

Teaching *Economic Forecasting* with MOODLE

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Abstract

In the two Spring semesters of 2007 and 2008, I taught the course of *Economic Forecasting* at the Master of Economics level. The course has no teaching assistant. To handle the bi-weekly assignments and discussions with students, I adopted the course management system of WebCT in 2007 and switched to MOODLE in 2008. In this paper, I would like to share my experience in teaching the course with the help of MOODLE. My experience shows MOODLE's wiki module helps accomplish my specific pedagogy very well. Its mathematical typesetting capability suits the need of economists perfectly.

1 Background

In the two Spring semesters of 2007 and 2008 I taught the course of *Economic Forecasting* at the Master of Economics (MEcon) level. Here is a brief description of the course:

The determination of costs and benefits of alternative policies often requires forecasts of several key variables. Also, ex-post evaluation of a policy requires the understanding of the seasonal and cyclical fluctuations in the target variable, so as to distinguish the effects of policy from these periodic fluctuations. This course provides an overview of forecasting methods.

This course introduces the elements of forecasting and various forecasting techniques. The methods include regression based models, ARIMA models, exponential smoothing methods and multivariate methods. The course also looks at techniques for the evaluation of performance of forecasting methods and examines the role of forecasts in the decision making process.

Obviously, the course will use a lot of mathematical notations. While the course can be very theoretical, we aim to train students practical skills of forecasting, with a focus in economic applications. We emphasize that on completion of the course, student should be able to

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1. Collect data, select the appropriate model to produce out-of-sample forecast, and write a short report based on the results.
2. Understand and evaluate basic forecasting results of research reports.

Accordingly, the course assessments are designed to achieve these two outcomes. Specifically, students were required to hand in a writing assignment every two weeks. The aim is to let students practice the basic elements of forecasting. Each student will have to work on a economic time series that is different from other students. Students will have to upload a file (along with the Eviews work file and program) summarizing the findings.¹

There are obvious advantages of getting students to work on different datasets:

1. Students cannot copy the homework assignments of their classmates. When assignments are the same for all students, it is difficult to check whether students have done their own work or simply copied from others – even with the most sophisticated softwares such as Turnitin.
2. Because students are working on almost identical problems (differ only in datasets), students are encouraged to discussed with, and learn from, each other how to apply what they learn in the assignment.
3. Students are exposed to many different datasets/countries throughout the course. Thus, students are encouraged to developed global perspectives, an objective of our Master of Economics programme.

The drawbacks are:

1. A lot of work is involved in matching students to different datasets.
2. A lot of work is involved in grading the assignments.

In the past, for courses with teaching assistants (TAs), I usually let the TA administer the homework assignments – collection and grading of them. On my own web server, I would maintain a class web page of teaching diary and an archive of PowerPoint lecture notes and additional reading materials.

Because none of the MEcon courses are provided with any teaching assistant (so are undergraduate courses of small class size), I turned to course management systems for help. Ideally I would want the system to allow me to post PowerPoint lecture notes, to maintain a teaching diary and a discussion forum for electronic tutorials, to assign students to work on different datasets in their assignments and to collect assignments electronically, and to let them see their grades and immediate feedback on their assignments. Due to the mathematical nature of the course (as in many Economics and Finance courses), I also wanted a system that allow me to type mathematical notations on the fly, say using L^AT_EX type of syntax. This last function is particular useful in discussion forums.

¹By requiring students to upload the data and program files, I can double check whether students had actually done their work and give additional comments when students report difficulty in completing the assignments.

2 My brief experience of WebCT

It was natural for me to turn to WebCT for course management because it has been the only course management system supported by the University of Hong Kong. Consequently, I took a training course on the use of WebCT offered by the University Computer Center and used WebCT in 2007. Although WebCT has many features, I only wanted to use the WebCT to assign students to work on different datasets in their assignments and to collect assignments electronically. The main reason to use only this subset of the WebCT functions was that the WebCT did not appear user friendly and I could perform most of the tasks on my own web server much more efficiently.

It is unfortunate that WebCT could not help replace the most daunting task of matching students to datasets. To match students to datasets, I have consider two approaches, each with its own drawbacks.

1. Approach #1: Let students choose among a list of datasets. Students have to check the updated list of available datasets. Once a student makes a choice, he/she has to inform the instructor/TA. A updated list of available datasets will be posted on the web. However, this approach has problems.
 - (a) Problem #1: The instructor/TA has to update the list of available datasets. The number of updates is at least as big as the number of students
 - (b) Problem #2: There will be conflicts when two or more students email in their choice of datasets at the same time, or when the instructor/TA is not available to update the list (say, at night when students are most active).
2. Approach #2: Generate a list of dataset-student pairs. Tell them they have to work on specific set of datasets. This approach has problems too.
 - (a) Problem #1: The instructor/TA has to generate a list, say using some randomization function of Excel.
 - (b) Problem #2: The instructor/TA has to keep track of who is supposed to use which dataset.
 - (c) Problem #3: Before creating such list, the instructor/TA has to inspect all the datasets to make sure that the datasets on the list are all suitable for analysis.
 - (d) Problem #4: Students cannot choose to work on their preferred datasets.

Balancing the pros and cons of the two approaches, I finally adopted approach #2. Although this is a daunting task, I consider the work worthwhile for what it can help accomplish.

3 The discovery of MOODLE

My discovery of MOODLE was an accident. In the Summer of 2007, I was contemplating a model of doing collaborative learning with peer assessment.² In searching for advice, I was finally referred to David Kennedy, who alerted me the existence of an alternative course management system named

²My experience of adopting peer assessment will be summarized in another paper soon.

