Completing the Research Article Writing Process in an Introductory Course

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How well can students exposed to political science for the first time work through the research article writing process? Previous research has introduced selected research article writing skills to students in introductory courses, but has not studied whether students in such courses can complete the entire process of writing and revising a research article. I re-designed an Introduction to Comparative Politics course based on the research article writing process. I hypothesized that students would make major gains in article writing skills and develop a proficient ability to write each research article component. Using a pre- and post-test design along with rubrics for each part of the research article, I found support for my hypotheses. Students reported large increases in confidence and ability to handle research article writing tasks as a result of the course and demonstrated proficiency on more than two-thirds of rubric items. These results suggest that research article writing tasks are appropriate for students in introductory courses and that their presence can help effectively introduce students to the discipline. I also provide suggestions for ways to implement parts of this course design in traditional, large introductory course settings.

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(7811 Words)

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To what extent are students able to develop the skills necessary to complete the research article writing process in an introductory political science course? This study aims to bring the scientific process of political science to students who are being exposed to political science concepts and research for the first time. Instead of relegating undergraduate research to upper-level coursework, I suggest that students in an introductory course can think and work through the research article writing process surprisingly proficiently. Research design and writing skills are critically under-supplied in the political science major. Whereas students may be exposed to research methods courses later in their major career, most political science majors both lack experience with research design and article writing and need this experience in order to do well in future courses, a capstone or senior thesis, and in jobs where systematic social science ways of thinking are valued. I develop an intervention to addresses this need via a research article writing focused Introduction to Comparative Politics course.[1]

Recent revisions to the political science major have highlighted the importance of students participating in the research article writing process. However, students' first experience doing undergraduate research typically occurs in a senior capstone course at the end of their career as an undergraduate (Hummer, 2014). While such a course is certainly helpful in synthesizing knowledge accrued throughout the major, students often struggle to both learn how to do research for the first time and to produce high-quality work deemed acceptable for their capstone. A solution to this problem has been to move research methods instruction to a separate course required before students enter their senior year (Bernstein and Allen, 2013). In these courses, instructors tend to prioritize learning how to conduct statistical analysis in a particular software package over teaching students to develop theoretical arguments and to ask compelling research questions (Leston-Bandeira, 2013).

Numerous scholars have suggested moving research design and writing topics to substantive courses so that students have the opportunity to practice these skills before writing a capstone paper (Bergbower, 2017; Bos and Schneider, 2009; Medvedeva and Recuber, 2016;

[1]This study was approved by the Institutional Review Board, #201112140.

Olsen and Statham, 2005; Siver, Greenfest and Haeg, 2016). This makes sense because developing writing acumen is an iterative process that requires extended practice (Sommers and Saltz, 2004). I extend this argument by suggesting that introductory political science courses are an ideal place to introduce the research process of professional political scientists and to involve students as colleagues in this process. In doing so, I combine existing piecemeal approaches to teaching research design and writing in introductory classes from political science with a well-developed and successful emphasis on first-year undergraduate research in the hard sciences. Political scientists have integrated various parts of the research process into introductory courses and have generally found that students are successful in learning research concepts and applying them (Bob, 2001; Blings and Maxey, 2017; Dickovick, 2009; Franklin, Weinberg and Reifler, 2014; Kramer and Schechter, 2011; Olsen and Statham, 2005; Williams, Goodson and Howard, 2006). Centellas (2011) provides a particularly well-designed model of this integration which I expand on and seek to empirically support. Guiding students through writing their own research article is a more comprehensive and holistic way to synthesize the research design and writing skills that others have had success teaching in parts (Sherman and Waismel-Manor, 2003; see also Ishiyama, 2002). Such an integrative approach has formed the basis for rich research collaborations in many science disciplines (Carson and Miller, 2013; Harrison et al., 2011; Jordan et al., 2014).

Early exposure to research article writing skills will help students better tackle future writing assignments and develop social science research skills that are critical to many professions (Bernstein and Allen, 2013; Ishiyama and Breuning, 2003; Sommers and Saltz, 2004; Zeiser, 1999). Introductory courses also attract many non-political science majors, so such a course may be the only opportunity to expose students from other disciplines to political science research.

As a potential side benefit, involving students in the research process may increase interest in the discipline (Carson and Miller, 2013; Harrison et al., 2011; Jordan et al., 2014; Scheel, 2002; Wenk and Tronsky, 2011). By working through the political science research process,

students can better understand that political scientists do not memorize facts about different countries, rather they search for answers to salient questions of governance, questions to which students themselves can contribute answers.

I taught a re-designed Introduction to Comparative Politics course to nine students at a medium-sized private Midwestern university in summer 2019. This course exposed students to typical topics in comparative politics, but structured coursework around the four main concepts that encompass research article writing: 1. helping students learn to read political science research, 2. working in class to develop parts of a research article, 3. asking students write a research article draft, and 4. creating a peer review and revision process. I hypothesized that student confidence and ability to perform research article writing related tasks would increase as a result of the course and that students would demonstrate a proficient ability to write a research article. I measured self-reported student confidence and demonstrated ability using a pre- and post-test design and evaluated student proficiency using rubrics for each component of the research article. Student confidence and ability to perform research article related tasks increased and students completed these tasks surprisingly proficiently, supporting both hypotheses. Though this course represents a significant departure from the design of many introductory political science courses, I provide suggestions for ways instructors teaching larger courses in a more standard format could introduce the research article writing process in order for their students to gain some of the benefits from this intervention.

Course Background and Structure

I taught an Introduction to Comparative Politics course focused on the research article writing process in summer 2019. While the political science department maintains consistency in the way core courses are taught during the spring and fall semesters, the small and diverse student body enrolled in summer semester courses offered an opportunity to implement a

re-designed course focused on the research article writing process. Because of the nature of the summer course, class size was small (9 students) and met in a condensed time frame (8 contact hours per week for 5 weeks).

Student demographic characteristics were similar to the types of students enrolling in traditional Introduction to Comparative Politics courses. The course attracted significant gender, ethnic, and grade level variation. Most students had not taken prior political science courses. Students reported some prior experience reading a journal article, but low levels of experience reading political science articles and writing any part of a disciplinary research article.[2]

The course was structured to introduce students to the research article writing process and to enable them to produce a draft research article, excluding empirical results, on a comparative politics topic of their choosing by the end of the semester. To reach this goal, the course focused on four key aspects of the article writing process: 1. helping students learn to read political science research, 2. working in class to develop parts of a research article, 3. asking students write a research article draft, and 4. creating a peer review and revision process.

The course proceeded in modules corresponding to each part of a research article. These modules were: research question; literature review (and annotated bibliography); theory; research design; and introduction, abstract, and conclusion. Since this was not a research methods course, students were not expected to analyze empirical results in a results section. A pre-module helped students learn how to read political science articles.

Each module had a similar structure. Before a given class, students read a research article that was selected to be substantively relevant and to relate to the research article writing module. For example, during the literature review module, students read an article that synthesized literature into two conflicting groups. Students then summarized the article and reflected on a substantive and article writing topic in a reading journal. The purpose

[2]The Supplemental Information (SI) 1 further details demographics and prior experience.

of this guided reflection and consistently asking students to read published research was to help them develop skills reading and analyzing political science that they could then use as inspiration and transfer into their own article draft.

