

# TEACHING THE ART OF ECONOMIC RESEARCH IN A SENIOR SEMINAR

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## **Abstract**

In many academic settings, undergraduate economics majors are asked to do an independent project or thesis in their final year. Because doing research is very different from learning economics in a classroom, students are frequently unprepared for this endeavor. This article describes a seminar course intended to ease this transition by preparing students to embark on such a project. The first goal of the course is to assist students in developing a sound economic research project. The second goal is to help them develop the research skills to execute their project. In essence, the course is an abbreviated and accelerated version of some of the learning that takes place alongside the standard curriculum in graduate school. The article describes a course that has been designed for a liberal arts setting, and also discusses other possible variations.

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### **Abstract**

In many academic settings, undergraduate economics majors are asked to do an independent project or thesis in their final year. Because doing research is very different from learning economics in a classroom, students are frequently unprepared for this endeavor. This article describes a seminar course intended to ease this transition by preparing students to embark on such a project. The first goal of the course is to assist students in developing a sound economic research project. The second goal is to help them develop the research skills to execute their project. In essence, the course is an abbreviated and accelerated version of some of the learning that takes place alongside the standard curriculum in graduate school. The article describes a course that has been designed for a liberal arts setting, and also discusses other possible variations.

Keywords: capstone, project, curriculum, senior, thesis, research

## Introduction

An undergraduate honors thesis can provide a valuable opportunity for students to build on the knowledge they have gained in college, to ask an interesting question, and to use the tools of their discipline to answer that question. As an economics professor at a small liberal arts college, I find the honors thesis a particularly exciting moment in our students' education. While many students come to economics out of their curiosity about real-world events (government policy, financial markets, development), it is not necessarily so easy for them to bring the economics they have learned back to those same real-world events. Through our own experience, we are all aware of the simple reason for this difficulty: actually *doing* economic research is markedly different from *learning* economics in a classroom.

Undergraduate economic majors spend most of their time absorbing and understanding well-established economic theory. They spend some of their time doing problem sets and other assignments to improve their understanding of that theory, and to be able to use the theoretical tools of economics to answer well-defined questions. They spend a much smaller portion of their time questioning established theory and debating unresolved economic problems. And, finally, they spend little time, if any, formulating and answering research questions of their own. In many academic settings, economics majors do not embark upon an independent research project until their senior year.

Thus, while undergraduates learn a lot about economics, most do not learn how to actually do economics. They have not been taught how to formulate a well-defined and interesting research question, how to design a feasible project to address the question, and how to go about testing hypotheses to answer the question. Many economists would argue that “doing economics” is not something that can be taught – rather, it falls more under the rubric of

learning-by-doing. Furthermore, many would say it does not happen in the classroom, but rather in the first years of graduate school or in a research assistant job.

However, despite the reality of when and how this learning does or does not happen, many departments *expect* students to be able to do their own research as senior majors. Many institutions offer accomplished students the option of doing a senior thesis, an honors thesis, or an independent project in the senior year. Some institutions even require such a project of all economics majors. In these situations, it is inevitable that students struggle with making the difficult transition to doing original research, and that faculty struggle to assist students in this endeavor. We all persist in this effort because we acknowledge the importance of this capstone experience, the knowledge and experience to be gained from actually completing a research project of one's own from start to finish. While that motivates the students and the faculty, it does not make the path much easier.

One approach to bridging this gap is to offer a junior or senior research seminar, or a "thesis" seminar – a course specifically intended to assist students in embarking on this research project. If well-designed and well-executed, I believe such a course can do a good job initiating students into the art of doing independent economic research. This article describes the specific seminar that I have developed for the senior honors thesis writers at a small liberal arts college. This course aims explicitly at bridging the gap between passively consuming economics and actively producing economics. The course is essentially an accelerated version of some of the learning that takes place alongside the standard curriculum in the first years of a Ph.D. program in economics. It is essentially learning-by-doing, but structured and with help. There are of course many possible approaches; this is just one approach that has worked in one particular

setting. My hope is that this approach, or pieces of it, can be adapted to serve similar needs in other settings.

### **Course Goals**

The senior seminar course has two main goals. The first goal of the course is for each student to develop a feasible and interesting economic research project, one that she or he will pursue as an honors thesis or senior project. The second goal is to help students develop the skills to do research in economics and thereby execute their chosen project effectively. These goals are pursued in parallel throughout the semester. At heart, the course's one overarching goal is to initiate students into the art of doing independent economic research.

The first task – the development of a thesis topic<sup>1</sup> – is done throughout the semester by the student, in consultation with the professor for the course, their peers, and the larger economics faculty. Ideally, students will start the semester with one or two areas of interest (e.g., microfinance in India, health care for poor children) and even particular questions that pique their curiosity. A very few students will come in with well-formed project proposals. Through a series of proposal drafts and opportunities for presentation and discussion, the students work to develop a clear, feasible, and interesting thesis proposal.

