Critical Thinking: Developing Reasoning with Students

A Definition: "Critical thinking is that mode of thinking - about any subject, content, or problem - in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them."

Thinking becomes *critical thinking* when it's centered on the *why* and the *how* of our ideas, on assessing their reasonableness. Critical thinkers examine the reasoning and evidence behind their ideas (the "why"), and the metacognitive process they we use to arrive at their ideas (the "how").

Why critical thinking is so critical:
When students think critically by providing reasons for their ideas and evidence for their claims or solutions, they are developing good judgment and becoming problem solvers.

In a constantly shifting world, students must learn to be critical thinkers so that they can tackle the new situations
and become independent learners who can apply a set of reasonable steps to carve out a path to solutions or answers to the questions at hand.

Conditions for developing critical thinking:

- The belief by teachers and students that they are all deep thinkers and with support can share the reasons behind their thinking and become increasingly metacognitive
- A classroom culture of achievement (positive, collaborative, focused on quality)
- A culture of inquiry where students search for reasons with open minds and examine multiple perspectives before drawing conclusions
- Rigorous, relevant and authentic content with questions that promote high-level thinking
- Explicit instruction of thinking, including modeling and thinking aloud
- Assessment for learning strategies that scaffold for all students to succeed (students know where they're going, can describe where they are now and track their progress to set goals for improvement)
- Structures for students to independently and collaboratively share test, and refine their thinking

Tracking critical thinking:

- Anecdotal Records: Observation, logs, running records, tracking charts, video clips
  Used often in the introduction or mini-lesson or during conferences. Evidence is often superficial and should be confirmed with more in-depth strategies
- Recording Forms: Note-catchers for capturing student thinking; two-column notes; etc.
  Organized into columns or sections with prompts to find evidence; explain thinking, etc. Used for discussion, reading, research, presentations, labs, etc.
- Interactive Journals: Include various types of sections or prompts tailored to purpose
  Organized to match outcomes; include graphics and visuals, partner writing, and places for peer and teacher response
- Exit and Entrance Tickets: Questions and prompts for student response matched to the lesson
  Used to pre-assess student readiness for learning or summarize and synthesize after a lesson. Can be organized in any format to match the purpose of the lesson
- Open-ended responses/prompts: Single or multi-paragraph responses in upper grades; pictures with keywords or sentences and/or conferences in early grades
  Used when detailed connections and descriptions will provide the best evidence of student learning
- Performance Assessments: Students have the opportunity to showcase their learning through a process of drafting/practice, critique and revision in a variety of formats
  Used in any content area for in-depth and longer term learning

heart of critical thinking and academic discourse, the kind of writing students need to know for success in college.

What Students Need to Know for Success in College

Those of us who know the needs of college writers and who are familiar with the new ACT and SAT writing samples know that persuasive writing will not suffice. For college and career one needs to know how to make an effective case, to make a good argument. Gerald Graff was recently cited in *Education Week* as giving the following advice to college students: "Recognize that knowing a lot of stuff won't do you much good," he wrote, "unless you can do something with what you know by turning it into an argument" (qtd. in Viadaro).

In 2009, the National Governor's Association Center for Best Practices and the Council of Chief State School Officers put a document on the Internet entitled *College and Career Ready: Standards for Reading, Writing, and Communication.* It says this of writing argument:

> The ability to frame and defend an argument is particularly important to students' readiness for college and careers. The goal of making an argument is to convince an audience of the rightness of the claims being made using logical reasoning and relevant evidence. In some cases, a student will make an argument to gain access to college or to a job, laying out their qualifications or experience. In college, a student might defend an interpretation of a work of literature or of history and, in the workplace, an employee might write to recommend a course of action. Students must frame the debate over a claim, presenting the evidence for the argument and acknowledging and addressing its limitations. This approach allows readers to test the veracity of the claims being made and the reasoning being offered in their defense. (2B)

Calls for increased attention to logical thinking and argumentation should be heard. Here I provide information and an example from a real classroom for teaching logical argument in a complex and effective manner.

What Kind of Logic Can We Teach?

In this day of postmodernism and the widespread notion among literacy scholars and certain philosophers that we cannot know anything with certainty, the question is this: What can count as logic in arguments? If argument demands logic, and if we are going to teach it, then we must have an answer.

