Dear Marianne,

As you probably know, in the math/cs department, we have been discussing the issues of assessing students' ability to reason abstractly. In particular, we have been exploring the possibility of giving a standard set of questions to all students taking one of the Reasoning Abstractly GE courses.

Attached below is one objection to such a plan, expressed by Russ Howell. Could you give us your response. I think think the central question is: must we use an "instrument" other than students' successful completion of the course to assess students' ability to reason abstractly? If so, why?

thanks,
Patti

---------- Forwarded message ----------
From: Russell W. Howell <howell@westmont.edu>
Date: Nov 13, 2007 2:24 PM
Subject: Re: [Mathcs] FW: Message from Kerrwood750
To: mathcs@westmont.edu
Cc: Jim Taylor <taylor@westmont.edu>, mathcs@westmont.edu, Mark Nelson <manelson@westmont.edu>

Ray and all,

I've always enjoyed Smullyan's little riddles, and in some context I'm sure working through them with students would indeed be fun. Having said that I must say that creating a separate assessment tool for the "Reasoning Abstractly" GE requirement (beyond the assessments we do in courses that meet the requirement) is going way overboard. It is yet again another test among the growing pile of tests to which we are subjecting our students, all to satisfy WASC. And if the reply to this concern is that another option would be to incorporate these types of questions (or others we might create) into every course satisfying the Abstract Reasoning GE, then it seems to me we are letting the tail wag the dog. Let me explain.

Here is what the Abstract Reasoning category says:

Courses satisfying this requirement focus on critical and analytical reasoning about non-empirical, abstract concepts, issues, theories, objects and structures. Students in these courses should learn to understand and evaluate abstract arguments and explanations, analyze abstract concepts and solve abstract problems.

Now, it seems to me that, in courses satisfying this requirement, satisfactory completion of the course is, ipso facto, evidence that students have met the requirement. Suppose, for example, someone from WASC were to ask me, "How do you know that your students in Calculus have learned to understand and evaluate abstract arguments and explanations?" My response would be along the lines, "Well, look at the final exam from semester x... Question 2 asked students to...; question 5 asked students to..., and the satisfactory solution to any of those questions clearly demonstrates an ability to understand and evaluate abstract arguments and explanations."

Of course, not every question on any given exam (nor every aspect of courses meeting the Abstract Reasoning GE) will involve abstract reasoning. Thus we should, with warrant, demand good documentation (by way of looking at the
content of exams, syllabi, etc.) from courses claiming to meet the Abstract Reasoning requirement. But anything much beyond that, it seems to me, is just plain silly. Let's put on the brakes now so that ten years hence someone doesn't look back with wonder at how we could have gotten so bogged down in these kinds of activities.

What began as a discussion along the lines, “Say, here's a chance to create something in which we really believe and do it right” has degenerated into "Well, we have to do such and such to satisfy WASC."

Okay, there it is. Let me have it if I'm wrong. But if I am wrong, I want to gather a troop of faculty from various institutions, march up to WASC, and reason abstractly together.

Russ

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Dear all;

Here is a set of logic puzzles of the type to which I referred in our discussion of abstract reasoning. They are taken from Smullyan's Alice in Puzzle-land. What do you think?

Ray

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From: kerrwood750@westmont.edu [mailto:kerrwood750@westmont.edu]
Sent: Tuesday, November 13, 2007 11:40 AM
To: rosentr@westmont.edu
Subject: Message from Kerrwood750

Mathcs mailing list
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Patti Hunter <phunter@westmont.edu>  
To: Marianne Robins <robins@westmont.edu>, mathcs@westmont.edu

Marianne,

Below are two possible responses to your request.
1. "goals" from one course. I suspect that they don't count as outcomes. Other math/cs folks--maybe especially Russ: do you have outcomes you can send to Marianne?
2. outcomes I cooked up for an exam, in an effort to think along these outcomes-lines.

**MA-10 Elem. Calc. II goals for students:**
- Gaining an understanding of the concept of the integral, both as an abstract structure and as a tool for modeling certain phenomena;
- Learning how to use the integral and differential equations as tools for measuring and describing;
- Acquiring the knowledge and skill necessary to do routine calculations of integrals (numerically and symbolically);
- Learning how to approximate functions with Taylor and Fourier polynomials (and why you'd want to);
- Becoming familiar with the abstract concept of infinite series.

**Student Learning Outcomes for Exam I**

1. State antiderivatives of basic functions.
2. Use the method of substitution to find antiderivatives.
3. Exhibit knowledge of the Fundamental Theorem of Calculus.
   - State the FTC.
   - Give the derivative of an area function (function defined by an integral).
   - Determine where an area function is increasing, decreasing, concave up, concave down, and where its extrema occur by analyzing the graph of the integrand.
4. Exhibit understanding of Riemann sums.
   - Represent a Riemann sum geometrically on the graph of a function.
   - Given a definite integral, compute the appropriate summands and sum of a specified Riemann sum.
   - Identify $n$, $\Delta x$, and the sampling points of the Riemann sum, given a geometric representation of the sum.

On Nov 14, 2007 9:24 AM, Marianne Robins <robins@westmont.edu> wrote:
Dear Patti,
Could you send me the list of outcomes that has been put together by the professors teaching those courses? This would help me put the question in context. My initial response is that a separate instrument is not always needed -in fact, in some cases, it is not needed at all. However, I assume that what happened here is an attempt to find common ground -and a common instrument. I have not followed these developments very closely, so the list of outcomes would help.
Thanks!
Marianne

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