FEATURES AND INFORMATION


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The true method of knowledge is experiment. – William Blake

A fool is a man who never tried an experiment in his life. – Erasmus Darwin

One associate editor’s perspective on classroom experiment articles is detailed in this article. The associate editor provides recommendations for manuscripts for the Instruction (those that describe new classroom experiments) and Research (those reporting studies into the efficacy of classroom experiments as a pedagogical tool) Sections of the Journal of Economic Education as well as some general suggestions for authors.

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Journal articles on classroom experiments have a special place in my heart. In 1998, as a graduate student about to solo-teach my first class, I read Charlie Holt’s article, “Classroom Games: Trading in a Pit Market” (Holt 1996). I would not be exaggerating to say that the article changed my teaching forever, and the course of my research was significantly altered as well. My very first published article was on the efficacy of classroom experiments (Emerson and Taylor 2004). Now some 15 years after reading that first experiment article, I have read, written, refereed, and edited many articles on classroom experiments. In my role as an associate editor for the Journal of Economic Education (JEE), I manage many of the classroom experiment submissions. I am writing this piece for the JEE to guide others writing articles on classroom experiments, articles that will undoubtedly impact the teaching and research of many economics instructors to come.

Manuscripts related to the topic of classroom experiments fall into two general categories. The first group of submissions involves new classroom experiments under development. We consider manuscripts describing these new exercises, simulations, and experiments for the Instruction Section of the JEE. Developers and advocates of classroom experiments, like those of any other

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active learning approach, base their endorsement of experiments on purported improvements in student outcomes associated with use of the technique. Manuscripts from researchers seeking to verify the efficacy of classroom experiments constitute the second category of submissions. Submissions reporting the findings of studies into the impacts of classroom experiments on any number of student outcomes are considered for the Research Section of the JEE. In the remainder of this piece, I will provide suggestions for each type of manuscript in turn, followed by some general recommendations, and I will conclude with some final thoughts.

INSTRUCTION SECTION ARTICLES ON CLASSROOM EXPERIMENTS

For if any man who never saw fire proved by satisfactory arguments that fire burns. His hearer's mind would never be satisfied, nor would he avoid the fire until he put his hand in it that he might learn by experiment what argument taught.

– Roger Bacon

Classroom experiments provide students with opportunities to discover and experience economic concepts for themselves. Applying Roger Bacon's statement on experiments to economics, classroom experiments illustrate the veracity of economic theory in a manner that reason and models alone could not. Development of new experiments for the classroom should proceed with this purpose in mind, conveying economic theory to students effectively.

A wealth of classroom experiments exists in the literature. In developing new experiments, one should identify gaps in the literature or concepts for which existing experiments could be significantly augmented or improved. Further, I recommend focusing on concepts where seeing the theory in action is particularly illuminating. For example, the neutrality of tax incidence is neither intuitive for students nor is modeling of this topic alone terribly convincing. I recall a student once saying that she would not have believed the neutrality of tax incidence with respect to the party from whom the tax is collected had she not seen it herself through an experiment.1 A far more fundamental concept, but no more obvious to students, is the power of the invisible hand in coordinating activities of self-interested agents. The simple double oral auction experiment wonderfully illustrates the attainment of market equilibrium and allows the instructor to discuss a wide range of related concepts with data students have created themselves. These are but two examples of the variety of topics that classroom experiments help demonstrate to students. Any number of concepts remain unaddressed by classroom experiments. I encourage researchers to seek out those topics where students would greatly benefit from seeing the concept in action and develop classroom experiments to help illuminate students' understanding.

Not only should experiment developers consider their choice of topic and the clarity and accuracy of their experiment, but they also must provide sufficient information and materials for replication of the experiment. Classroom experiments derive their value from use and implementation in the classroom, something that will not happen without adoption by other instructors. I encourage those developing new classroom experiments, exercises, and simulations to consider the following in writing up their experiment for submission.

- Provide sufficient information for the reader to replicate the experiment in his or her own classroom. After working with an experiment for some time, a developer may have difficulty identifying the information and materials that a novice to the experiment might require.
Having a colleague read through your manuscript—perhaps even try the experiment in their class—may be particularly helpful in recognizing gaps in your manuscript.

