MOTIVATING QUALITY RESEARCH IN ECONOMICS CAPSTONE COURSES

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Abstract

There has been a proliferation of capstone experiences in economics. These experiences often require that students complete original research and write a lengthy paper, a task that many undergraduates find intimidating. This paper explores methods that reduce anxiety and incentivize undergraduate students to create new knowledge through quality research by examining our capstone seminar experience at a small Midwestern university. The paper recommends encouraging high-quality student research by breaking projects into manageable parts, having explicit grading criteria, and using peer review. Students also benefit from sharing their work with others through oral presentation and publication in undergraduate journals.

Key Words: capstone course, pedagogy, undergraduate research, active learning

JEL Classification: A22

Introduction

The role of incentives in motivating desirable economic behavior is central to economic theory and dominates economic policy discussion. However, we sometimes miss opportunities to provide students with readily available incentives to do high-quality research. Focusing on a research-oriented senior seminar capstone course at a small Midwestern university, this paper explores several best practices that increase the quality of undergraduate research in capstone courses:

- Require students to make an original contribution;
- Break senior research projects into multiple graded parts of written work and oral presentations and always provide a clear grading rubric;
- Require students to review each other's work to introduce the motivating force of peer pressure;
- Encourage students to share what they learn with each other and through conference presentations;
- Encourage students to publish and review articles in undergraduate journals.

Require Students to Create New Knowledge

Hansen (1986, 2001) argues that economics programs will be most effective if they help students develop specific proficiencies. Traditional classes that emphasize only lectures and exams cannot achieve these proficiencies. Writing and active learning are also important (Feyrer, 2017; Schmeiser, 2017; Walstad & Saunders, 1998). Hanson's six proficiencies are:

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1. Access existing knowledge
2. Display command of existing knowledge
3. Interpret existing knowledge
4. Interpret and manipulate economic data
5. Apply existing knowledge
6. Create new knowledge

Hansen (2001) ranks the proficiencies in order of cognitive requirements, with proficiency number 6 generally being reached in a senior capstone experience involving research and at least one paper. Completion of a well-designed capstone experience involves the application of all six proficiencies. Hansen (2001) emphasizes the importance of helping students develop these proficiencies throughout the economics curriculum with the types of active learning advocated by Walstad and Saunders (1998).

There is increasing recognition of the importance of undergraduate research in the curriculum (Hoyt & McGoldrick, 2017; McGoldrick, 2007; Siegfried, 2001), and economics capstone courses have become more prevalent in recent years. These capstone courses take different forms depending on program characteristics and student skills. (e.g., Conaway, Clark, Arias, & Folk, 2018; Feyrer, 2017; Li & Simonson, 2016a; Raymond, Deck & McCrickard, 2013). Undergraduate capstone experiences occur at R1 universities, state colleges, and small liberal arts institutions.

The purpose of this paper is to describe a capstone course at a small Midwestern university that has a mix of liberal arts and professional programs. We offer our capstone course during the fall semester and require all senior economics majors to complete this course as part of the economics core. It is essential to offer the course in the fall so that students have the opportunity to extend their research through the spring if they choose to do so. Some of our best students choose to extend their research into the spring by pursuing "research honors" in economics under a faculty committee's direction. Others continue their research through the spring in an advanced research seminar or an independent study course.

Successful capstone courses are often supported by a curriculum that emphasizes writing, statistics, and econometrics. However, many curricular models prepare undergraduates for quality undergraduate research. For example, Butcher and Weerapana (2017) describe a research-oriented program at Wellesley College, Feyrer (2017) outlines a program that emphasizes active learning at Dartmouth, and Brunnermeier (2017) explains how Princeton prepares and incentivizes students for a quality senior thesis experience. However, elite universities do not have a monopoly on high-quality capstone experiences. For example, Li and Simonson (2016) describe and assess a well-designed research-oriented capstone experience at Minnesota State University: Mankato. They found that "Despite substantial differences in the academic backgrounds of our students, the outcome from this capstone course rivaled successful capstone and senior research experiences reported in the literature" (p. 365). They found that students who completed their new research-oriented capstone course were more likely to pursue graduate school and be successful in blind review research competitions.

