Making Students Smart Through Socratic Questioning

 The Model-Lead-Test/check-Verification format is an effective way to communicate information (such as definitions of concepts/names; how to do certain behaviors and routines; rule relationships), so that students quickly get it and then use it. In addition to acquiring and using knowledge taught with MLTV, lecture, discussion, and projects, we use the Socratic method (follow up questions) to help students *think critically*. To

* Tell what they learned. “As I read the document, I identified main concepts, defined them, and wrote them on Frayer models.”
* Improve what they think they know. “I need more facts to describe Hardy’s Pond.”
* Be confident. “Now I’m a fluent reader---quick and accurate.”
* Know *how* they know. “I identified features of geological formations that are the same and different by comparing and contrasting examples and nonexamples.”
* Assess the validity (accuracy, usefulness, logic) of their beliefs. “Just because Y follows X doesn’t mean that Y is caused by X. Y could be caused by other factors. I’ll look for these.”
* Assess the credibility of what they hear and read in the news, expository text (history, science), politics (speeches, legislation), in what their teachers say, and in what is claimed to be “science.”

What is Socratic Questioning?

 Socratic questioning (the Greek word is *elenchus*), comes from the works of Plato. The main character in many of Plato’s “dialogues” is Socrates--Elder philosopher and stone mason. Socrates believes that human happiness and just societies are possible only when human beings question and improve their beliefs (which are often an illusion, illogical, and false), until eventually they are guided by *definitions* (of love, friendship, justice, the good) and *principles* (“It is best to be governed by philosophers---lovers of knowledge--rather than by persons and groups who are interested only in what benefits them) that are consistent *with reality*.

 Here is an example of the *Socratic method* in Plato’s *Republic* (B.C.E., 360). Italics and brackets added.

 Socrates, Polymarchus, and Cephalus are discussing the concept of justice. What *is* it? What is an acceptable *definition*? What are reasonable *examples.* You cannot plan a just society if you don’t know what justice is and is not.

 *Socrates never says what he thinks the correct or even acceptable definition is.* Instead, he asks questions to help his companions to examine and improve their definitions. By peeling away what justice *can’t* be, they hope to arrive at a *logically correct* and therefore *useful* definition.

 Cephalus says that justice means speaking the truth and paying your debts. Socrates replies.

*Socrates.* “Well said, Cephalus,….; but as concerning justice, what is it? --to speak the truth and to pay your debts --*no more than this*?” [Now Socrates helps Cephalus to examine this definition.]

“… Suppose that a friend when in his right mind has deposited arms [weapons] with me and he asks for them when he is *not* in his right mind, ought I to give them back to him? No one would say that I ought or that I should be *right* in doing so any more than they would say that I ought always to speak the truth to one who is in his condition.”

[Socrates showed that Cephalus’s definition of justice could have harmful consequences, such as returning a madman’s weapons to him. Can just actions have harmful consequences? No. Therefore, Cephalus’s definition (paying debts) cannot be correct. Cephalus sees the error in his definition.]
*Cephalus.* “You are quite right.”…
[Socrates confirms what they just learned.]

*Socrates.* “But then, I said, speaking the truth and paying your debts is not a correct definition of justice.”

[Cephalus leaves to go to a ceremony. Socrates continues the discussion with the philosopher Thrasymachus, who has been listening in.]

Thrasymachus says that *justice is whatever groups in power define it to be*. Namely, they define justice to be what is in their interests; for example, to maintain power. Therefore, they might make it illegal, a crime (and “unjust”), to write or speak critically of how they rule.

Socrates asks Thrasymachus if rulers are ever *wrong* about their interests.

Thrasymachus agrees.

Socrates then asks if their subjects are still *obliged* to follow the law laid down by rulers.

Thrasymachus agrees.

[Here is the flow of questions.]

*Socrates*. “But are the rulers of states absolutely infallible, or are they sometimes liable to err?”

*Yes…*

“Then in making their laws they may sometimes make them rightly, and sometimes not?”…

*Yes…*

“When they make them rightly, they make them agreeably to their interest; when they are mistaken, *contrary to their interest*.”..

*Yes…*

“Then you must also have acknowledged justice *not to be for the interest of the stronger*, when the rulers unintentionally command things to be done which are to their own injury.”

[In other words, Thrasymachus’s definition is *self-contradictory*. If rulers use their definition of justice, they might make laws contrary to their interests---in which case, the definition is not logical.]

Classroom Examples of the Socratic Method When Teaching Tool Skills and

Content Knowledge

Raven Blackwing Uses MLTV and Socratic Questioning to Teach Multiplication

 Here she goes….

*Frame.*”Let’s solve another problem in our *acquisition* set.” (See chapter 4 on phases of mastery.)

 56

x 12

*Working the problem.* “Remember, first we read the problem (*Model*)….. What do we do first?... *Read the problem…* Correct, first we read the problem… Do it… *56 times 12…*Yes, 56 times 12.”