MOODLE. During that summer, with the support from the School of Economics and Finance, I started to use MOODLE.

“Moodle is a course management system (CMS) - a free, Open Source software package designed using sound pedagogical principles, to help educators create effective online learning communities. You can download and use it on any computer you have handy (including webhosts), yet it can scale from a single-teacher site to a University with 200,000 students.”
– <http://moodle.org/>

“Moodle was created by Martin Dougiamas, a WebCT administrator at Curtin University, Australia, who has graduate degrees in Computer Science and Education. His Ph.D. examined ‘The use of Open Source software to support a social constructionist epistemology of teaching and learning within Internet-based communities of reflective inquiry’. This research has strongly influenced the design of Moodle, providing pedagogical aspects missing from many other e-learning platforms.” – <http://en.wikipedia.org/wiki/Moodle>

It is important to note that MOODLE has many pedagogical tools that are missing from many course management systems such as WebCT. It is these additional pedagogical tools that lead me to choose MOODLE over WebCT.

4 The features of MOODLE used

MOODLE is much more friendly than WebCT. Because of its own-source nature, many pedagogical features have been developed and made available. Detailed discussions of major features in MOODLE may be found in [1] and [2]. Here I reported only the small set of features that I used to achieve my teaching objectives.

1. Teaching diary: Moodle is very structured. At the time the course is created, it will ask us how many weeks we plan to have (may be adjusted later if needed). It allows us to easily edit a teaching diary, including links to PowerPoint files, etc.
2. Using the *Feedback* module, I conduct a quick survey at the very beginning of the semester. I also take this opportunity to train students to use MOODLE.
3. Using the *Forum* module, I conduct the online tutorials. I encourage students to asked questions in the forum. In return, I promise to answer the questions promptly. Because my answers can be read by all students, the forum has saved me much time from answer similar questions via email.
4. The profile function allows students to upload pictures and write short biographies of themselves. Pictures are important because it helps recognize who’s who in my course.
5. Online submission and grading of assignment: Feedback will be available to students after the grading is done. Deadline is set but I allow students to continue upload assignments after the deadline. For submissions after the deadline, MOODLE will mark the assignment as late as a

reminder to the grader. Number of files to be uploaded is flexible, predetermined by the teacher. Like WebCT, assignment deadlines are marked in a calendar as a reminder to students.

For the learning outcomes I intended to achieve, the magic of MOODLE is really in the *Wiki* module and its capability in typesetting and displaying mathematics.

4.1 Wiki

I used the Wiki module to get students to match themselves to different datasets.

“A wiki is a collection of web pages designed to enable anyone who accesses it to contribute or modify content, using a simplified markup language. Wikis are often used to create collaborative websites and to power community websites. For example, the collaborative encyclopedia Wikipedia is one of the best-known wikis.” – <http://en.wikipedia.org/wiki/Wiki>

“The Moodle wiki(s) enables participants to work together on web pages to add, expand and change the content.” – http://docs.moodle.org/en/Wiki_development

Wiki pages can be accessed by all participants (students) but can be edited by only one user at a time. Thus, it solves the problem of requiring the TA/instructor to update the list of student-dataset pairs. Essentially, wiki helps me replicate approach #1 discussed earlier. It gives students the right to choose datasets and reduces the maintenance cost to essentially zero.

4.2 Math typesetting

\LaTeX syntax can be used in editing all pages in MOODLE. To get a display of $y_t = \beta_0 + \beta_1 x_t + \epsilon_t$, we only need to type `$$y_t = \beta_0 + \beta_1 x_t + \epsilon_t$$`, i.e., \LaTeX syntax enclosed in double dollar signs (instead of the single dollar signs in \LaTeX). Because a lot of Economic discussions use some kind of mathematical notations, this feature certainly appeals to teachers of Economics.

5 How do students like MOODLE

At the end of the semester, a survey was conducted to collect students' view on the use of MOODLE in organizing the course.³ The course has 30 students. A total 15 students responded to our survey.

1. All respondents agreed or strongly agreed with the statements
 - (a) “Moodle is useful in my study”
 - (b) “Moodle promotes an exchange of ideas with peers and instructors.”
 - (c) “Moodle makes learning more efficient.” (One indicated that he/she was “unsure”.)
2. All respondents indicated that they like the course site on MOODLE because
 - (a) “I can have convenient access to course materials.”

³Many thanks to Lisa Deng for sharing the survey data collected for a study on the use of Course Management Systems at University of Hong Kong.

- (b) “The content of the online course is well organized.”
 - (c) “I can ask questions through discussion forum at anytime.”
 - (d) “It’s easy to submit assignments online.”
 - (e) “Moodle is user-friendly.”
 - (f) “Wiki is a convenient way to sign up for assignment.” (one indicated “unsure”.)
3. When asked of the major challenges or difficulties encountered, only one respondent indicated that he/she had mild difficulty using MOODLE.

In summary, it is safe to say that students find MOODLE useful and user-friendly.

6 Conclusion

For me, having tasted MOODLE, I would never go back to WebCT again.

By summarizing my experience of using MOODLE in teaching *Economic Forecasting* in this paper, I hope that I have successfully demonstrated to my colleagues that some useful pedagogy can be accomplished with minimal cost through the adoption of a friendly course management system.

References

- [1] Cole, Jason R. and Helen Foster (2008): *Using Moodle: teaching with the popular open source course management system*. O’Reilly. 2nd ed.
- [2] Rice, William H. (2006): *Moodle: e-learning course development : a complete guide to successful learning using Moodle*. Packt Publishing.