Econometrics is an essential preparatory course for senior research. An ideal econometrics course would require students to write an empirical paper that involves multivariate analysis (Klein, 2013). Students who have taken such a course during their

Sophomore or Junior year are comfortable with basic econometric methods and writing a technical paper before starting the capstone senior seminar course.

In addition to econometrics, senior capstone seminar students benefit from having many opportunities to write within the major. McCloskey (2000) argues that students learn solid analytic thinking through writing and that requiring writing in courses is essential. Fisher (2019) shows how research and writing are possible in introductory economics courses. Schmeiser (2017) presents several innovative ways that Mount Holyoke College uses writing throughout the economics curriculum. She concludes that offering a "variety of types of assignments throughout the economics curriculum helps students learn critical and clear thinking, engages them, and helps them prepare for a career" (p. 262). This type of departmental commitment to developing writing skills also prepares students for a capstone senior research experience.

While a bit nerve-racking for students, the requirement to make an original contribution helps motivate them. Often the contributions are not earthmoving and sometimes involve as little as analyzing a new data set with an already developed model. Still, the prospect of sharing their findings energizes students.

The instructor's primary role in a capstone senior seminar course is to serve as a mentor and occasionally as a demonstrator. McElroy (1997) suggests that students benefit when instructors share their research and become fellow participants in the seminar process.

> The seminar's most distinguishing feature is the equal participation of the instructor, creating his or her research paper and presenting mini drafts of each component about one week before similar student assignments are due. These written "demonstrations" underscore the importance the professor places on research and writing, clarify expectations, and minimize questions about format, style, and audience. Along with their verbal justifications, the demonstrations also allow the professor to model in a staged sequence, concrete solutions to specific problems the students are also confronting how to limit the question, select appropriate variables, interpret results, and draw out research and policy implications. The demonstrations also provide the professor with an opportunity to solicit student comments and incorporate their suggestions. This helps create a collaborative and participatory classroom atmosphere. (McElroy, 1997, p. 33).

The instructor's participation has been an essential component of our senior capstone course for the past 30 years. Students enjoy having the professor writing along with them and modeling the research process in real-time. These student-professor interactions in the seminar have resulted in much co-authored research with students after they graduate. Mentoring relationships often become professional partnerships.

Allowing students to choose their research topic is an important feature of our senior seminar course. As long as the chosen topic has economic content, we approve it. When students choose a topic that they are passionate about, they are more likely to be fully engaged and, in the end, make an original contribution. Since the topics vary greatly, we require that senior seminar participants consult with at least two faculty members about their topics. The entire department becomes consultants who are readily available to help students with ideas and guide them toward appropriate literature. Students enjoy sharing research with faculty members, and faculty members enjoy being part of the creative process.

Break Big Projects into a Set of Small Graded Projects

Many senior seminar students are overwhelmed by the requirement to complete an original research project, write a lengthy paper, and formally present the paper to the seminar. Our senior seminar course attempts to relieve this anxiety and prevent procrastination by dividing the senior project into several graded components. Students also make several formal oral presentations during the semester. Breaking the senior project into multiple graded parts relieves some of the stress and motivates the entire process with a set of rewards given throughout the semester. Table 1 details the assignments for fall 2019, in chronological order.

Table 1: Seminar Assignments in Chronological Order

	Points
First visit to two faculty mentors	10
Second visit to two faculty mentors	10
3-page review of a survey article	20
4-page research topic proposal	50
2-page review of *Undergraduate Economic Review* submission	20
3-page review of research paper	20
Lead discussion of sample research	10
Research proposal	50
Research proposal presentation	20
Presentation of theory	10
Presentation of empirical model	10
Presentation of results	10
Annotated bibliography	40
Draft of first part of senior project	50
Draft of complete senior project	100
Oral presentation of senior project	100
Final draft of senior project paper	300
Participation grade	100

Since students choose their research topics, mentoring students on content is difficult. However, the freedom to choose does motivate students because they enjoy researching something that has real meaning. This year's senior seminar topics range from an analysis of the U.S. vs. China trade war to college majors' earnings premiums.

