TEACHING AND LEARNING

teaching experimental political science: reloaded

ulrich hamenstädt

Institute of Political Science, University of Muenster, Schlossplatz 2, 48149 Münster, Germany E-mail: ulrich.hamenstaedt@uni-muenster.de

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Abstract

Experimental methods are on the rise in Political Science, and we have a growing demand for teaching experimental methods within university courses. This article is an update on an article published in European Political Science (EPS) in 2012 titled 'Teaching Experimental Political Science'. It presents an alternative teaching concept, where experiments are not just experienced but also designed by students. Consequently, this article argues that teaching experimental methods in Political Science should include students working on their own research projects.

Keywords teaching; methods; experiments; course design; political science

INTRODUCTION

or decades, expe'riments have not been part of the methodological toolbox for political scientists. One of the most famous quotes in this context is from an early issue of the American Political Science Review, defining the discipline as a non-experimental science (quoted by Druckman *et al*, 2011). However, this has changed since the mid-1990s (Druckman *et al*, 2006; Morton and Williams, 2010). There are different reasons for these changes (Hamenstädt, 2012b), including among others technical

developments, an enhanced cost-benefit ratio, and new research questions raised within the discipline. These changes also lead to a growing demand for teaching experimental methods within the scope of university courses. Routledge's 'Handbook for Teaching and Learning in Higher Education' covers in chapter 16 how to teach experimental science (Fry *et al*, 2009), but the focus is clearly on natural science as an experimental discipline. However, treating Political Science as a non-experimental science disregards many advantages for students: experiments can be seen as a gold standard for deductive, hypotheses testing research designs—therefore, teaching experimental Political Science is a salient approach to introduce research designs to students, notably for undergraduates.

The importance of teaching experimental designs to undergraduate students has already been discussed in my EPS article from 2012 (Hamenstädt, 2012a). However, the previous article in EPS presented a course design that was characterised by a 'disassociation between research in theory [...] and research in practice' (Ryan et al, 2013: 85) since it was rooted in the idea of explaining a method to students and letting them repeat or reproduce the content. In contrast, this article argues firstly that experiments are one good way to avoid students' refusal of methods in Social Sciences (Adriaensen et al, 2015) and that experiments in particular are a good instrument to introduce students to the structure and logic of (quantitative) research. Secondly, that it is important for a course to work with adequate examples which should cover research questions from the discipline the students are studying. Finally, the article argues that students in methods courses should 'get their hands dirty' by working on small research projects themselves.

In terms of structure, the article initially discusses what benefits there are from teaching experiments in Political Science and how methods courses for undergraduate students can be structured. The article then considers an undergraduate course structure, which is a 'reloaded' version of the EPS article from 2012 (Hamenstädt, 2012a). In the third section, the students' feedback and the lecturer's experiences from the course are considered. Lastly, the concluding section discusses the arguments raised here in the introduction against the old version of the EPS article.

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TEACHING EXPERIMENTS TO UNDERGRADUATE STUDENTS

The driving forces to write this article are outlined in the following section. The first argument of this article is that teaching experimental Political Science can be a good way to avoid students becoming 'Mad about Methods' (Adriaensen et al, 2015). Experiments can be seen as a gold standard for deductive, hypotheses testing research designs. Therefore, teaching experimental Political Science is a salient approach to introduce research designs to students, notably for undergraduates. The focus on research designs allows introducing maths and statistics to undergraduate students in a very practical and not overly complex way. For example, comparing two means with a t test can be demonstrated and comprehensibly taught. To overcome students' 'statistical anxiety' (Adriaensen et al, 2014), the emphasis on design-based research as well as transparency and simplicity in quantitative analysis can be helpful (Dunning, 2012). Transparency and simplicity are often seen as criteria of good experimental research in Social Sciences. However, this is not a call for simplifying statistics, but to make it more tangible. A basic understanding of research designs and statistics is important for undergraduate students. Students should also learn to understand themselves as critical recipients. Published (experimental) studies can contain highly contested assumptions and confusing interpretations of the results. Undergraduate courses are appropriate places to discuss those findings, including critical discussions. However, I would never suggest considering bad practice examples for course readings. Nevertheless, students often voice much more criticism about articles, even about award-winning articles from top journals, than one might expect. It is important for students to develop skills for systematically analysing research designs. This goes beyond summarising an article and its findings, and it has to be rehearsed together with the students.

