The Economics of Online Dating: Teaching Guide

The goal of this Teaching Guide is to provide additional pedagogical support for the structure of The Economics of Online Dating, including course coverage, grading, and assignment details. It has been written and made publicly available as a supplement to *The economics of online dating: a course in economic modeling*.

A. Course coverage. Despite blending discussions, peer review sessions, lectures, in-class activities, and modeling assignments, a wide range of topics is covered in The Economics of Online Dating. The backbone of the material is the Oyer reader, but there are a couple of minor adjustments to the progression of modules which better lead students through theoretical material.

While module 2 lines up with Oyer's chapter 2 on cheap talk, I use the theoretical section of module 2 to focus on more fundamental ideas in static and dynamic games, such as (static) game matrices, (dynamic) game trees, strategy definition, and equilibrium concepts. Incomplete information basics are introduced here, but deeper treatments of signaling and cheap talk are then incorporated into module 4, which focuses on problems of incomplete information. By this time, students have much more experience with both game theory and modeling in general. This has them better prepared for the advanced game theoretic tools - information sets, belief formation, and Bayesian-Nash equilibrium - native to incomplete information models of screening, signaling, and cheap talk.

Module 6 is typically time restricted, but could contain any number of distinct topics, among which social choice, brinksmanship, and bargaining are most relevant. Brinksmanship

models (see Dixit, Reiley and Skeath style, for example) most resemble module 3, while social choice, when taught with an emphasis on individual preferences and the Arrow Impossibility Theorem, can be a nice course recap which links to module 1 or 5.

B. Course coverage and the online dating industry. How do online dating sites and apps work? How much do they charge and to whom? Why are some sites so specialized? What makes a dating app successful? Though it does not get a specific callout in the progression of course topics, analysis of the online dating industry is an undercurrent of the course. We inevitably discuss a dating site's or dating application's need for a critical mass of users when discussing network externalities, and the tradeoff between thin and thick markets during Oyer's chapter 6. The student models and research projects focused on the dating industry take on an unmistakably industrial organization flavor, analyzing Tinder's decision to evolve into a "freemium" platform, for example. This contribution to The Economics of Online Dating represents a significant and powerful application of industrial organization theory to an industry which is growing rapidly and whose boundaries are increasingly blurry.[1]

C. Grading. Assessment in the course is **formative**. I construct discussion credits, modeling assignments with peer review, and exams to consistently generate opportunities for students to receive feedback on their efforts and contributions. This emphasizes to students that assessments are not end products but part of the continued development of their knowledge base and skill set. Formative assignments are critical to the promotion of self-efficacy: for students to gain confidence in their own abilities, they need to respond to mistakes, overcome obstacles,

[1] Students have argued that social media sites like Facebook and even online gaming platforms - MMORPGs, or massively multiplayer online role playing games, typically - should be considered as critical components of the online dating world.

experience successes, and (via attribution theory) learn to associate outcomes with their own effort levels. From Bandura: "Another form of teacher feedback that carries efficacy implications highlights the quality of academic work [...] Feedback that one's work is of good quality progress progressively raises perceived efficacy, which, in turn, predicts subsequent performance" (Bandura 1997, 226). The use of formative assessments encourages students to re-examine their work, helps to focus students' views of assessments as part of the learning process itself, and supports self-efficacy.

Since students in this course typically possess a wide range of mathematical and economic experiences, a one-size-fits-all approach to assessment would not be ideal. I aim to balance the dual emphases of proficiency (making sure students all attain a minimum threshold of skills by the end of the course) and growth (measuring each student's success by her continued progress toward benchmarks tailored to her individual starting point.) While I recognize the challenge in reconciling these two objectives, assessment in this course attempts to incorporate both in a way that respects student differences yet encourages all students to achieve the course competencies laid out at the onset.

Grades on discussions and exams are based on **proficiency**: discussion points are earned by simple participation, while exams require both solving instructor-selected models accurately and modeling instructor-selected phenomena appropriately. Modeling assignments and the course project incorporate proficiency and **growth** into grading. A less-technically-proficient student may build a simpler model for her first modeling assignment, using numerical parameter values and a decision tree very similar to mine, while a senior economics major may build a more adventurous model, branching out from mine and incorporating concepts from her previous

economics courses. Targeted individual feedback (during workshops and written on submitted work) on successive assignments, combined with scaffolded theoretical skills, encourages each student to focus on expanding her own toolkit and developing models which are progressively more realistic.

