

Case-Based Learning for Declarative Knowledge

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Introduction

In this paper I will report on my experiences with redesigning a first year Economics course for improved learning. I will reflect on my experiences from teaching the same course last year and discuss why I chose to introduce Case-Based Learning as the core Teaching-Learning Activity (TLA). I will briefly describe how I implemented the new activities and spend some time evaluating the outcome.

This is the second year I teach the first year course International Economics on the Agricultural Economics programme at the faculty of Life Sciences, University of Copenhagen. The course is taught in english to a mix of Danish “in-house” students and foreign exchange students (roughly 50/50 mix). Typically around 35-40 students attended the lectures.

Throughout the paper, I draw on the concepts and ideas discussed in Biggs & Tang (2007). Where nothing else is stated, this work should be considered the main reference.

Reflections on last year’s experience

International Economics is very theoretical in nature. Its traditional aim is that students should gain knowledge and understanding of a range of different theoretical models explaining why international trade is desirable, what happens when the government conducts trade policy (e.g. imposes

import tariffs) and the role played by exchange rates and international capital movements. Thus, the knowledge to be learned is traditionally viewed as declarative in nature, akin to theoretical courses in the natural sciences, and teaching activities have traditionally involved lecturing combined with tutorials, in which the students are expected to perform various calculations based on the models taught. This is also how I offered the course last year.

Having completed the course last year, I could not escape a feeling of slight disappointment over many of the students' general performance at the final exam. A few students did very well indeed, and not many students did so badly that they failed the course, but still the overall picture was one of generally poorer performance than what I have expected. In fact, when grading the exam papers, I was sometimes shocked to find myself searching for subtle signs that the students were going in the right direction so I could reward them for that, even though their answers were plainly wrong. More than once I wondered whether my expectations were just too high – after all, I had little experience in teaching and evaluating student performance.

There turned out to be a certain pattern in the gap between the students' performance and my expectations. Many students failed to clearly distinguish between the theoretical world discussed within the lecture hall and “the real” world outside it. In economics (and presumably other sciences as well), theoretical models can sometimes be highly abstract representations of the subject studied. For instance, in international trade theory a typical model of the world contains two countries (e.g. EU and China), in which two types of agents (e.g. workers and capitalists) produce two products (e.g. clothes and automobiles). The model then goes on to show what happens when, under different circumstances, the EU and China engage in trade with each other. When I posed this question in the final exam, many students did not answer in terms of the model as expected. Instead they wrote a small essay discussing the general trade relationship between the EU and China, based on information obtained from the news or their general “common sense”.

To me, this experience demonstrated the danger of teaching declarative knowledge for “knowledge's sake”. When designing a course with the stated purpose that students should gain knowledge of and understand a list of theoretical models, we ignore the important question of “why”? Why should the students bother trying to understand these abstract and often complicated models? Because the teacher says so? And what is worse, we tend to design our teaching activities (read: lectures) based on this line of

reasoning: we prepare lectures to “cover” a given range of material (Gibbs; 1981).

Of course, as trained economists, we know that the theories are not (or very seldom) the end themselves, but merely means to an end. The real (implicit) purpose of the course is to allow students to *use* the theories in order to make sense of the real world, to explain why we observe certain developments, to predict what is likely to happen in the future and to recommend policies to address problems. All this requires that we are able to bridge the gap between “the real world” and “the theoretical world”, first in one direction by “translating” what we observe in the real world into something the theory can process, and then in the opposite direction by “interpreting” the results of our analysis in terms that the real world can understand. I call this to think as an economist, and to a trained economist it comes as a second nature. It is something we have learned to do along the way during our own studies. But to a first year student, it is not so obvious. To learn to think as an economist is exactly the implicit purpose of the course (indeed, the entire economics programme), so why not make it explicit?

Redesigning the course

I decided to stop thinking about international economic theory as declarative knowledge and to start thinking in terms of functional knowledge and seek inspiration in some of the techniques relevant to functional knowledge learning, such as Problem-Based Learning (van der Vleuten et al.; 1996) and its smaller sister, Case-Based Learning. I imagined the students as professionals, e.g. officials in the Ministry of Foreign Affairs, whose job it is to advise the Foreign Minister on topics of international trade policy and exchange rate policies.¹ This picture formed the basis of a redesign of the course implemented this spring.