Class time was evenly split between discussions and activities related to substantive and article writing topics. Each class used the assigned journal article to illustrate article writing concepts that students then worked to relate to their own article. Students engaged directly with the article they read, identifying strengths and weaknesses of the ways in which the author(s) addressed the writing topic. Students also worked to revise the author(s) work and engaged in discussions about best practices for the particular writing topic.

I developed a number of in-class activities to assist students in crafting their article components; I highlight three specific activities from the theory module here. Before the theoretical argument was due, students read articles that I selected specifically to help them craft their theory sections. One such article listed numerous hypotheses with little justification for any of them. This article helped to structure a class activity related to identifying a key hypothesis and describing it clearly in the theoretical argument.

Later in this same module, we focused on producing a "flow diagram" linking the independent and dependent variables along a causal pathway and addressing alternative explanations. Students worked with their diagrams several times in class and also diagrammed theoretical arguments from published work as an in-class activity. Developing this flow diagram was a critical component to writing the theoretical argument: students had a clear road map for how to organize and structure their theory based on their diagram.

The theory and research design sections of the article were timed to coincide with a in-class simulation called Policy Day. During Policy Day, students wrote briefing papers and simulated working in a legislature of a country randomly chosen at the beginning of the class to adopt policies related to their research articles. Policy Day built up the importance of the research article and its possible impacts in students minds while also teaching them the difficulties of translating academic work into legislation. This provided students with

motivation to translate their theoretical argument into the best possible research design in order to be able to determine whether their policy would be effective.

Collaboration and revision are critical components of the research article writing process that were also integrated into the course. Toward the end of each module, students turned in their own version of the skill learned in the module (e.g., their own theory for the theory module). One class in each module was devoted to a workshop where students discussed their work in a collaborative environment.[3] For the theory module, the workshop involved spending time in groups discussing students' theoretical arguments before introducing core ideas related to research designs. Students then rotated in groups around the classroom discussing which research method would be best for their project, using Internet resources to find data sources, and identifying alternative mechanisms. Since student research questions were diverse, frequent rotation ensured that core course topics were mentioned and synthesized repeatedly.

Workshops were followed by a more formal peer review and comments from the instructor. Students had the opportunity to turn in a revised version of their work based on the comments they received if they wished to improve their grade. Otherwise, students were expected to revise their work and to include it in future versions of their research article. In this way, each article component cumulated so that students produced a full draft of their own research article by the end of the semester. The purpose here was to have students work through the comment and revision process that is critical to revising research articles and preparing them for potential publication.

Theory, Hypotheses, and Measurement

This intervention had two key outcomes. First, I wanted to know whether student confidence and ability to learn research article writing tasks improved as a result of the course. Second,

[3] I used Lisa Baglione's excellent *Writing a Research Article in Political Science* to structure our discussions of different article components.

I wanted to assess how well students are able to write their own articles. Importantly, the second outcome is not wholly conditional on the first: students could be proficient at developing certain parts of their article at the same time they struggled to demonstrate overall improvement in article writing skills.

Improvement from Pre-Course

It is not obvious that student confidence and ability to write a research article should increase as a result of this course. Students were being exposed to vast amounts of new information and were quickly asked to use these skills to write their own article drafts. More content is not always better (Sundberg, Dini and Li, 1994). By reading published work in class, this may provide students with unrealistically high expectations for their own draft articles, therefore reducing student confidence. While each student will likely improve in some aspect of article writing, previous research has introduced only one article writing skill per introductory course. Combining all article writing skills into one semester may mean that student knowledge about any one skill blends with knowledge about other skills and causes confusion.

On the other hand, students in undergraduate research experiences in the hard sciences successfully learn the entire research article writing process early in their college careers. I argue that the mechanics of article writing are not especially difficult to learn and to model off of the many examples we work through in class. Further, the way that article components are tied together through the course's emphasis on revision and collaboration should prompt high effort from students.

Hypothesis 1: Student confidence and ability to perform research article writing related tasks will increase as a result of taking the course.

To test this hypothesis, I administered a pre- and post-test with a common battery

of test questions. Students were given the pre- and post-tests as assignments that they completed at home so that they did not have to rush, though an estimated completion time was suggested. The common battery consisted of a confidence section and an applied section. The confidence section asked students to evaluate "How confident are you in your abilities to do the following" where numerous statements were listed, and responses were coded on a Likert scale from 1 (low) to 5 (high). These statements related to students' perceived ability to conduct article writing tasks. Statements included: "Identifying the key points in a political science research article" and "Developing testable hypotheses," among others (Bernstein and Allen, 2013; Bos and Schneider, 2009). The confidence measures indicated both exposure to the skills described and perceived ability to perform these skills on an exam or in a paper. I recorded the pre- and post-test responses and conducted paired t-tests with the null hypothesis that the pre-test and post-test results were the same. I expected that the post-test mean would be significantly greater than the pre-test mean.

During the applied section, students were asked to read a short research article and to answer several questions about the article. Students were first asked to summarize the research article, demonstrating article reading comprehension. I then asked them to build on what they learned in the article, identifying their own research question related to the article and describing possible relevant literature, hypotheses, and data (Wenk and Tronsky, 2011). I selected two articles for students to read — one for the pre-test and one for the post-test — to eliminate the possibility of students recalling previous answers. I matched the length and perceived complexity of the articles as best as possible: both articles were approximately 4,000 words and were published in *Research & Politics*.[4]

These open-ended responses were evaluated based on a rubric from 1 (needs improvement) to 5 (outstanding). Two independent coders scored anonymized student responses to ensure consistency. SI.2 provides details on the scoring protocol and the inter-rater reliability across

[4]The pre-test article was "The longevity of national identity and national pride: Evidence from wider Europe" by Valentina Dimitrova-Grajzl, Jonathan Eastwood, and Peter Grajzl, 2016. The post-test article was "The impact of foreign fighters on civil conflict outcomes" by Tiffany Chu and Alex Braithwaite, 2017.

coders, which was quite high. I recorded the pre- and post-test scores and conducted paired t-tests with the null hypothesis that the pre-test and post-test results were the same for each applied skill. I expected that the post-test mean would be significantly greater than the pre-test mean for each applied skill.

Proficiency

Students in this course were introduced to the research article writing process for the first time and were asked to write their own research article. What level of proficiency can we expect from these students? I argue that the main difference between student performance in this course compared to a senior capstone course is student grade level, not student experience and that students can still be successful at article writing with limited prior experience.

Many political science departments have followed Wahlke (1991)'s recommendation to structure the major with research methods and senior capstone courses (Parker, 2010; Sum, 2015; Thies and Hogan, 2005) and achieve better student outcomes by doing so (Ishiyama, 2005). As discussed in the motivation for this study, research design and methods topics are rarely taught outside of methods or senior capstone courses. Further, because many research methods focus on quantitative methods (Parker, 2010; Turner and Thies, 2009), seniors entering a capstone course are often still grappling with research article writing issues (Bos and Schneider, 2009; Hauhart and Grahe, 2010).[5]

Of course, capstone students are taking such a course toward the end of their major and are often seniors. Students in introductory courses are usually younger and are often non-majors. These two differences could put students in introductory courses at a disadvantage compared to capstone students. Yet younger students who may not have declared their major often quite successfully participate in undergraduate research opportunities (Harrison et al., 2011; Ishiyama, 2002; Jordan et al., 2014). Thiry et al. (2012) present evidence

[5]Monogan (2017)'s review of research methods textbooks illustrates this emphasis.

suggesting that level of experience is more important for determining the benefits and success of undergraduate research than grade level or major. As such, I argue that a substantial proportion of students in the course will be able to gain a proficient grasp of these concepts and to be able to produce proficient versions of each component of a research article.

