

Using metaphors to acquire, organize, and prioritize relevant scientific knowledge

Introduction

Listlessness. Anxiety. Lack of concentration. Lack of motivation. These are not characteristics generally encouraged in a science classroom. They are, however, all becoming characteristic of many students who experience information overload: any information, everywhere, at any time. Before the almost ubiquitous state of the internet, a lot of relevant information regarding the variable perspectives of science may not have been available to the average consumer or student. However, it is often the case now that there is too much information available. Many students are unable to judge between relevant and irrelevant information and knowledge claims. I would like to propose, then, that if students are presented with an opportunity to explore scientific knowledge claims within a local and culturally-specific context, and if they are offered object metaphors which – in prompting them to explore the cultural contexts of knowledge – help them organize their findings, then this process of learning could be helpful in counteracting information overload. It would be a constructive alternative to other explorations of scientific knowledge, those other alternatives being ones which primarily propose the deconstruction of knowledge; though necessary in order to expose cultural contexts of knowledge claims, I believe the deconstruction of knowledge without a corresponding re-construction may only exacerbate the contemporary problem of information overload. This, then, is a lesson plan to help teachers engage students/groups in constructions of local scientific knowledge. The idea is for students to take a dynamic structure that is familiar to them, a tangible metaphor, and then use what they know of the framework of that structure to investigate and organize scientific claims which are relevant for them.

Part A: The Initial Metaphor

The associations that students construct around each initial metaphor will be later used as a framework for exploring, organizing and prioritizing local and culturally specific scientific knowledge claims.

Step 1: Hand out object metaphors. Encourage students to also come up with their own dynamic metaphors.

Examples: *Orange, Birth control tablets, Rock-climbing gear, Tainted Peanut Butter, Parachute*

Step 2: Explore the dynamics of the each object with the class. Ask students which presuppositions they bring to the objects and which associations they might have with each object. The purpose is to understand that each object 1) had a creator(s) and/or variable contexts of creation; that 2) each has some sort of life as it exists in front of us, on its own; but that 3) generally *how* it was created and the conditions under which it was formed and brought to us will determine how effective or deleterious it is once appropriated. Examples of questions and associations pertinent to the orange and rock-climbing gear are offered below:

General Q's: What do we know about each object? What is its purpose? What do we not know about it? What would we want to know if we were going to ingest, use or interact with the object?

Orange: *What is it?* An Orange. *What do we do with it?* Eat it. *Why?* Its healthy, it tastes good. *What determines if its healthy or tastes good?* Age, where its been, what its been exposed to, what season it was harvested in, how healthy the tree was. *Other Considerations?* Labor practices, fair pay for growers, whose land was it grown on, sustainable growth practices, etc. *What would we want to know if we were going to buy it or eat it?* Probably age, what its flesh has been exposed to, if the workers were treated fairly. *Conclusion?* Just being an orange does not mean it is healthy or tastes good! The relevant knowledge about it is the background knowledge, however obvious or as yet unknown that knowledge is.

Rock Climbing Gear: *What is it?* A daisy-chain and a carabiner. *What was it intended to be used for?* Anchoring properly into a rock face, carrying a static load with a redundant safety system. *What do we want to know?* Whether or not the carabiner was dropped on cement, if the anchor on the rock is secure, if the daisy-chain is frayed. *Conclusion?* Just because an object was manufactured appropriately, does not mean that it will be used as it was intended to be used. Effective use depends on skill of user, history of equipment, and other variables.

Part B: Acquiring, Organizing and Prioritizing Scientific Knowledge

Step 1: Propose or brainstorm about relevant scientific issues which the group is exposed to.

Step 2: Ask students which object metaphors and which object's associations previously discussed could be relevant as a framework for organizing knowledge claims, questions and associations pertaining to the chosen scientific issue(s).

Step 3: Discuss the overt claims proposed by each local scientific issue, the effect and/or possible consequences of moving forward based on those claims, and the background information that actually determines how the claims become manifest. Keep a metaphor in mind in order to prompt and organize information, like an *orange* or the *climbing gear*.

Step 4: Discuss how to acquire the information – interviewing people, field-site visits, internet, newspapers, municipal offices, involved non-profits, local residents. Organize the information in relation to the overt claim and decide what the determining factors should be regarding its appropriation.

Example: The Small-Scale Dam proposal for a nearby river is an example of a clean, green, renewable energy source and will contribute to our province's energy independence.

What is it? A less than 50 MWh dam. *How is it supposed to 'taste'?* "Healthy", clean, unpolluted, cheap. *For whom?* Anyone who "eats" it, or buys the energy. *What determines if it is clean, unpolluted, cheap, and accessible? What is its*

lifespan, when will it rot?

This is where it can get messy, confusing and where students and groups may begin to feel powerless with regards to how to organize information and determine what is most important. Using the metaphor as a tool can help. For example, similar to the word “healthy”, what does the word “unpolluted” mean? In this case, maybe there are very few carbon emissions, but the river life itself will be impacted. What does a loss of river life do for the surrounding biotic and social communities? Also, like a grocery store, who is selling the idea of the dam and the claim that it is clean energy? What are their interests in selling it, what is their history with these projects? An orange also has seasons of harvest and seasons of growth; a river experiences seasonal changes as well. When were the tests conducted regarding the viability of the river and the impact on the river's inhabitants? To push the metaphor even further: Regardless of how “healthy” the orange is or how “clean” the energy from the river is, what or who else is affected by the project? For the orange it could have been the treatment of the workers in the grove; for the river it could be the people who live on land nearby or who use the river area as a means of livelihood.

General and Case-Specific Resources:

Jungwirth, Bernhard, and Bertram L Bruce. “Information Overload: Threat or Opportunity.” *Journal of Adolescent and Adult literacy* 45, no. 5 (F 2002).

Weaver, Jace. *Defending Mother Earth: Native American Perspectives on Environmental Justice*. Maryknoll, NY: Orbis Books, 1996.

BC Citizens for Public Power. <http://www.citizensforpublicpower.ca>

Independent Power Producers Association of British Columbia. <http://www.ippbc.com/>