

The Informal Learning Model: A Sociocultural Perspective of Questioning Pathways

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Abstract

The term “zoo” is a socially shared concept that is framed by society. In order to define how learning takes place in institutions of informal learning, such as zoos, we must identify the external stimuli within our society that influence informal learning. This paper focuses on the Interactions component of the Informal Learning Model from a sociocultural perspective and provides ideas about how zoo educators can use questioning to inform their teaching. During the study, visitors’ discourse was recorded to determine the level of questions that were occurring between visitors and between visitors and staff.

Introduction

The Informal Learning Model (Figure 1) illustrates that the informal learning experiences, which occur at the zoo, are molded by (1) the zoo’s definition of learning, (2) the images portrayed in the exhibits, (3) the interactions that occur between visitors and between visitors and staff, and (4) the information provided within the exhibit (Patrick & Tunnicliffe, 2012). Given that studies show that informal settings provide opportunities for science conversations (Zimmerman, Reeve, & Bell, 2010), more information is needed that focuses on the sociocultural interactions that occur during the visit. The social constructivist theory asserts that science learning occurs through socially mediated experiences such as conversations that transpire in social situations (Wood, Bruner, & Ross, 1976). Social experiences provide people with an opportunity to access prior knowledge about a subject and build on that knowledge to construct a new understanding (Bruning, Schraw, & Norby, 2011).

Much of the discourse that has been recorded in zoos examines how visitors learn within self-guided visits; however, less is known about the social discourse that occurs between the visitors and staff. Social discourse is viewed as a tool that is used in the process of learning and learning is evidenced in the change of the discourse patterns over time (Ash 2003). This study was specifically interested in the discourse that occurred between visitors and between visitors and staff in the form of questioning. Bloom’s Taxonomy (see Table 1) represents a way to classify learning objectives from recalling facts to a complex system of making judgments and validating ideas (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956).

Since its inception, Bloom’s Taxonomy has become a standard for the types of questions that elicit learning within each level of the learning objectives. Consequently, this study utilized Bloom’s Taxonomy to focus on the following research questions:

(1) What level in Bloom’s Taxonomy did the questions represent? (2) Did the level of questions change when visitors interacted with staff?

Methodology

This study took place in a gorilla exhibit at a large southeastern zoo. During a one day visit to the zoo, 115 conversations between visitors and between visitors and staff were recorded on paper and digitally. The staff included a zookeeper and two docents, who were located in two different areas of the exhibit; therefore, the same visitors may have been recorded

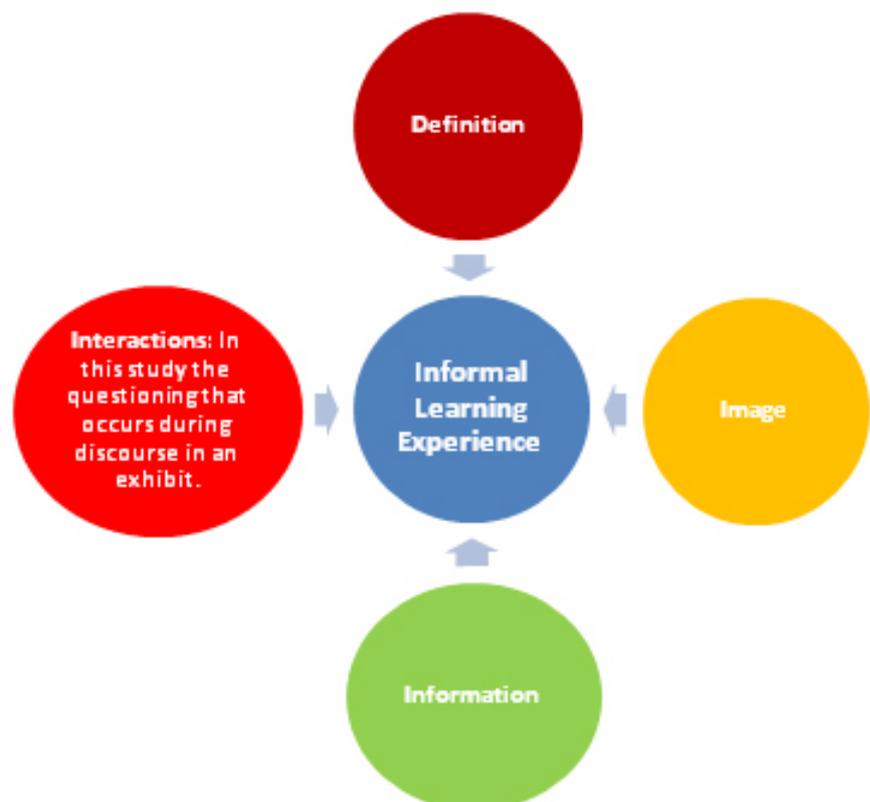


Figure 1. The Informal Learning Model shows the influence of questioning on an informal learning experience (Patrick & Tunnicliffe, 2012).