- Include copies of experiment materials (student instructions, record and/or student information sheets, etc.) in the appendix to the paper.
- Instructors must know the amount of time required to run and debrief the experiment and the course(s) for which the experiment is best suited.
- For novice adopters, suggested questions to guide an experiment debrief may be quite helpful.
- Sample results from a run of the experiment also help instructors to better understand the experiment and the output they can expect to generate.
- While a formal evaluation of the impact of the experiment on student outcomes is not necessary, readers may be more likely to adopt your experiment if you provide some information on student outcomes and their reactions to the experiment. For example, how did students respond to the experiment? Do you have any evidence that student achievement was improved as a result of participation in the experiment? Anecdotal evidence and perhaps some summary statistics reporting student impressions from a survey would be sufficient.
- If certain issues or pitfalls may arise in running the experiment, you may want to mention them in your manuscript and provide suggestions as to how they can be best dealt with or avoided.

My dissertation advisor once told me that reading other well-written articles would serve me well in improving my own writing. He then handed me a copy of one of his *AER* articles to read as a sample. While this may not have been the most modest of choices on his part, his advice has served me well nonetheless. Therefore, I give you similar advice here. In writing a manuscript describing your own experiment, I suggest you read some well-written articles describing classroom experiments. There are many I could recommend to you, but as a start I will direct you to works by two classroom experiment authors: Charles Holt and Denise Hazlett. As I mentioned in my introduction, Holt’s (1996) article describing a classroom pit market experiment had an enormous impact on my teaching. He has written other articles with various colleagues (e.g., Bostian and Holt 2013), and he has posted material on classroom experiments on his Web site. Denise Hazlett has developed a considerable number of experiments for the classroom, but unlike most available experiments that address microeconomic topics, she has a number of macroeconomic experiments, the latest of which is a classroom experiment on banking conducted with several colleagues (Kassis, Hazlett, and Ygosse Battisti (2012)).

**RESEARCH SECTION ARTICLES ON CLASSROOM EXPERIMENTS**

*The establishment of a law, moreover, does not take place when the first thought of it takes form, or even when its significance is recognized, but only when it has been confirmed by the results of the experiment.*

– Dmitri Mendeleev
Instructors adopt classroom experiments with a variety of goals in mind, but the commonality among the goals is the pursuit of improvement of student and faculty outcome(s). These outcomes may be related to student achievement (quiz and exam scores, course grades, improved standardized tests), retention (in the course or major), or interest (in the course or discipline). They may also be related to faculty interest and teaching evaluations. Until relatively recently, most of the evidence on the effects of classroom experiments was anecdotal. In the last two decades, researchers have taken a much more rigorous approach to investigating the impacts of classroom experiments on student outcomes. Manuscripts relating findings from such studies are considered for the Research Section of the JEE.

Researchers investigating the efficacy of classroom experiments often collect their own original data, frequently from their own classrooms. If your research plans include collecting original data, you must give careful attention and consideration to acquiring Institutional Review Board (IRB) approval. While I am sure the vast majority of readers know this, it is important enough to state explicitly. If you will be using “human subjects” in your research, you must get IRB approval from your institution before you start your study. Policies and procedures differ across universities, so you must check with your home institution’s IRB but be sure to do so prior to collecting any data from your classes. In many cases, you will be able to go through an expedited review (which is not terribly onerous but is very necessary).

Another fundamental element to good research is a well-developed research design. In studies of the efficacy of active learning techniques, the researcher seeks to compare the innovative instructional method of interest to some other instructional approach. Very often, the comparison is to the lecture or “chalk-and-talk” approach. In other cases, however, the comparison is to some other instructional method. In either situation, the researcher must carefully decide what the appropriate control (or comparison) group is for their particular study. To do so, I would suggest thinking carefully about the mechanism through which you believe the innovative approach being tested impacts student (or faculty) outcomes. Once the mechanism is identified, you should carefully design your study to isolate and test the effect of that mechanism. Additionally, as data on the efficacy of classroom experiments (or other active learning techniques) is often drawn from one’s own classroom, careful attention should be paid to issues of selection. Absent careful planning, research design may contain significant flaws, and the result is a study that fails to measure what you hoped.