Importantly, each student will likely struggle with one or more components of the research article because each component requires different research and writing skills to complete successfully. To account for this, I examine the average performance across students on each research article component.

Hypothesis 2: Students will, on average, produce proficient versions of each component of the research article.

The empirical focus here is on the end-of-module assignments that students turned in that applied the module's concepts to their own research project.[6] Each component was evaluated based on a rubric provided to students at the beginning of the semester. Rubrics aligned with the checklists listed in Baglione (2018)'s research article writing book that students read. Baglione's book is widely accepted as an authoritative guide for undergraduate students writing a research article, particularly in a senior capstone course (Centellas, 2011). Rubrics were split into three categories: "needs improvement" (0), "proficient" (1) and "outstanding" (2). "Proficient" in this context meant that the student performed the rubric skill as described in Baglione's book. The main outcome of interest, *% Proficient*, was constructed by taking the percentage of all the rubric skills in a given article component that at least 80% of students completed "proficiently" using the above scale. I set the 80% criterion to better evaluate whether students on the whole demonstrated proficiency in rubric skills.[7] I also calculated the *Average Score* for all students across all rubric skills for each

[6] I examined student submissions at the end of each module, not the fully revised version of the article turned in at the end of the semester. This provides the hardest test of my hypothesis, as article components improved with successive revisions.

[7] SI.3 discusses the rubric coding in detail and robustness checks.

article component.

Results

Improvement from Pre-Course

Table 1 displays results from the confidence and applied sections of the pre- and post-test. Also displayed are questions from the post-test regarding students' perceived importance of the research article writing assignments. I report pre- and post-test mean confidence and applied scores along with t-values and p-values from paired t-tests.[8] Student confidence increased by a significant amount across all aspects of the research article writing process, supporting Hypothesis 1. In the pre-test, students reported low confidence; confidence increased to relatively high confidence in the post-test. Students in the pre-test were slightly more comfortable identifying the key points of articles and writing research questions compared to other skills. They also reported a moderate level of ability to understand the purpose of political science. After the semester ended, confidence in all measures increased. In particular, students almost universally reported a high level of understanding the purpose of political science and confidence in writing research questions, defining variables, and understanding different research methods. It is also noteworthy that students increased their identification as social scientists, given the diverse majors present in the course.

[Table 1 about here]

The applied skills section of Table 1 indicates that reported increases in confidence were mirrored by increases in student ability to demonstrate article writing skills, further supporting Hypothesis 1. In the pre-test, article summaries were frequently too brief and missed key points of the article. The new research questions students wrote were vague, and the literature they identified as relevant to studying their research questions was highly derivative

[8]No students simultaneously took another course that involved research article writing, so there is no compound treatment.

of the article they read. Hypotheses were not falsifiable, nor were they specific and testable. Ideas about data to test their hypothesis and specifications of independent and dependent variables were again very similar to the structure of the article they read.

In the post-test, article summaries were more focused on key ideas. Research questions and especially hypotheses followed the structures taught in class and variables were defined more precisely. Students still had some trouble identifying a good list of relevant literature, but this difficulty was not mirrored in their actual research articles. Finally, students recognized the importance of the research article writing assignments in different aspects of the course.

Proficiency

I now move to testing how proficient students were at completing each component of the research article. Table 2 lists the five rubrics used to evaluate students as well as an overall average. The five rubrics consisted of 68 individual skills. Each student received a score of 0, 1, or 2 on each skill. If at least 80% of students received a 1 or higher, the class was considered "proficient" at this skill. The *% Proficient* column displays the percentage of skills on a given rubric that students performed proficiently. In all cases, *% Proficient* exceeded 50%, supporting Hypothesis 2. The *Average Score* column displays the average student score across skills on a given rubric. The *Average Score* ranged from 0.80 to 0.90. This indicates that most students received a score of "proficient" on most of the skills with a few "needs improvement" scores.

[Table 2 about here]

The final two columns in Table 2 break the rubric skills in *% Proficient* into categories: structure refers to rubric skills that students could demonstrate proficiency in by following a template or formula (e.g., an "if/then" hypothesis) whereas content skills lacked this cut-and-paste approach. Thirty-four percent of rubric skills were based on structure. Stu-

dents demonstrated a high level of proficiency fulfilling structural rubric skills. Proficiency in content based skills was substantially lower than for structure skills, but students still demonstrated proficiency in two-thirds of content related skills. This break-down suggests that students exposed to article writing for the first time are quite adept at applying structural rules or formulas to their work. That is, once taught about ways in which to structure a hypothesis, students quickly learned how to write effectively structured hypotheses for themselves. Students may be more familiar with learning structural skills, as many high school courses involve assessments based on memorization.

Though content proficiency was lower, students still demonstrated impressive proficiency with content related skills. In what follows, I describe some of the skills that students succeeded in and others that they struggled to complete in order to present a clearer picture of the types of skills students were able to learn in the course. The evidence in the rest of this section comes from a combination of student proficiency on rubric tasks and a series of informal evaluations where students discussed their perceptions of their progress in the course.

Students reported that getting started and writing the research question and literature review were both very challenging. These challenges were compounded by the fact that the short duration of the course meant that the research question was due at the beginning of the second week of the course and the literature review was due at the beginning of the third week. Because this was most students' first exposure to political science, they struggled to understand the scope of the discipline and to figure out how their question fit into existing literature. These challenges were partially compensated by students' high levels of interest in big political science questions. We conducted several activities in class to conceptualize the entire discipline and to work to identify research questions that were relevant to students and to public policy: without these two connections, students felt that research questions were not worth such a large investment of their time.

One student's initial research question was "Why does the KMT support cross-straight

relations with the CCP?" This question was too specific, did not clearly fit into political science literature, and is not falsifiable. During the individual meetings I conducted with students after they turned in their research questions, I learned that this student was interested in Taiwan–China relations and that this interest prompted his research question. With a little work thinking about framing and ways to make his question puzzling, the student successfully altered his research question to examine the extent to which within country-level factors drive relations between democracies and autocracies.

A second student's initial research question began as a puzzle, but morphed over time. She asked, "Why are highly educated individuals susceptible to scientific misinformation in political contexts?" After some assistance finding sources in the existing literature, she realized that studies have shown that highly educated individuals are not more susceptible to misinformation than other people. However, she then identified a possible contribution — the stakes people have in correctly identifying factual information — and used this to create a more nuanced and novel research question, hypothesizing that highly educated individuals will be less susceptible to misinformation compared to less educated individuals specifically when the stakes are high.

In both cases, the student's initial research question changed significantly from the first time they wrote it until they turned in their theoretical argument. Since students were new to political science literature, they had little to build on initially, but this weakness fixed itself as students clarified their ideas as we worked through the literature review writing process.