Figure 2. Bloom's Taxonomy Record Sheet.

Bloom's Level	Sample Questions	C1	C2	C3
		visitor to visitor	visitor to staff	staff to visitor
Knowledge Recalling facts, terms, basic concepts and answers.	What is...?, Where is...?, How old is...?, How many...? When do they...?, How long have...?, Who...?, Why are they doing...? When are we...? Where are we...? Did you see...? Can we...? Etc.			
Comprehension Organizing, comparing, translating, interpreting, giving descriptions and stating main ideas.	What can you tell me about...?, Can you tell me how...? Is...like...?, Why do they...?			
Application Applying acquired knowledge, facts, techniques and rules in a different way.	How do you think they use...?, Why do you think they use...?			
Analysis Identifying motives or causes; making inferences and finding evidence to support generalizations.	Can you think of another reason they need...?			
Synthesis Combining elements in a new pattern or proposing alternative solutions.	Why do you think they...?			
Evaluation Making judgments about information, validity of ideas or quality of work based on a set of criteria.	What do you think you can do to help...? Do you agree with...?			

on two separate occasions during the same visit. Two undergraduate science education students recorded the questions being asked by visitors and staff on a Bloom's Taxonomy Record Sheet (BTRS) (Figure 2) and with a digital recorder. The BTRS was developed from Writing Objectives Using Blooms Taxonomy (UNCCH, 2010).

The students were asked to make a mark on the record sheet each time they heard a question that correlated to a level on Bloom's Taxonomy and identify if the question was between visitors or between visitors and staff. For example, if the questions were asked within the group the student recorded only in the visitor/visitor column. If the visitor asked the same question of the staff the question was recorded again in the visitor/staff column. If a visitor asked their group the same question more than once, the question was only recorded once. A conversation was defined as the talk that occurred between the time the group entered and exited the area of the exhibit.

Data and Results

Table 1 illustrates the data from the analysis of the 115 conversations. Of the 2,391 questions that were asked, visitors asked 2,004 (84%) questions, with staff asking 387 (16%) questions.

Visitors Questions: Within their groups, visitors asked 1,442 (60%) questions. The visitors were found to engage mainly in Knowledge (1,304; 55%) related questions, which is Bloom's lowest level of questioning. The following are examples of the questions that occurred between visitors: "What is that?" "Where did it go?" "Do you see it?" "Where is it?" "Where are we?" "Where are we going next?" "Are we going

to eat?" "Where are we going to eat?" "Do you know what that is?" "Can they climb the trees?" "Do you think he looks like Uncle Bob (pseudonym)?" "Where is the bathroom?" "How old is ...?" "Did you see that?" Visitors did ask Comprehension (138, 6%) questions within their groups, but with less frequency. For example, they asked: "Why is (s)he doing that?" "Do you think our hands look like her/his hands?" "Why is (s)he picking his nose?" "Why did (s)he do that?" "Why is it hiding?" "Why is that one picking on that one?" However, visitors did not ask Application, Analysis, Synthesis, or Evaluation questions within their group. Visitors asked staff 562 (24%) questions. The discourse that took place between the visitors and the staff occurred after the visitors had asked questions within their groups. Of the 562 questions asked of staff, 77% (n=393) were initiated by visitors asking the same questions they had asked within their group. Visitors asked 313 (13%) Knowledge level questions such as: "Where is it?" "Where did it go?" "What is that?" "Where is the bathroom?" "What is her/his name?" "Which one is this one?" "Are they happy?" "What do they eat?" "Are we going to see the... next?" "When are we going to see the...?" However, visitors asked more Comprehension (244, 10%) level questions when interacting with the staff than they did within their groups. Visitors asked staff: "Why is (s) he doing that?" "Why do they eat grass?" "What do they do all day?" "Why is (s)he sitting like that?" "Do they see us like we see them?" "How are they related to us?" "What would you do if one escaped?" One visitor asked an Application level question ("If they are

so endangered, how can they be saved?") and one visitor asked a series of three Evaluation level questions ("I read in the paper that gorillas are endangered...there are only a few left in the world. Shouldn't these gorillas be in the wild...I mean how are gorillas sent back to the wild...you know...does the zoo help gorillas in the wild?").