I sought to design all elements of the course, from Intended Learning Outcomes (ILOs), to assessment techniques and TLAs, according to the functional knowledge way of thinking. First, I specified new ILOs to reflect this, notably the following ILOs:

- *apply* relevant economic theories to real world issues. This involves i) setting up an economic model applicable to the real world issue; ii) conducting relevant analyses (comparative statics) within the model; and

¹ Technically, these issues are determined at the EU level and not in Copenhagen, but I suppose the Foreign Minister still needs to be advised on the issues.

- iii) interpreting the results in terms of real world concepts and providing policy conclusions/recommendations
- *evaluate* the applicability of different economic models for analysing specific real world issues

All course activities followed this pattern. A student assignment would present a description of a real world case and ask a few questions framed in real world terms. The students' task would then be to first translate the case and questions into a format resembling the theories taught in class, then to answer the questions using the theoretical models, and finally to interpret the results, i.e. to translate back again from the theoretical terms into a language understandable by non-economists. Afterwards, the students were asked to evaluate the models by asking such questions as; which issues are "lost in translation"? Is there something in the real world case that the models are not equipped to handle? How important are these lost issues?

I prepared a syllabus detailing the topics (and corresponding chapters in the textbook) to be discussed at "lectures"². Before each "lecture" I made available a newspaper article (typically obtained from the archives of The Economist, Financial Times or The New York Times) discussing an issue relevant for that "lecture" together with a number of study questions related to the article.

An ideal "lecture" would go like this: Before the "lecture" the students would read the study questions and keep them in the back of their minds (or on a piece of paper in front of them) while studying first the newspaper article and then the relevant chapter in the textbook. The idea was that the newspaper article should provide a real world context and the study questions a purpose for the students' study of the textbook. I did not expect the students to answer the study questions before coming to class, but they would ideally initiate the students' thinking about them. The time at the "lectures" would be spent going through each of the four steps detailed above (translation, analysis, interpretation and evaluation), first by the students themselves in small groups and then as a general class discussion.

A key element of this approach is that student-teacher contact time is used to help the students *use* the theory to understand real world issues instead of teaching the material in the textbook directly. At the beginning of (and repeatedly during) the course I made it clear to the students that I did not intend to lecture on the material found in the textbook. I operated

² I use the term "lecture" to denote the time slot available for student-teacher contact, not the activity taking place during that time slot.

under the assumption that the students had all prepared for the lecture, and had studied and understood the relevant chapters in the textbook. This has proven to be advantageous in several ways. The students feel that the “lectures” are not a complete waste of time as I am not just repeating what they can read by themselves in the textbook. They are more motivated for spending time on their own studying, as they have discovered (the hard way) that they cannot simply skip the textbook and pick up the main ideas at the lectures. From the teacher’s point of view, it has also turned out to be somewhat of a relief as the pressure to fit a wide range of material into what little contact time is available has abated.

I designed the student assessment along the same lines in order to achieve better alignment with ILOs and TLAs. All the test problems presented to the students for assessment had the exact same structure as the in-class TLAs described above. In fact, in the first “lecture” (and repeatedly thereafter) I described to the students what the exam would look like and told them that all we would ever do in the course is to train for the exam. Evidence suggests that students are very mindful of the expected requirements at assessment and tend to structure their learning according to these expectations (referred to as “Backwash”, Biggs & Tang (2007)). I decided I may as well use this to achieve as much alignment as possible.

Evaluation

I have three sources of information, upon which to base my evaluation of the redesign introduced this spring: grades, students’ course evaluation and my own personal impressions (self evaluation), all comparing the redesigned course with last year. None of them are particularly objective in nature, and there is a risk that over-enthusiasm on my part may colour my evaluation. With that in mind, I will try to provide as balanced a picture as possible.

Grades

Student grades in 2009 (first year teaching) and 2010 (the redesigned course) are shown in figure 10.1. It shows little movement in the lower end of the scale (although a few more students failed in 2009 than in 2010) but considerable upgrading from the middle ground to the higher grades.