I asked students to turn in both an annotated bibliography and a literature review. Literature reviews are difficult for many scholars to construct and they were particularly challenging for students who lacked all the component skills necessary to even begin examining the literature. We devoted class time to learning how to read and summarize political science research articles, how to find and evaluate the usefulness and credibility of scholarly sources, and how to extract common themes from a set of sources. Perhaps surprisingly,

both high school/underclassmen and upperclassmen were rather adept at finding appropriate sources, analyzing and grouping them, and discussing them in a literature review format.

Students tended not to clearly differentiate their research question from the existing literature in their literature review. One reason for this was a lack of confidence in their research question. I asked students to reflect on how they felt about their literature review, and more than half stated that they struggled a lot to write it and did not feel confident in the end product. This feeling is a logical result of asking students to read an immense amount of published work and then telling them to figure out how their work contributes to this literature. One preemptive step I took was to make clear to students that, by enrolling in the course, they became political scientists and were qualified to engage the work of other scholars and to critique it. After diagnosing lack of confidence as an underling problem that manifested in literature reviews, I took reactive action and spent class time explaining the lengthy and convoluted process it took to publish one of my own articles. Student confidence and willingness to articulate their article's unique contribution improved after this activity.

Theoretical arguments were strong, though this was the point at which students' work diverged more substantially. Some students had one simple and clear hypothesis, while others were trying to manage multiple hypotheses with complex causal explanations. This disjuncture resulted in some students with complex causal explanations trying to fit those explanations into a single, simple hypothesis. For example, one student hypothesized that a certain type of people would be "better able to determine risk surrounding a situation and re-evaluate their perception of misinformation." Her hypothesis implied that the independent variable would separately influence two dependent variables. However, her theoretical argument was that different types of people have different abilities to determine risk and that the ability to determine risk is really the independent variable that causes perceptions of misinformation. The hypothesis was quickly corrected, but this highlights the ways in which students developing a theory for the first time may try to adopt the structure of examples discussed in class, even if those structures do not match their argument.

Writing the research design also provided students with the opportunity to search for and explore existing data and measures. Though we discussed and read formal and normative theory early in the semester, I asked students to create an empirical research design. Since the course was not focused on implementing the research design, students worked to create the best possible design to test their hypothesis. Many students initially gravitated toward either one-time citizen surveys or country-level case studies. However, students were also quite interested in addressing causation and, after working through different research methods in class and reading a diverse set of published work, the majority of the class chose panel regression analysis or an experiment as the primary way to test their hypothesis. I asked students to propose and describe a primary and a secondary research method. This provided them with the opportunity to blend qualitative and quantitative methods along with methods that are better equipped to test causation. As a result of the brief introduction students received to each research method, some students had a difficult time articulating all of the benefits and costs of the methods they chose. Similarly, students did consider how well their measures were able to test their hypothesis, but this discussion was often superficial.

As a final step, students wrote an introduction, abstract, and conclusion to their article. Even though they did not complete the actual analysis, I felt that it was important for students to leave the course with a fully written article that included all of the major components. Students did a good job developing a compelling introduction and summarizing their work in the conclusion. Conclusions were naturally more policy focused than in much published work because of the emphasis placed on policy both during Policy Day and throughout the course. Policy focused content in the conclusion did push out some discussion of future research and generalizability, both of which are a bit difficult to address without knowing the results of the study. Writing a compelling and concise abstract was challenging. We worked in class to write a complete abstract and to conduct a detailed peer review. This helped students get through the abstract writing process, but most abstracts could have been motivated more effectively.

Throughout the article writing process, students were asked to engage in peer reviews and to incorporate peer and instructor comments into revised versions of their article. The purpose of this was both to expose each student to the work of others in the class and to teach students how to refine their work and to provide effective feedback. The quality of peer review feedback was mixed, despite a handout and a discussion about ways to provide effective feedback. Part of the grade on each rubric was to incorporate previous peer and instructor feedback. Often students would receive good quality feedback and not fully implement it in revisions to their article. One potential reason for this was time. Students needed to quickly begin work on the next component of their article, and they knew that revisions to their previous article components made up at most 10% of their grade. The time issue may correct itself in a longer semester course. Another reason was that students were not fully comfortable receiving conceptual feedback instead of feedback on style or grammar that mimicked how they were assessed in high school. Peer reviewers were encouraged to mark grammar or style issues, but they were asked to mostly focus on content. A potential solution is to devote more class time early in the semester to revising article components based on feedback.

Lessons for Larger Courses

Overall, students increased their confidence and ability to complete research article writing tasks as a result of the course and demonstrated proficiency in more than two-thirds of rubric skills. Students also seemed to understand and appreciate the learning goals of the course. Few instructors will teach a core course like Introduction to Comparative Politics to such a small group of students over a condensed time period. However, I do believe that ideas from this course could travel to other course contexts.

Recall that the course's emphasis on research article writing amounted to reading published work, discussing article components in class, writing an article, and collaborating to

provide article writing feedback. Hence, my recommendation for instructors teaching larger courses is to fulfill these four criteria in some way. Three barriers exist for instructors in larger courses: grading time, instructional time, and course format flexibility.

If grading time is the primary concern, instructors could, for example, teach a course that follows the research article writing process without asking each student to write their own research article. One way such a course could work in a medium sized class is that students collaborate to write one research article as a group. This would dramatically reduce the number of research articles the instructor needs to grade while still providing students with the full research article writing experience. Providing space for some in-class group work is an important way to make group work more equitable and to more effectively monitor student progress.

A second method that still fulfills the essence of the four research article writing process criteria is to distill each element of the research article into its most condensed form. Instead of writing a full theoretical argument, students could draw a flow diagram and write their hypotheses. The research design could be replaced by a table outlining the design's major features. Not only does this technique reduce grading time, but it also requires less instructional time and means that instructors wishing to introduce research article writing to their courses need not engage in a wholesale course re-design to fulfill the essence of research article writing.

Besides the grading barriers, instructors teaching larger courses with over one hundred students may prefer to assess students using traditional exams. In this case, students can be assessed on their ability to perform research article writing skills by including assessment questions similar to those used on the pre- and post-tests in my re-designed course on traditional exams. Ishiyama and Watson (2014) outline how peer evaluation and assessment techniques can be used to further simplify grading of these assignments.

In these three potential modifications, the only component that changes is the way that students write their own research article. These courses would still require students to

read published research articles, to participate in in-class article writing activities, and to collaboratively review and revise their work. Students who took my re-designed course said that the entire process with all four components was what maximized their learning and made the course enjoyable. While we know that utilizing any one of these four components on its own is beneficial, their argument was that teaching the whole research article writing process made each component more valuable.

Given the importance of modeling the entire article writing process, how can instructors who are unable to completely redesign their courses make the most impact in the shortest amount of time? My suggestion is to create a unit of the course that provides students (individually or in groups) with a mini-article writing experience. During this unit, the instructor could select one or two published articles relevant to the course, but that encapsulate each part of a research article exceptionally well. After teaching students to read the articles, the instructor could spend ten minutes over each of five or six class periods introducing the essence of each article writing component. Students could then complete the corresponding part of essentially an extended abstract after each class and conduct a peer review. Total instructional time for this kind of activity could be limited to fewer than two hours spread across several weeks of the course. While quite limited in scope, this type of activity could provide at least an introduction to the entire research article writing process.