Staff Questions:

The staff asked 387 (16%) questions and parallel to the visitor data the majority of staff questions were at the Knowledge level (223, 9%). Interestingly, the questions the staff asked visitors at the Knowledge level were comparable to the questions the staff was asked by the visitors. The staff asked visitors: "Do you see her/him?" "Do you see the male/female?" "Did you see her/him eating?" "Have you been to the other side?" "Did you see her/his hands?" "Did you see what (s)he did?" "Which one is that?" "What is (s)he doing now?" "Have you seen the...?" However, unlike the visitors' questions, the staff's questions ranged from the Knowledge level to the Evaluation level, but did not include questions from the Synthesis level. The following are examples of the types of questions the staff asked visitors.

Comprehension (125, 5%): "How are the gorilla's hands similar to your hands?"

Application (21, <1%): "If you were a gorilla, what would you like to eat?"

Analysis (11, <1%): "What are some of the problems you think gorillas face in the wild?"

Evaluation (7, <1%): "What do you think you can do to help the gorillas in the wild?"

When the staff instigated the questioning, they started with Knowledge level questions. If the discourse continued between the staff and the visitor, the staff asked higher order thinking questions, mostly at the Comprehension level.

Discussion

Although the study is of a small scale and is not meant to generalize broadly to all zoos, it provides insight into the questions that arise during social discourse in an exhibit. As a result of the analysis, the questions were found to take three paths: (1) visitor to visitor, (2) visitor to staff, and (3) staff to visitor. The questions that occur most often in all pathways are Knowledge level questions that relate to animal location, animal behavior and the visitor's group activities, such as, the location of specific facilities and the next organism the group will visit. However, the pathways show that the discourse that took place between the visitor and the staff encouraged the visitors to ask more Comprehension related questions; meaning that when visitors interact with the staff, they ask higher level questions. During the discourse, the staff took on two main roles: Sage and Facilitator. The staff acted as a Sage answering lower level questions that required short answers. However, once the staff was engaged in the conversation with the visitor, the staff's role reversed and they became

Bloom's Level	Questions Between Visitors n(%)	Staff Questions to Visitors n(%)	Visitor Questions to Staff n(%)
Knowledge	1,304 (55%)	223 (9%)	313 (13%)
Comprehension	138 (6%)	125 (5%)	245 (10%)
Application	0 (0%)	21 (<1%)	1 (<1%)
Analysis	0 (0%)	11 (<1%)	0 (0%)
Synthesis	0 (0%)	0	0 (0%)
Evaluation	0 (0%)	7 (<1%)	3 (<1%)
Total	1442 (61%)	387 (15%)	562 (24%)

Table 1. The Bloom's Level at which visitors' and staff's questions were scored. N=2,391 questions.

a Facilitator who asked visitors questions that began at a lower level and progressed to a higher level. Not only do the questioning pathways reinforce the use of sociocultural perspectives for understanding questioning in a zoo exhibit, but are suggestive of program designs that take into account the interactions that take place between the staff and the visitors.

Conclusion

This study indicates that if staff members are trained in questioning techniques, they may influence the level of learning discourse that takes place between the visitors and between the visitors and the staff. The majority of questions were initiated by the visitors, while the majority of higher order questions originated with the staff. This suggests that zoos need to rethink how their program facilitators can best support the questioning that occurs during the visit. The key conclusions drawn from this study for identifying the level of questions that occur between the visitors and between the visitors and staff are to determine the types of questions that could be put into practice within an exhibit. The sociocultural discourse that takes place is specific to an exhibit, so it is important to link or relate the questions to the exhibit and to the visitors' prior knowledge.

Using Bloom's Taxonomy as a quick analysis of the types, levels, and pathways of questions that are being asked within exhibits, educators may identify the information that staff ought to focus on with questioning that will stimulate visitor wonder, encourage conservation action, foster a positive attitude toward the natural world, incite engagement in questions about conservation practices, inspire the visitor to find more information when they leave the zoo, and cultivate new conceptualizations that promote diverse types of questions. The challenge for zoos is to have staff members that are not only knowledgeable of the organisms in the exhibit, but are also able to interact with visitors through higher order questioning. By answering the spontaneous questions asked by visitors and in turn asking higher order questions, the staff members may increase the holding power at the exhibit.