Stepping around the Brick Wall: Overcoming Student Obstacles in Methods Courses

Angela L. Bos, *College of Wooster*
Monica C. Schneider, *Miami University of Ohio*

ABSTRACT Many political science departments offer, and increasing numbers of them require, undergraduate research methods courses. At the same time, studies cite high levels of student anxiety about such courses. Utilizing survey data from both students who take and faculty who teach methods, we conduct an analysis that compares the barriers students and faculty independently perceive. Next, we share results from our own exploratory assessment technique, which evaluates our success in increasing student confidence with regard to conducting research. Finally, we present specific exercises and assignments which can serve as solutions to student barriers. We argue that conscious reflection as to where students lack confidence and assessment of our efforts allows instructors to approach teaching methods more effectively.

While courses in political science research methods are increasing in number,[1] students' enthusiasm and preparation for such courses has decreased (Brandon et al. 2006). This suggests political science professors teaching methods should consider new styles of teaching in order to make methods courses valuable learning experiences for students. We begin our study on effective teaching with an observation: students experience anxiety in learning the steps of the research process. This observation is corroborated by research noting high levels of math anxiety (Maier and Curtin 2005) and library anxiety (Highby 2006) among undergraduates. Therefore, we first explore the barriers that *students* identify as problems in learning quantitative methods. We then compare the barriers students identify to professors' perceptions of student barriers in order to understand how we can design our teaching to provide solutions for our students. Finally, we offer an exploratory assessment technique to evaluate our success as methods professors in improving students' confidence in their ability to perform the components of the research process. We conclude with suggestions for improvement in the design and implementation of undergraduate methods courses to best meet student needs.

Angela L. Bos *is an assistant professor of political science at the College of Wooster and can be reached at abos@wooster.edu. Her research agenda focuses on political parties, gender and racial stereotypes of candidates, and effective pedagogy in both college political science courses and high school citizenship education. She teaches courses on methods, introductory U.S. politics, media, gender, parties and elections, and political psychology.*
Monica C. Schneider *is an assistant professor of political science at Miami University of Ohio and can be reached at mschneider@muohio.edu. Her research agenda focuses on elections, gender and racial stereotypes of candidates, and differences between male and female candidates in their campaign rhetoric. She teaches courses on public opinion and political participation, parties and elections, introductory U.S. politics, and graduate-level statistics.*

BACKGROUND

Courses in political science methods could include a variety of methodologies; we limit our discussion to *quantitative* methods courses or those that follow a general positivist model. Often, such quantitative research methods courses require a research project, or they precede a senior thesis, capstone, or honors project. Attendees at the methods track of previous American Political Science Association's Teaching and Learning Conferences came to a consensus on standard components of such methods courses, including: "An understanding of key political science indicators; where to find literature and supporting data; how to assess literature and the supporting data's academic quality; reliability and validity; the use of appropriate statistical measures; data presentation skills" (Brandon et al. 2006, 535).

doi:10.1017/S1049096509090519

https://doi.org/10.1017/S1049096509090519 Published online by Cambridge University Press

Little scholarly work in our field addresses teaching research methods at the undergraduate level (Thies and Hogan 2005). What scholarship exists focuses on the components of methods courses, describes general approaches and specific assignments to achieve student learning (e.g., Cole 2003; Corrigan, Dorey, and Swanhart 2006), or analyzes the benefits of methods courses for students (e.g., Andersen and Harsell 2005).

Our own observations suggest that students fear some components of a methods course and that these fears prevent them from optimal learning. In this paper, we aim to address gaps in the existing body of work by identifying the major obstacles students face throughout the research process. We will discuss solutions, such as course projects, assignments, and in-class exercises, which may minimize these barriers.

Scholars of teaching note that when we develop innovations to solve student obstacles, it is critical to assess student outcomes, that is, we need empirical demonstrations of whether our innovations succeed or fail (Brown, Blankenship, and Kramer 2007). We can use several different tools to determine if and what students learn in our course, including: conventional tests, graphic representation of concepts, journals, research papers, portfolios, and peer assessment (McKeachie 2005). Other forms of assessment include detecting changes in self-efficacy (Maier and Curtin 2005; Brown, Blankenship, and Kramer 2007), student knowledge, and teaching evaluations (Brown, Blankenship, and Kramer 2007).