The second argument of this article is that methods and statistic books often use (extremely) simplified research designs and data sets that have been designed for the use of unambiguous statistical models, or work with examples that are not from the field of Political Science-like the classical textbook for experiments from Shadish et al (2002). It might be true that it is easier for many people to understand an experimental design by taking examples from medicine. In contrast, this article argues that it is best to provide students with examples from their own discipline and discuss them. Experimental Political Science is very much an interdisciplinary approach und therefore confusing enough for many students, so we might carefully challenge them with 'transfer tasks'-by transfer tasks I mean for example discussing the methodology of a medical study and have students transfer the methodology to Political Science. I would suggest starting with examples from Political Science, before presenting a methodological problem to the plenum. In addition, it is much easier discussing challenging methodological points when the entire group of students can draw from specific examples.

The third argument is that the key of understanding a method is to actually do research. It is a difficult task to send students out into the field or let them run experiments, and it might not even lead to the desired results (Nikolopoulos and Zettl, 2014). However, students need to get used to thinking systematically about their research and the opportunity 'to try out practically' what they have learned. Students should experience in a safe learning environment how to convert an idea into a research question, to come up with a testable hypotheses and get their own small (classroom) experiment started.

Students also reflect differently on existing research and articles. For undergraduates, research articles are not only interesting in terms of scientific findings, they are also interesting in terms of how to design and carry out research. When students have to do research-on their own, or better in small groups-they turn back to examples they found convincing and try to adapt the research process. It is important to teach students how a research process can be organised. The best way to do so is to let them try it under guidance whilst giving constant (personal) feedback, assigning project work in small groups, and encouraging (peer) feedback for their projects (Blair et al, 2013a, b). The best place for this learning process is a methods course, since the classroom can be transferred into a learning environment of debating and testing different ideas. Testing ideas always includes failure as part of the learning process. However, learning, as well as research, always has to deal with errors; therefore, it is crucial to transform the classroom into a 'safe' learning environment where everyone can learn from mistakes.

COURSE STRUCTURE

It is not the goal of this article to argue against the old EPS article (Hamenstädt, 2012a) about how to teach experimental Political Science. Furthermore, its aim is to give a good example of an alternative approach. In this section, I will present the course structure of a method course that I have developed and taught. The full syllabus including the reading list is available online (Supplementary_Material_1). The course was divided into four blocks and each of them consisted of three to four teaching units of 90 min. The first teaching block was designed to give a general introduction to the topic, including an orientation in the field of quantitative research, as well as introducing routines, such as classroom experiments. The second block focused on different examples of experiments, whilst the third block examined the theoretical background. The last block consolidated the different learning achievements when students had to come up with their own small experiments.

The first block included inputs from the lecturer and classroom experiments to give students a feel for the content. The teaching goal of this first block was to show what kind of questions in Political Science can be answered with experiments. The literature focused on articles that give an overview of methods in Political Science and demonstrate where experiments can be positioned within the discipline. The aim of using classroom experiments as a teaching tool was to establish an order to criticise experiments. For example, the first lecture started with a classic, the 'Tragedy of the Commons', which is based on the research of political economist Elinor Ostrom (Holt and Laury, 1997). There are online sources, describing how this classroom experiment or game can be done in a course setting.¹ The students easily determined that the game was about how a common good is produced, relating to the issues of why we need a state to organise the production of common goods, why and when we need taxation, the free-rider problem, etc. Starting each lesson with a short classroom game can be used to discuss methodologic guestions, like the use of different research designs, as well as experiencing different settings of experiments, e.g. web-based experiments. If the classroom has access to the web, platforms like veconlab² can be of additional value for teaching-not least, because students may use the web access for checking their emails. However, as this is often the case in many experimental

subjects when given online access, the experience tells the class a lot about what can happen in a web-based or online experiment, providing interesting starting points for discussing the data generating process (DGP) in experimental research and its challenges.