“Next, we find the ones column (*Model*)…. What do we do next?... *Find the ones column….* Yes, do it.” [Students scan the problem and find the ones column.]

“What numerals are in the ones column?... *6 and 2…..* So, what numerals do we multiply?... *6 and 2…* Correct, 6 and 2… Do it. … *6 times 2 equals 12…* Correct.”

[The class continues with the rest of the steps. Chapter 14 shows how to teach routines.]

*Test/check.* “Now it’s your turn to solve the problem. Tell the steps before you do them.”

Next.

Silas Gatling Uses the Socratic Method to Help Students to Apply (Generalize) Knowledge of The Solar System

*Model a Rule Relationship.* “Class, remember our causal rule (a generalization). ‘The farther a planet is *from* the Sun, the longer in Earth years is its orbit *around* the Sun.’”

*Yup… We sure do.*

“Here are examples of the rule.”

“Neptune is the eighth planet out. Its orbit is 165 Earth years.”

“Pluto is farthest out. Its orbit is 248 Earth Years.”

*Socratic questioning. Using the rule to make a prediction.* “If there were a planet *even farther* from the Sun than Pluto, would its orbit take the same, more, or less years than Pluto?” *More*… How do you know? *Because the rule says so.* “What rule?” *That the farther a planet is from the Sun, the longer in Earth years is its orbit…* Excellent using the rule to make a prediction!”

*More Socratic questioning.* “The Earth’s orbit takes 12 months. If a planet---let’s call it---Zeno---were *closer* to the Sun than the Earth, what do we know about the time its orbit would take?”

*Less time.*

“How do you know?”...

*Deductive reasoning tells us.*

“Let’s hear your deductive reasoning.” (See Copi, Cohen, & McMahon, 2016.)

*The rule is, the farther a planet is from the Sun, the longer in Earth years is its orbit.*

*The fact is, Zeno is less farther from the Sun than is the Earth.*

*The conclusion must be that Zeno’s orbit takes less time than Earth’s orbit.*

“You guys are too smart for your hats!”

Next.

Trina Langer Asks a Socratic Question While Teaching Long Division

“Class, look at this problem.”

 2 0 20 with remainder 10.

 13 2 6 0

 2 5

 1 0

 0 0

 1 0

“There’s an error somewhere. Where is the error?”...

*Two times 13 is not 25….*

“Oh? What is two times 13?”…

*26*….

“How did the person get that wrong?”

*Probably added two and five instead of multiplying.*

“How can we avoid that error?”

*Remember that the step is to multiply the quotient by the divisor…. Check every step!*

“Correct. Now you solve the problem.”

*Okay… Easy.*

Next.

Polly Peptide Asks Socratic Questions About Deductive Reasoning

“Class. Here’s a deductive argument.”

“1. Bears (a picture of bears fishing in a river) sleep in the winter.” (A generalization---a rule relationship---about bears. The first premise of the argument.)

2. “These bears (another picture of bears) are sleeping.” (A fact statement relevant to the class of bears. Second premise.)

3. “Therefore, it must be winter.” (Conclusion drawn from the first and second premises.)

“Is that a valid argument? Does the conclusion follow logically from the rule and the relevant fact?”

*No…. Invalid!.. Also ridiculous…. You’d have to be a dope not to see it.*

“How do you know?”

*The rule does not say that bears sleep only in winter.... Bears sleep at other times besides winter… Like after a hard day fishing…. Yeah, or after partying.*

“Okay, so what would be a *valid* deductive argument using bears, sleeping, and winter?... Think.”

*First premise. Rule. When it’s winter, all bears sleep.*

*Second premise. Fact. It’s winter.*

*Conclusion. Therefore, these bears are sleeping.*

“How do you know that the conclusion is valid?”

*Because bears sleep in winter…. And in fact it is winter…. In other words, the fact is included in the rule… So, these bears (like all bears who sleep in winter) must be sleeping.*

“I love it when you are logical. Socrates would be proud.”

More Socratic Questions in Class

 Here are examples of Socratic questioning during lectures, demonstrations, class discussions.

1. How do you know that (your answer is adequate, that your solution is correct, that the argument in our text is valid, that you did the right step)? What happens if you are wrong?

2. What (is the next step, are you going to do next)? How does this step follow from the last step?

3. What are the features of an adequate definition? Is (your, the author’s) definition of (economic progress, ecosystem, alliteration) adequate? Does the definition list all of the defining features?

4. What makes a description (a list of facts) adequate? Is (your, the author’s) description of (this ecosystem, this historical event) adequate? Can you think of any facts that the description does not include?

5. You just spoke about the class of vertebrates. What is a class? What is the difference between a class, a concept, and a name?

6. What are the components of a fact statement? (subject and predicate)

7. What is a rule-relationship? (A categorical or causal connection between classes/concepts) Give an example. Are these rule statements? Which kind? All horses are mammals. When steel is heated to 2900 degrees it melts. How do you know?