The second task – the acquisition and development of economic research skills – is the more fundamental goal of the seminar, but is also by nature more unusual and less tangible. The research skills targeted include: formulating a good research question, designing a sound project, researching the literature, critically reading journal articles, formulating economic theory, analyzing data, interpreting results, and conveying ideas clearly. The idea is to move students closer to being able to do economic research independently.

These goals are clear enough, and I present them in this manner to the students right at the outset. I emphasize that doing research is different from most things they have done before, and that actually doing research is the best way to learn how to do it. I try to make it clear to students that more is expected of them in this setting, and that their own motivation and interest are crucial: the senior seminar is an active endeavor in which students must fully engage, not a passive course where they will sit and absorb knowledge.

### **Laying the Groundwork**

The official time at which a senior project begins can vary widely across institutions. In many settings, a senior project takes place almost exclusively during the senior year. In order to prepare students to make the best use of the time they have, I believe it can be helpful if the department is able to establish some structures that will lay the groundwork, months or years earlier. This can greatly ease the transition, assisting students in focusing their interests and developing their research skills.

As a foundational experience, nothing compares to working as a research assistant or doing an independent research project in some field of economics. Departments can establish simple structures to provide, facilitate, and publicize such opportunities. At smaller institutions, it can be especially valuable for students to work as an RA for an economist at another institution in the summer. Early research experience can be instrumental in focusing a student's interests, as can conversations with faculty at their home institution and elsewhere.

It is also a good idea to make the thesis or honors track more visible to economics majors in their junior and sophomore years. One way to do this is to encourage students to read past theses, possibly even by assigning past theses as reading and discussion material in electives and

seminars.<sup>2</sup> Another possibility is to directly involve junior majors in the thesis process, by encouraging or even requiring that they attend the presentations done by students in the senior seminar. This gives students additional insight into what a thesis is and how it evolves, and they can get a glimpse into the thesis process which they may embark upon in the next year. This can be supplemented by a meeting or panel in which faculty and thesis writers can discuss the thesis process with junior majors.

Lastly, it makes sense to set the bar high right from the start, by asking students to read a selection of articles in all fields of economics carefully before the semester starts. The list I send usually includes five to ten articles, ranging from acknowledged classics to relatively new work. I include the following suggestions with the reading list:

Things to think about while reading: What is the fundamental economic theory? How does that fit in with what you know? What is the empirical strategy? Does that seem like a good idea? What are the results - do they seem plausible? What do you learn from the paper? Does it give you other ideas? Generally, you should read carefully, actively, and critically. Try to get a good sense of what the paper does.

This is intended to get them started thinking like economists, and ready to start the semester working hard.

## **Course Structure**

Ideally, the course will meet as a small group of students in a seminar format. Because each student has his or her own research topic, entirely different from the others and spanning a wide range of fields, having a small class size – preferably less than 15 students – is essential to making the seminar work smoothly. It is also helpful to meet in a seminar-style room, in which students are not sitting in small student chairs facing the professor, but rather sitting around a

table in a more collaborative setting. Structuring the physical environment in a less hierarchical and more collaborative way can help create an environment conducive to student participation and active engagement. Two class meetings per week, each lasting an hour and a half, seem to provide sufficient time for the course.

Table 1 shows an example of a course schedule for a course that meets twice a week for thirteen weeks. The course is divided into six two-week chunks, alternating between “tools” and “topics.” This is intended to keep the two principal objectives – developing the proposal and developing the skills – proceeding in parallel, giving students time to develop both their projects and the research skills needed to complete their projects in the subsequent semester(s).

### **Starting Out**

In the first class, I set out the two goals of the course – learning to do research and developing a thesis proposal. I generally try to give the students a realistic picture of what they are facing by impressing upon them that doing economic research is quite different from merely learning about economic research that has already been done. I also emphasize that, while they should aim to create economic knowledge, they need not completely rework growth theory or do something similarly groundbreaking: it should be interesting and exciting, not too easy but not too hard.<sup>3</sup> I outline the skills they will need to do research, and explain how the work of the semester is intended to help them develop those skills: researching the literature, structuring their thoughts, thinking like an economist, finding data, performing empirical analysis, and presenting their work.

After laying out the framework for the course, we take a few minutes for each person to discuss their research interests and goals for the semester. Students can arrive at the course with

a very specific research plan or with only a general idea of the area in which they might want to work. This is their first chance to discuss these thoughts with the group. I also find it is helpful if students write this information down on an index card that they pass in, adding any particular questions or concerns. I encourage students to find one or two other students with similar interests, and to use these informal groupings throughout the semester as an additional place to share ideas and seek advice.