Instructors could choose to implement a single component of the article writing process in introductory courses as Bob (2001) and others have done. However, as I outline above, the article writing process is difficult to separate, and student benefit is maximized when each component can be introduced. That is not to say that just teaching students to read published research articles or asking students to peer review or revise non-research article assignments is not worthwhile, rather that the article writing process as a whole is not easily decomposed into parts. At the same time, any exposure likely helps. Learning to read political science research is an essential precursor to talking about article components or to writing and revising a research article. If instructors can introduce reading skills and spend

some time asking students to explore their own potential research questions, hypotheses, and research designs even just in small group work, students will gain some initial exposure to the research article writing process.

Discussion and Conclusion

Student involvement in undergraduate research increases student interest and builds important skills that are useful for capstone projects and future careers. Previous work has introduced pieces of the research article writing process in introductory courses, but scholars have yet to study how effectively students can learn the entire process in these courses. I taught a re-designed Introduction to Comparative Politics course that heavily emphasized a collaborative learning environment wherein students read published articles, broke down article writing concepts in class, wrote their own research article, and revised and reviewed each others work. I hypothesized that student ability to perform article writing tasks would increase as a result of taking the course and that students would be proficient at most article writing skills. Using a pre- and post-test and a set of rubrics, I found support for both hypotheses. Though these results occurred in a small class setting, I offer some suggestions for ways to teach research article writing skills in larger introductory courses.

The design of this study does not feature a control course. Such a course would need to be taught in the same way, but would not include any of the four research article writing components that made up the re-designed course. Comparing this intervention to a control would not make sense for testing the second hypothesis, since students in the control classroom would not complete any of the research article writing assessments. A pre- and post-test could be used to determine whether students learned research article writing skills in the control course. This comparison did not take place at the university where the study was implemented because removing the research article writing process from the re-designed course leaves out half of the course time and 45% of the grade which would need to be filled

with some other content, reducing comparability. I also felt that withholding an intervention that I believed would benefit students was not ethically ideal. SI.4 discusses a control course in greater detail and provides qualitative observations indicating that students in the traditional course did not develop knowledge about the research article writing process despite it not being part of that course.

Institutional constraints limited course enrollment and my ability to repeatedly teach this course, so the results presented here should be viewed as but one attempt at integrating the research article writing process into an introductory course. While SI.5 discusses these concerns explicitly, when combined with existing findings suggesting that parts of the article writing process can be successfully taught in an introductory course, I would argue that students new to the discipline learn a lot from and actually enjoy engaging in the work that political scientists do. Future work would do well to replicate the course re-design implemented here and to see whether the research article writing skills students learn in an introductory course translate into increased interest and improved performance in research methods or senior capstone courses, thus producing long-run benefits both to students and to the department as a whole.

References

Baglione, Lisa. 2018. *Writing a Research Paper in Political Science.* Thousand Oaks, California: CQ Press.

Bergbower, Matthew L. 2017. "When Are Students Ready for Research Methods? A Curriculum Mapping Argument for the Political Science Major." *Journal of Political Science Education* 13(2):200–210.

Bernstein, Jeffrey L. and Brooke Thomas Allen. 2013. "Overcoming Methods Anxiety: Qualitative First, Quantitative Next, Frequent Feedback Along the Way." *Journal of Political Science Education* 9(1):1–15.

Blings, Steffen and Sarah Maxey. 2017. "Teaching Students to Engage with Evidence: An Evaluation of Structured Writing and Classroom Discussion Strategies." *Journal of Political Science Education* 13(1):15–32.

Bob, Clifford. 2001. "A Question and an Argument: Enhancing Student Writing through Guided Research Assignments." *PS: Political Science & Politics* 34(3):653–655.

Bos, Angela L. and Monica C. Schneider. 2009. "Stepping around the Brick Wall: Overcoming Student Obstacles in Methods Courses." *PS: Political Science & Politics* 42(2):375–383.

Carson, Susan and Eric S. Miller. 2013. "Introducing Primary Scientific Literature To First-Year Undergraduate Researchers." *CURQ on the Web* 34(4):17–22.

Centellas, Miguel. 2011. "Preaching What We Practice: Bringing Scope and Methods "Back In"." *PS: Political Science & Politics* 44(4):817–822.

Dickovick, J. Tyler. 2009. "Methods in the Madness: Integrative Approaches to Methodology

in Introductory Comparative Politics." *Journal of Political Science Education* 5(2):138–153.

Franklin, Daniel, Joseph Weinberg and Jason Reifler. 2014. "Teaching Writing and Critical Thinking in Large Political Science Classes." *Journal of Political Science Education* 10(2):155–165.

Harrison, Melinda, David Dunbar, Lisa Ratmansky, Kimberly Boyd and David Lopatto. 2011. "Classroom-Based Science Research at the Introductory Level: Changes in Career Choices and Attitude." *CBE-Life Sciences Education* 10(3):279–286.

Hauhart, Robert C. and Jon E. Grahe. 2010. "The Undergraduate Capstone Course in the Social Sciences: Results from a Regional Survey." *Teaching Sociology* 38(1):4–17.

Hummer, Jill Abraham. 2014. "The Content and Integrative Component of Capstone Experiences: An Analysis of Political Science Undergraduate Programs." *Journal of Political Science Education* 10(2):222–242.

Ishiyama, John. 2002. "Does Early Participation in Undergraduate Research Benefit Social Science and Humanities Students?" *College Student Journal* 36(3):318–387.

Ishiyama, John. 2005. "The Structure of an Undergraduate Major and Student Learning: A Cross-Institutional Study of Political Science Programs at Thirty-Two Colleges and Universities." *The Social Science Journal* 42(3):359–366.

Ishiyama, John and Marijke Breuning. 2003. "Does Participation in Undergraduate Research Affect Political Science Students?" *Politics & Policy* 31(1):163–180.

Ishiyama, John and Wendy L. Watson. 2014. "Using Computer-Based Writing Software to Facilitate Writing Assignments in Large Political Science Classes." *Journal of Political Science Education* 10(1):93–101.

Jordan, Tuajuanda C., Sandra H. Burnett, Susan Carson, Steven M. Caruso, Kari Clase, Randall J. DeJong, John J. Dennehy, Dee R. Denver, David Dunbar, Sarah C. R. Elgin, Ann M. Findley, Chris R. Gissendanner, Urszula P. Golebiewska, Nancy Guild, Grant A. Hartzog, Wendy H. Grillo, Gail P. Hollowell, Lee E. Hughes, Allison Johnson, Rodney A. King, Lynn O. Lewis, Wei Li, Frank Rosenzweig, Michael R. Rubin, Margaret S. Saha, James Sandoz, Christopher D. Shaffer, Barbara Taylor, Louise Temple, Edwin Vazquez, Vassie C. Ware, Lucia P. Barker, Kevin W. Bradley, Deborah Jacobs-Sera, Welkin H. Pope, Daniel A. Russell, Steven G. Cresawn, David Lopatto, Cheryl P. Bailey and Graham F. Hatfull. 2014. "A Broadly Implementable Research Course in Phage Discovery and Genomics for First-Year Undergraduate Students." *mBio* 5(1):1–8.

Kramer, Daniel Boyd and Michael G. Schechter. 2011. "Shock and Awe: Rapid-Fire Theory, Some Surprising Survey Results, and Triage Statistics in an Applied Freshman Research Seminar." *Journal of Political Science Education* 7(3):329–347.

