiences – to provide a sense of Progression. One of the major inferences made through the outdoor engagement was the transitions in the nature of questions asked by students. The finding reflects back on the principles laid down in the National Curriculum Framework, NCERT (2005) document which explains how students can import the acquired skills from their outdoor learning to classrooms. The paper also emphasizes the importance of asking questions to help enrich the curriculum.

The insights from the study helped understand students perception about birds before and after their engagement with the natural environment. The evidences emerged through the study highlight the need for exploring the conceptual and theoretical aspects of outdoor learning. The study raises numerous avenues for future investigations to deepen our understanding of incorporating outdoor learning into classrooms.

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