While classroom experiments may affect faculty outcomes, the main focus of the impact of this active learning technique is on student outcomes. Teaching strategies, including classroom experiments, can affect students in a variety of ways. Becker and colleagues (1991) made an important point, stating that multiple measures of student outcomes should be used in efficacy studies. I reiterate this important message here. Much interest focuses on student achievement; we are, after all, trying to teach students about economics. To that end, I suggest that researchers carefully consider the achievement measures they will use in their study, and I would encourage the use of multiple measures. You may also want to consider using measures that have been used in published studies, as this will present opportunities for cross-study comparison. Additionally, instructional methods affect a variety of other outcomes as well: retention, persistence, attitudes toward and interest in the subject, and so forth. These outcomes are at least as important as achievement measures, so I encourage you to attempt to gauge the impact of various techniques on these factors as well.
Finally, whether using data you collect yourself or data from established sources, there are a variety of econometric issues that must often be addressed. For an introduction to some of the econometric issues related to research in economic education, I recommend consulting the econometrics training modules at the Web site for the American Economic Association’s Committee on Economic Education.3

GENERAL COMMENTS

The Review Process

For the most part, the review process at the JEE is much like that at any other journal. When the JEE receives a manuscript for review, the editor makes the initial decision as to whether or not the manuscript should be sent on to one of the associate editors and, if so, which one. The associate editors, based on our various areas of expertise and interest, cover a variety of topics and manuscript types. Given my interests, I am generally assigned manuscripts dealing with classroom experiments. When I receive a manuscript from the editor, I review it quickly to assess whether I think it has adequate promise to be sent out for a full review. On a few occasions, I have received manuscripts that described classroom experiments which are not substantially different from those published elsewhere. In these cases, I have provided this information to the editor so that he could make a decision regarding the paper. In most instances, however, I send the paper out for a complete review with two or three referees. Upon receiving feedback from the referees, I also review the paper. When the general consensus of the referees suggests that the paper is either (1) acceptable for publication as is or (2) lacks sufficient merit for publication, I forward all the referee reviews (including my own) to the editor so that he may make a final decision. When the referees find promise in the paper, but also that revisions are necessary for publication, I will send the author a “revise and resubmit” request with referee reports where I highlight particular issues that I think require addressing. Authors then have the opportunity to revise their papers. Should they choose to do so (and I hope they will), I will generally review their revisions and then forward all documentation and a recommendation to the editor for final decision. Only on rare occasions do I send revised papers back to referees and then only when revisions are extensive or when authors opt not to make significant requested revisions. Ultimately, all review materials are forwarded to the editor for a final decision.

Writing

Whether you are writing for the Instruction or Research Sections, you should pay careful attention to the literature review and general writing of the paper. Unfortunately, I often receive manuscripts with very long, “kitchen sink” literature reviews. While you want to be sure not to miss any relevant work, you should also avoid including everything that may have any relation to your particular topic (regardless of how remote). The literature review is at least partially an opportunity to motivate and position your work, and as such it should receive due attention. Last but certainly not least, high quality writing is a must. To this end, you should write clearly and concisely. I often receive excessively long manuscripts. These manuscripts can seem even longer when they
are replete with spelling and grammatical mistakes. After working on a manuscript, you may have difficulty identifying your own errors. I encourage you to seek a colleague to read your paper and give you feedback, and of course, revision is an author’s best friend.

CONCLUSION

The major challenge facing most foundations is that they are risk averse. This inhibits their ability to experiment and commit to the experimentation and innovation process. – Steven Levitt

Risk aversion challenges instructors and may be at least partially the reason that Watts and Schaur (2011) found that the median percentage of class time spent lecturing is so high. Not so long ago, I was one of those instructors considering alternative pedagogical approaches and the multitude of things that could go wrong if I adopted them. I overcame my risk aversion due to one well-written, compelling article describing a simple experiment. Others, myself included, are equally moved by empirical evidence on the efficacy of classroom experiments (or other active learning techniques). Therefore, I know from first-hand experience the power of an article. I encourage all those working in the area of classroom experiments, whether developing new ones or researching their efficacy and best practices. Your work is important and has the potential to vastly impact the teaching and learning of economics.

NOTES

1. The experiment in this instance is the tax experiment (Bergstrom and Miller 1999).

REFERENCES