8. What kinds of knowledge are in this (paragraph, Nature scene)? List the important concepts, facts, rule statement, and routines (anything with steps or phases).

9. Give another example of (an ecosystem, alliteration). What makes it an example?

10. Give a nonexample of (an ecosystem, alliteration). What makes it a nonexample?

11. What is the next step that we do (that you are going to do) in this routine? How that next step enable us to do the one after that?

12. Did you do the correct next step? What did you do?

13. (You, the writer) say(s) that X happened and then Y happened. Is it logical to think that X caused Y? *No. Because other things could have caused Y…. In fact, other things could have caused both X and Y…. Y could have started changing before X happened.*

14. If we are pretty sure that X caused Y, is it logical to think that X will cause Y again? *No… Because X may have had an effect only in a certain circumstance and may not work anywhere else. So, it may have been a rare coincidence.*

15. Does an argument or a proposal use emotionally-charged language? If so, is it designed to persuade you by evoking feelings rather than by presenting a logical, factual argument?

16. Does an argument or a proposal denigrate others so that the audience or reader will reject what they say, rather than presenting certified relevant facts? For example,

The leaders of the Republicrat Party are (Nazis, Communists, fascists, rich, fat, divorced, hated by many, vain, mentally ill, aggressive, stupid). Don’t vote for them. Vote for us!

This argument is called *ad hominem—*against the man. When persons are charged up by emotional language, and have not been taught Socratic questioning, they may be persuaded by *ad hominem* arguments--persuaded even to shun, cast out, imprison, and commit genocide.

17. Is the following statement nonsense that only sounds intelligent? Can it be reduced to a few simple, clear, informative statements? If not, it remains nonsense.

We acknowledge that reality is a construction. Knowledge, too, is a construction, as is experience. We construct reality, knowledge, and experience with constructs. These constructs emerge from our experience as we interact with the reality that we have constructed with constructs. Notably, our current body of knowledge (our reality) is a context that shapes our construction of knowledge, or reality. We hope this is clear.

Notice that the concepts are never defined. In fact, each thing (knowledge, experience, constructs, reality) is a *cause* of the others, and at the same time, each thing is the *same* as the others. This is called a *circular argument.*

18. If we (do, don’t do) X, something bad will happen. And that will lead to another bad outcome, which will lead to yet another bad outcome. For example,

We must stop burning all fossil fuels. If we do not, carbon dioxide will produce global warming. This will melt the Arctic and Antarctic ice. This will raise the ocean levels. This will result in coastal cities all over the world being flooded. This will result in billions of persons drowning. So, we must stop burning fossil fuels right now, before we all drown---unless we know how to swim or have kayaks.

This is the fallacious argument called *slippery slope.* The speaker is trying to scare listeners in to doing what they speaker wants, for fear of what will happen if they don’t. But there is no evidence or only bogus evidence of what will happen.

19. Over and over you hear,

 All of the (smart, popular, well-informed, well-liked) persons agree that (a high fat diet is bad for you, a low fat diet is bad for you, meat is bad for you, meat is good for you). Do you want to be someone who does not follow the advice of (smart, popular, well-informed, well-liked) persons? No, so follow the crowd!”

This fallacious argument is called *appeal to popularity.* Everyone, the smartest persons, and all scientists can believe something, and still be wrong. The Sun does not revolve around the Earth. Old, poor women are not witches who make cows sick. Plague is not spread by the smell of decay. The moon is not made of cheese. The question is, What facts support claims?... What facts challenge claims?

20. Another claim is,

The administration of President Dummer has made so many stupid policy decisions. So, don’t listen to anyone in it.

This is the *fallacy of division.* A house may may be huge but not every part of it is huge. A presidential administration may act stupidly (as a collective), but not every person in it is stupid. You have to examine and judge each independently.

21. Someone makes the following claim.

 Person A. “The defendant, Scarlet O’Hara, is guilty.”

 Person B. “What solid evidence do you have that she is guilty?”

 Person A. “Ha! What solid evidence do you have that she is *not* guilty?”

Person B. That is the fallacy of *appeal to ignorance*. You’re the one making the claim of guilt. So, you’re the one who must back it up!

22. Here is another claim.

 Person A. “Children who are often disruptive and uncooperative have Oppositional Defiant
 Disorder.”

Person B. “How do you know that they *have* oppositional defiant disorder.”
Person A. “Because children who have Oppositional Defiant Disorder are often disruptive and uncooperative.”

This is a *circular argument.* Disruptive and uncooperative behavior, and oppositional defiance, are basically the same thing. The name for something isn’t the cause of the something.

 Okay! In later chapters, the reader will see examples of the Socratic method to help students to examine what they just learned and how they learned it; to recall and apply what they just learned; to critically evaluate what is presented in books, articles, speeches, and classroom instruction; and, importantly, to evaluate what they believe.

Extra Readings

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