The most important purpose of the first class, as in most courses, is to set the right tone for the semester. In this case, that is one of intellectual engagement, self-motivation, and hard work. I reinforce this by asking students in the first class to write a short response paper, answering a question on one or two of the articles on the summer reading list. My hope is that their answers will show that they have started thinking critically about economic research, and also provide some substantive material around which to start a discussion. I realize that some students will not have done the reading, or will not have done it very carefully enough. Accordingly, the secondary purpose of this assignment is to shock some of the students into realizing that this course is different, in case they hadn't already figured that out.

The first class can also be a good time to briefly raise the question of whether they want to do a thesis or senior project at all. I emphasize to the students that the keys to success, aside from sound economic reasoning and hard work, are their own interest and motivation. Students can gain some insight into their own preferences by talking to peers, meeting with faculty, and looking at past theses in the first week of the semester. If there is indeed a choice to be made, it can help immeasurably to select a group of students who are motivated and committed and winnow out those who are uninterested or unprepared.

## **Beginning the Research Process**

In the next few classes, I endeavor to give students basic tools and get them moving on their projects. We discuss the process of doing research in economics more generally, and of writing a thesis in particular. As we all know, doing research is something of a learned skill, and one that undergraduates are unlikely to have acquired through their previous coursework. I set out the steps of the research process in broad strokes: the research question, literature review, theory, empirics, interpretation, and presentation. I try to give them the larger picture of how to do research and how to develop ideas into interesting and feasible projects. I also take time to discuss the scientific method, primarily as a method of structuring the process in a disciplined manner to arrive at a valid answer. Students have a variety of experiences with academic honesty, so it may be wise to take this opportunity to lay out basic guidelines for ethical and responsible research.

Students seem to find this broad overview of the structure and rhythm of research extremely helpful, however sketchy and incomplete it may be. In graduate school, budding economists are expected to pick this up as they go along, and most do. But undergraduates rarely have the luxury of time to do that, nor are they enmeshed in an active research community that provides an appropriate learning environment. I believe this is the key innovation of a senior seminar course of this type: to condense and facilitate this type of learning – learning that usually takes place alongside (and outside) the graduate curriculum in economics. It is an essential building block for graduate students, and is no less essential for undergraduates who are trying to do high quality independent research. Undergraduates seem most surprised by the non-linear and circuitous path of research: they read carefully honed and edited articles where all the

bumps have been smoothed away, and are blissfully unaware of the complex path that was traversed.

Another area in which undergraduates need substantial additional assistance is in finding a good research topic. Many young economists say that finding the topic for their dissertation was one of the biggest challenges of graduate school. Undergraduates have less of almost everything – time, experience, knowledge, motivation – and so find this task even more challenging. One school of thought holds that undergraduates are so unprepared to choose a good topic that they should be given one by a faculty member: the student's contribution is then the execution of the research, not the design. Another school of thought holds that students should be appropriately guided to develop the topic themselves, so that the entire project is of their making. Depending on the academic setting and culture, either approach can work.

My own preference has been for the second approach. Since fostering student independence is in the spirit of this course, I think it is worthwhile to enable and assist students in developing a good research question. It helps to provide students with a brief roadmap as they embark into this uncharted territory: picking a topic area of interest, reading related articles, thinking about the issues, talking to faculty and peers. Many students find it helpful to keep a research journal as they develop and focus their ideas, and I encourage them to do this in a publicly-accessible blog. The goal is to carefully hone in on a well-defined, interesting, and feasible question. Of course, having an idea of what makes a good project can help structure this process, and I emphasize the following elements: an interesting question, a testable hypothesis, clear theory, good data, and a methodology that provides insight. With this guidance, most students will find their way to a topic of their own.

## **Course Elements: The Thesis Proposal**

The development of a thesis topic is a primary goal of the course, and it is done throughout the semester by the student in consultation with the professor for the course, their peers, and the economics faculty. Ideally, students start the semester with one or two areas of interest and even particular questions that they might like to explore. As discussed, students are given guidance in how to form their ideas into a feasible research project. They are also given an outline to follow, and are encouraged to highlight potentially difficult issues rather than smoothing them over, in order to facilitate discussion and project development. Through a series of proposal drafts and opportunities for presentation and discussion, the students work to develop a clear, feasible, and interesting thesis proposal.

In the spirit of jumping right in, I ask students to write a preliminary proposal in the first week of class: a one-page proposal that has a clear question, working hypothesis, brief background, explanation of why it is of interest, and list of challenges. Accompanying this, I ask them to write a preliminary literature review, making a few substantive points by drawing on three to five articles in the area. This is a modest, if abrupt, start, and subsequent drafts of the thesis proposal and the associated literature review are more extensive and sophisticated. Figure 1 shows the proposal outline they are asked to follow. I ask them to keep the proposals to under two pages. When reading the successive drafts, I focus more and more on the section which identifies challenges and current questions.