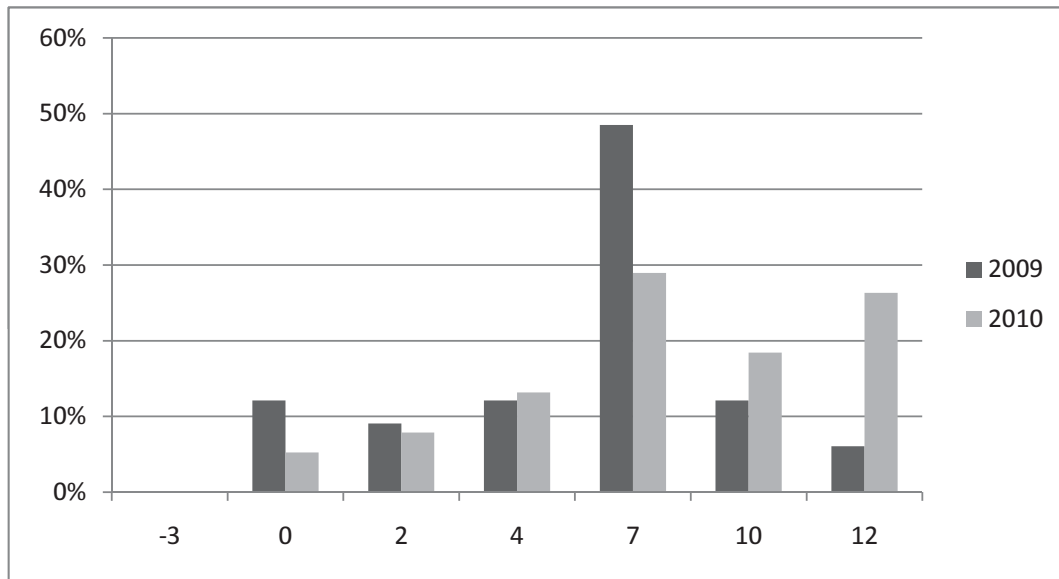


Fig. 10.1. Frequency of student grades in 2009 and 2010

This suggests that the redesign of the course has had a positive effect on many students' performance, particularly around the average range.

It is interesting to see that roughly the same share of students' performance were assessed to be in the below-average range in 2010 as the year before. I take this as an indication that not all students benefit equally from the changes in activities and assessment techniques. There can be various reasons for that. For instance, the small group work taking place at the "lectures" were organised on a voluntary basis, and I allowed the students to work individually if they wanted to (most chose to work in small groups). The risk is that the students who were most challenged by the material, were also the ones opting out of the group work and that they therefore benefited little from the activities. Another reason could be that some students chose to study the material by themselves and did not attend many of the "lectures". Whether they are the ones obtaining the lowest grade I do not know. Whatever the reason, it is worth noting the pattern and considering for next year whether the TLAs are designed sufficiently flexible to allow all students to benefit from them.

Students' course evaluation

I did not design a student survey specifically addressing the new design of the course. Instead, as I had taught the same course last year using more

traditional lecturing techniques, I wanted to utilise this opportunity to compare the students' perceptions of the two approaches. The students' course evaluations provided a standardised way of investigating these experiences.

I will not go into exhaustive detail with the evaluation. Instead, I will comment on three of the questions I find particularly informative in this respect and discuss a few of the students' elaborations. The students were asked to state whether they agreed or disagreed with the following statements:

1. All in all the course was good
2. The course provided room for my active participation
3. The teacher stimulated me to reflect on academic issues related to the course

Looking at the answers, it turns out that the three statements solicited pretty much the same response. To keep this exposition brief, I present the students' answers to the first question in figure 10.2 and leave out the other two.