Since our focus in this paper is on student fears, anxieties, and barriers related to conducting research, we assess whether our teaching has inspired confidence in our students to carry out the steps of a research program on their own. Increasingly, schools are adopting a capstone model and the goal of instructors in this type of teaching environment is for students to be confident and competent to carry out self-directed projects without significant faculty input. Thus, to measure student outcomes for this particular goal, our assessment technique gauges if students' confidence in their research methods abilities increases.[2]

In this paper, we look at three separate studies we conducted. First, we review our survey of students in methods courses to identify barriers to student confidence in various stages of the research methods course. Next, using a survey of professors who teach research methods, we compare student problems with professor perceptions of student problems. We identify ways in which professors can—and do—attempt to address these student barriers when they design their courses, projects, assignments, and in-class activities. Finally, we provide one assessment technique from our own course as an example for evaluating the success of attempts at overcoming student barriers. Our concluding discussion addresses best practices in teaching research methods.

METHODS

Student Barriers

To understand what barriers students perceive to their success in the research process, we surveyed students enrolled in three quantitative methods courses, one honors course, and two regular courses, at a large midwestern university. This particular methods course is not required for political science majors at this university,[3] yet it does fulfill a liberal arts mathematical thinking requirement. As a result, approximately 50% of the students are political science majors. Although this sample differs from the norm of a required course with only political science majors, the differences between our sample and a sample of political science majors in a required course are likely to be minimal.[4]

Forty-nine students completed short questionnaires near the beginning of the term. Given a list of steps in the research process,[5] students designated which research skills they had experience with prior to their enrollment in the course (see Table 1). Next, students documented their concerns about completing each step in the research process. To quantify the comments, we developed a list of broader categories and classified the comments accordingly (see Tables 2 through 8). This survey, along with all of the other survey instruments and supplementary results, are available on our Web site.[6]

Professor Perceptions of Barriers and Their Solutions

In a second survey, we examined what teachers of research methods courses consider the barriers for students and how they design their courses to overcome these obstacles. To explore these questions, we surveyed teachers of methods courses and asked them to consider what barriers students face, to share instructional solutions to address potential student obstacles, and to submit their course syllabi.[7]

To sample professors, we obtained a list of four-year institutions from the Carnegie Foundation (Carnegie Foundation for the Advancement of Teaching 2006). The data set, updated by the Carnegie Commission on Higher Education since 1970, features multiple measures for each college and university in the U.S. for things such as: its areas of instruction, a profile of its student body, and its geographic setting. From the Carnegie list of 1,711 colleges and universities, we randomly sampled 100 four-year colleges and universities, eliminating schools that did not have a four-year political science degree.[8] Our sample of 100 institutions is approximately 5.8% of four-year institutions in Carnegie's database.[9] We do not suggest that our sample definitively represents four-year Carnegie institutions, but are nonetheless confident that our sample reasonably represents the diversity of practices of methods professors in our field.

We then searched the Web sites of the sampled schools to identify either a professor of methods or a department chair who could refer us to an appropriate instructor.[10] We sent an e-mail invitation for the study to each identified instructor. After the introductory letter, if we received no response, we sent up to two reminder e-mails.[11] The data were collected on surveymonkey.com, an online data collection bank. Our response rate was 50%, with 50 of 100 methods professors responding.[12]

On average, our respondents have been teaching methods in political science for 5.33 years. Over 70% of respondents indicated a methods course is a formal requirement in their department's curriculum.[13] Of the types of methods courses, 25% indicated they teach a "scope and methods" course, 26% teach research design, 31% teach quantitative analysis, and 14% teach a senior capstone. In Tables 2 through 8, we summarize the most popular responses to the questions of specific concerns of students, compared to the obstacles professors think students face (described in the Results section).

Student Assessment

Our third study assesses whether or not instructors succeed in reducing anxiety and increasing students' confidence in their

https://doi.org/10.1017/S1049096509090519 Published online by Cambridge University Press

Table 1

Student Experience with the Research Process

Which of the following aspects of the research process have you had any experience with prior to this course? (Check all that apply.)

	49 STUDENTS
Devising a social science research question	49% (24)
Doing a literature search	55% (27)
Assessing the academic quality of literature	61% (30)
Choosing an appropriate sampling design	24% (12)
Choosing appropriate measures	27% (13)
Performing relevant statistical analyses	35% (17)
Presenting data to an audience of your peers	51% (25)

research abilities. By conducting a test of each student's confidence before and after a methods course, we can assess changes in student confidence. As stated earlier, promoting student confidence is one method to judge the success of a methods course. Students in a quantitative methods course at the same large midwestern university described above[14] were given a survey at the beginning and end of the semester, with each of the goals for the class, including: defending their view on the use of human subjects; creating and testing a research question; choosing, evaluating, and implementing a research design; sampling technique and research method; analyzing data; assessing results; giving a presentation; and, finally, their ability to succeed in a more advanced statistics course. For each course objective, the students indicated how confident they felt in their ability to perform such a task on a 4-point scale, from 1 ("Not at All Confident") to 4 ("Extremely Confident").