The discussion of the thesis proposals – questioning, interacting, reading, thinking – is where most of the real work happens. This interaction is crucial to helping the students develop their ability to “think like economists.” Fostering the students’ own ability and courage to comment constructively on each others’ work is an important underlying goal of the course, and

as the semester progresses the students do substantially more of that. My comments are aimed at helping students focus their topics, become familiar with the relevant literature, think carefully about the fundamental economic theory, and consider empirical feasibility.<sup>4</sup> Online discussion can take place using wikis, blogs, or discussion boards within course-management sites. Blogs and wikis are much less linear, and allow a more fluid and vibrant online discussion to take place. A wiki, in particular, allows the thesis proposals to be dynamic documents that evolve throughout the semester based on input from the participants in the class. Each student is also matched with one or two other faculty members whose interests line up well with the student's, and expected to consult with those faculty members at various points during the semester.

By the end of the semester (usually earlier), students should have developed a finely-tuned thesis proposal that sets out an interesting and feasible research project. At this point they are asked to present their thesis proposal to the entire economics faculty. Since most students have neither made nor observed many research presentations, we prepare by practicing in class and discussing the elements of a good presentation. Guidelines, such as the "Top Ten Tips for an Effective Presentation" provided by the Committee on the Status of Women in the Economics Profession, provide a good foundation. Students present to the class (a familiar and comfortable audience), and we provide comments on strengths and weaknesses. By late in the semester, students have generally become sufficiently comfortable in the group and confident in their own skills to talk and comment freely. This small preparation can produce presentations that are clearer and more focused, with students showing greater confidence in their ability to talk with ease about their projects, answer questions, and think on their feet.

## **Course Elements: Tools for Economic Research**

The acquiring of economic research skills is the second major goal of the seminar. It is more basic, and also more elusive. These skills include: formulating a good research question, framing a good project, researching the literature, critically reading journal articles, formulating economic theory, analyzing data, interpreting results, and conveying ideas clearly orally and in writing. While these are skills that graduate students generally pick up along the way, this course tries to structure a process through which undergraduate students learn these skills via a combination of instruction, guidance, and practice. The tools elements can be interspersed with the thesis topic development in a variety of ways.

### *Thinking like an Economist*

Reading, responding to, and discussing economic journal articles is an important piece of the course. This is a moment in which students move from being passive consumers of economic theory to critical and active consumers who are ready to be producers. Students read journal articles, write response papers to those articles, and engage in a lively class discussion of the theoretical and empirical issues at hand. The idea is to move the students towards thinking, talking, and acting like economists. I don't want them to say "Yes, I read that paper, it says x y z." I want them to say "Yes, I read that paper, and I found x compelling, but I'm concerned about y and would like to see the authors do z. Maybe we should read a, b, and c and check with person K to see what he thinks." The response papers provide good material for these discussions, and two or three students are also asked to be "on panel" for each article; this means they are expected to be the resident experts during the discussion.

The reading and discussion of journal articles is instrumental in teaching students to think like economists. A well-chosen and diverse group of articles can provide numerous and varied

opportunities to learn about context, theory, identification, and presentation. The faculty member can choose some articles herself or himself, colleagues often have excellent suggestions, and students can be asked to suggest articles of interest to them. I tend to seek out articles that will provide learning opportunities, not simply classic articles that have stood the test of time and are universally admired. It's really about getting inside the research process. Students are particularly intrigued when they are given a chance to look inside an ongoing research project of the professor or an economist on campus to give a seminar; they can read the paper (or even multiple drafts thereof) and hear about the process first-hand.

### Analyzing Data

The second major skill we focus on is data analysis. All students will have taken at least one econometrics course in which they have learned how to test economic hypotheses using data. However, given the constraints on the econometrics curriculum in most institutions, they have generally solved well-defined problems using clean data. If they do an empirical thesis, they will need to find data and design a set of econometric tests, a process that will be much messier. The data analysis project in this course is designed like a more difficult lab experiment – students are asked to investigate a very simple economic research question from start to finish. The assignment is to find a data set (hopefully relevant to their thesis), summarize the data, state a hypothesis, and test that hypothesis using the data.

To the uninitiated students, this assignment sounds simple. As they proceed, students discover that each step presents its own challenges, and they are able learn techniques for confronting those challenges. This assignment also gets students started using an econometrics package (such as STATA), and provides some an opportunity to do preliminary analysis for their project early on.<sup>5</sup> We do this assignment in a collaborative way – I provide initial advice on

strategies and techniques, and then circulate among the students making comments as they work. At the end, we discuss the final projects in class, trying to draw general lessons from the experience. Subject to the limits of interest and time, students can be given an opportunity to produce a revised project based on comments they have received. There are other possible variations on this assignment – e.g., asking students to answer a set research question using data provided to them or data that they find from a particular source such as the Inter-University Consortium for Political and Social Research (ICPSR). However it is done, this project moves the students a step closer to producing economics, and often provides a useful building block for their larger project.

