STATEMENT OF TEACHING PHILOSOPHY

Gray Calhoun, December 9, 2016

My teaching philosophy has been heavily influenced by the "Team-Based Learning" instructional style (TBL), which I learned about from a series of workshops run at Iowa State in 2014. TBL is a "flipped classroom" approach; students are expected to familiarize themselves with course material outside of class and deepen their understanding by applying that material in the classroom. But TBL differs from other flipped classroom teaching styles in the way that it structures classroom exercises and students' individual study sessions and, I believe, these features make it especially well suited for my instructional goals and for many aspects of university education. Since taking these workshops, I have converted my required PhD econometrics course to TBL (Econ 671); I am in the process of converting my Principles of Macroeconomics course (Econ 102); and I plan to convert my graduate econometrics elective (Econ 674) in the future. I have also continued to learn more about TBL, frequently attend meetings of the TBL "Learning Community" organized on campus, and have presented some of my course material to the TBL Learning Community for feedback (on October 3, 2014, October 30, 2015, and December 9, 2016).

In the first part of this section, I will explain my teaching principles and goals. The second part of this section will briefly describe TBL and explain how it is effective in meeting those goals. And the third part discusses areas of teaching that occur outside of formal coursework—another area of teaching that I have been heavily involved in. In addition to the courses I have taught at Iowa State, I have been the advisor for two PhD students, both of whom have graduated and taken research positions in academia, and am currently advising another. I have also served on 15 graduate student committees in the Economics and Statistics departments (including current students); and I have organized several informal reading groups and workshops for graduate students.

TEACHING PRINCIPLES AND GOALS

I try to follow three general principles when I teach. First, I believe it is important to give students the opportunity to solve challenging, open-ended assignments that match real world use of the material covered in the course. These assignments serve several purposes: they help students integrate the different components of the course and understand them better; and they directly help students understand how the material can be used in practice, giving them a better understanding of economics in general and making it more likely that they will recognize situations where they can apply the skills they have learned in the class. Second, I try to structure the course and its assignments to motivate students and to prepare them to be successful in solving challenging and realistic open-ended assignments. Motivating students that are very comfortable with the material and motivating students that are struggling with the material typically require different approaches, but both are important. Third,

I design the course so that the students and the instructor get frequent and accurate feedback about the students' performance and level of understanding.

Obviously, a challenging, open-ended, and realistic assignment for Principles of Macroeconomics is very different than one for a PhD-level econometrics course, but I have found that emphasizing these principles helps both sets of students: the Principles of Macroeconomics students learn skills that they can use later in college and after graduation, and the PhD students are shown how they can apply the course material to their own research.

TBL DESCRIPTION AND EXAMPLES FROM MY CURRENT TEACHING

A TBL class has a few distinctive features. (More details are available at the main TBL website, http://www.teambasedlearning.org, along with references to additional resources.)

- The semester is split into 4-7 major sections, each lasting 2–4 weeks. For PhD Econometrics, for example, I use the following 6 sections:

    1. Introduction to Probability Theory (3 weeks)
    2. Sampling and asymptotics (2 weeks)
    3. Statistical inference and estimation (3 weeks)
    4. Finite-sample properties of linear regression (2 weeks)
    5. Asymptotic properties of linear regression (3 weeks)
    6. Causal inference using linear regression (2 weeks)

- Students are assigned reading (and potentially homework) before each section, then spend most of the class meetings working with their team on challenging group assignments.

- Each of the 6 major sections starts with a structured quiz and review session that lasts one or two class meetings. This review ensures that students are familiar with and prepared to use the material in the team assignments. After that review, the remaining class periods are spent on team assignments, where students will learn how to use this material effectively.

- The team assignments follow several principles to make them as useful as possible; assignments that are easily split into parts that can be delegated to individual members of a team are discouraged in TBL, as are those that require teams to make a final product that is particularly complicated, time-consuming, or difficult to evaluate. (Group papers and group presentations are strongly discouraged in TBL for those reasons.) For most assignments, teams are instead asked to make a small number of decisions based on some amount of background and context-specific information. For example, one of the assignments towards the end of my Principles of Macroeconomics class has students assume the role

of an advisor to the Icelandic government during the recent financial crisis. It culminates in the question:

Which of the following policies would you advise the Icelandic government would be best for the economy in the middle of a financial crisis? (There is going to be a recession for sure, this question is all about managing its damage.)

