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Context-Rich Problems in Public Finance:
Reverse Engineering an Upper-Level Policy Course

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Abstract

This paper describes work done during the fall 2009 semester to significantly re-envision an upper-level course in public finance using context-rich problems (CRPs) as the assessment backbone of the course. CRPs differ from regular, short-answer/essay questions in that CRPs do not necessarily have a specific correct answer, as many short-answer questions do. Rather, CRPs place students in a “real-world” setting, requiring them to use economic concepts they have learned in class to accomplish a specific task. CRPs offer students flexibility in answering the questions as they perceive them, but also require students to explain how they arrived at their answer. In that way, it may be a better way of identifying student learning, as opposed to student understanding, of the material.

Previously, most of my use of CRPs in the classroom has been limited, primarily in the context of wanting to demonstrate to students specific applications of economic concepts. However, CRPs have the potential to be more fully integrated into the class, as their use can provide an opportunity to reverse engineer the course. During the fall 2009 semester I revised the student learning objectives (SLOs) for the course, and then created significant “backbone” CRPs at the outset of the course to gauge student completion of those learning objectives. Working backward through the material, smaller, less abstract CRPs were used to give students experience not only with solving these particular types of problems but also to provide them with the specific material they needed to succeed in the course. In this way the CRPs drove the content of the course, not the other way around.

I. Introduction

This paper describes work done during the fall 2009 semester to significantly re-envision an upper-level course in public finance using context-rich problems (CRPs) as the assessment backbone of the course. CRPs¹ differ from regular, short-answer/essay questions in that CRPs do not necessarily have a specific correct answer, as many short-answer questions do. Rather, CRPs place students in a “real-world” setting, requiring them to use economic concepts they have learned in class to accomplish a specific task. CRPs offer students flexibility in answering the questions as they perceive them, but also require students to explain how they arrived at their answer. In that way, it may be a better way of identifying student learning, as opposed to student understanding, of the material.

Previously, most of my use of CRPs in the classroom has been limited, primarily in the context of wanting to demonstrate to students specific applications of economic concepts. In answering them, students had an understanding of what needed to be done in the context of that particular learning unit, but also recognized that they could rely on previous information in the class. However, CRPs have the potential to be more fully integrated into the class, as their use can provide an opportunity to reverse engineer the course.

During the fall 2009 semester I revised the student learning objectives (SLOs) for the course. Then, significant “backbone” CRPs were created prior to the beginning of the course to gauge student completion of those learning objectives. Working backward through the material, smaller, less abstract CRPs were used to give students experience not only with solving these particular types of problems but also to provide them with the specific material needed to succeed in the course.

¹ For a thorough discussion of this active learning technique, see Bangs, Blunch, Maier and Peterson (2009).

The next sections outline the process for reconstructing a course with CRPs as an assessment mechanism in mind. In this way the CRPs can be linked back to the specific learning objectives, as can specific student responses that demonstrate satisfactory completion of the learning outcomes. Due to the small class size, statistical evidence was not obtainable, but it was possible to demonstrate evidence of pedagogical effectiveness based on student responses to the CRPs used in class.

II. The Process

I teach at a small church-affiliated liberal arts school in the Midwest. Upper-level courses tend to be small in size; this course had 5 students, all of whom were economics majors. As I began preparing my course for the fall semester, it occurred to me that I had never put together official student learning objectives for this course. My first step, then, lay in identifying the appropriate learning objectives for this course. I want students to be able to recognize economic applications in the larger world around them, especially during the political process; and I want students to be able to manipulate cost/benefit analysis in order to make an argument in favor of or against a particular policy issue. Therefore, I used two of the student learning outcomes identified in our program learning outcomes²:

SLO #1: Demonstrate the ability to recognize economic applications in everyday life.

SLO #2: Demonstrate the ability to utilize cost-benefit analysis to solve economic problems.

²While specific student learning outcomes may vary from institution to institution, the spirit of the learning outcomes may be fairly consistent across institutions. Indeed, as Myers, Nelson and Stratton (2009) suggest, such learning outcomes are never far removed from Hansen's (1986, 2001) proficiencies for the economics major.

For this project, I focused on three topics for my assessment of student success in meeting these two SLOs: the economic impacts of the national debt and deficit, political economy, and tax reform. While these topics are not the only things covered in the class, they are the topics I spend most of my class time discussing, and therefore are the most appropriate.