After topic selection, students complete a series of graded assignments on related literature, including three critical article reviews and an annotated bibliography. Students reflect on how they intend to incorporate the articles' content into their projects in the annotated bibliography. They also write reports about the content of office visits with faculty members where they discuss their projects and get ideas on related literature.

The senior seminar research paper proceeds in four stages. Students understand that they are making progress toward their final paper by completing each stage. This reassurance that small manageable assignments will turn into a comprehensive research paper provides some comfort to students who are intimidated by the idea of doing an original research project. First, students write a research proposal (50 points) that establishes the project's feasibility, provides relevant background information, and argues that the research question is important. Second,

students submit a draft of the first half of their research paper (50 points) that includes several sections of the paper: introduction, review of related literature, theory, statement of research hypotheses, description of data, and development of the empirical model. Third, a rough draft of the entire paper (100 points) is submitted about two weeks before the semester ends. Fourth, students polish their draft, hopefully responding to instructor feedback, and submit their finished papers (300 points) at the end of the semester.

Students submit each draft electronically as a Word document. We use the "Track Changes" feature of Word to make comments and suggestions. Students appreciate the feedback and generally respond with constructive changes in each subsequent draft. This iterative approach with multiple graded drafts and constructive feedback breaks the large research project into manageable parts. When students receive positive feedback on early assignments, they gain confidence in their work and are more likely to have the incentive to work toward the best possible final product.

Much of the in-class seminar time is devoted to student presentations of their research. Peer pressure is a great motivator, and students seem to work hard in preparation for these presentations. During the semester, students make five oral presentations:

1. Research proposal presentation
2. Theory presentation
3. Empirical model presentation
4. Results presentation
5. Final paper formal presentation.

The first three presentations permit students to get frequent useful feedback to prepare for their final presentation. This sequencing also makes the final presentation less daunting since the earlier shorter presentations allow students to prepare PowerPoint slides and other materials well in advance of the final presentation.

While the course content and the many requirements may seem overwhelming, there is a distinct advantage to this approach. Breaking the project into many components encourages students to make a steady effort throughout the course. The result is less anxiety by students who would otherwise procrastinate and more student satisfaction with the final products.

Use Peer Pressure through Peer Review

Peer review is an essential component of our senior seminar course. As mentioned above, there are plenty of opportunities early in the seminar for students to review each other's work. The instructor attempts to create a healthy atmosphere where students offer constructive criticism to help each other. The early semester short presentations result in some of the best constructive peer discussions.

About three weeks before the end of the semester, students are paired up and exchange complete drafts of their papers for an extensive review. The reviewers do not grade their partners' papers but offer constructive ideas in light of the instructor's grading criteria. Specific grading criteria help the student reviewers focus on the same aspects of the research that the instructor uses for determining grades. The idea is for the reviewer to help the author add value to the paper by focusing on important issues. For example, the criteria direct the reviewer to consider specific questions:

- Does the introduction carefully develop the research problem?
- Is it clear how the reviewed literature relates to the research problem?
- Does the theory fit the research problem?
- Does the theory suggest a testable hypothesis?
- Is the empirical research design appropriate to test the research hypotheses?

Without this direct guidance, peer review sessions quickly devolve into copy editing sessions that do not focus on organizational and content issues.

We also engage our students as reviewers for our two undergraduate journals. The first is a journal that only publishes papers authored by students from our university. The other is an online journal that accepts submissions of undergraduate economic research from students around the world.