RESULTS

Our first finding, consistent with other research (e.g., Brown, Blankenship, and Kramer 2007), was that students were very unfamiliar with the steps of the research process. As shown in Table 1, almost half of the students had some experience with social science research questions, literature searches, assessing the quality of academic literature, and giving a presentation. Far fewer than half of the students had any experience with sampling, measurement, and statistical analyses, crucial components for completing a research project.[15]

Generating a Social Science Research Question

Nearly all professors (94%) believe it is important to teach how to develop a social science research question. While many students say that they have had experience in this area, most faculty estimated that 20% or fewer students come to their courses with some prior instruction in this area.

When faced with the task of devising a research question, the two most common barriers reported by students were developing a question that is clear and/or specific and generating a unique question (see Table 2). Students want a question that "hasn't already been asked" and is "original." Other less frequently reported barriers were lack of experience with asking social science research questions, interest in the topic, importance, feasibility, and finally, that the topic is "neutral" or "unbiased."

While the faculty sample did not differ vastly from the students in their perceptions of student barriers overall, there are some noteworthy disparities. First, students mentioned the uniqueness of their project more often as an obstacle than professors did. Faculty underestimated student concern that a project needs to be completely new and different in order for it to be valuable. Second, students were more concerned with the feasibility of the project (e.g., what types of resources do I need and where can I find those resources?). Professors may not recognize this student fear because, as experts, we likely have a better automatic understanding of the feasibility of student projects and the scope of our expectations. To calm student fears regarding developing a research question, professors employ examples, such as breaking down good (or bad) research questions for the class to contemplate, and give assignments that require students to read an article to identify the author's causal question.

Table 2

Barriers in the Research Process: Social Science Research Question*

	49 STUDENTS	50 PROFESSORS
Clarity/specificity	27% (13)	16% (8)
Uniqueness	22% (11)	4% (2)
Feasibility	18% (9)	6% (3)
Inexperience with social science	18% (9)	28% (14)
General inexperience	12% (6)	10% (5)
Importance	8% (4)	6% (3)
Lack of interest to the student	8% (4)	6% (3)
Neutrality	4% (2)	0% (0)
Student lack of interest in social science	0% (0)	4% (2)

*Note that percentages can add to more than 100 because of multiple mentions.

https://doi.org/10.1017/S1049096509090519 Published online by Cambridge University Press

Table 3

Barriers in the Research Process: Doing a Literature Search*

	49 STUDENTS	50 PROFESSORS
Finding good sources	37% (18)	6% (3)
General unfamiliarity	14% (7)	28% (14)
Finding enough sources	10% (5)	8% (4)
Finding unbiased sources	8% (4)	0% (0)
Time consuming	8% (4)	6% (3)
Internet research vs. library research	6% (3)	14% (7)
Connecting source to argument	6% (3)	12% (6)
Finding too many sources	4% (2)	4% (2)
None	2% (1)	0% (0)
Referencing sources	2% (1)	2% (1)
Academic vs. popular literature	0% (0)	16% (8)

*Note that percentages can add to more than 100 because of multiple mentions.

Literature Review

Students have more experience with the literature review aspect of the research process than almost any other area: 55% of students claimed prior familiarity with this topic and professors' estimates agree with this claim.

Having prior experience with the topic, however, did not alleviate all student concerns. Students' primary concerns with the literature review process reflect the difficulty of sorting through the many available sources: finding *good* sources (37%), *enough* sources (10%), and deciding how to navigate through *too many* sources (4%) (see Table 3). Another concern of students was to find unbiased sources (10%), an unusual statement that may reflect students' difficulty assessing the academic quality of literature (discussed fully in the next section).

Professors are more concerned with the students' inability to connect the literature to the research question (12%) and the students' general unfamiliarity with literature searches (28%). Significantly, professors indicated that students do not seem to know what constitutes an appropriate source and struggle to differentiate between academic and popular literature. Professors reported the following solutions to the fears associated with literature reviews: in-class instruction, visits to the library, presentations by librarians, demonstrations of JSTOR and other search engines, and requiring student to create an annotated bibliography.

Finding and Assessing Literature

In order to write a literature review, students should be able to assess scholarly literature.

Students reported experience in this area (61%), but the majority of the faculty disagreed, estimating that 20% or fewer of their students had experience in this area (see Table 4). Students may be so unfamiliar with assessing literature that they are not even sure what it means. The most commonly reported student barrier was a general unfamiliarity with this step (20%), followed by having no concerns (8%), concerns about peer review (8%), and concerns about bias (6%). The concern with bias is peculiar—students were concerned that the research that they find might have a particular "agenda" instead of being truly scientific. Faculty perceive students as lacking the knowledge, experience, and skills to navigate through academic literature. To solve this problem, they again turn to instruction from librarians and general rules of thumb, such as identifying top journals for the students, and introducing them to the concept of peer review.