The second block of the course dealt with different forms of experiments. Starting with laboratory experiments, the course covered field experiments, survey experiments, and last but not least natural experiments. Each form of experiment stresses the 'ideal type' of experimental design in its own way. My suggestion is to have a student presenting a journal article reporting on an experiment and assign an overview chapter from the Handbook of Experimental Political Science (Druckman et al, 2011; see also the syllabus for the course, Supplementary_Material_1) to the other students in the course. I also encouraged every student's presentation to start with a classroom experiment. However, I suggested elaborated and well-described games, since the goal was to gain experiences as experimenters.

In the third block, specific problems of experimental designs were discussed. For example, questions of causality and validity-and how causality and validity can be operationalised within a research design. It might also be important to discuss ethics, since it is a cross-sectional topic that will appear in the discussion of many experiments. That sounds very theoretical. Yet, it is important for students to learn to reflect on their knowledge about experiments while discussing those questions. You will already have a wide range of different research examples already discussed in class, which will make those topics more interesting for the students.

For the last block, I suggest to include project work in the course syllabus. I usually like to let students work in groups of four or five—that is from my experience the perfect group size. In the referred to course, the students worked

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in pairs and their assignment was to conduct a classroom experiment and hand in a report of the experimental design, after having it tested and discussed in class. It may sound like time off for the lecturer, but it is quite the opposite: students need a lot of guidance and feedback. What I found notable is that students often had to work out the previously discussed content again since it only now became relevant in their own experiments. The feedback concerned topics such as what is a good research question and how this question can be answered within an experimental design.

In sum, compared to the previous article on Teaching Experimental Political Science in EPS from 2012, the course structure presented here is much more rooted in the idea of building an active learning environment for students. Therefore, it is important to combine lecturer-centred input with group work right from the beginning. Leaving the assessments to the final part of the course also boosted the students' involvement. Often-discussed problems in quantitative research courses for undergraduate students, such as 'statistical anxiety', as mentioned in the last section, can be directly approached by changing the traditional classroom environment (Touchton, 2015) and turning the critical examination of experiments into student group projects. At this point, one of the experiences from the course is that it is so easy to awaken the students' interest in statistics, when the data is coming from their own small research projects.

FEEDBACK FROM STUDENTS AND LECTURER

The article argues that changes in the way method courses are taught can help to overcome common problems in teaching quantitative methods. At this point, we also have to look at students' feedback and lecturer's experiences with the course. Therefore, the article draws on the students' feedback given via the standardised course evaluation. The course has been carried out twice, and 17 students completed the students' evaluation forms (the statistics and the personal comments are provided as supplementary material: Supplementary Material 2).

The evaluation and the comments from the students are overall very positive. They emphasised the clear structure of the course. One student even suggested more maths and statistics as part of the course content, while another student requested stricter specifications for the written group assignment in the last block of the course. These comments, together with the data from the evaluations, tell us that the students welcomed the overall course structure. However, they also give good advice on how the course can be developed further.

From the lecturer's perspective, I share the overall positive impression of the course structure. Furthermore, I would like to outline five further thoughts. In the first instance, one can argue that a course on experimental methods in Political Science should focus on experiments. Contrary to this, I would argue instead that experiments are one method among several, and in larger research projects they often serve as a complementary approach. Therefore, we should consider, in planning a seminar for (quantitative) methods, to teach experiments as one example of organising a research plan and testing a hypothesis. As I argued before, experiments can be understood as a gold standard of a deductive, hypothesis testing research design. However, not many students run an experiment for their bachelor thesis, but they still have to be able to structure a research process. Experiments as a method can deliver transferrable knowledge to the students,

even if experiments are not the method they chose for their final thesis. Second, one student who took the course in the winter term 2015/16 commented, 'a bit more maths and calculating would have enriched the course' (comment no. 4, supplementary material no. 2). As lecturers, we have to find the middle ground: demanding from those students who feel confident with maths and statistics, yet not over demanding and supporting those who do not. The key is to find the right balance depending on the composition of the course. I think it is important that the lecturer actively works towards an atmosphere of open discussion and constructive group work.