A survey of 17 student reviewers indicates some benefits from engaging students in the review process (Davis-Kahl, et al., 2013). For example, we suggested several possible benefits from the review experience and then asked the student reviewers to indicate the extent that they experienced each benefit. The possible responses ranged from "yes, definitely" to "not at all." Benefits that received at least 75 percent of the responses in the "yes, definitely" and "somewhat" favorable categories were:

- Exposed me to other models of research and inquiry
- Helped make me more aware of using data as evidence in my writing
- Offered a model for my writing
- Helped me further develop analytical thinking skills
- Helped me learn about other areas of economics
- Helped me to learn new applications of economic concepts
- Improved my understanding of how articles are reviewed and selected in professional journals

Also, most of the 17 respondents felt that the review process was a "valuable use of their time," and most felt that reviewing offered "evidence of co-curricular activity on their resume."

Incentivize Quality Research by Requiring a Formal Public Presentation

Students make a formal presentation of their research paper during the last week of class. Faculty members also attend. We also encourage students to consider presenting at a campus-wide undergraduate research conference that takes place every April. Scheduling the capstone course for the fall gives students plenty of time to prepare for spring conferences.

Conferences like this are a great way to recognize students' research publicly and give them opportunities to present to broader audiences. In the process, students build confidence and improve their formal presentation skills. Conference presentations seem to increase student interest in research.

We encourage students to present at professional meetings. There are undergraduate sessions at the Missouri Valley Economic Association meetings in the fall and sessions at the Midwest Economic Association and Eastern Economic Association meetings in the spring. The undergraduate journal *Issues in Political Economy* organizes undergraduate sessions at the Eastern Economic Association meetings. This initiative is an excellent idea because it links two beneficial co-curricular activities: journal publication and student research presentation.

We are fortunate to have a dedicated university budget to support student presentations off-campus. Several students have taken advantage of this resource to present at various venues, including the Carroll Round Conference on international economics at Georgetown University and undergraduate sessions at the Missouri Valley Economic Association meetings, the Midwest Economic Association meetings, and the Eastern Economic Association meetings. Students who give off-campus presentations seem to benefit from the opportunity to interact with highly motivated peers from other institutions and from the feedback and encouragement that they receive from professional economists at these conferences. These experiences seem to pique their research interest and provide encouragement to pursue graduate study.

Incentivize Quality Undergraduate Research by Providing Opportunities to Publish

Research on economics education has a long-standing interest in the importance of active learning (Brunnermeier, 2017; Walstad, & Saunders., 1998). Engaging students in original research and presenting that research is one of the best active learning devices. Writing requirements are increasing in economics programs, with a survey of 254 economics departments reporting that 70 percent have some sort of formal writing requirement (McGoldrick, 2008). With the increase in writing at the undergraduate level, it seems that providing undergraduate publishing opportunities would give students an incentive to publish. The importance of sharing undergraduate research is receiving increasing attention in the literature. For example, DeLoach, Perry-Sizemore, and Borg (2012) refer to a joint statement by the National Association of Undergraduate Research, and the National Conferences on Undergraduate Research suggests a four-step research process. The last of the four steps is to share research findings with others. Undergraduate publications can play an important role in incentivizing quality research and complement a department's writing-intensive capstone experience (Carlson et al., 1998). In addition to motivating students to publish, undergraduate journals can show students examples of high-quality student work that might serve as models for their research.

At present, there are not very many opportunities for undergraduate economics students to publish their research. However, technological changes have made web-based open access publishing a real possibility for many economics departments (Carlson et al., 1998; Suber, 2012). Any program that emphasizes writing and active learning could benefit from helping students establish a journal. Also, today's students desire to have a positive online image. Publishing in a reputable online journal helps them create a favorable image (Martinez, Alemán, and Wartman, 2009). It is reasonably easy to get started. All that is needed are concrete guidelines to authors, explicit criteria for assessing submissions, and a web page with a table of contents and links to accepted articles. There must also be a faculty advisor who can monitor the project and a student Editor-in-Chief to coordinate article reviews and make final decisions. Departments should consider choosing their Editor-in-Chief from students who have paid student assistantships to assure consistent time commitments.