Leston-Bandeira, Cristina. 2013. "Methods Teaching through a Discipline Research-Oriented Approach." *Politics* 33(3):207–219.

Medvedeva, Maria and Timothy Recuber. 2016. "Developing an Original Argument: A Strategy for College Writing." *College Teaching* 64(3):139–144.

Monogan, James E. 2017. "A Review of Textbooks for Teaching Undergraduate Methods." *PS: Political Science & Politics* 50(2):549–553.

Olsen, Jonathan and Anne Statham. 2005. "Critical Thinking in Political Science: Evidence from the Introductory Comparative Politics Course." *Journal of Political Science Education* 1(3):323–344.

Parker, Jonathan. 2010. "Undergraduate Research-Methods Training in Political Science: A Comparative Perspective." *PS: Political Science & Politics* 43(1):121–125.

Scheel, Elizabeth D. 2002. "Using Active Learning Projects to Teach Research Skills Throughout the Sociology Curriculum." *Sociological Practice* 4(2):145–170.

Sherman, Daniel J and Israel Waismel-Manor. 2003. "Get It in Writing: Using Politics to Teach Writing and Writing to Teach Politics." *PS: Political Science & Politics* 36(4):755–757.

Siver, Christi, Seth W. Greenfest and G. Claire Haeg. 2016. "Are We Teaching Them Anything?: A Model for Measuring Methodology Skills in the Political Science Major." *Journal of Political Science Education* 12(2):186–199.

Sommers, Nancy and Laura Saltz. 2004. "The Novice as Expert: Writing the Freshman Year." *College Composition and Communication* 56(1):124.

Sum, Paul. 2015. Capstone Courses and Senior Seminars As Culminating Experiences in Undergraduate Political Science Education. In *Handbook on Teaching and Learning in Political Science and International Relations*. Cheltenham, UK: Edward Elgar pp. 16–27.

Sundberg, Marshall D., Michael L. Dini and Elizabeth Li. 1994. "Decreasing Course Content Improves Student Comprehension of Science and Attitudes towards Science in Freshman Biology." *Journal of Research in Science Teaching* 31(6):679–693.

Thies, Cameron G. and Robert E. Hogan. 2005. "The State of Undergraduate Research Methods Training in Political Science." *PS: Political Science & Politics* 38(2):293–297.

Thiry, Heather, Timothy J. Weston, Sandra L. Laursen and Anne-Barrie Hunter. 2012. "The Benefits of Multi-Year Research Experiences: Differences in Novice and Experienced Students' Reported Gains from Undergraduate Research." *CBE—Life Sciences Education* 11(3):260–272.

Turner, Charles C. and Cameron G. Thies. 2009. "What We Mean by Scope and Methods:

A Survey of Undergraduate Scope and Methods Courses." *PS: Political Science & Politics* 42(2):367–373.

Wahlke, John C. 1991. "Liberal Learning and the Political Science Major: A Report to the Profession." *PS: Political Science & Politics* 24(1):48–60.

Wenk, Laura and Loel Tronsky. 2011. "First-Year Students Benefit From Reading Primary Research Articles." *Journal of College Science Teaching* 40(4):60–67.

Williams, Michelle Hale, Kymberly Anne Goodson and W. Gary Howard. 2006. "Weighing the Research Paper Option: The Difference That Information Literacy Skills Can Make." *PS: Political Science & Politics* 39(3):513–519.

Zeiser, Pamela A. 1999. "Teaching Process and Product: Crafing and Responding to Student Writing Assignments." *PS: Political Science & Politics* 32(3):593–595.

Table 1: Pre- and Post-Tests Show Improvement in Confidence and Applied Skills

Measure	Pre-Test Mean	Post-Test Mean	t-value (p-value)
Reported Confidence			
Identifying Article Key Points	2.33	4.00	5.77 (0.00)
Writing Research Questions	2.33	4.44	8.10 (0.00)
Identifying Literature	2.11	4.00	5.38 (0.00)
Choosing Sources	2.00	3.89	4.46 (0.00)
Developing Hypotheses	2.22	3.89	3.78 (0.01)
Defining IV/DV	2.00	4.44	8.32 (0.00)
Choosing Research Design	1.44	3.89	5.50 (0.00)
Writing Research Article	1.44	3.78	8.08 (0.00)
Understand Purpose of PS	3.22	4.78	4.13 (0.00)
Understand PS Research Methods	2.22	4.11	4.86 (0.00)
Identify as Social Scientist	2.00	3.33	8.00 (0.00)
Applied Skills			
Article Summary	2.88	4.13	2.88 (0.02)
Research Question	2.56	4.31	5.58 (0.00)
Literature Ideas	2.81	4.00	4.77 (0.00)
Hypothesis	2.94	4.81	5.35 (0.00)
Data and IV/DV	3.00	4.13	5.35 (0.00)
Importance of Research Article in...			
Applying Course Ideas		4.25	
Increasing Course Involvement		4.13	
Bringing in Interests		4.13	
Exploring New Ideas		4.50	

Results from pre- and post-tests. Confidence and importance are self-reported; applied skills questions were free responses scored on a rubric by two independent coders, average is shown. t-value is from a paired t-test with the p-value in parentheses. Sample size is nine students.

Table 2: Class Was Proficient on the Majority of Rubric Skills

Article Component	% Proficient	Average Score	Structure %	Content %
Research Question	67	0.83	100	50
Literature Review	77	0.80	88	67
Theory	83	0.90	100	67
Research Design	71	0.83	100	67
Intro, Abstract, Conclusion	79	0.83	100	73
Overall	78	0.84	96	67

Results from student submissions scored using rubrics. *% Proficient* is the percentage of rubric skills at least 80% of students completed proficiently. *Average Score* is the average rubric score on a scale from 0 to 2. *% Structure* and *% Content* break out *% Proficient* by type of skill. Sample size is five students.

Supplemental Information: Completing the Research Article Writing Process in an Introductory Course

The Supplemental Information contains demographic characteristics (SI.1), a description of the pre- and post-test applied section coding procedure and robustness checks (SI.2), a description of the rubric skills coding procedure and robustness checks (SI.3), a discussion of a control course (SI.4), and a description of potential sample size and inference issues (SI.5).

Replication data and code for all empirical analysis is posted on the author's website. Anyone interested in teaching materials produced for this course should feel free to contact the author.

SI.1: Demographic Characteristics

The typical Introduction to Comparative Politics course at this university enrolls about 100 students and follows a standard format of two hours of instructor led lecture and one hour of an undergraduate teaching assistant led discussion section per week. The course uses a popular comparative politics textbook and has a relatively typical structure common to many Research 1 universities.[1] Students are assessed entirely on the combination of three multiple choice exams, multiple choice homework problems, and true/false or short answer pop quizzes. During the course, students are exposed to political science research through

[1] I examined Research 1 universities listed on `collegefactual.com`'s Best Political Science schools list. Twelve of the top schools had syllabi available for review. The average class size was 146 students; all twelve courses were taught with two lectures and one discussion section per week. Most used a well-known comparative politics textbook. Eight included some writing component, though only one focused on any aspect of the research article writing process.

textbook in-text citations; they are not required to read research articles. Students do not complete writing assignments in the course.