### Creating Theory

While most students pursue empirical projects, some are interested in more theoretical pursuits. In recent years, several students have completed a hands-on theory project that mirrors the data analysis assignment. This is of a much more varied nature; it must draw its structure from the particular theoretical question under investigation. Students can develop a simple proposal where they intend to investigate a small bit of theory, such as rederiving a theoretical result under slightly different assumptions, or solving a game under different incentives or with different players. This is a different sort of challenge than the data analysis project, and requires a bit more creativity and vision. With a focused approach and positive guidance from a faculty member, it can work well to move a student along on a theoretical project.

Just as students doing theoretical projects need some exposure to data analysis, so too do students doing empirical projects need some exposure to theory. This is often begun in class discussion or individual meetings with faculty, where students are forced to make some hard choices and come up with a simple yet workable model.

### Library Research and the Literature Review

There are a number of other research skills that are important for the students to acquire. Library research skills can be a good place to start, especially for a generation of students whose main research tools are Google and Wikipedia. Librarians are often eager to introduce students to library resources, explain how to conduct a literature review, and discuss methods for locating and acquiring data. In some institutions, librarians may even be interested in meeting one-on-one with students, assisting them with their research, and advising them on potential avenues.

I have been fortunate to have found a willing collaborator in the library, and we generally conduct several sessions together with the class. The first introduces students to basic tools and methods for searching the literature, such as EconLit or the Social Science Citation Index. This is followed closely by an optional session on how to use bibliographic management software such as EndNote. I coordinate these sessions with a literature review assignment, in order to give the students the tools they need to actually complete the assignment. Interestingly, it has worked out well to have the students try to do a preliminary literature review – 3 to 5 relevant articles – before learning anything from the librarian. It seems that the experience of doing it without much guidance makes them realize that there actually is something useful to learn about how to find information in a structured manner. Actually writing the literature review provides them an opportunity to test and develop their critical reading skills; they are asked to provide some structure and find a narrative thread in what they read, not merely to summarize blandly.

The second session with the librarian addresses finding data, and can be held several weeks into the semester. This too is something that students have little idea how to attempt, why it is necessary, and why it is difficult and time-consuming. Working through some of the common search methodologies can give them some idea where to start. It is also, of course,

important to get them to think clearly about what they are seeking – ideal data, serviceable data, unacceptable data.

To be sure, there are other library-related research skills, beyond reviewing the literature and finding data, that students can learn. Moreover, students may come into the class with a broad range of skills – these may be more substantial as more institutions make “information literacy” a higher priority. A course can be flexible enough to accommodate this diversity, and collaboration with a knowledgeable librarian or someone else from a research staff can work out very well.

### Writing and Presentation

The final act of economic research is the presentation of the work and the results, generally orally and in writing. As discussed above, oral presentation skills can be cultivated through discussion and practice towards the end of the semester. I usually offer straightforward advice about how to construct a clear and compelling presentation, how to deliver remarks with clarity and confidence, and how to answer questions intelligently and respectfully.

Students generally have had more experience writing papers, but not necessarily economics research papers. Their writing skills for this purpose can be developed by working through the drafts of the thesis proposal and response papers; a small seminar makes it possible for the professor to provide detailed comments and to have individual conversations with students about how to present their work. Many institutions have writing advisors or a writing center, and these resources can potentially be incorporated. For some students, it is important to emphasize that presentation of the work is not an afterthought, and that good economics and good writing will reinforce each other. Deirdre McCloskey’s book, *Economical Writing*, expresses this and other choice advice quite eloquently, and can be helpful.

## **Feedback and Evaluation**

Grades in the seminar are based on all of the work discussed above. In establishing the structure of the coursework and the grading scheme, one must balance the oft-conflicting goals of providing enough independence so that students are able to follow their own interests but also motivating students to do key pieces of assigned work. In my course, I have based 40% of the grade on the thesis proposals, 40% on the various “tools” assignments, and the remaining 20% on class participation.

### *The Thesis Proposals*

The thesis proposal is clearly a central piece of the course. Accordingly, the thesis proposal represents 40% of the grade, with 10% of the grade assigned to each of three drafts and 10% assigned to the final presentation. The thesis proposals generally develop continuously from one draft to another, although there are usually a few students who try out two different proposals at the beginning or who switch topics entirely between versions. Proposals are graded based on the quality of the research project and the clarity of exposition. Essentially, the proposals are graded based on how they are progressing towards a feasible and interesting economic research project. Accordingly, grading standards evolve as the semester progresses – a proposal that is very good for a first proposal is probably not as good for a third proposal. Particularly because students are encouraged to highlight potential difficulties (such as a weakness in their theory, a problem with the data, etc.), I grade them not on how polished the proposal is but on whether it is developing well.