Choosing Appropriate Sampling

Sampling design is often taught so students understand methods of random sampling and how deviation from those methods affects results. Of faculty surveyed, 69% stated that teaching sampling concepts was "very" or "extremely" important in methods courses. Faculty members estimated 20% of students have experience with this topic, which matches student reports (24%) (see Table 5).

Faculty members cited that students lack quantitative skills and knowledge related to probability. A surprising number of professors mentioned they want to eliminate this topic, in part because sampling is "beyond most students." Both students and faculty are concerned that students lack experience with and confidence in their skills to choose a sampling design. However, students did not identify the mathematics involved with sampling as a problem as often as faculty do. Students reported obstacles related to more global concerns such as choosing an appropriate design that is feasible, relevant, and representative.

Faculty respondents offered several useful approaches to teach concepts relating to probability, different types of sampling techniques, target population, representativeness, and bias, including discussing examples in small groups, posing scenarios in class, or assigning homework where students apply and create different sampling designs.

Choosing Appropriate Measurement

Nearly all teachers of methods in our sample (90%) agreed that it is "very" or "extremely" important to teach concept measurement, reliability, and validity. Faculty perceptions of student experience with measurement match student perceptions from our sample: 78% of faculty estimated 20% or fewer of the students in their courses come into the course with any familiarity with

https://doi.org/10.1017/S1049096509090519 Published online by Cambridge University Press

Table 4

Barriers in the Research Process: Assessing Academic Quality of Literature*

	49 STUDENTS	50 PROFESSORS
General unfamiliarity	20% (10)	2% (1)
None	8% (4)	0% (0)
Peer review	8% (4)	2% (1)
Bias	6% (3)	0% (0)
Time consuming	6% (3)	0% (0)
How to determine quality: general	6% (3)	14% (7)
Lack knowledge/experience/skills	4% (2)	32% (16)
Undergraduates simply do not do this	2% (1)	2% (1)
Not required in my class	0% (0)	4% (2)

*Note that percentages can add to more than 100 because of multiple mentions.

Table 5

Barriers in the Research Process: Sampling*

	49 STUDENTS	50 PROFESSORS
Lack of representativeness or generalizability/bias	16% (8)	4% (2)
Feasibility	12% (6)	0% (0)
Relevant to research question/hypotheses	10% (5)	2% (1)
Sample size	8% (4)	2% (1)
What to consider/what is appropriate	8% (4)	2% (1)
Lack of experience/confidence	6% (3)	2% (4)
None	4% (2)	0% (0)
Not required in my class	0% (0)	14% (7)
Lack knowledge/experience	0% (0)	12% (6)
Lack reasoning/probability/math skills	0% (0)	10% (5)

*Note that percentages can add to more than 100 because of multiple mentions.

measurement, which roughly matches the 27% of students reporting prior exposure.

Faculty and students largely perceive the same student barriers with regard to measurement (see Table 6), including: knowing what types of measures exist, understanding reliability and validity, and identifying which measure is appropriate in a given research situation. Students commented that "because there are so many methods you can use to measure, it's difficult to decide which are most effective" and that "making sure I'm measuring what I actually intended to measure" is a concern.

As with sampling, the professors cited their perception that students lack requisite mathematical skills and knowledge of measurement concepts. For example, faculty commented that "numbers scare [the students]" and that students "often have difficulty understanding how something can be measured, and what the limits of various measures are." No students, however, mentioned such concerns.

Common themes in instructional topics related to measurement included discussing reliability and validity, measurement, and operational definitions. One faculty member asks students to operationalize variables in real life before asking them to think about applying measurement concepts to politics. Faculty stressed using a variety of measurement examples in class, including having students examine measures used in articles. In addition, faculty assign homework where students choose and assess the quality of measures for various concepts.

Performing Relevant Statistical Analyses

There is a divide among faculty with regard to whether our methods courses should teach students to perform statistical analyses. Of the respondents, 67% of faculty find it "very" to "extremely" important to teach this in their courses. Others cited time constraints, such as covering different types of methods, that prevent meaningful instruction in statistics.

