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The Creative Attitude … Roger Schank

Learning to ask and answer the right questions

Creativity is a game of making and testing hypotheses, taking them as far as they can be taken, then watching them crumble and wondering, why.

There are three very common scenarios for discouraging creative thinking, which are:

- **Formulaic thinking** …Believes there is an answer for every question
- **Reinventing the wheel syndrome** … if you want to be creative, you must not be afraid to reinvent the wheel
- **Tripping on the prototype** … we go no future than what we remember in the past of a similar experience.

Scripts are formula's for living. Children are rapid script learners and script formers. Its what grounds the child as they grow.

Scripts and the learning cycle;

What happens when thing don't follow our internal script? You do three things

- Notice the anomaly
- Ask a question
- Find an explanation

Understanding something means either determining that what we have witnessed is consonant what our expectations, in which case the cycle simply finishes, or else determining that an event has failed your expectations. If your expectations have not been satisfied, you must wonder why and demand an explanation from others or create one on your own. An important questions is, What becomes of your new explanation? There is a critical step in the normal understanding cycle: Alter the failed expectation.

The part of understanding that relates to learning is **what we do when our scripts fail**.

We look back in our memory for an explanation, but scripts are in essence old, fossilized explanations. We could look for an explanation in old standards like proverbs. As an example; an old friend goes away and fails to communicate with you might be upset because "Absence makes the heart grow founder" or Out of site out of mind"

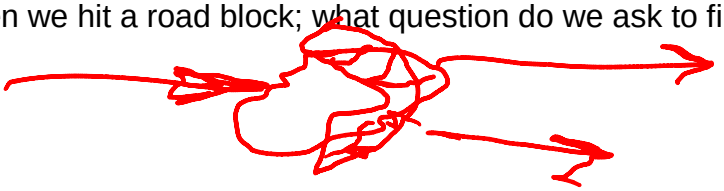
These are explanations that are generally available and easy to recall. Creativity often comes from the failure to have predicted correctly and asking questions where we haven't asked a question before.

Making understanding conscious and active:

Instead of letting our mind do its thing when expectations fail, you must start to taking control of processes your mind has been doing for years without your thinking about them. You must begin to think about what you are thinking about. Creativity comes from the posing of an ordinary question in an extraordinary place, and the explanation of seemingly irrelevant reminding. It is creative to ask questions of the ordinary; it is creative to ask "Dumb" questions where "dumb" means a question that has been considered to be fully and completely answered.

We must learn to play with rules as well as follow them.

When we hit a road block; what question do we ask to find our way?



The understanding cycle is straightforward; we must fail, we must wonder why, we must be reminded of similar situations in which we were similarly confused, and we must compose a question in order to explain what is going on. As far as our creativity is concerned, the end result of the explanation process doesn't matter half as much as the process of constructing explanation itself.

The creative attitude:

People have an attitude about change. The creative attitude has at its core, the philosophy that if something isn't working it can be fixed. It also has an intrinsic part the underlining question, **I wonder why it broke in the first place.**

Creative people, if they have anything in common at all, have in common the need to wonder, to speculate, to explain. A creative attitude means a willingness to look for holes in traditional systems and ways of doing things, to wonder just where the system fails to fulfill its own promise or goals.

Wondering is what creativity is all about, regardless of the domain in which we do the wondering.

Good question are the ones that lead you down interesting paths in the pursuit of answers.

Questioning is like being a great artist in the sense that intuitive capacity is needed to ask the right questions in the right way at the right time.

The wording of the questions

Three words –might, could and should; these words are sometimes used as synonyms but imply different meaning in people.

Do you think anything **should** be done to make it easier for people to pay doctors or hospital bills?