Thirdly, many students in Social Sciences might have more general reservations towards the use of numbers and stats. It is important to address those reservations within the course and ideally replace them through better knowledge about methods and the application of statistics in science. This can be done best if the research design and the statistics are relatively simple. At this point, it should never be underestimated how difficult it can be to internalise some central aspects of research designs and it is important to return to these points over and over again. For example, the distinction between random assignment (in experiments) and random selection (in surveys) is important to critical evaluate quantitative methods. It is important to discuss confounding variable in research and assess findings from presented research. I would recommend limiting the teaching input to the essentials in the first instance before going in-depth on specifics. This might sound much like an intuitive point, but particular attention should be placed on topics like randomisation and confounding variable in research, so that students do not get lost.

Fourth, sometimes we understand the plot of a story best, if we read a short abstract right at the beginning. This might be a more general note towards structuring seminar content. Like a wellwritten thesis-with an introduction, a main part, and a conclusion—a seminar might be constructed in the same way: tell the students what you/they are going to do, then do it, and then come back to what you have done. Therefore, it is constructive to discuss the learning outcomes of the entire course in the first session and come back to the learning outcomes throughout the entire course and not only when the students work on their own projects. During the last course sessions, when the students worked in pairs on their small projects, the feedback was given that they had to read through (most of) the literature again in order to understand the different research designs they had learned and think about the application to slightly different research questions. There is a clear-cut between theoretically learning a method and applying that information to one's own research project.

A final, yet nonetheless important point, is that the teaching goals should be clearly defined by the lecturer and not be limited to the content of the course; each course offers students different possibilities to practice their skills in multiple ways. Towards the end of the course, it is worth reflecting upon those competences—for this purpose, we have to plan in advance in which competences we want the students to improve. Then, the structures of the seminar and the teaching methods have to follow this decision accordingly.

CONCLUSION

Back in 2012, I published a best practice article on how to teach experimental Political Science (Hamenstädt, 2012a). In contrast to that article, this one argues that teaching methods in Political Science should focus on students' practical experience with methods. This in effect means that a course should make it possible for students to develop and test their own

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research designs. Therefore, the classroom might have to be restructured. Based on these thoughts, a method course was developed and put into practise. The aim of this article was not just to offer an updated version of the previous EPS article, but rather to take the argumentation for a change in teaching method courses further. Methods for activating students—such as classroom experiments-should be introduced early in the seminar. Students can develop skills for critical assessment of experiments through reviewing journal articles and simple classroom experiments. By the end of an undergraduate course on experimental Political Science, students should be able to design and undertake small experiments by themselves. It is important to make such experiences possible. Furthermore, the article argues that there is a difference between talking about research and undertaking research (Page, 2015)—even if research is limited to small sized classroom experiments. As often discussed in the literature, many undergraduates start their studies with fears or prejudices about statistics-and this can be true for quantitative methods—which as a result can hinder the learning processes of job relevant skills (Adriaensen et al, 2014, 2015). Approaching statistics not only from the traditional classroom setting, but including different didactical methods and teaching tools for higher education, can help to create a more active and participatory learning environment for students. Such a learning environment can help to overcome fears about numbers and statistics that most often exist without reason. Last but not least, the article argues that Political Scientists have developed and

'This article argues that teaching methods in Political Science should focus on students' practical experience with those methods. Focusing on practical experiences can create a more participatory learning environment and can therefore help to overcome preconceptions about quantitative methods and the use of statistics that some students in Political Science may have'.

conducted plenty of interesting experiments in recent years. A lot of literature on experimental methods still refers to experiments from neighbouring disciplines in Social Sciences or Medical Science. Be that as it may, but in teaching experimental methods for Political Science we can now revert to a multiplicity of examples from our own discipline. The goal in a Political Science methods course should be to make a method practically implementable for students in their own research projects. In bringing forward these arguments, I showed in the course of the article how to structure a course and what the students' and my own experiences are.

Notes

 The 'Public Goods Experiment' of Holt and Laury is well described on the following webpage: URL: http://serc.carleton.edu/sp/library/experiments/examples/36647.html, last access, 14.01.2017.
URL: http://veconlab.econ.virginia.edu/admin.htm last access, 14.01.2017.

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About the Author

Ulrich Hamenstädt is a lecturer for Politics at the University of Muenster. He teaches international relations, political theory, and methods.

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