The main concern students held with regard to performing analyses of data was that they might misinterpret their findings. For example, one student reported concerns about "misinterpreting data, making sure that the data is causal and not confounded by another variable." Both faculty and students perceive math or statistics phobias and questions surrounding how to determine what analysis is appropriate (see Table 7). Common themes in the comments included: "terror of math," "hard to not get lost in the numbers," and "how do I know which analysis to use?"[16] Faculty incorporate the following ideas: having students do analyses by hand, creating detailed handouts regarding types of analyses and types of data situations, assigning

https://doi.org/10.1017/S1049096509090519 Published online by Cambridge University Press

Table 6

Barriers in the Research Process: Measurement*

	49 STUDENTS	50 PROFESSORS
Determining when a measure is appropriate	8% (4)	4% (2)
Miscellaneous	8% (4)	4% (2)
Lack of experience/confidence	6% (3)	12% (6)
Understanding reliability/validity	6% (3)	4% (2)
Knowing types of measures/data	4% (2)	6% (3)
Ease/difficulty of measuring	4% (2)	0% (0)
Relevant to research question/hypotheses	2% (1)	2% (1)
Bias	2% (1)	0% (0)
None	2% (1)	2% (1)
Measurement concepts/mathematical skills	0% (0)	14% (7)
Conceptualizing	0% (0)	4% (2)

*Note that percentages can add to more than 100 because of multiple mentions.

Table 7

Barriers in the Research Process: Statistics*

	49 STUDENTS	50 PROFESSORS
Choosing analyses appropriately	12% (6)	8% (4)
Understanding data/measures	10% (5)	4% (2)
Misinterpretation of data	10% (5)	0% (0)
Fearing numbers/statistics	10% (5)	22% (11)
Understanding analyses	6% (3)	2% (1)
No experience/confidence	6% (3)	6% (3)
Using analysis programs	4% (2)	2% (1)
None	2% (1)	6% (3)
Understanding concepts of statistics	0% (0)	6% (3)

*Note that percentages can add to more than 100 because of multiple mentions.

application assignments, and requiring weekly labs to demonstrate and practice specific techniques.

Presenting Data

Many teachers of methods agree that a goal of a methods course should allow for students to practice presenting data (Brandon et al. 2006). Approximately 70% of faculty respondents in our survey indicated they find it "very" or "extremely" important to include presentations in their courses. Having students present in class, particularly data they have analyzed, allows students to demonstrate a deepened understanding of what their data mean.

When asked what barriers they perceive with regard to presenting data, student respondents replied that they were concerned about (1) whether their conclusions were correct, (2) whether they would be asked difficult questions, and (3) whether their presentation would be interesting and clear. A few representative comments include, "making sure my data isn't flawed and fear of criticism of my data" and "knowing how to present information with clarity so people are not bored or confused." Faculty mentioned that students lack the skills to effectively use visual aids, and to "keep their overheads or PowerPoints focused."

Faculty perceptions of student concerns were, for the most part, correct (Table 8). One faculty member offered the following suggestion as to how to instruct students to give effective presentations: "I provide students with an example of how I present my own research at a conference, so they can see what it should look like."

Student Assessment

To assess our success in overcoming student barriers, we analyze students' pre- and post-course confidence ratings (see Table 9) with regard to performing various aspects of the research process. Prior to the course, students on average rated their ability to perform each research task between 2 and 3 on a 4-point scale, ranging from 1 ("Not at All Confident") to 4 ("Extremely Confident"). These numbers reflect the fact that, despite having familiarity with some aspects of the research project, students were not at the top of the scale in terms of their confidence. For example, 49% of students initially claimed experience with developing a research question but, on average, students rated their abilities in this area around 2.5 and still identified fears about completing this task.

As we hoped, after taking the course students were significantly more confident in their ability to create and test social scientific hypotheses, to choose an effective research design, to analyze data using relevant statistical analyses,

https://doi.org/10.1017/S1049096509090519 Published online by Cambridge University Press

Table 8

Barriers in the Research Process: Presentation*

	49 STUDENTS	50 PROFESSORS
Clarity/organization	12% (6)	12% (6)
Overall project quality	12% (6)	0% (0)
Conveying statistics	10% (5)	4% (2)
Fears about public speaking	8% (4)	16% (8)
Keeping audience attention	8% (4)	0% (0)
Skills related to public speaking	8% (4)	4% (2)
None	8% (4)	6% (3)
Answering questions	6% (3)	0% (0)
Creating presentation visuals	0% (0)	8% (4)
Not applicable	0% (0)	4% (2)

*Note that percentages can add to more than 100 because of multiple mentions.

to assess results, and to describe and defend their research in front of their peers.[17] This assessment suggests that we are addressing student fears.

DISCUSSION AND CONCLUSIONS

Our results suggest several concrete ways in which methods professors might improve their courses to better address student barriers. Given the disparity between faculty perceptions and student fears, our first suggestion is that professors would do well to conduct their own research on student fears at their particular institution. In addition to using a formal assessment tool, we recommend pairing students on the first day of class to share their concerns about the course. In our course, this exercise revealed numerous fears students were hesitant to share with the larger group. It is possible that simply having a professor acknowledge their fears might be helpful for students. Moreover, having an understanding of institution-specific student barriers may spark useful solutions. For example, if we know that students in the class are worried about navigating through a tremendous number of sources, perhaps a specific course session on this topic would be useful.