The kind of logic taught in schools since the time of Aristotle and through the early 20th century centers in the syllogism, thought to be the most important, if not the only, path to truth (see Aristotle, *Prior*). The syllogism derives a conclusion from a set of statements called premises, which are thought to be true and which have a common or middle term in each. For example,

Major premise:	All men are mortal.
Minor premise:	Socrates is a man.
Conclusion:	Therefore, Socrates is mortal.

In most disciplines (with the exceptions of mathematics and sometimes physics) and in most everyday problems and disputes, we do not have premises that we know to be absolutely true. We have to deal with statements that may be true or that we believe are probably true—but not absolutely true.

Aristotle, the chief inventor of the syllogism whose works were used throughout the Middle Ages and the Renaissance as the Bible of syllogistic thinking, recognized that the syllogism was not appropriate for the problems that he saw being debated in the senate and elsewhere. These were arguments of probability, arguments that were not amenable to syllogistic reasoning. His response to that problem was his *Rhetoric*, long recognized as one of the most important texts in the field of rhetoric. It deals with arguments of probability of three kinds: forensic, epideictic, and deliberative, or what I like to call arguments of fact, judgment, and policy.

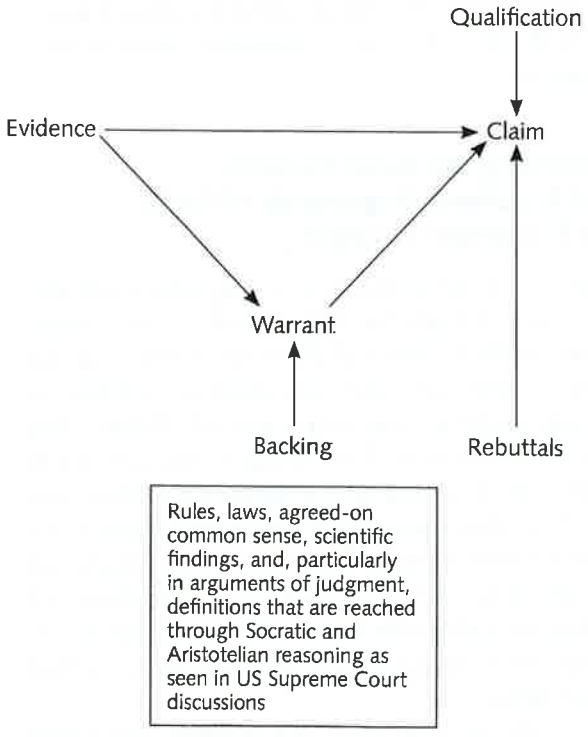
In the past two or three decades, colleges and universities have turned to a newer treatment of arguments of probability, that by Stephen E. Toulmin in *The Uses of Argument.* Several popular college

writing texts are based on the theories of Toulmin and devote considerable space to the explication and teaching of the methods involved (e.g., Lunsford and Ruskiewiscz; Ramage, Bean, and Johnson; Williams and Colomb).

Toulmin's basic conception of argument includes several elements: a **claim** based on **evidence** of some sort, with a **warrant** that explains how the evidence supports the claim, **backing** supporting the warrants, **qualifications**, and **rebuttals** or counterarguments that refute competing claims. Figure 1 provides a representation of these elements and their relationships.

Although many teachers begin to teach some version of argument with the writing of a thesis statement, in reality, good argument begins with looking at the data that are likely to become the evidence in an argument and that give rise to a thesis statement or major claim. A thesis statement arises from a question, which in turn rises from the examination of information or data of some sort. This year, I had an opportunity to examine a set of lesson plans that began the year with the writing of thesis statements. There was no mention of data of any kind. Apparently, students were supposed to find problems somewhere and make some claim about them. However, without analysis of any data (verbal and nonverbal texts, materials, surveys and samples), any thesis is likely to be no more than a preconception or assumption or clichéd popular belief that is unwarranted and, at worst, totally indefensible. For that reason, my students and I have approached the teaching of argument from the examination of data as a first step. We have tried to find data sets that require some interpretation and give rise to questions. When the data are curious, do not fit preconceptions, they give rise to questions and genuine thinking. Attempts to answer these questions become hypotheses, possible future thesis statements that we may eventually write about after further investigation. That is to say, *the process of working through an argument is the process of inquiry.* At its beginning is the examination of data, not the invention of a thesis statement in a vacuum.