Changing the words gives 82% said should, 77% said could and 63% said might

These words pose different meaning

- Should is like a moral issue
- Could poses the issue of possibility
- Might poses the issue of probability

TEACHER QUESTIONS THAT SUPPORT INQUIRY

Karen Worth, Jeff Winokur, Sally Crissman Martha Heller-Winokur Martha Davis

"A good [stimulating] question is the first step towards an answer…" – Jos Elstgeest

- Teachers need to formulate questions that stimulate scientific thinking and develop the students' ability to ask good questions
- **The Inquiry Learning Cycle** – can ask questions at every level
- "Clear, focused questions keep students' eyes on the prize and at the same time convey the message that the goal is for students to take ownership of their learning."
- Example questions: *"Why is that happening? What do you think? Can you tell me more about that? What was your evidence for that? Why do you think that? What is your proof? Now what do you think and why?"* – Kristen Shrout

- **Person-Centered Questions**: "phrased to ask directly for the children's ideas, with no implication that one idea is more "correct" than others.
    - What do you think you will observe when you add another bulb to the circuit?

    - How long do you think it will take the ice cube to melt?
    - How long do you think it will take the ice cube to melt? Be sure to tell us reasons for your ideas
- **Subject-Centered Questions:** "ask about the content in a way that suggests there is a right answer."
    - How long will it take the ice cube to melt?
    - What will happen to the brightness when you add another bulb to the circuit?

Just slight differences in the wording of a question can make students feel more a part of the scientific process in discovering the answer – must show their answer, not just "tell" the correct answer. Person-Centered questions should invite students to articulate their own ideas, to reveal their own reasoning, and to think though the steps they themselves might take as they investigate.

- **Equitable Question:** asking a question that provides a common experience (such as a brief trip outdoors, bringing materials to the class, or first providing an interesting challenge for students to explore) ensures all students will have experiences from which to build ideas
    - *Equitable Question:* When we went outside this morning, what did you notice about the clouds in the sky?
    - *Inequitable Question:* When you are in an airplane, what do you notice about clouds?

- **Open Questions: Avoid the "Yes" or "No" Trap**
    - Invite students to respond with varied answers from multiple perspectives
    - Open Questions:
        - What are some ways that flowing water changes the surface of the land?
        - What does our data tell us about the relationship between the sixe and strength of magnets?
    - Closed Questions:
        - Does flowing water change the surface of the land?
        - Are bigger magnets stronger?

- **To craft meaningful and stimulating questions, the questions should be:**
    - Focused on science content
    - Appropriate for the purpose of the stage of inquiry
    - Person-centered
    - Equitable
    - Open

A Simple Solution to a Complex Problem

Greg Wheeler

When Benjamin Bloom created his taxonomy of educational outcomes in 1956, he faced problems not unlike those educators today must confront. Bloom's taxonomy (Bloom et al., 1956) quickly became one of the most popular frameworks in education. Yet in spite of its popularity and evolution (as evidenced by revisions by Anderson and Krathwohl [2001] and Marzano and Kendall [2007]), we see the same problems almost 60 years later as educators continue to grapple with ensuring students receive a rigorous education and defining what it means to teach "thinking skills."

Research scientists Derek Cabrera and Laura Colosi call for a new approach to teaching thinking skills so that all students receive an education that prepares them for the 21st century. In their book *Thinking at Every Desk*, Cabrera and Colosi (2009) describe research they conducted that led to the DSRP method, a framework for teaching and learning that represents a seismic shift away from other taxonomies.

The DSRP method is intimately tied to knowledge. In more than 20 years of research completed at Cornell University, Cabrera examined thousands of disciplines, surveying their histories and interviewing experts in those fields. He also studied how novices and experts construct new knowledge or change existing knowledge. The result was four universal patterns that structure knowledge:

1. Making **D**istinctions Between Identity and Other
2. Organizing **S**ystems into Parts and Wholes
3. Recognizing **R**elationships of Cause and Effect
4. Taking **P**erspectives of Point and View

These four universal patterns work much like DNA: their combinations and subtle changes produce the rich biodiversity of ideas.

