

Using Intellectual Standards to Assess Student Reasoning

To assess student reasoning requires that we focus our attention as teachers on two inter-related dimensions of reasoning. The first dimension consists of the elements of reasoning; the second dimension consists of the universal intellectual standards by which we measure student ability to use, in a skillful way, each of those elements of reasoning.

Elements of Reasoning

Once we progress from thought which is purely associational and undisciplined, to thinking which is conceptual and inferential, thinking which attempts in some intelligible way to figure something out, in short, to reasoning, then it is helpful to concentrate on what can be called "the elements of reasoning". The elements of reasoning are those essential dimensions of reasoning whenever and wherever it occurs. Working together, they shape reasoning and provide a general logic to the use of reason.

We can articulate these elements by paying close attention to what is implicit in the act of figuring anything out by the use of reason. These elements, then - purpose, question at issue, assumptions, inferences, implications, point of view, concepts and evidence - constitute a central focus in the assessment of student thinking.

Standards of reasoning. When we assess student reasoning, we want to evaluate, in a reasonable, defensible, objective way, not just that students are reasoning, but how well they are reasoning. We will be assessing not just that they are using the elements of reasoning, but the degree to which they are using them well, critically, in accord with appropriate intellectual standards.

To assess a student response, whether written or oral, in structured discussion of content or in critical response to reading assignments, by how clearly or completely it states a position, is to assess it on the basis of a standard of reasoning. Similarly, assessing student work by how logically and consistently it defends its position, by how flexible and fair the student is in articulating other points of view, by how significant and realistic the student's purpose is, by how precisely and deeply the student articulates the question at issue - each of these is an evaluation based on standards of reasoning.

Distinct from such reasoning standards are other standards that teachers sometimes use to assess student work. To evaluate a student response on the basis of how concisely or elegantly it states a position is to use standards that are inappropriate to assessing student reasoning.

Similarly, unrelated to the assessment of reasoning is evaluating student work by how humorous, glib, personal or sincere it is, by how much it agrees with the teacher's views, by how "well-written" it is, by how exactly it repeats the teacher's words, by the mere quantity of information it contains. The danger is that such standards are often conflated with reasoning standards, often unconsciously, and students are assessed on grounds other than the degree to which they are reasoning well.

The basic conditions implicit whenever we gather, conceptualize, apply, analyze, synthesize, or evaluate information - the elements of reasoning - are as follows:

1. **Purpose, Goal, or End in View:** Whenever we reason, we reason to some end, to achieve some objective, to satisfy some desire or fulfill some need. One source of problems in student reasoning is traceable to defects at the level of goal, purpose, or end. If the goal is unrealistic, for example, or contradictory to other goals the student has, if it is confused or muddled in some way, then the reasoning used to achieve it is problematic.

A teacher's assessment of student reasoning, then, necessarily involves an assessment of the student's ability to handle the dimension of purpose in accord with relevant intellectual standards. It also involves giving feedback to students about the degree to which their reasoning meets those standards. Is the student's purpose - in an essay, a research project, an oral report, a discussion - clear? Is the purpose significant or trivial or somewhere in between? Is the student's purpose, according to the most judicious evaluation on the teacher's part, realistic? Is it an achievable purpose? Does the student's overall goal dissolve in the course of the project, does it change, or is it consistent throughout? Does the student have contradictory purposes?

2. **Question at Issue, or Problem to be Solved:** Whenever we attempt to reason something out, there is at least one question at issue, at least one problem to be solved. One area of concern for assessing student reasoning, therefore, will be the formulation of the question to be answered or problem to be solved, whether with respect to the student's own reasoning or to that of others.

Assessing skills of mastery of this element of reasoning requires assessing - and giving feedback on - students' ability to formulate a problem in a clear and relevant way. It requires giving students direct commentary on whether the question they are addressing is an important one, whether it is answerable, on whether they understand the requirements for settling the question, for solving the problem.

3. **Point of View, or Frame of Reference:** Whenever we reason, we must reason within some point of view or frame of reference. Any "defect" in that point of view or frame of reference is a possible source of problems in the reasoning.

A point of view may be too narrow, too parochial, may be based on false or misleading analogies or metaphors, may contain contradictions, and so forth. It may be restricted or unfair. Alternatively, student reasoning involving articulation of their point of view may meet the relevant standards to a significant degree: their point of view may be broad, flexible, fair; it may be clearly stated and consistently adhered to.

Feedback to students would involve commentary noting both when students meet the standards and when they fail to meet them. Evaluation of students' ability to handle the dimension of point of view would also appropriately direct students to lines of reasoning that would promote a richer facility in reasoning about and in terms of points of view.

4. **The Empirical Dimension of Reasoning.** Whenever we reason, there is some "stuff," some phenomena about which we are reasoning. Any "defect," then, in the experiences, data, evidence, or raw material upon which a person's reasoning is based is a possible source of problems.

Students would be assessed and receive feedback on their ability to give evidence that is gathered and reported clearly, fairly, and accurately. Does the student furnish data at all? Is the data relevant? Is the information adequate for achieving the student's purpose? Is it applied consistently, or does the student distort it to fit her own point of view?

5. **The Conceptual Dimension of Reasoning:** All reasoning uses some ideas or concepts and not others. These concepts can include the theories, principles, axioms and rules implicit in our reasoning. Any "defect" in the concepts or ideas of the reasoning is a possible source of problems in student reasoning.

Feedback to students would note whether their understanding of theories and rules was deep or merely superficial. Are the concepts they use in their reasoning clear ones? Are their ideas relevant to the issue at hand, are their principles slanted by their point of view?

6. **Assumptions:** All reasoning must begin somewhere, must take some things for granted. Any "defect" in the assumptions or presuppositions with which the

reasoning begins is a possible source of problems for students.

Assessing skills of reasoning involves assessing their ability to recognize and articulate their assumptions, again according to the relevant standards. The student's assumptions may be stated clearly or unclearly; the assumptions may be justifiable or unjustifiable, crucial or extraneous, consistent or contradictory.

The feedback students receive from teachers on their ability to meet the relevant standards will be a large factor in the improvement of student reasoning.

7. **Implications and Consequences:** No matter where we stop our reasoning, it will always have further implications and consequences. As reasoning develops, statements will logically be entailed by it. Any "defect" in the implications or consequences of our reasoning is a possible source of problems.

The ability to reason well is measured in part by an ability to understand and enunciate the implications and consequences of the reasoning. Students therefore need help in coming to understand both the relevant standards of reasoning out implications and the degree to which their own reasoning meets those standards.

When they spell out the implications of their reasoning, have they succeeded in identifying significant and realistic implications, or have they confined themselves to unimportant and unrealistic ones? Have they enunciated the implications of their views clearly and precisely enough to permit their thinking to be evaluated by the validity of those implications?

8. **Inferences:** Reasoning proceeds by steps in which we reason as follows: "Because this is so, that also is so (or probably so)," or "Since this, therefore that." Any "defect" in such inferences is a possible problem in our reasoning.

Assessment would evaluate students' ability to make sound inferences in their reasoning. When is an inference sound? When it meets reasonable and relevant standards of inferring. Are the inferences the student draws clear? Are they justifiable? Do they draw deep conclusions or do they stick to the trivial and superficial? Are the conclusions they draw consistent?

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