Does Teaching Enhance Research in Economics?

William E. Becker and Peter E. Kennedy

Can you think of an instance in which your teaching enhanced your research? We have had several such experiences, and wondered if it was a common phenomenon among economists. We asked several eminent economists if they could cite a specific study that emanated directly from their teaching. The original goal was to report some examples of how teaching could play a positive role in research. We expanded our goal, however, when we were swamped with examples.

We found that 1) teaching plays a far more important role in enhancing research than the existing literature suggests, 2) this influence is recognized by a large fraction of active researchers, and 3) this positive effect of teaching on research occurs through a wide variety of channels.

I. Literature Review

The consensus in the higher education literature is that there is little or no connection between teaching and research. Hattie and Marsh (1996) provide a survey of the theoretical and empirical work on this issue, concluding (p.529) that “the common belief that research and teaching are inextricably entwined is an enduring myth.” One peculiar feature of this literature is that it is all in terms of research enhancing teaching, ignoring any possible causality in the other direction. Noser, Manakyan and Tanner (1996) provide a dramatic illustration in their national survey of a thousand economics professors who were asked if their research enhanced their teaching, but were not asked if their teaching enhanced their research.

Economists' views on how teaching affects research sometimes appear in biographical essays. For example, Richard Schmalensee (1998, p.246) writes: "I have

also gotten good topics from students' questions to which 'I don't know' is a correct but unsatisfying answer. Mostly, though, I have found teaching valuable because it regularly requires me to organize, distill, and evaluate a body of literature. A number of my papers address problems uncovered while preparing lectures." A particularly cogent statement comes from Gregory Mankiw (1998, pp.182-3): "A less obvious benefit of classroom teaching and textbook writing is that they stimulate ideas for research. Whenever you have to explain something to someone, either in person or on a printed page, you have to think it through more thoroughly than you otherwise would. Preparing a lecture or drafting a textbook chapter reveals holes in your understanding. And, sometimes, as you try to fill these holes, you get ideas for research. Put simply, imparting knowledge and creating knowledge are complementary activities. That is why these two forms of production take place in the same firms, called universities."

These statements suggest that some respected economists think teaching enhances research; yet, we were not able to find many such statements. Of the 61 biographies of modern economists we read, only 9 mentioned how teaching responsibilities affected their working life or their research. We wondered if perhaps the Schmalensee and Mankiw statements were anomalies.

II. The Survey

Our study differs from the higher education literature on teaching and research in that we explicitly sought examples of how teaching enhances research. Our survey was sent to a wide range of economists whom we knew to be productive researchers. We protected against a possible sample selection problem (the response rate was 65 of 150) by forcing a 100% response rate from a subset of the sample consisting of all 21 full professors from Simon Fraser University; they were harassed until all had responded.

Their initial response rate matched that of the entire sample. More importantly, the natures of both their initial and ultimate sets of responses were qualitatively similar to that of the entire sample.

The survey results show that about 50% of the 65 responders gave specific examples in which their teaching led to research publications; about 35% did not give a specific example, but claimed that teaching did play a positive role in their research; and about 15% could not think of a specific example and volunteered no information on whether teaching had helped them in the research dimension.

III. Substitutes or Complements?

Given a time constraint, an additional hour of teaching implies one less hour available for research. But as Becker (1975, 1979) demonstrates, both teaching and research output can be higher in equilibrium because of joint production. Only one respondent, Harry Markowitz, felt that a pure research environment, with no teaching, was superior to an institutional setting with teaching and research objectives. Others felt differently.

Paul Samuelson: "A light teaching load probably adds to the fertility of a scholarly researcher. That is why universities hold their own against think-tank institutes."

Jim Brander: "I would guess that there is complementarity up to a small positive amount of teaching - say up to two standard one-term courses per year, but that beyond this the primary effect is substitution."

Charles Beach: "While they are substitutes in time in an era of increasing teaching and administrative loads, I do think there is some complementarity in the quality and interestingness of the research problems one looks at. Two of the best papers I have done (at least in my mind) definitely grew out of teaching in the area and having to think about how to present ideas to students in as clean and simple a way as possible."

IV. How Does Teaching Enhance Research?

The evidence reported above makes clear that teaching can play a very positive role in research, and does so for a vast majority of researchers. How does this happen? An unexpected bonus from our survey is that almost all respondents included unsolicited commentary on how teaching had influenced their research. We have grouped these influences into 13 categories. In an important sense, our categories are misleading, however. Many respondents claimed that teaching and research were so closely connected that for them to identify a specific role for teaching in enhancing research is impossible – for example Amartya Sen: "Teaching and research are so integrally linked in my life that it has been the dominant theme, rather than a source of exceptional experiences." (Space limitations force us to provide only one exemplary quote for each category but in a longer version of this paper we provide a fuller sampling.)

1. Honing Understanding

Several respondents noted that their teaching provided a perspective and understanding that had a positive influence on the way in which they conducted research.

Robert Solow: "I have found that about the second or third time I teach a topic, I really begin to understand it, my intuition gets honed. Even without a specific research paper, this kind of understanding begins to guide your later thinking about that topic."