Because it began with knowledge as the subject of its research, the DSRP method can be easily taught within any standards-based curriculum. For example, during a unit on community helpers, Head Start students ages 3–4 learn to break a fire truck down into its parts and, at the same time, see the truck as part of a broader whole (community). In a middle school science class, students list the parts of each system of the human body, examine the interrelationships among these systems, and break those relationships into parts.

In both examples, students learn not only the content (communities, human body) but also underlying conceptual structures (part-whole systems, relationships) that are universal to all content. Whether students are learning to write an essay, solve a math problem, conduct a scientific experiment, or just think about the way they think (metacognition), they can use the

DSRP method to strengthen thinking skills.

Equipped with these robust thinking skills, students are able to structure content knowledge meaningfully, leading to deeper understanding. Because the four patterns of DSRP are based on how knowledge is universally structured, these same patterns help students recognize structures that are already built into the content that they're learning and structure the information into meaningful knowledge. Additionally, this leads to tremendous horizontal articulation, or transfer, as students use the same thinking skills in every class.

DSRP increases vertical articulation, as well. As students progress through school, they can continue to use the same four patterns of thinking to build new ideas. In fact, the DSRP method is used in Head Start programs and graduate degree programs around the country. Rather than learning entirely new material at each grade level, students use the same metacognitive patterns to build more sophisticated constructs that are intimately connected to their prior knowledge. In hundreds of video case studies, teachers from preschool to 12th grade demonstrate their use of the same four patterns to teach students thinking skills.

Cabrera and Colosi call for a set of national standards for thinking skills and to use DSRP as a tool to assess students' thinking. Rather than attempting to classify students' thinking using an arbitrary taxonomic schema, DSRP standards would simply describe the universal behaviors students use to build ideas and change them over time. This would give teachers a list of observable outcomes that they would see when their students are thinking.

Cabrera explains why the DSRP method brings about outcomes far beyond thinking skills and increased content acquisition that many districts across the country are looking for—outcomes such as increased engagement, decreased behavioral problems, increased transfer of knowledge, and deeper understanding:

DSRP focuses our efforts and resources where it matters most—on making the teacher and student more metacognitive. This develops thinking skills and knowledge acquisition. This may seem like an overly simple way to address the huge problems facing education: closing the achievement gap, differentiating teaching for all students, etc. Unfortunately, people believe that to solve these complicated educational issues, we need a complicated solution. What we know about complex systems is that nothing could be further from the truth. It's because it is so simple that it works.

Is this to say that Cabrera and Colosi have solved the problems of Bloom's taxonomy? There is still tremendous work to be done in schools around teaching both thinking skills and a deep understanding of a standards-based curriculum. When educators can list hundreds of content-based standards (the "what to know") but cannot come to an agreement on the thinking skills to teach (the "how to know"), it's clear that we need a better method to teach thinking skills. The DSRP method is a refreshingly simple and elegant solution.

References

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I have been using the word *subject* for an idea like *diagnosis* but it is not a subject and should not be seen that way. I was only using the word to contrast it to existing *subjects* in school. Diagnosis is a fundamental cognitive activity. Cavemen did diagnosis. They may not have done it well, but they did it well enough to continue the species. The diagnostic process is as old as people. Knowing why, being able to prove a hypothesis, is a fundamental cognitive process.

School needs to be organized around fundamental cognitive activities. It would be easy to demean what I have said here by saying *he wants to teach kids to date and drive better*. What kind of school is that?

But this trivializes the point. I do want to teach students to date and drive better. But, these are just a few instantiations of general cognitive processes. Forming human relationships and figuring out what is going in the physical world are two of many very important cognitive abilities that manifest themselves in myriad ways in real life.

A properly designed school system needs to focus on cognitive abilities not scholarly subjects. Kids will recognize instantly that these activities are the ones they know that they need to get better at. If we allow them to choose what areas of knowledge they would like to focus on while learning these skills, they will be attentive and interested students.

A society that organizes schools around cognitive abilities would become one where people were used to thinking about what they do and how and why they do it. They would not find school stressful.

This wouldn’t be a bad thing.