The modal student enrolled in the course is a college freshman with one of many possible majors. The course fulfills a requirement for the political science major as well as a distribution requirement for students in other majors. Freshman major choices are relatively flexible: even though many freshman declare a major upon entering the university, most are still unsure of their major, and their minds may be changed as a result of a first course in any particular discipline.

This course was significantly smaller (nine students) and met more frequently in a condensed time period (eight contact hours per week for five weeks). Table SI.1.1 displays demographics of the students in the course and their perceived experience with several research article writing topics. Gender and ethnic diversity were fairly representative of the student body as a whole. Summer classes allow enrollment from selected high school seniors; about half of enrolled students were underclassmen or in high school whereas half were upperclassmen. This represents a larger enrollment from upperclassmen than is typical for an introductory political science course.

Sixty-six percent of enrolled students reported that the reason they enrolled was due to intellectual curiosity or personal interest, whereas 44% enrolled because the course fulfilled either a major or distribution requirement. The majority of students had taken no previous political science courses and were not majors. Indeed, student majors ranged from Neuroscience to Finance to Psychology. Students reported taking a substantial number of Advanced Placement classes in high school, an indicator of high academic achievement.

I gauged student experience as part of a beginning-of-semester pre-test (scored from 1 indicating no experience to 5 indicating extensive experience). Though students did report a moderate amount of experience reading research articles in disciplines other than political science, experience with political science research article writing was quite low. In particular, though a few students said they had read a political science article, students had virtually no

Table SI.1.1: Prior Experience

Measure	Mean
Demographics	
Female	0.44
Ethnic Minority	0.33
High School	0.22
Freshman/Sophomore	0.22
Junior/Senior	0.56
Enrollment Required	0.44
Enrollment Interested	0.66
No Previous PS Classes	0.56
PS Major	0.33
AP Classes	7
Pre-Test Experience	
Reading an Article	3.33
Reading PS Article	1.67
Conducting PS Literature Search	1.56
Writing a PS Research Question	1.56
Writing a PS Theoretical Argument	1.33

Self-reported information from nine students. Pre-Test Experience scored from 1 (none) to 5 (high).

experience with the research article writing process in political science. Lack of knowledge was expected given the diversity of student majors and lack of exposure to political science courses. However, it is noteworthy that reported experience among the two political science majors who had already taken courses in the discipline was not dramatically higher than the reported experience from the other students. This suggests that these majors had not learned research article writing skills, perhaps because one of the only opportunities to do so is during an optional senior capstone.

SI.2: Pre- and Post-Test Coding and Robustness Checks

Both pre- and post-test applied responses were coded on a scale from 1 to 5 where 1 meant "needs improvement" and 5 meant "outstanding." Because these responses did not have rubrics associated with them, I developed a set of qualities that I was looking for in each

response:

- Summary: identifies motivation for the study and lists hypothesis, key independent variable, dependent variable, and results.
- Research Question: not a yes or no question, is concise, is falsifiable, is a puzzle, and can plausibly be tested empirically.
- Literature: identifies appropriate themes in the literature worth investigating, and themes are specific enough to be meaningful.
- Hypothesis: does not simply replicate the hypothesis in the pre- or post-test article, follows "if/then" format, is concise, is falsifiable, and avoids a compound hypothesis.
- Data, IV/DV: does not simply replicate the research design in the pre- or post-test article, lists plausible data and research design to test the hypothesis, and clearly identifies the independent and dependent variables.

A score of 5 represented meeting all of the qualities listed above. I employed two coding methods. First, I coded each response on the 1 to 5 scale and listed comments to justify particularly good or particularly poor responses. The goal of doing this was to increase the reliability and replicability of the coding. Additionally, I asked an independent coder with no knowledge of either my coding or of the journal articles employed in either the pre- or the post-test to provide his coding for each response. This particular independent coder was especially well suited for the task: he has taught introductory political science courses before and is engaged in discussions about pedagogy and the scholarship of teaching and learning.

To complete the coding, responses were anonymized by assigning random numbers to both pre- and post-test responses and keeping a separate key linking the random numbers to de-identified student numbers and whether the response was part of the pre- or post-test.

I assessed the robustness of the results in two ways. First, I computed three measures of inter-rater reliability of the coding method. I measured the percentage of agreement between coders using a tolerance of 1 Likert scale point. Agreement with this tolerance was 89.9%, which is quite high. I then calculated Cohen's Kappa using squared distance weights, a method traditionally used for assessing inter-rater reliability when working with ordinal scales. Cohen's Kappa was 0.68 which falls into the "substantial agreement" range as defined

by Cohen. Finally, I computed Cronbach's Alpha as 0.83 where a value above 0.7 indicates a high level of comparability between the two coders. The point of greatest disagreement was on pre-test literature idea scores where coder 1 provided higher scores than coder 2 on average. However, coder 1 also provided higher scores for the post-test literature item, so the overall impact of this coding difference is minimal. Overall, the mean absolute difference in scores was 0.69 points, well within the traditional tolerance of 1 point in Likert style coding.

Second, I ran the t-tests shown in the main text for each individual coder. Table SI.2.1 shows these results. In all cases and across both coders, the post-test mean score was significantly higher than the pre-test mean score. Thus, the results consistently hold when using individual coders or when aggregating data from both coders.

Table SI.2.1: Applied Skills Separated by Coder

Measure	Pre-Test Mean	Post-Test Mean	t-value (p-value)
Coder 1			
Article Summary	3.00	4.25	2.24 (0.06)
Research Question	2.88	4.25	3.67 (0.01)
Literature Ideas	3.50	4.13	2.38 (0.05)
Hypothesis	3.00	4.88	5.35 (0.01)
Data and IV/DV	2.88	4.13	8.00 (0.00)
Coder 2			
Article Summary	2.75	4.00	3.42 (0.01)
Research Question	2.25	4.38	5.34 (0.00)
Literature Ideas	2.13	3.88	3.86 (0.01)
Hypothesis	2.88	4.75	4.26 (0.00)
Data and IV/DV	2.75	4.13	3.87 (0.01)

t-value is from a paired t-test with the p-value in parentheses. Sample size is nine students.

SI.3: Rubric Coding and Robustness Checks

As mentioned in the main text, I used Baglione (2018)'s end-of-chapter checklists as a basis for the rubric skills in each component rubric. A researcher who studies assessment in scholarship of teaching and learning reviewed the rubrics to ensure that the rubric items and coding were clear. These rubrics were also workshopped with a group of four instructors

who were implementing scholarship of teaching and learning projects. I then used these rubrics twice: once to provide student feedback and grades during the semester and again to determine proficiency after the semester had ended. I chose to use the rubrics in these two ways in order to both encourage and reward students for their best attempts at each article component during the semester while also being able to evaluate students against a competency standard for the purposes of this project.

Before evaluating rubric skills, I wanted to be familiar with what the discipline considers proficient examples of undergraduate research article writing. To do this, I read through several issues from each of the last several years of *The Pi Sigma Alpha Journal of Politics*, the main peer-reviewed undergraduate research journal in political science. This step was critical for the research article evaluation process because it represents a fair comparison group: other undergraduate students who were deemed by their peers and political science faculty to have conducted political science research in a proficient manner.