We divide the remainder of our suggestions into six major areas: examples, problems and activities, focus on conceptual issues, rules of thumb, assessment, and opportunities. One theme among faculty suggestions for alleviating student concerns is to give and use many examples. We concur: examples of a variety of research questions—both in and outside of the discipline of political science—can help students form their own ideas and understand concepts. For example, questions such as "how do voters decide?" or "why do some people have certain opinions while others do

Table 9

Assessment of Confidence

Before the term began, students were asked to evaluate their confidence in their ability to perform the following tasks on a 4-point scale from Not Confident at All (1) to Extremely Confident (4). At the end of the term, they were asked to complete the same self-evaluation.

	PRE-TERM	POST-TERM
Defending my view on the use of human subjects in social scientific research	2.89 (0.758)	3.61* (0.502)
Creating and *testing* my own, well-formed, social scientific question using quantitative methods	2.50 (0.857)	3.78* (0.428)
Choosing, *evaluating*, and *implementing* a research design, sampling technique, and measurement method	2.44 (0.185)	3.67* (0.485)
Analyzing data using relevant statistical analyses	2.72 (0.826)	3.44* (0.616)
Assessing results, critiquing both research design choices and initial research question	2.61 (0.698)	3.61* (0.608)
Applying statistical knowledge by *assessing* statistics in the media	2.61 (0.698)	3.56* (0.511)
Describing and *defending* research in front of peers	3.00 (1.029)	3.56* (0.616)
Succeeding in a more advanced statistics class	2.11 (0.900)	3.17* (0.786)

Note: Entries are means with standard deviations in parentheses.

*Mean difference is significant at a $p < 0.05$ level.

https://doi.org/10.1017/S1049096509090519 Published online by Cambridge University Press

not?" can help students begin to think more theoretically and in causal terms. To help encourage polished presentations, we can give presentations of our own research or to invite our colleagues to present their research. Finally, professors might assign portions of political science articles for easy examples of concepts to refer to within class sessions.

Our second recommendation is to incorporate smaller problems and activities. For example, students can gain valuable practice with causality by breaking into groups to identify the independent and dependent variables or hypotheses in an article. Creating assignments that have natural steps to achieving a larger methods goal can be very helpful. For example, writing a literature review can be broken down into smaller parts, including an annotated bibliography followed by a review of a small number of sources on an assigned research question. Students may then feel less overwhelmed by the number of academic sources available.

Small group activities work especially well to teach many methods concepts. Given a research question, groups of students can make recommendations for a sampling design and can generate ideas regarding how to measure a concept. We have found that having students operationalize the concept of racism works well to spark discussion, particularly when followed by a critique of the reliability and validity of existing measurements. Once again, we would stress the importance of incorporating both political science and non-political science examples to pique student interest and to help students apply the concepts beyond our discipline. One of us has created a library "geocache" exercise[18] (similar to a scavenger hunt) where student teams navigate the library system. Finally, we can alleviate students' presentation fears by having them exchange presentations ahead of time to generate questions for one another.

Third, we want to emphasize the importance of tying specific details to the larger, more global point, particularly in instruction on sampling. In identifying student fears on sampling, faculty overestimate student fears regarding math and did not identify the more global, pragmatic, and conceptual concerns of students, such as knowing what measures already exist and how to choose the appropriate ones. We suggest a constant return to the bigger picture, especially when delving into probabilistic or statistical details.

A fourth solution for alleviating student fears is to give students rules of thumb. For example, when we professors look at a list of sources, we often use shortcuts—names of journals, book publishers, authors, article titles, or an examination of independent and dependent variables—to determine the relevance of a source. When looking at a regression table, we use similar rules of thumb—looking at the R-squared, and the direction and significance of our independent variables. Teaching students our shortcuts can help to alleviate their fears and to increase competence.

Fifth, assessment of student learning through a variety of techniques is a good way to evaluate our success. In addition to assessing student learning through exams and projects, we can also measure how confident students feel in their abilities, in order to make sure that their fears are alleviated. When students feel confident in their abilities, they may be more able to competently conduct research. In this paper, we present one way to assess student improvement but others are possible.

Finally, we must give students the necessary opportunities to learn all of the different components to the research process put forth by the APSA Teaching and Learning Track (Brandon et al. 2006). Since methods courses are often too crowded with topics, we advocate attempts to incorporate methods topics into substantive courses to reinforce the work done in methods courses (e.g., Brown, Blankenship, and Kramer 2007) and particularly for schools where methods courses are not required. To that end, we are currently developing short modules that would take up minor amounts of time in substantive courses, but would significantly help reinforce methodological concepts for students.