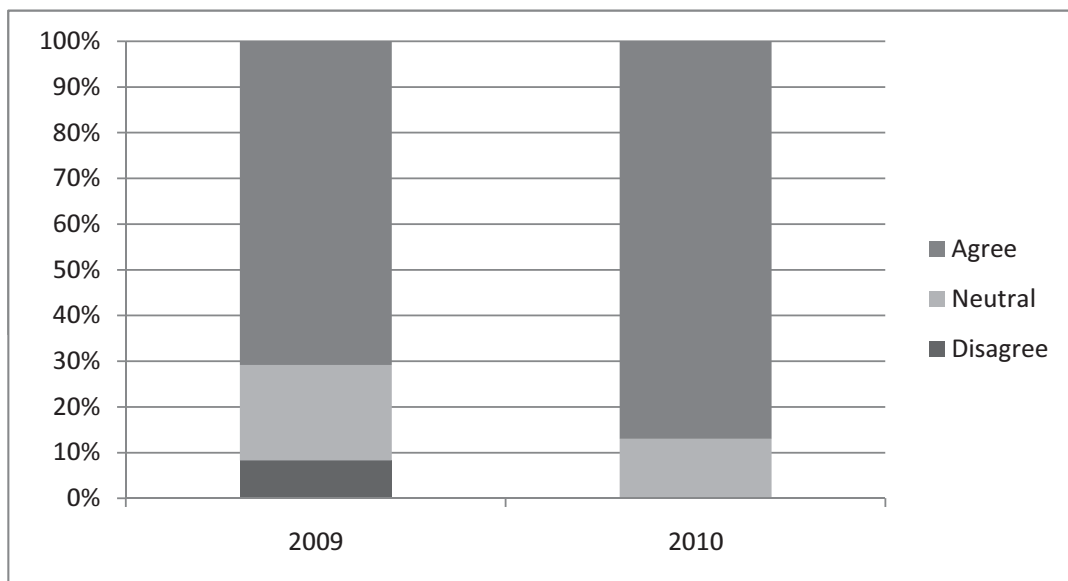


Fig. 10.2. Students' response to the statement: "The course was good"

There seems to have been an improvement in the students' perception of the course in general, and in their opportunities for active participation and reflection within the course, although their opinion of the course was not too bad to begin with. Looking at some of the specific comments to

the 2010 evaluation paints more or less the same picture. Most are positive along the lines of “Great balance between theory and practise...”, and “The articles were great – it was possible to apply what you had learned studying the textbook and during class”, and many specifically noted that they had no suggestions for further improvements and “I wish all courses were like this...”.

There were, however, also students who preferred the traditional way of lecturing or who felt that I had gone too far in focusing on student activities. One student wrote “Sometimes too much time was spent talking in groups. It is good that students are more involved in the lectures, but sometimes time could be saved by going through the material on the blackboard...” and several students suggested that we spend less time on group work and more on traditional lecturing.

It is difficult to judge to what extent these comments are representative of most students. The overall impression of the course evaluation is one of a very positive student perception of the course in general and student activities in particular. On the other hand, the comments suggesting that the scales have shifted a bit too far in the direction of student group work appear to be more than the voices of just one or two disgruntled students. It is worth considering if a slightly more balanced approach is optimal.

Self evaluation

My own personal impression of the outcome of the redesign of the course pretty much mimics the picture painted by the grades and the student evaluations. I have decided here to list a few of the small signs of improvements that convinces me that the approach described in this project is a better approach to teaching than the traditional lecturing format:

- Students are more awake: I am now able to keep the students’ attention for a longer period of time, simply because the “lecture” is broken into smaller units, each no longer than 20 minutes, alternating between group work, discussion and actual lecturing.
- More students are actively engaged in the discussions: Last year, when I attempted to raise discussions in class, a relatively small number of the most motivated students responded. This year, discussion were still limited to only a part of the class, but the share was considerably larger than last year.
- Students are more well-prepared for class: There was to me a clearly noticeable improvement in the extent to which the students prepared

for class during this year's course. At the beginning of the course, most students had a difficult time working out the problems posed. However, after a few weeks, during which I had demonstrated to them that I meant it seriously when I told them that I would not lecture on material described in the textbook, the students performance improved significantly.

- Many students mastered difficult concepts: I noticed in home assignments and the final exam that many of the students demonstrated understanding of concepts that are considered difficult parts of the field. As an example, I asked the students in the final exam to explain the concept of *Comparative Advantage*, a core concept in international trade theory, but one that many non-economists fail to appreciate. I was happy to note that although several students failed to answer this question correctly, many did, and almost all were on the right track.

Perhaps the best indication of the improvement in the students' performance is that virtually none of them displayed the difficulties in distinguishing between real world and theory observed last year. All students attempted to "think as economists", albeit with varied success.

Conclusion

My experience from the last two years of teaching in International Economics has demonstrated to me that considerable improvement in students' learning can be achieved by rethinking declarative knowledge learning more along the lines of functional knowledge learning. In many conversations with colleagues, I have come across the perception that many of the courses we teach have little to do with the real world – the students must understand the basics of abstract theoretical economics before they can be expected to apply the theories to real world problems. I would tend to disagree. We cannot expect students to be highly motivated for learning abstract theory by telling them that the purpose of the course is to learn theory for the sake of theory (I suppose some students are motivated by this, but they are probably a minority), or by promising them that one day they will discover its relevance. However, by asking the students to solve real world problems that they can relate to, we force them to learn the theories by themselves in order to solve the problems. My experience in this regard has been favourable. But there is still room for improvement next year.

All contributions to this volume can be found at:

http://www.ind.ku.dk/publikationer/up_projekter/2009-2-1/

The bibliography can be found at:

http://www.ind.ku.dk/publikationer/up_projekter/kapitler/2009_vol2_nr1_bibliography.pdf/