Each modeling assignment is monitored on three components: degree of generality, uniqueness relative to the model I presented in class, and degree of complexity. Maximum credit on assignments can only be earned if students demonstrate both proficiency (is the model solved correctly? is it an appropriate choice for the phenomenon being modeled?) and progress along the above dimensions. A student may choose to expand along one dimension in one model, then another in a subsequent model. But, ultimately, progressive modeling assignments should reflect student effort to model more generally, more independently, and with more complexity.

Elements of Proficiency:	Elements of Growth:
•Does the model include a detailed description of the phenomenon in words? •Is the model an appropriate selection for the phenomenon being modeled? •Are assumptions clearly stated and justified? •Is the model technically clear and accurate? •Is the model solved correctly? •Is the model internally consistent from start to finish? (overarching notion)	Compared to prior models submitted by the student, does the current model … •demonstrate an effort to work with fewer numerical and more variable parameters? •incorporate additional extensions of the model which have not explicitly presented by the instructor? •represent an increased willingness to branch out in a novel direction, to think outside of the box as necessary to model the phenomenon?

Figure 1: Grades on modeling assignments balance the dual objectives of proficiency and growth. Performance is measured by considering the questions in each column above, and elements of proficiency and elements of growth both contribute to the assignment grade.

D. Discussions. Discussion grades are a non-neglible component to the course grade, and require a combination of participation in in-class discussion or online discussion, and contribution of relevant and originally researched articles. Discussion contributions are vital to

students' introduction to concepts, and allow students to explore connections between economic concepts and their potential applications in the dating world and the world more broadly.

Importantly, discussions connect students to each other. They often feed off of one another, sharing reactions and experiences in ways unique to the lives of college students. The *online* discussion forums promote this interconnectedness well. Students can track relevant articles, reply with related links, and provide feedback on original ideas - all at their own pace. Discussions require students to interact with one another in ways that promote critical thinking and the exploration of applications of and perspectives on economic concepts.

E. Course project. The final component of the course is a semester-long research project, which allows students to synthesize their skills on a topic of their choosing to produce an in-depth original research paper. A modeling component is required, and nearly all papers are exclusively theoretical.[2] Unlike the individual modeling assignments, which focus students' models on a particular module, the project is very open-ended. This is by design. Students propose studying one phenomenon four weeks into the semester, then adapt their thinking and modeling as the semester progresses and their theoretical toolkit expands. Often, in the evolution of their idea across the semester - false starts, evolutions, reinventions, and discoveries - students experience what it means to deeply model one topic.

The Economics of Online Dating has built-in mechanisms to support independent student research: in the discussion stage (open discussion and idea sharing, basic literature review via article sharing for discussions); economic theory scaffolding in the theory stage; in the modeling

[2] Students (almost always economics majors and upperclassmen) have incorporated empirical components into their projects as well. One project collected survey data from the campus about online dating habits, and used the data to produce an estimate for a parameter of a theoretical (cheap talk) model.

stage (the practice of peer review, applied to individual assignments and specifically to the paper), and via the course-wide emphasis on self-efficacy and critical thinking. One student, for example, used the idea of network externalities to explore common pool resources and the salmon industry, writing a paper that helped him secure competitive summer research funding and segued into an empirical senior thesis on the local salmon industry with a sophisticated and well-developed common pool resource model backing it. Another dug more heavily into the computer science of constructing matching algorithms, drawing connections to his coding experience. Students have conducted empirical research to attempt to match the parameter values in their theoretical models to real world data. The open approach to the research project allows for extensions like these which are adjacent to the course yet connected to students' unique points of interest.

F. Exams. Exams are take-home assessments which include four problems. Two problems ask students to **solve a model** presented to them. Aimed at refining students' technical and analytical skills, these typically are extensions of models they have seen in class. The remaining two problems ask students to **model a specific phenomenon** I have laid out for them. Students are given the exam format from the beginning of the course, and are able to prepare for both problem solving and modeling exercises in exams. This approach to exams sends a balanced message to students: using the appropriate technical skills, you should be able to both analyze the prediction of a specific model when asked, and construct a model in a more open-ended environment. A sample exam is provided on the course website.