In conclusion, to help professors teaching methods courses, our research suggests three steps. First, we need to understand what challenges and obstacles *students* perceive when they walk into our classroom that might prevent them from being able to carry out a research project. This may be as simple as asking students specific questions about their previous experiences and what barriers they perceive. Second, when designing our course activities and assignments, we ought to consider what types of activities could help students overcome these specific obstacles. And, finally, we should assess our course assignments and activities to make sure that our efforts were successful. Our conscious reflection regarding our students' lack of confidence or skills can allow us to approach teaching methods in a more effective way. By considering and assessing the ways in which our pedagogies may be at odds with student barriers, we can more effectively engage students in our methods courses. ■

NOTES

This paper was initially prepared for delivery at the Teaching and Learning Conference for the American Political Science Association, Charlotte, NC, February 9–11, 2007. We wish to thank Melanie Burns, Bas van Doorn, Jamie Druckman, Songying Fang, Alina Oxendine, Kevin Parsneau, Vaishali Raval, Ani Sarkissian, Shawn Trier, and Aine Zimmerman. We also thank two anonymous reviewers whose comments undoubtedly improved our work. In addition, the participants of the APSA Research Methods Track and especially Cameron Thies offered many worthy insights.

1. More schools offering a liberal arts education are starting to require methods courses (see, for example, Wahlke 1991; Hill 2002; Selingo 2003; Brandon et al. 2006).

2. We advocate using this assessment technique in addition to more traditional methods of using pre- and post-tests of students' answers to objective methods questions.

3. Over 50% of Ph.D.-granting institutions do not require a methods course; across all types of schools, 64% have a methods requirement for undergraduates (Thies and Hogan 2005).

4. Political science majors in a required course might differ from political science majors in a non-required course, non-political science majors in a required course (i.e., a college or university requirement), or non-political science majors in a non-required course. We consider the differences between these groups on our relevant variable: student fears. Political science majors in a required class might be the least fearful in that they may have chosen the major based on knowing that this course was required. Alternatively, they may be the most fearful given they could be in a course that they do not wish to take. We believe that political science majors are unlikely to have *different* fears from other undergraduate students simply because many students arrive with similar secondary school preparation. Moreover, all of the students in our sample are in the arts and sciences more generally. Political science majors in a non-required course, which constitutes half of our sample, might be more confident and more interested in statistics because they are voluntarily taking the course. However, because the methods course at this particular school also fulfills a general requirement, the course attracts students who are very fearful of math and methods but who need this course to graduate. Finally, very few students, if any, in our sample would be non-political science majors in a course that fulfills no requirement, because students have little interest in taking such a course. We have no reason to believe that the sample will be biased towards having students who are *more* fearful or *less* fearful than political science majors in a required course. Because our sample also includes some students who are taking the course for a requirement, differences between our sample and a sample of political science majors in a required course should be minimal. We conducted a small test to provide support for the idea that students in our sample would not differ significantly from political science majors in a required course. Using a small sample of political science majors in a required course at a small liberal arts college, we

https://doi.org/10.1017/S1049096509090519 Published online by Cambridge University Press

find few differences between the samples that would cause us to change our conclusions.

5. We included the following: devising a social science research question, doing a literature search, assessing the academic quality of literature, choosing an appropriate sampling design, choosing appropriate measures, performing relevant statistical analyses, and presenting data to an audience of your peers.

6. www.wooster.edu/polisci/stepping/main.html.

7. We received too few syllabi from faculty members to make any kind of generalizations.

8. Two-year institutions were not included as they typically do not offer methods courses of the type this paper focuses on. A random sample was drawn by generating random numbers for all 1,711 institutions in the sampling frame. We reordered the data according to these numbers to select the first 100 institutions as our sample. When, through our identification process, a school was deemed not to meet the sample criteria, we re-sampled an additional school using the same process. In all, we reviewed 159 schools to obtain a sample size of 100 programs that met our sample criterion.

9. We analyzed potential differences between our sample and the sampling frame. The comprehensive nature of the Carnegie database allows us to compare our sample's characteristics and those of the sampling frame. To this end, we conducted three specific tests. First, we assessed whether the geographic region of schools in our sample differ significantly from that of the entire Carnegie list that we drew the sample from. We find that the mean response for schools within our sample (N = 100) is 4.05 and for the overall sample (n = 1,608) is 4.28. A t-test comparison of means revealed no significant difference between the two (t = 1.020, 1,708 df, p < 0.31). Second, we examined whether the proportion of schools represented in our sample that are private colleges is significantly different from the proportion of private schools in the entire frame. For this test, we tested whether the proportion of private colleges in our sample differs significantly from that in the frame. We computed a z-statistic that is compared to a standard z-table. All p-values reported here are two-tailed. We find that the proportions—0.549 in our sample and 0.587 in the frame—do not differ significantly (z = –0.749, se = 0.0503, p < 0.45). Finally, we tested whether the locales (urban to rural) of schools in our sample differ in significant ways from the locales in the frame. We find that in the mean for the entire frame is 3.27 whereas our sample mean is 2.99 and that these differences are not significantly different (t = 1.264, 1,708 df, p < 0.207). These tests provide support for our argument that the sample is likely adequate for drawing conclusions.