Our department, in cooperation with our library, publishes two undergraduate journals. Our first undergraduate journal was introduced in 1993 and linked closely to the capstone senior seminar course. The idea was that seniors could complete the seminar during the fall semester and then polish and submit their work for publication in their student-edited journal. The journal has a student editorial staff that considers articles submitted by our economics students. The editorial staff also writes feature stories about economics alumni and news stories about the department. A hard copy version of the journal is published and distributed to Illinois Wesleyan

University students, faculty, and alumni. We also publish this journal online. The in-house undergraduate journal encourages excellence in research, promotes goodwill with alumni, and helps students develop leadership skills. Like professional economists, students do better work when there is a good chance that their work is appreciated and acknowledged by a wider audience.

Our university has developed a second student-edited journal that is online with no print edition. First published in 2005, the *Undergraduate Economic Review* now solicits high-quality undergraduate research articles from universities worldwide. The editorial staff and most article reviewers are economics majors from our university. Open access publishing makes it possible for student research to be widely available, free of charge, wherever readers access the Internet. The journal typically gets between 4,500 and 5,500 full-text downloads of published articles per month. Students are excited to be involved in the editing and reviewing process for this journal and feel connected in a tangible way with ambitious and gifted students from other universities competing for the opportunity to publish. These interactions help to motivate students to produce their own high-quality research for publication.

Creating undergraduate journals does require some faculty effort, but the task is not as daunting as might first appear. For example, we have collaborated with our library, which has a contract with Digital Commons to post and manage creative materials on the university web pages. This partnership makes the journal's construction relatively easy and lifts traditional burdens on editors through electronic tracking systems and automatically generated correspondence between editors, authors, and reviewers. Because of the ease of setting up online publications, we expect to see more undergraduate economics journals. Even where this type of collaboration is not possible, economics departments can quickly start a no-frills in-house online journal. All that is needed is a journal home page that gives the table of contents, provides links to editorial policies, and hyperlinks to published student papers.

Since journal involvement motivates undergraduate researchers to develop their research skills, faculty mentors should consider encouraging senior seminar students to review articles. We require every senior seminar student to review two submitted papers. They enjoy reviewing the work of students from other universities and take seriously the fact that their decisions are meaningful to the authors. Many of the student reviewers eventually submit their research papers for publication.

Conclusions

This paper outlines several elements of our capstone course at a small Midwestern university in light of literature on best practices for capstone experiences. Here is what we learned. First, require students to make an original contribution to the discipline to motivate significant research effort. Second, break the research project into many graded parts to guide students through the research process and keep them on track. Third, provide a detailed grading rubric so that students understand instructor expectations throughout the course. Fourth, require seminar students to review each other's work to motivate quality research through exchange of research ideas and application of peer pressure. Fifth, provide meaningful opportunities for students to share their research with a broader audience, such as oral presentations on-campus or off-campus at professional meetings. Sixth, encourage students to publish in undergraduate journals and serve as student reviewers and editors.

While this paper focuses on a single example of a capstone course that attempts to integrate best practices, there are many other models. Departments that seek to develop new or

improve existing capstone courses should design those experiences around their unique resources and student characteristics. Our capstone course began 30 years ago as a stand-alone fall semester research course culminating in a paper and presentation at the end of the semester. Over time, we learned how to break up the project into components and developed several co-curricular activities around undergraduate publications and conference presentations that reinforce course objectives.

Departments that want to develop a capstone experience for economics majors could start with a basic fall semester research course. This capstone experience should actively engage students in an original research experience of their own choosing. The course should include multiple graded assignments, peer review of drafts, oral presentations, and detailed grading criteria. As resources permit, departments could develop a student-edited undergraduate journal. This publication should initially be a simple web page with links to student papers chosen for publication. If this no-frills journal is successful, faculty members can collaborate with student editors to create more sophisticated publication frameworks.

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