The final presentation is graded separately from the final proposal, based on the extent to which the presentation is a clear exposition of a viable and interesting economic research

question. Students are also expected to handle questions intelligently, and be able to engage in a discussion with the audience about any issues that arise.

### Response Papers

Reading, responding to, and discussing economic journal articles is an important activity in the course. Students are asked to write brief one-page response papers to the articles under discussion, and to write a longer two-page response paper when they are “on panel.” The response papers can represent from 20 to 30% of the total grade. The primary criterion for evaluating the response papers is the student’s intellectual engagement with the material, and application of strong critical thinking, sound economic theory, and solid econometrics. Students are not expected to engage with the article on every level and every issue, but merely to raise a single methodological or theoretical issue and show that they are reading actively and applying their knowledge of economics. If the response papers are posted online, students can engage in further online discussion, which can be very fruitful.

### Analyzing Data or Creating Theory

The small project that asks students to analyze some data or develop a bit of theory is really asking them to do a tiny paper in itself. I grade this quite simply based on the quality of what they’ve done – not the quality of the results, which are often largely absent – but the quality of the methods and the effort. I want to see that they’ve been able to explain their data by highlighting important features without overwhelming the reader with irrelevant detail, and that they have clearly stated and tested a hypothesis that is at least somewhat interesting. Given the narrow range of the assignment and the short time-frame, discussion of the shortcomings of the data and the econometric approach are certainly appropriate (in lieu of actually addressing those shortcomings.) A theoretical piece can be assessed by considering to what extent the exercise

was handled in a careful and rigorous manner, and one that indicates an understanding of the theoretical issues at hand.

### Class Participation

As is the case in many seminar courses, engagement in class discussion is as important as it is difficult to grade. One possible approach is to grade each student based on the extent to which he or she seems to be engaging in the whole endeavor of developing a thesis topic and learning how to do research. While this engagement can take many different forms depending on each student's character, it is not extremely difficult to assess whether the student is very engaged, somewhat engaged, or unengaged. This is my personal metric, and I try to assess their participation in class discussion, online, and outside of class. I assign each student a letter grade for each two to four week period (standards change with the rhythm of the semester), and average these at the end, to comprise approximately 20% of the overall grade.

### **Student Perceptions**

In an ideal world, students would see the purpose of each pedagogical venture with perfect clarity. In reality, that is not the case. In this course, students may have different reactions to being asked to take responsibility for their own research project, and to working independently. Many are accustomed to being guided through a set of carefully orchestrated educational experiences. While this course is certainly orchestrated, the freedom and personal responsibility can obscure the organization. Not having had the experience of being thrown into research without any preparation, they may be more likely to perceive the lack of structure (relative to previous courses) rather than the presence of structure (relative to being thrown into research alone.) Most students, however, seem to appreciate the structure of the course:<sup>6</sup>

The expectations were made very clear in the syllabus and we were always encouraged to ask questions and discuss economic issues in class. I think the class went from being rather silent and uncertain of how to approach each other's topics to being very open and constructively critical. Comments went from being general, vague, and not always relevant to being pointed and concise so I think we all learned to think better in economic terms.

I think the discussions of each other's topics, and the data project, made me feel as if I was making real progress instead of floundering around trying to get a foothold on the process.

The challenge, however, is for the students themselves to create the time to devote to the development of their own projects. Even with several deadlines and assignments, students are always short of time and can easily shirk this task. It is not easy to create an appropriate incentive mechanism that will elicit the optimal effort on their part. Indeed, if one places a high value on the student's own motivation and ownership of *their* independent project, such a mechanism is not even desirable. There is simply an unavoidable tension between providing incentives and giving them independence. I have tried to address this by exhorting the students to make the project their own, to do something exciting, to work harder than they have worked before. Many seem to appreciate this type of encouragement and confidence in their abilities:

Aggressive deadlines were very helpful in keeping us on track.

[H]igh expectations in the beginning meant that I was always prepared to work hard. I think [the professor] managed to achieve a coherence to the class, despite the great variety of topics and interests of the students.

Thus, while explanations about the ambiguity of the research progress are useful, they cannot replace the actual experience of pursuing an independent project fraught with its unique challenges. Even at the end of the semester, with little time to give them perspective on the

experience, most students seem to appreciate the value of the course and what they have achieved:

I think I'm more ready to write a thesis than I would have been without the seminar – it was especially helpful for thinking about econometric and data issues.

[The class was] great. Learned how to really delve into economics papers, got a good start on a thesis topic that I enjoy, classroom environment was stimulating and fun... I appreciate how [the professor] challenged me. Critical reading of econ papers was very fun and helpful.

I enjoyed this class very much, not least because it gave me confidence in my ability to apply economics I have learned since Economics 11 and be comfortable discussing it with my peers.