10. In some instances, we found or were referred to multiple instructors for one institution. In this case, we e-mailed all of the instructors.

11. If an e-mail bounced or it seemed that the information on the Web site was out of date, we then contacted the department chair or any other relevant department member.

12. In addition to the examination of sample verses frame characteristics, we also conducted analyses to determine whether the institutions of our respondents differ significantly from those of our sample's non-respondents. We tested the same variables—geographic region, proportion of private colleges, and locale—as in the case of comparisons between our sample and the frame reported above. We find only marginally significant differences regarding regional location (t = 1.946, 99 df, p < 0.10). With regard to the proportion of private schools, we find there are no differences between respondent and non-respondent institutions in this regard (p_{sample} = 0.451, $p_{nonrespondent}$ = 0.400, z = 0.485, se= 0.106, p < 0.63). Finally, there are only marginally significant differences between locale of respondent institutions and non-respondent institutions (t = –1.696, 99 df, p < 0.10) whereby respondent institutions (mean = 2.48) are somewhat more urban than non-respondent institutions (mean = 3.23).

13. This percentage is higher than expected; this may be due to those responding being more likely to be at an institution that requires such a course.

14. This class was taught in fall 2005 by one of the authors and was not included in the study asking students about their barriers.

15. The students in the honors section of the course had only slightly more experience with the quantitative aspects of the research process.

16. Concerns with using new computer software were minor (4%), but given our own observations of student fears of learning a new tool, perhaps a separate question would have shed more light on fears in this particular area.

17. Of course, students may be overconfident in their abilities; that is, they feel confident that they can conduct analyses, but realistically cannot perform the task. While this is possible and should be tested in future research by examining the relationship between student confidence and their course grades, in our experiences, fear and under-confidence are more common than student overconfidence.

18. Geocaching is a game similar to a treasure hunt where hikers use a global positioning system (GPS) to hide or seek containers. A library geocache contains initial hints that lead students to subsequent clues. To reach the cache students must acquaint themselves with various aspects of the library (online databases, print journals, etc.).

REFERENCES

Andersen, Kristi, and Dana Michael Harsell. 2005. "Assessing the Impact of a Quantitative Skills Course for Undergraduates." *Journal of Political Science Education* 1 (1): 17.

Brandon, Amy, Mitchell Brown, Christopher Lawrence, and Jennifer Van Heerde. 2006. "Teaching Research Methods Track Summary." *PS: Political Science & Politics* 39 (3): 535.

Brown, Mitchell, Jeff Blankenship, and Robert Kramer. 2007. "The Potential of Embedding Research Methods into Substantive Political Science Courses." Presented at the American Political Science Association's Teaching and Learning Conference, Charlotte, NC.

Carnegie Foundation for the Advancement of Teaching. 2006. "The Carnegie Classification of Institutions of Higher Education." www.carnegiefoundation.org/classifications/.

Cole, Alexandra. 2003. "To Survey or Not to Survey: The Use of Exit Polling as a Teaching Tool." *Political Science and Politics* 36 (1): 245–52.

Corrigan, M., J. Dorey, and M. Swanhart. 2006. "Challenges and Benefits of Executing a Survey Research Project in Political Science Research Methods Courses." Presented at the American Political Science Association's Teaching and Learning Conference, Washington, D.C.

Highby, Wendy. 2006. "Literature Review and the Library: How to Help Students Make Effective Use of the Library." Presented at the American Political Science Association's Teaching and Learning Conference, Washington, D.C.

Hill, Kim Quaile. 2002. "The Lamentable State of Science Education in Political Science." *PS: Political Science & Politics* 35 (1): 113–16.

Maier, Scott R., and Patricia A. Curtin. 2005. "Self-Efficacy Theory: A Prescriptive Model for Teaching Research Methods." *Journalism and Mass Communication Editor* 59 (4): 352–64.

McKeachie, William. 2005. *Teaching Tips: Strategies, Research, and Theories for College and University Teachers.* 12th ed. Boston: Houghton Mifflin Company College Division.

Selingo, Jeffery. 2003. "What Americans Think About Higher Education." *Chronicle of Higher Education*, May 2, A10–16.

Thies, Cameron G., and Robert E. Hogan. 2005. "The State of Undergraduate Research Methods Training in Political Science." *Political Science and Politics* 38 (2): 293–97.

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

https://doi.org/10.1017/S1049096509090519 Published online by Cambridge University Press