

...and Spiders are not Insects
Susan Herbert

*And down came a spider
And sat down beside her
And frightened Miss Muffet away.*

We encounter spiders everywhere—in our homes, workplaces, schools, and in stories and poems. But what are our understandings about them? Are they just another set of creepy, crawly "insects?" This article illustrates my attempt to confront this everyday idea.

One day, two of my seven-year-old relatives asked me to take them to the National Museum (upper Frederick St., Port of Spain). This would not have been our first visit there. On the last occasion, they had shown an interest in reading the map/floor plan (they were thrilled that they could translate this two-dimensional diagram into their 3D experience of the world), in the rocks and fossils on the ground floor, and in the ecology section on the first floor. They wanted to do some research! I did not ask for details. I assumed that they had seen something or met some terms that were unfamiliar, and their interest had been piqued.

My teacher training swung into gear. I knew that I should strike while the iron was hot because there is a great deal of research in education that reports on the important role of student interest—it makes learning easier and more enjoyable. Children are not necessarily interested in the topics/issues that engage the attention of adults or teachers, so when they do express an interest in ideas that are congruent with the world of school knowledge, teachers know that they should seize the opportunity to develop these ideas. My young relatives were interested in the displays of rocks, fossils, and fauna that they had seen at the museum, and these are topics that are addressed in science classes. I promised that we would visit the museum on the following Saturday.

As we entered, they went immediately to the floor plan, and we proceeded up the stairs to the ecology section. Diligently, one brought out a piece of paper (I gave him a pen) and began to record the names of the animals located in each display case—bats: vampire bats, fruit-eating bats.... We then moved on to the display on invertebrates (animals without backbones; compare with vertebrates to which the classes of mammals, fish, reptiles, amphibia, and birds belong). Taking turns, they recorded the names of more animals on the page—butterflies: the blue emperor and others. On to the spiders we went. Then, one said: "A spider is an insect."

Immediately, I put on my teacher's hat. As a science teacher for 15 years at the lower secondary level, I had found that students often came to the classroom with the idea that spiders belong to the class of invertebrates that western scientists refer to as insects. I had also found that students' ideas are not easily modified simply because the teacher says differently. So I initiated a discussion on the topic as follows:

"Spiders are not insects, they are arachnids," I said.

"No," they insisted. "We have seen shows (TV programmes) in which spiders are called insects. And we went into town with Grandma and we saw an insect pack with a spider in it." (referring to a toy pack in a store in Port of Spain).

Well, how do I compete with this? I thought.

"Okay," I said. "How many legs does the spider have? Eight. Let's look at the others, and let's count the number of legs."

I tried to provide evidence that conflicted with their prior understandings, in keeping with the constructivist view, which posits that we all learn about, or make sense of, the phenomena that we experience/encounter in light of our prior knowledge, and that modifications to our understandings take place when old concepts do not satisfactorily explain new experiences. So, together, we counted the number of legs of some animals, as I tried to provide the evidence that there are six-legged animals, and that these are referred to as insects. I did this until one said: "Let's stop counting. Spiders are special kinds of insects." I acquiesced. I decided that there was some compromise and that there was no point at this stage trying to continue the lesson. Persons who subscribe to constructivism as a philosophy of knowledge also recognise that students' concepts may not be modified completely, or sometimes at all, during the first encounter with evidence that can lead to alternative ways of knowing.

It is not easy to change ideas that have served so well in one's life, in terms of understanding the world and how it functions, and that have led to a measure of comfort. For my relatives' purposes at this time, it was probably satisfactory that creepy, crawly, little spiders are special kinds of insects. They were not yet willing to completely abandon their original label, in spite of contradictory evidence. Their response is in keeping with research in science education, which has shown that prior concepts are often very resilient, in spite of teaching strategies that explicitly attempt to have students construct alternative concepts. In this instance, there was a slight change in their ideas about spiders. Perhaps with time and exposure to science at school, they will come to understand the importance and function of the classification system devised by western scientists, in terms of its predictive value, and hence acquire this alternative conceptual understanding of the relationship between spiders and the class of animals known as insects.

As teachers who embrace constructivism as a philosophy of knowledge, we can only continue to elicit students' prior understandings, and try to help them to become aware of, and understand, the different constructed understandings of phenomena that they encounter, by deliberately confronting their prior knowledge. It is not an easy task (often we are unaware of students' prior knowledge and there are always time constraints) or an approach that guarantees immediate success. However, it challenges us to be ever mindful of the ideas that the students bring to the classroom, and of the value of having

them interested in the topics being considered, if we want them to engage in meaningful learning (when there are links between ideas, which are networked into a cogent conceptual framework) instead of surface or rote learning that may allow for successful performance on examinations but then is easily forgotten.

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