The next step was to identify major CRPs that would guide not only my assessment of the SLOs, but also the way I prepared the class. My intention was to modify the types of short-answer problems I typically had given students in the past to allow greater flexibility in forming an argument. My traditional assessment mechanisms involved the use of papers or exams, and while mechanisms like these can help determine if students can reproduce economic concepts in a constrained context, they do not address whether students have mastered the information sufficiently to respond to more open-ended inquiry.

For example, consider the following short-answer question from a previous public finance exam:

What is the relationship between domestic investment and the federal government's decision to increase deficit spending?

Clearly the question deals with the potential crowding out of private investment, which suggests that the interest rate increases that result from the government's decision to borrow causes private domestic investment to fall, assuming Ricardian equivalence does not hold. This allows students to demonstrate what they know about this relationship, but does not demonstrate a more complete understanding and ability to integrate relevant information. A student could have memorized a piece of material and answered this question well, but not necessarily mastered the economic content. But consider that problem reworded in the following way (from Bangs et al. (2009):

You are an economic analyst with a small company. At the start of the recession, the federal government indicated that it was planning to significantly increase its spending to help out those in need. Your boss and president of the company came into your office ranting about the fact that investment by their and other firms would dry up, slowing economic growth. They ask you for a “fair and balanced” appraisal of the government spending increase. What do you say to them?

The focus of the problem has shifted from the student’s understanding of the crowding-out effect to the impacts of government spending on businesses in general, including the concept of Ricardian equivalence. The student also could bring in additional information about the changes in interest rates, ultimate changes in tax rates, or long-term benefits from the increased spending. The ultimate value in this kind of question lies with the requirement that the student explain his or her answer, rather than simply restate something found in a textbook.

However, CRPs can easily be expanded to incorporate additional flexibility in student responses. For example, consider this example of a major CRP from my fall class, hereafter referred to as **Problem #1**:

Walking down the street one day, you see a college classmate speaking to a group of people gathered on a street corner. Walking closer, you hear that your friend is protesting the high level of federal government debt accumulated to this point. His principal arguments are that government indebtedness is preventing our country from doing what needs to be done socially, and that the increasing level of debt will eventually bankrupt us as a nation.

Suddenly, he sees you in the audience, and says, “Look, there is my friend from college who is an economics major. This person has studied the matter closely, and can provide an expert’s opinion on the matter.” All eyes turn to you, and the crowd falls silent.

You clear your throat, and begin talking. Write a short, five-minute presentation detailing what you would say to this crowd.

This particular CRP accomplishes several goals. It requires students to think through the economic effects of deficit spending, and create a coherent argument in favor of, or against,

continued government spending. In light of the student learning goals, this problem addresses most closely SLO #2 given above, as it requires an understanding not only of cost/benefit analysis, but also the underlying notion of opportunity cost. But at the same time, it can be used to address SLO #1 by including the requisite that your friend wanted you to discuss elements from what the popular press has been carrying over the last few weeks regarding government programs.

Here, the value is not in the specific answer given; some students will agree with their hypothetical friend, and others will not. Rather, the value lies in the student's ability to craft an argument based on what has been learned in class. This pushes the students past the ability to simply recall economic concepts into the realm of integration of economic concepts into everyday life.

In addition to Problem #1, two other problems were used as the assessment backbone of the course:

Problem #2:

One morning while eating breakfast and reading your favorite morning newspaper in Central Market, you encounter a letter to the editor from your local congressperson. This person is quite distraught over the myriad hurdles that must be cleared and the varying sizes of required majorities needed before a bill can become law in our legislative system. As a result, this person has decided to run for re-election on a platform of rejuvenating our legislative processes, including a requirement that every legislative action will require only a simple majority for passage.

Ignoring your roommate's comment that it is time to get to class, you quickly reach for your laptop and begin writing your own response to this letter, a response that will be submitted to the same newspaper. What do you wish to say? Don't forget to formulate this as a letter to the editor. Keep in mind that this newspaper has a 300-word limit on letter submissions, and that the editor prefers to print letters that have strong economic arguments behind them. Be sure to keep your argument focused.