Overall, the students seem to think they have accomplished the two primary objectives of the course: they have developed decent thesis proposals and they have learned useful research skills. Many of them also seem to have gained an appreciation for the joys and challenges of economic research, and gained confidence in their own ability to bring their economics training to bear on interesting questions.

### **Situating the Course**

The foregoing text describes one way of mounting an undergraduate research seminar of this kind. There are, indeed, many many variations on this theme. No course will work perfectly for each student, each professor, or each institution; hopefully a course can be flexible enough to work reasonably well for most. This model can easily be adapted to other institutional settings or cultures, while maintaining a good degree of flexibility. In this section, I discuss some issues related to situating the course in other contexts.

Regardless of the institutional setting, preparing students early and laying a strong foundation can make things go much more smoothly, if only by offering students some of these learning opportunities and teaching them some of these skills earlier on. Structures that connect students with research opportunities either on-campus or off-campus, encourage them to take challenging seminars, provide opportunities to hear guest lecturers or attend conferences, and generally spark their interest in economic research, can all work to lay a strong foundation. These goals can be accomplished via a formal “honors track” or more informal means, depending on the institutional culture.

Setting out these opportunities can also provide a means for selecting students into the thesis seminar or the honors track. Universities and colleges vary widely in the number of economics majors they serve, the academic goals of those students, and in the faculty’s interest in selecting a certain group for this endeavor. All sorts of selection mechanisms can come into play, from a grade cutoff, to some indication of preparatory work, or better yet some sign of commitment to the effort. Whatever the specific process, students will benefit greatly from knowing what it means to do a senior project or thesis at that institution – they can learn this by attending thesis presentations, reading past theses, talking with faculty, or talking with alumni who have gone through the process.

The reason selection may be necessary is that the course, as described, really does need to be less than 15 students to work well. Research is very individualized, and the seminar needs to be able to make enough space for all of those separate topics. It would be possible to have a larger group and several break-out groups, and to incorporate graduate student mentors as well. If there are enough students to separate the course by field (even just micro vs. macro), that could potentially improve the ability of the group to focus on the particular topics. The broad

point is that this collective learning of somewhat intangible skills, combined with the development of specific individual projects, best happens in a small group that can be cohesive and supportive.

An additional reason to think about laying a foundation and selecting students is to be able to determine where exactly to start the seminar. If students are sufficiently prepared, the course could be offered in the junior year. If students have done foundational work and have started their projects to some degree, the course can take this additional preparation into account. At a minimum, students should have completed their core theory courses; it is advantageous if they have also taken advanced theory courses and an upper-level seminar in which they have had the opportunity to engage with current research and possibly write an independent paper. Timing and pre-requisites can vary greatly.

In most institutions, it makes sense to build on the foundation established by the economics major and any broad university-wide requirements, as well as to draw on institutional resources. Seminars, brown-bag lunches, writing tutoring, computer training, data support, library training – all of these can be brought into service to the economics senior seminar and project, with very little direct effort by the professor for the course.

Other resources can also be helpful, and can be worked in depending on the professor's preferences and the students' interests. A small library of relevant books – such as Steven Greenlaw's *Doing Economics*, Thomas Wyrick's *The Economist's Handbook*, or Peter Kennedy's *A Guide To Econometrics* – can be made available to students at specific junctures or just more generally. Students can find chapters or passages that align with their personal approach or help them with their own individual challenges. A course website can provide a space for discussion of assigned articles, student blogging about their projects, or general

discussion. Students can be sorted (or sort themselves) into small “research groups” with similar interests, giving each other comments on their proposals and ideas as they develop. Other faculty can easily check in on student progress if it is posted regularly online, and feedback can be shared to whatever extent the various parties are so inclined.<sup>7</sup>

The underlying theme here is that nearly all elements of the course – timing, specific assignments, skills addressed, resources used – can be varied or modified. The beauty of this is that the course can have a fluid structure that adapts to the faculty member’s preferences, student preparation and interests, and institutional culture. Some elements may be extraneous in some settings, others may be essential, still others may be entirely missing from the above discussion. The course can evolve to meet the needs of the students and the institution, with the broad goal of getting them started in the right direction with some confidence and a few useful tools in hand.

## **Conclusion**

While undergraduate economics majors learn a lot about economics, they do not generally learn how to *do* economics. They have probably not been taught how to formulate a well-defined and interesting research question, how to design a feasible research project to answer that question, and how to go about testing a hypothesis. It is inevitable that students struggle with making the difficult transition to doing original research, and that faculty struggle to assist students in this endeavor. Those of us who persist in this effort do so because we acknowledge the importance of this capstone experience, the knowledge and experience to be gained from actually completing a research project of one’s own. The collaboration of students and faculty in this research endeavor can be a stimulating, if challenging, culmination of an undergraduate education in economics.