1. *Allow the Krona/Euro exchange rate to be determined by the market, and use monetary and fiscal policy to offset the recession.*
2. *Plan to sell Krona to keep the exchange rate from moving too quickly; then use monetary policy to offset the recession.*
3. *Plan to buy Krona to keep the exchange rate from moving too quickly; then use monetary policy to offset the recession.*
4. *Peg the exchange rate at a new level using monetary policy; use fiscal policy to offset the recession.*
5. *Decrease government spending to restore faith in financial markets.*

To effectively answer this question, students need to apply specific and detailed knowledge from the course and to evaluate and discuss each possibility. But to report its answer, a team just needs to choose the appropriate letter. This allows the students to focus entirely on understanding and using the course material, not on coordinating the effort to report their conclusions.

However, this is not a pure "multiple choice" question. Teams will be expected to explain their answers to the class and to evaluate the other teams' choices as part of the exercise and to get credit for their answer. Requiring teams to report a single choice is done to facilitate discussion within the teams and within the class overall.

- Team construction follows several principles as well. Students are grouped into relatively large teams (5–7 students each) at the beginning of the course and keep those teams for the entire semester. The teams are assembled transparently by the instructor to have a diverse mix of backgrounds and skills in each team. Since they work together for the entire semester, students have enough time to build strong relationships with their teammates, leading to higher performance through more effective teamwork and greater individual accountability.

I have found that this structure is very effective at meeting my instructional goals and principles. These teams of students are able to solve very difficult real-world questions that very few of the students would be able to solve individually. Each student is able to contribute meaningfully to the team, and the interaction between the students helps them all understand the material more deeply. Similarly, when teams are working together effectively they can accomplish more in a single lecture than students working individually, so the assignment can incorporate more of the meta-skills that will be necessary for students to apply the material later in their careers—framing the problem so that it can be solved using some of the models

they've learned earlier in the semester, for example—that are difficult to fit into class otherwise. Moreover, when students are working on assignments, the TAs and I circulate among the teams to answer questions, discuss the approach they are taking, and (occasionally) give them additional problems if they think that they've finished the current assignment. This, along with the full-class discussions and the review sessions in the review process, provides an enormous amount of feedback to the students and the instructors on their level of understanding and performance, making it easier for the students to adjust their effort levels and allowing me to provide additional background knowledge if it is necessary.

Furthermore, the emphasis on team assignments has served as a very powerful motivator for students of every level of individual performance. This motivation can be increased even more when the assignment can be structured so that teams are competing against each other directly. (Another one of TBL's recommendations.) Direct competition is easy to incorporate into many assignments in economics and econometrics; in one assignment for Econ 671, for example, teams construct and estimate a linear regression model for forecasting state-level unemployment, and are partly graded on the forecast's accuracy; and in another assignment teams use probabilistic and statistical models to bid for risky assets in an auction. Both of these assignments have had very high levels of engagement, enthusiasm, and effort from the students.

MENTORING AND ADVISING GRADUATE STUDENTS

I have been very active in working with graduate students outside of class as well. In addition to advising several PhD students and serving on graduate student committees (in both the Economics and the Statistics departments), I have organized reading groups for graduate students and faculty that have targeted specific areas of econometrics, one on the bootstrap during the spring 2016 semester and one that met later that summer on machine learning. After speaking with faculty at other universities about their graduate programs, I have also started to organize a workshop for our PhD students that will start meeting in the 2016 Fall semester. This workshop will be used for PhD students to present their research regularly to the econometrics faculty and to review and discuss relevant papers that are presented in our departmental seminar, and faculty at other institutions have found that similar workshops have greatly benefited their graduate programs. This workshop is being organized in consultation with several other faculty members in the department, but under my own initiative. We expect it to lead to much better research by our graduate students and a higher level of polish and confidence on the job market.

The same principles that I try to follow in the classroom apply in these less formal settings as well: I try to give students a safe environment for them to practice and perform the skills they need to develop professionally and I try to pay attention to the students' motivation and energy level and give them frequent and accurate feedback.