Problem #3:

You are having a conversation with your parents over Christmas break, and your father grumbles about the breaks people get as a result of tax deductions, especially from the home mortgage interest deduction. Your father shouts, “Life would be a lot more equitable if there people got a tax credit instead of a deduction, and if everyone got exactly the same credit for home ownership.” How do you respond to your father’s comment about equity in this case? (adapted from Gruber 2007, p. 544)

Preparing the course:

Given these specific problems, I proceeded with class preparation, making sure students would had the tools to answer these questions. As I prepared the lessons, I discovered that much material I had previously taught was not necessary to accomplish my SLOs, while other relevant material needed to be included in its place. For example, I included relevant outside reading from the Congressional Budget Office (2008, 2009) to accompany the textbook material covering the national debt and deficit. These readings offered students a more holistic, objective perspective on the impacts of government spending, and were a worthwhile addition to the course.

One other topic took on a significant role in the course, based on the 2009 election cycle in New York. A number of articles had appeared in the popular press regarding the 23rd Congressional district in upstate New York, which people were considering to be the first test of the Republican’s ability to win back voters (Bendavid (2009), Nagourney and Peters (2009), and Peters (2009)). Given my emphasis on political economy in the class, it seemed appropriate to create a CRP to measure SLO #1 with this case:

Problem #4:

Suppose you are the chief political strategist for Doug Hoffman, Conservative Party candidate for the open seat in NY's 23rd Congressional district. In a fit of despair after the election, he approaches you and says, "(Name), please, please explain to me why we lost. I thought we had it in the bag. We demonized the Democrat, made the Republican look like a Democrat, and appealed to traditional Republican bases. What happened?" In a brief (250 words maximum) essay, explain to him why he lost the NY election. Note: You may assume he understands key terms, so there is no need to explain them in your response.

Grading

In a number of ways, the use of CRPs is easier to use for classroom assessment than are short essay questions. Shorter questions have closed-form solutions, and unless the solution key is made up ahead of time, there is no guarantee that any such solution exists (and it must, at least at the principles-level). With CRPs, only the context need be created by the instructor, and the student can provide the rest. Rubrics can then serve as a helpful tool in grading these problems, as they not only provide a way of letting the student know a priori how the question will be graded, but also help the instructor maintain consistency in grading across what may be highly dissimilar responses to the CRP.

The previous problems discussed offered specific cues that guided the students in their responses, but there is no specific path that students had to take in answering the questions. A rubric outlining specific targets I required helped facilitate the grading of these essays. Consider the following rubric for Problem #4:

	A	B	C	D	F
Economic Analysis (up to 10 points)	Accurately relates campaign process to political economy theory. Uses correct terminology.	Accurately relates some of the process components to economic analysis. Terminology is appropriate.	Incorrectly relates the process to economic analysis. Correct economic terminology may be present.	Incorrectly relates the political process to economic analysis. Correct economic terminology is not present.	Does not write to the proscribed assignment.
Mechanics (up to 10 points)	Written analysis constitutes a coherent argument. Few typographical errors.	Written analysis is less coherent; minor typos.	Written analysis is less coherent, and there are significant grammatical errors.	Written analysis is difficult to follow.	Written analysis raises major literacy concerns.

While use of a rubric does prevent the instructor from distinguishing minute differences between papers, use of a rubric does two things: provides the instructor with the means to consistently and objectively grade very different essays, and offers the instructor some flexibility in grading (i.e., distinguishing between a B+ and B- for mechanics). Clearly it is possible to have more grading options, as well as a more detailed rubric depending on instructor needs, but there is no getting away from this opportunity cost. The wider grading distribution is lost in the name of far richer responses to the questions.

III. Assessment of the SLO's

Given the small class size, it was not possible to conduct any meaningful statistical analysis on the results. However, a qualitative assessment of the student responses to the questions helped determine attainment of the SLOs. A sample of student content is included here for explanation.

The average score on Problem #1 was a B-. While students generally followed the format, and created arguments in one particular direction, they did not create the focused argument I was looking for. For example, consider the following comments taken from their responses:

My classmate is only focusing on the size of the government debt and not the relative size of the debt to the GDP. This leads to an inaccurate representation of the sustainability of the debt.

If the government made policy to keep a balanced budget we wouldn't be able to deal with emergencies...When society is at risk we must act now rather than worry about the future.