FIGURE 1. A Schematic Representation of Toulmin's Theory of Argument



G. Hillocks. Oct. 2009. Based on Stephen Toulmin. *The Uses of Argument.* Cambridge: Cambridge UP, 1958.

Once we have examined data to produce a question and have reexamined the data to try to produce an answer to the question, we may have a claim or thesis worthy of arguing. Occasionally, our readers or listeners are willing to accept data as appropriate support for our answers to these questions, but, more often, especially in serious arguments, they will want explanations of why the data we produce support the claims we make and are trying to demonstrate. This is the job of the warrant.

Warrants

Warrants may be simply commonsense rules that people accept as generally true, laws, scientific principles or studies, and thoughtfully argued definitions. In contemporary crime scene investigation programs on TV, considerable time is devoted to establishing warrants. Most viewers of such programs are likely to be fully aware, for example, that fingerprints at a crime scene may lead to an arrest of the person to whom those prints belong because any given person's prints are unique, and therefore indicate the presence of that person at the scene.

Similarly, we also know that pistols and rifles leave distinctive markings on bullets fired from them. Thus, a bullet found in a victim or at a crime scene may become the evidence that links a gun owner to the shooting of the gun and the commission of the related crime. The prints and the markings on bullets are the evidence that indicate the identity of perpetrators by way of warrants concerning their uniqueness.

Backing

Anyone familiar with these programs also knows that the warrants may be challenged. In Toulmin's terms, the backing is the support for the warrants. In the case of fingerprints and ballistics, there have been many studies that can be cited in the support of the warrants as to the uniqueness of fingerprints and bullet markings. However, in the TV shows themselves, sometimes considerable time is devoted to developing the backing for warrants. One frequently visited kind of backing in one program has to do with the development of studies of the development of beetles in corpses as the backing for warrants for assertions or claims concerning the length of time a corpse has been dead. Sometimes we see the criminalist studying the development of beetles from larva to adult to establish a time-line for the development of the insect through its various stages. This study will be the backing for the warrant for claims about how long a corpse has been deceased.

In more complex arguments of judgment and policy, the most crucial arguments pertain to the warrants and their backing. Platonic dialogues often deal with the backing for warrants. For example, in the *Euthyphro,* Socrates questions Euthyphro concerning his claim that he is justified in prosecuting his father for the death of a slave. The U.S. Supreme Court's discussions of cases are debates about the warrants used in lower court cases that have been appealed. In *Scott v. Harris,* for example, the argument concerns whether a police officer may use lethal force to stop a driver doing on average 90 mph on a two-lane road and crossing the double yellow line even in the face of oncoming traffic. Harris claimed that the officer's ramming of his car was a violation of his Fourth Amendment right protecting him against unjust seizure.

Qualifications and Counterarguments

In addition, because these are arguments of probability, two other elements are necessary: qualifications and counterarguments. Simply because we are dealing with statements that cannot be demonstrated to be absolutely true, qualifications are necessary in stating both claims and warrants. For claims, I like to encourage the use of words such as *probably, very likely, almost certainly,* and so forth. Some instructors refer to these as *hedge terms.* But they are not.

The idea that we are dealing with arguments of probability suggests that differing claims are likely to exist. For example, for over a hundred years, available evidence has shown that the teaching of traditional school grammar does not contribute to increasing the quality of student writing (see Braddock, Lloyd-Jones, and Schoer; Graham and Perin; Hillocks, "What Works"). Despite what I regard as massive evidence, many teachers and writers continue to argue for the teaching of traditional school grammar, the teaching of the parts of speech, parts of sentences, and concepts of grammar such as gerunds, appositives, and introductory adverbial clauses through the exercises presented in grammar books such as Kinneavy's. If I wished to make an argument as to the folly of teaching grammar again, I might have to make a counterargument to their position.

Teaching the Basic Elements of Argument (Arguments of Fact): A Classroom Example

All of this has been discursive and what I call presentational (Hillocks, "What Works") and declarative (Hillocks, *Ways of Thinking*). Students at the high school level and even above are unlikely to learn anything from such a method. Perhaps they will learn the terms, but I am quite certain they will not learn to develop strong arguments on their own. To learn that, they will have to become engaged in a highly interesting activity that is both simple and challenging, for which feedback is immediate and clear, that allows for success and inspires further effort, what Mihaly Csikszentmihalyi calls the flow experience.

For over 30 years, my students and I have been working on the development of such activities