DOINGWHATWORKS

Video
FULL DETAILS AND TRANSCRIPT

Key Concepts in Using Higher-Order Questions

Annemarie Sullivan Palincsar, Ph.D. • March 2008

Topic: How to Organize Your Teaching
Practice: Higher-Order Questions

Highlights

- Higher-order questions defined; explanations are one type.
- Teachers can support the practice of building explanations with question starters and participation structures that require students to take a stance.
- Building explanations helps students identify gaps in their understanding and compare their thinking with others.

About the Interviewee

Annemarie is the Jean and Charles Walgreen Jr. Chair of Reading and Literacy, Arthur F. Thurnau Professor and a teacher educator in Educational Studies at the University of Michigan. Her research focuses on the design of learning environments that support self-regulation in learning activity, especially for children who experience difficulty learning in school. She completed her doctorate at the Center for the Study of Reading at the University of Illinois, Champaign-Urbana. She began her research with the design and investigation of Reciprocal

Teaching; a form of reading comprehension instruction that takes place through a discussion, shaped by four comprehension monitoring strategies. In subsequent research she has investigated, with science educator Shirley Magnusson: how children use literacy in the context of guided inquiry science instruction, what types of texts support children's inquiry, and what support students who are identified as atypical learners require to be successful in this instruction. In collaboration with Rand Spiro and Linda Kucan, she investigated the use of a hypermedia tool to support bringing-to-scale knowledge and practice regarding text comprehension instruction. In collaboration with Bridget Dalton from the Center for Applied Special Technologies, she studied the use of digital texts to support children to interpret and learn from graphics-rich science text. Annemarie has served as a member of: the National Academy's Research Council on the Prevention of Reading Difficulty in Young Children, the OERI/RAND Reading Study Group, the National Research Council's Panel on Teacher Preparation, The National Education Goals Panel, and the National Advisory Board to Children's Television Workshop. She is co-editor of the journal *Cognition and Instruction* and is a member of the National Academy of Education.

Full Transcript

I'm Annemarie Sullivan Palincsar, and I am on the faculty at the University of Michigan. A higher-order question is usually contrasted with questions that require children to simply recall or practice information. So, higher-order question would engage children in using the information that they know to come to some deeper understanding or, perhaps, to solve a novel problem.

Engaging children in explanations for a phenomenon would be one example of a higher-order question. So to illustrate, in the life sciences, a teacher might ask a group of students to simply name the parts of a plant. But they could also ask the students to explain how the parts of a plant—and to perhaps compare the parts of a rose plant and the parts of a cactus plant—how is it that these parts tell us something about how a plant survives and reproduces in its environment.

An example in history would be—a factual recall question might be if the teacher says to the group. "So, when did the American Revolution start, and what caused the American Revolution?" In contrast, a more high-order question—one that would require youngster to engage in explanation—would be to ask the students to compare and contrast the American and British views of the start of the American Revolution. And to speak to the evidence that each perspective has in support of its particular explanation.

Some of the most compelling research on the value of eliciting explanations has been done by Micki Chi and her colleagues. For example, they studied students who read texts about the circulatory system. And then one group of students were asked to self explain—not even to explain to others but just to explain to themselves how the circulatory system works in the human being. And when they studied those youngsters—or those students actually, they were older students—they learned much more about the circulatory system

than students who didn't engage in that kind of self-explanation. And what the difference seems to be is in the process of doing that self-explanation, learners identified where there were gaps in their understanding. And so they went back to the sources to try to flush out those gaps. And that would be an opportunity that students who did not engage in self-explanation didn't have. So both the learner himself or herself get some idea about these gaps. The teacher of course also has an important window into what the gaps in students' understandings might be. And I think another reason why self-explanation, or explanation in general, works effectively is that students have an opportunity to compare their thinking with the thinking of others who are in their class.

One example of a participation structure that we have used in our own work, we took from the work of Itakura, and this participation structure involves grouping students according to the explanation that they are most interested in advancing. So, in our work students are studying the relationship between mass and momentum, and children would be grouped according to the explanation they want to advance. A group of youngsters might be together because they think that the mass of an object isn't going to make a difference in terms of the rate at which the object travels down an inclined plane.

Whereas, a second group of students are grouped because they think that the mass does indeed make a difference. Now what we found in our work is that by grouping children according to the explanation that they want to advance, first of all, they are very earnest about gathering their data in a way that's going to be clear and compelling. They are also working to find counter evidence for the claim that they are aware, the other group is going to be making. So it's a very effective way to have students really wrestling with the ideas, anticipating what others are going to find to be perhaps a fault with their data, or with the claim that they are trying to advance.

Teachers might want to keep in mind three different aspects of how it is that they can promote students engaging in higher-order thinking, particularly in explanation. One is the teacher's own knowledge—the degree of their knowledge, the comfort of their knowledge—with the topic that they are teaching. Not just the topic but also the domain that they are teaching. So for example, our teachers found it very liberating to start thinking about I am not just teaching students about matter and molecules or energy; I am teaching students how it is that scientists have engaged in their work, how is it that scientists have come to understand how it is that the world works, and to hold students accountable to engaging in those same processes of making claims about the world, looking at the relationship between those claims and the evidence for a particular phenomenon. So that supports teachers to both expect students to engage in explanation and give students the tools to work toward explanation.

A second is the teacher being aware of the kinds of conceptions that students are likely to find thorny or challenging. By doing that, the teacher anticipates where students are going to be needing more support. The teacher can also design problem spaces or investigations that are going to be particularly powerful relative to supporting students to come to deeper or more accurate or more complete explanations.

The third, of course, is the teacher bringing a genuine curiosity about students' thinking, a genuine interest in how children have come to the ideas that they have, a genuine interest in promoting students using that knowledge in more productive and generative ways.

So I think that armed with those three dimensions, the teacher will be more facile, more adept at establishing a really productive community in which the culture is to work for explanation, to advance explanation, to test explanation, and deepen and revise and refine explanation.