This act – the Balanced Budget and Emergency Control Act – was flawed from the start as the government realized it would be better to adjust the targets than automatically cut spending on important government programs.

Blaming the government for our current situation is not entirely fair; we have all contributed to our government's debt one way or another, and it is up to the government to successfully allocate funds to programs that will target increasing long-run costs and to us to behave sustainably by being more environmentally conscious as well as health conscious.

If we want to sustain our private investment during times of deficit, in order for it to be completely stable, it is necessary to find a way to sustain it with private saving alone because we will have no control over foreign saving which tends to be rather unstable.

Responses in general were good and for the most part economically sound, but had the “everything but the kitchen sink” in the arguments. Students were including as much as they could remember to make the argument, as opposed to making the argument using information they have from the course.

The average score on Problem #2 was much stronger, a B+. It appeared that students began to understand what was expected of them in these responses, and took steps to modify what they were doing. Student essays reflected much more coherent arguments, including only

that information that was relevant for their responses. Relevant student comments are listed below:

Strategic behavior is also an issue when talking about implementing a simple majority. People have an incentive to distort their preferences so someone will do the same thing for them on something they want passed.

A simple majority vote is likely to see a higher instance of cycling and possibly give power to the agenda setter for any given issue.

Simple majority is very restrictive and often doesn't work because the legislature system rarely fits into the necessary conditions.

A two-thirds majority rule eliminates voter cycling by opposing movement away from the equilibrium (eliminating multiple peaks).

Even if all individuals have single-peaked preferences, the median voter outcome is not necessarily the socially efficient outcome because it does not reflect the intensity of preferences.

The average grade on the last two problems was an A-, reflecting much improvement over the previous two sets of responses. Student arguments were much more coherent and on target, even though not everyone agreed. As can be seen, the grades on these CRPs increased as the semester went on. This can be a result of student familiarity with the problems, greater comfort with the open-ended nature of the responses, and greater familiarity with the material.

Given that SLO #1 was assessed primarily with Problem #4, it is clear that students mastered this objective. They were able to identify coherent economic arguments in a real-world setting, with an average score of A-. The second SLO was assessed with Problems #1, #2, and #3, and it is also clear that students have mastered this objective, with a collective score of B+ on these three. Anecdotally, use of CRPs did allow for easier assessment in this regard because the problems were created in conjunction with course material specifically for this purpose.

IV. Conclusion and Thoughts for the Future

This paper has outlined the process through which CRPs were used as the principal form of assessment of student learning in an upper-level Public Finance course. Beginning with the student learning objectives, the course was revised with these problems in mind. Qualitative results indicate that students did attain the objectives set out for the course.

It is clear that the sample size should be increased so that it becomes possible to quantify the benefit of CRPs over traditional problems. While there is much qualitative and anecdotal evidence indicating the benefits of CRPs in the classroom, to date there has not been a systematic study linking this particular teaching technique to statistically significant increases in student understanding. This remains a fruitful line of research.

One conclusion to be drawn from the qualitative analysis is that students may not have enough experience with this type of active learning technique to benefit from it fully. The typical student approach to writing an essay is to pack as much information into their essay as possible, regardless of the relevance. There are several ways to accommodate this. First, classroom teaching techniques can be modified to enhance performance on CRPs. This can take a variety of forms, from incorporating additional CRPs throughout the term to offer students additional practice, or by incorporating them into other teaching techniques, such as service learning (McGoldrick and Ziegert 2002), cooperative learning (McGoldrick, Rhoads, Rebelein, and Stockly 2009) or just-in-time teaching (Simkins and Maier 2004). These combinations would allow students to see these kinds of problems in many different contexts.

At the same time, CRPs should be incorporated more fully into lower-level classes to determine impact at upper level. Not only would incorporation into lower-level classes serve the same assessment purpose outlined here, but students would have been exposed to them earlier.

In that way, more complex CRPs can be used at the upper level. This makes it possible to establish linkages to program assessment as well. Peterson (2009) discusses a systematic approach to assessing courses and the economics program using CRPs at all levels of the curriculum. Incorporating the use of a single CRP in assessment allows for consistency and student understanding of the technique. Additional research would allow both course assessment and curriculum assessment to be better aligned.

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