The seminar described above, quite simply, is meant to help where help is needed. It is intended to prepare students to do their own independent research and thereby to ease this transition and improve the experience. While many economists would argue that “the art of doing economics” must be learned along the way and cannot be taught, it seems worthwhile to give it a try. The course I describe aims to be a rigorous and dynamic structure for preparing students to do economic research, and to do their best independent work. The idea is to give the students a strong foundation in most of what they need, help them learn how to figure other things out for themselves, and get them on their way to doing sound economic research.

#### NOTES

<sup>1</sup> For most of this paper, I refer to the senior project as a thesis, although it of course need not have that particular designation.

<sup>2</sup> For example, one student in social policy seminar used as a primary text a former student’s thesis modeling the choice to become homeless. This was not assigned, but rather found by the student following the professor’s suggestion.

<sup>3</sup> Admittedly, “interesting” is an ambiguous and subjective term. I mean it to be broadly defined, primarily indicating that the project has some economically substantive content, and is something about which the student himself (at a minimum) is curious. Examples of interesting projects range widely: the impact of globalization on markets for English football, a study of home bias in equity markets, intellectual property protection in developing countries, an investigation of low take-up rates for public health insurance.

<sup>4</sup> My comments are of various kinds. For the earlier drafts, I often ask students to focus their topic further, and give them suggestions of how to do that. I will frequently suggest specific journal articles to read, or point them towards textbooks, chapters in a *Handbook*, or review articles in the *Journal of Economic Perspectives*. This is also facilitated by their one-on-one meetings with faculty whose interests are close to their particular topic. I often push students to think carefully about the fundamental economic theory – what is the utility function in the model, who is maximizing what, what is in the production function, who are the economic actors, what is the nature of the information, etc. I also make many comments about empirical feasibility, and often find myself reminding students that a strikingly interesting question that remains unanswered may be so because it is extraordinarily difficult to test empirically.

<sup>5</sup> I also give them the opportunity for more formal training in econometrics packages, which many find helpful after they’ve struggled on their own for a while.

<sup>6</sup> The quotes in this section are excerpted from anonymous course evaluations completed by students in the course over the past several years. At the end of the semester, students were asked open-ended and general questions about the course and the professor. These evaluations

were not made available to the professor until after grades had been completed, and were typed to preserve anonymity.

<sup>7</sup> In some ways, these resources can serve as a “grab-bag” of sorts, from which students can pick what works well for them.

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**Table 1. Sample Course Schedule**

<i>Section</i>	<i>Week</i>	<i>Tuesday</i>	<i>Thursday</i>
<i>Intro</i>	1	Introduction to the course - Overview of the course - Discuss topics Beginning the process - Overview of the research process - How to develop a project Discuss summer reading	Topics – discuss - How to read papers (brief) * preliminary proposal and preliminary literature review due next Monday
	2	Topics and Proposals - How to develop a project - How to write a proposal - Match with faculty, meet w/ faculty Topics – discuss	Library Research - How to write a literature review - Learn about research strategies, finding articles, developing a bibliography, reviewing the literature * proposal 1 <sup>st</sup> draft due next Monday
<i>Topics</i>	3	Topics – Proposal draft 1 Topics – discuss * EndNote orientation tonight	Data - overview of economic data - library resources for Data
	4	Topics – discuss Articles – how to read	* work with faculty: meet weekly, set work plan, refine proposal
<i>Tools</i>	5	Article discussion (panels 1, 2) * prepare panel presentations and response papers	Article discussion (panels 3, 4) * literature review due
	6	(no class)	Article discussion (panels 5, 6)
	7	Article discussion (panels 7, 8)	* proposal 2 <sup>nd</sup> draft due (with faculty comments)
<i>Topics</i>	8	Topics – Proposal draft 2 Topics – discuss	Topics – discuss * find data for data analysis project or plan theory project
	9	Topics – discuss * continue refining proposal	Topics – discuss
<i>Tools</i>	10	Data analysis - overview and intro - begin data project in computer lab	STATA - introduction to STATA - continue projects
	11	* Data analysis or theory project due	Discuss projects * continue developing proposals
<i>Topics</i>	12	(no class, Thanksgiving week)	(no class, Thanksgiving week) * final proposal due next Monday
	13	Topics – Proposal 3 (final) Topics – discuss - prepare for presentations	Topics – discuss
	14	Proposals – Presentations * presentations to the department	Proposals – Presentations * presentations to the department
	15	Wrap up	

Note: assignments are marked with an asterisk, and listed close to their due date.

### **Figure 1. Thesis Proposal Template**

- Question: What are you asking, or what is your topic?
- Area: What is the larger topic area, and how does this fit in?
- Relevance: Why is it interesting?
- Theory: What is the analytical framework?
- Methods: How will you do it? Model, data, analysis.
- Issues: Any particular challenges, concerns, thoughts, or questions?
- References: List relevant articles.