I then evaluated individual rubric skills for each student and each article component. I took three pieces of information into account when making a scoring decision. First, I referred back to my original score and the justification I provided for taking points off. This original score provided a starting point for determining the final score. Second, I read through peer review comments from students on each article component to see whether these comments were in line with my original scoring. I paid particular attention to cases where students evaluated a rubric skill lower than I did. Third, I considered the quality of the rubric skill with reference to the above referenced examples of proficient undergraduate research article writing. Using these three pieces of information, I made a determination of the final score on a scale from "needs improvement" to "proficient" to "outstanding." I wrote comments accompanying each rubric skill to help explain the main challenges or successes students had with that skill.

This method allows me to code rubric skills while fully reflecting on how the student performed that skill during the semester. I am also able to address any rubric skills that

build on one another. For example, if a student fails to identify a sufficiently narrow research question, then that student is likely to produce a literature review that is expansive instead of concise. A non-holistic rubric skill evaluation would penalize the student for both the research question and literature review issue, not taking into account that the literature review issue could have been caused by the research question issue. In cases such as these, context about student performance in the course is critical for determining whether there is a causal link or if the student fixed his or her research question and simply failed to write a concise literature review for some other reason.

SI.4: Control Course

It would be ideal to run an experimental design to test the effectiveness of the course re-design proposed in the main text. In particular, the course was re-designed to teach the research article writing process in four ways: 1. exposing students to political science research articles, 2. engaging with the content and format of said articles in class, 3. asking students to apply these skills to write their own research article, and 4. modeling the collaborative writing process by engaging in peer review and revision. As I argue in the main text, this course re-design implements these four changes as a package. In doing so, I advance previous work that focuses only on exposure to reading political science research articles and the peer review process in introductory courses.

Hence, the best experimental design would compare a course with none of these four features to the re-designed course. Students would be randomly allocated into either the re-designed course or the same course minus all four points of the re-design. Unfortunately, this sort of experimental design is not practically feasible. The main reason for this is the scope of the course re-design intervention. If the course was taught without these four parts of the research article writing process, half of the in-person class time and 45% of the points in the course would no longer be included. Such a course would then have to fill this space

with something else, therefore eliminating the possibility of a true experimental comparison.

It is important to note that the research article writing process consists of these four components, but it is not clear what comparing the re-designed course to a course that fulfilled one or two of these components would reveal. My main argument is that students in an introductory course can demonstrate aptitude completing the entire research article writing process. Within this process, components build on each other. For example, it is not obvious that a control course that implemented just peer review of some student writing and none of the other three components would reveal the effect of these three other components, minus peer review. The reason is that students in the re-designed course would be peer reviewing each other's research articles whereas students in a control course would peer review something else. If the purpose of the intervention is to build a course wherein students are invested in and empowered by the research article writing process, then peer review must be integrated carefully in order to have its intended effect. In the main text, I discuss how features of the re-designed course might translate into larger courses, but the emphasis is again on trying to replicate the entire experience at some level, not selecting a single component of the process to implement.

An alternative to conducting an experiment is to present evidence regarding whether students in the traditional Introduction to Comparative Politics course taught every spring learn any skills relevant to the research article writing process. The traditional course fulfills none of the four components mentioned here: students do not read political science research articles, they do not discuss article components in class, they do not complete writing assignments, and they do not engage in revision and peer review. If students are able to acquire research article writing skills through this traditionally designed course, then perhaps the effect of the re-designed course is attenuated.

An important caveat is in order relative to the earlier discussion about experimental design. Because the traditionally designed course lacks these four components, its format and grading system are quite different. The course is taught in a lecture and discussion

section format with most of the grade coming from homework assignments and multiple choice exams. Because of this structure, it seems unlikely that students would significantly improve in research article writing throughout the semester.

To assess this claim, I rely on participant observation, including discussions with the instructor and students, during my experience as a teaching assistant for the traditional course. I chose this method of analysis due to the nature of the question being asked: students would be pedagogically confused if they were given the pre-/post-test or were asked to submit writing samples for rubric skills evaluation when the course contained no mention of these topics.

The course does use a textbook that introduces fundamental concepts related to the purpose and format of scientific inquiry. In particular, the instructor noted that one of the goals of the course is to help students understand that political science is not just a collection of facts, rather a systematic method of thinking up a hypothesis and supporting it with evidence. Students said that they felt they had learned this fact about the discipline after completing the course. While students became more comfortable *understanding* the purpose of systematic political science research, both the instructor and students did not feel that students had gained any *ability* to actually do political science research. Understanding was the explicit goal of the course, so the course certainly achieved that particular learning outcome. This evidence simply suggests that focusing on student understanding did not somehow translate into a very different learning goal: increased student research article writing ability.

Beyond exposure to the structure of political science inquiry, the course did not seem to improve student exposure with or ability to perform other research article writing tasks. Students did not feel like they had the knowledge required to attempt to write a literature review, theoretical argument, or research design. My observations throughout the course were that some students may have been able to write a hypothesis that was falsifiable if asked — falsifiability was a major course theme — but that the hypothesis would not meet

other criteria because they were not taught in the course.

To summarize my observations, I did not find that students gained research article writing knowledge naturally in a traditionally designed substantive course. Any gains in student understanding were positive and important features of the course, but they had no bearing on how well students could actually learn the research article writing process.

SI.5: Sample Size and Inference

One limitation of this intervention is that I taught the re-designed course to a total of nine students. This could present a threat to inference in two ways: 1. if the empirical analysis was underpowered and 2. if the students or instructor in this course were an anomaly and repeated versions of this course would produce different results.

The empirical analysis relies on student submissions, so its maximum size is nine students. As such, I conduct pairwise t-tests comparing pre- and post-tests and comparisons of means for the rubric items. While the sample size is small, t-tests are designed for use in cases where there are small samples. There should also be no inference problems comparing mean values with small samples.

I cannot fully address the possibility that the students or instructor in this course were an anomaly. Indeed, repeated versions of this course with different students and a different instructor could produce different results, and I would encourage other instructors to evaluate this course re-design for themselves. On the student side, while it is true that relatively few students took the course, the students enrolled in the course represented quite diverse demographic characteristics and background experience. The diversity in the course matches or exceeds that present in the traditional Introduction to Comparative Politics course. I will note that the results show that each individual student's perceptions and ability to complete research article writing tasks increased as a result of taking this course, so the effect shown in the main text is not an artifact of only some students succeeding.

Other concerns relate to course size, timing, and instructor. Course offerings, size and timing, and instructor selection are all based on projected student demand and Departmental preferences. In this case, the Department rotates instructional responsibilities for the traditional course among senior faculty. The goal is to present a consistent experience for students taking the traditional course. Courses taught in the summer have much more flexibility in terms of instructor and format. Instructors are able to develop and implement new course formats in this setting. One feature of summer courses is that they are small — usually no more than fifteen students. Additionally, summer course offerings must be carefully managed by the Department because of the much lower enrollment. Practically this means that instructors work with the Department to determine which course offerings work best in a given year. Typically one or two introductory courses and one or two upper-level courses are offered. This means that there is not always demand for Introduction to Comparative Politics each year and that it might make more sense for me to teach a different course in a given year.

For these reasons, repeating this intervention in a much larger Introduction to Comparative Politics course is not currently feasible, though it is definitely something I would like to do in the future. I am also happy to share instructional materials with other instructors interested in implementing and assessing a course re-design of this type.

References

Baglione, Lisa. 2018. *Writing a Research Paper in Political Science.* Thousand Oaks, California: CQ Press.