Reasoning Abstractly: Student Learning Objectives & Assessment Rubrics

Written rubrics: Rubrics clearly and explicitly outline both the goals of a given learning activity and the criteria by which it will be evaluated. Rubrics ensure a clear understanding of what is expected and allow faculty to provide more focused and efficient feedback on class assignments.

1. Recognition: Students can identify instances of abstract deductive reasoning about abstract objects or concepts (in the form of arguments, explanations, proofs, analyses, modeling, or processes of problem solving) and can distinguish premises from conclusions (or their analogues).

Recognition Rubric:

High proficiency (4): Always or nearly always identifies deductive reasoning and distinguishes premises from conclusions.

Proficiency (3): Most of the time identifies deductive reasoning and distinguishes premises from conclusions.

Some proficiency (2): Sometimes identifies deductive reasoning and distinguishes premises from conclusions.

No/limited proficiency (1): Rarely or never identifies deductive reasoning and distinguishes premises from conclusions.

2. Construction: Students can construct an instance of valid deductive reasoning about abstract objects or concepts (in the form of arguments, explanations, proofs, analyses, modeling, or processes of problem solving).

Construction Rubric:

High proficiency (4): Can state a conclusion and formulate premises that clearly entail it.

Proficiency (3): Can state a conclusion and formulate premises that entail it.

Some proficiency (2): Can state a conclusion and formulate a premise for it.

No/limited proficiency (1): Cannot construct a valid deductive argument.

3. Evaluation: Students can distinguish valid forms of deductive reasoning about abstract objects or concepts (in the form of arguments, explanations, proofs, analyses, modeling, or processes of problem solving) from invalid and/or fallacious forms of reasoning.

Evaluation Rubric:

High proficiency (4): Evaluates material with insight.
Proficiency (3): Evaluates material competently
Some proficiency (2): Evaluates material inconsistently
No/limited proficiency (1): Is unable to evaluate material or does so superficially
Dear Encouragers of Abstract Reasoning,

I've attached my report on the GE-related assessment I did last semester in the Reasoning Abstractly course I taught (PHI 102: Modern & Contemporary Philosophy). I welcome your comments.

Sincerely,

Jim

All,

This is just to confirm that we agreed at our meeting on Wednesday that we would each employ some specific version of the rubric we adopted to grade a final assignment or exam (or part of a final assignment or exam) this semester. The rubric is intended to measure our students' degree of achievement of our second student learning objective:

2. Students can construct an instance of valid deductive reasoning about abstract objects or concepts (in the form of arguments, explanations, proofs, analyses, modeling, or processes of problem solving).

We also agreed that what we want our students to construct might well be an instance of some kind or other of an algorithm.

Here are the three levels of evaluation that we agreed to employ (with some suggested wording for descriptors that you can change and make more specific to suit your own purposes):

High proficiency: Can construct a complete appropriate sequence of implications
Some proficiency: Can construct a partial appropriate sequence of implications
Inadequate proficiency: Cannot construct an appropriate sequence of implications

What would count as an "appropriate sequence" depends on the type of exercise and what is provided as given.

Though my intention in sending this email is simply to record what I think we agreed on, I welcome your comments and questions if you have any.

Sincerely,

Jim
Report on Reasoning Abstractly GE Assessment Results

Modern and Contemporary Philosophy

Spring 2008

Jim Taylor

Relevant Student Learning Objective

2. Students can construct an instance of valid deductive reasoning about abstract objects or concepts (in the form of arguments, explanations, proofs, analyses, modeling, or processes of problem solving).

Background

(1) At the beginning of the semester, I asked the 17 students in this Modern and Contemporary Philosophy course to respond to the following prompt:

"Please read the excerpt from Thomas Hobbes' Leviathan. Then analyze the main argument in the passage by stating the argument's conclusion and premises. Then briefly discuss whether the argument is deductively valid and whether the premises are plausible."

These brief argument analysis discussions provided me with a baseline indication of the students' initial understanding of argument analysis and evaluation.

(2) At the end of the semester, I assigned the students a final project with the following instructions:

Your term paper (due at 5 pm on Thursday, April 24th, which is the last day of classes) should provide a well-written, well-organized, and well-reasoned analysis and evaluation of an argument or alternative abstract pattern of reasoning employed by a modern or contemporary philosopher. In the analysis section, you should state the premises and conclusion of the argument (or the general abstract pattern of the reasoning). In doing so, you may have to make implicit premises or assumptions explicit. In the evaluation section you should discuss whether the premises of the argument (or assumptions in the pattern of reasoning) are plausible (rationally believable in virtue of being likely to be true).

The reason I mention both arguments and patterns of reasoning is that some philosophers deliberately employ relatively explicit forms of deductive argumentation to establish their conclusions (such as Descartes and Hume) whereas other philosophers (such as Kierkegaard and Nietzsche) deliberately avoid such traditional forms of argumentation. It is possible nonetheless to find implicit in these philosophers' philosophical discussions abstract patterns of reasoning that can be made explicit as arguments and evaluated as such.

Your paper should be word-processed and should range between 2000 and 2500 words.

Results

Initial Argument Analysis and Evaluation Discussions

I did not grade these discussions. Instead, I provided each student with a written response in which I (a) commented on what I considered to be on the right track and (b) raised a question about something they said to encourage them to continue thinking about argument analysis and evaluation. A look at my comments suggests the following evaluation summary:

High proficiency (HP): Can construct a complete appropriate sequence of implications

Some proficiency (SP): Can construct a partial appropriate sequence of implications

Inadequate proficiency (IP): Cannot construct an appropriate sequence of implications
n = 18
HP: 5
SP: 13
IP: 0

**Final Project**

n = 17 students
HP: 10
SP: 7
IP: 0

Students who scored in the HP range were able to construct a valid deductive philosophical argument with all the premises and the conclusion stated explicitly.

Students who scored in the SP range were able to construct part of a valid deductive philosophical argument, but did not explicitly state all the required components of the argument (i.e., they left out a premise or the conclusion).

**Commentary**

I was pleased that in both the initial assessment and the final project, all the students showed some proficiency in constructing valid deductive arguments. Perhaps this is at least partially due to the fact that most of these students were philosophy majors who had already had at least one philosophy course in which they would have learned about constructing, analyzing, and evaluating such arguments. I was also pleased to see that the percentage of students who demonstrated high proficiency increased from 28% (in the initial exercise) to 59% (in the final project). In the future I will design the pre-test and post-test to be more similar so that it will be clearer that if the students show improvement, it will be on similar sorts of argument construction tasks (the pre-test required all the students to construct an argument on the basis of the same passage while the post-test required them to pick any argument we had studied throughout the semester).