2. Learning Through Teaching

A frequent survey response is captured by the well-known phrase "the best way to learn something is to attempt to teach it to others." Several respondents noted that they had deliberately volunteered to teach a new course, in the belief that doing so would uncover new puzzles and prompt thinking about new issues.

Michael Lebowitz: "One of the reasons that I have regularly taught selected topics courses is that they are a constant source of new problems for which I try to give brilliant answers. On the few occasions in which I think I succeed, the material inevitably finds its way into articles."

3. Preparing for Class

A common story told by respondents began with "In preparing for class I wondered if ...." Such wondering was triggered by a variety of things, such as looking at data gathered for a lecture illustration, reading an article which otherwise would never have been read, or noticing something that had not been noticed before.

Phil Cook: "I wanted to illustrate quasi-experimental design by showing the effects of Roe v. Wade on birth rates for different age groups. When I assembled the time-series data I was amazed to discover that there is no discontinuity in birth rates for 15-19 year olds around 1974. That inspired me to ….."

4. Explaining to Students

Many respondents noted that the need to explain things to students has played a prominent role in their research. In short, thinking about how to present clearly and simply leads to new insights.

Arnold Zellner: "Another aspect of my teaching experience that has led to new research results is an attempt to present material as simply as possible. In teaching multivariate regression many years ago, the idea somehow occurred to me to write the many equation system in a single equation form. When I figured out how to do that, many new results flowed from the simplified version of the model, including seemingly unrelated regression (SUR) estimation and testing techniques."

5. Classroom Trauma

A common story offered by respondents was one in which while lecturing they realized that they were not able to explain adequately the phenomenon they were teaching, leading to a complete rethink, and eventually a publication.

Will Baumol: "There are a number of occasions when my teaching led to research, particularly when I made statements to my class, confident of my assertion, only to discover that it did not hold up, and needed full rethinking. The clearest example was in a graduate course on the economics of regulation, when I started to expound on natural monopoly and realized that, for a multiproduct firm, scale economies were not enough. This forced me to rethink the entire matter and led to …"

6. Discussing with Students

We naturally think it is discussions with our colleagues, both at home and at conferences, that provide the debates and exchange of ideas that fertilize our research thinking; yet, Dan McFadden tells of being motivated by a graduate student looking for a way to analyze data on freeway routing decisions of the California Department of Transportation. Several respondents identified classroom discussions as having been extremely valuable, and some indicated that they deliberately used them as testing grounds for ideas under development.

James Buchanan: "I more or less deliberately changed my teaching style; I engaged the students, who were uniformly good, directly with me in working on problems that seemed challenging and important. …. And I treated the students almost as parts of a team effort, helping me to work out my own ideas as these developed."

7. Student Questions

Questions from students, both shrewd and ignorant, have led to substantive research.

Paul Samuelson: "A bright student protested that the explanation seemed self-contradictory. On reflection, I tended to agree. That led me to publish some much-cited journal articles (and to discover that Ohlin did not quite understand his own theory)."

8. Creating Examples

Several respondents to our survey gave examples of how efforts to find clarifying examples led to new and/or expanded inquiries.

Bill Sharpe: "I wanted to make the economics behind the Black/Scholes option pricing formula clear to my students. I came up with a binomial example to show the way in which one can use a stock and a riskless asset to replicate a call option. It then occurred to me that it would be interesting to see how quickly the results converged to the B/S values as the time intervals were made shorter and shorter. I found that the convergence was remarkably fast. One evening I showed this to John Cox, who then showed it to Mark Rubenstein and Steve Ross. This resulted in the Cox/Rubenstein paper, which greatly expanded on my original results. I published my version in the first edition of my textbook and have used the binomial process ever since for both much of my research and also for teaching in a number of applications."

9. Exam Questions

A natural means whereby teaching can enhance research is through the development of exam questions, because such questions by design often push the boundaries of the classroom material and so require further critical thought on the part of the instructor.

Robert Solow: "The main result has come to be known as the "Solow condition" in efficiency-wage theory. My God, suppose I had just assumed it was easy, and left it on the exam!"

10. Supervising Students

Many respondents noted the positive role played by student supervision, especially at the undergraduate level. This role had many forms: students producing examples from their own experience that do not fit the standard theory; students asking basic questions; students finding new data; students stimulating interest in a new topic; students failing to replicate existing studies.

Alan Krueger: "I suggested she look at the October CPS. I didn't know that the 1989 October CPS had questions on computer use at that time. She came back to my office and said, 'Wow, the CPS has a wealth of information. It even asks whether you use a computer at school and at work.' I said, 'It does?' This led to a well-known paper I wrote called 'How computers have changed the wage structure.'"

11. Pedagogical Experiments

A few respondents noted the value of pedagogical experiments. The first market experiments came out of Edward Chamberlin's experiments via classroom exercises designed to show students that competitive outcomes do not arise with decentralized bargaining, leading to a 1948 JPE paper. A student in that class, Vernon Smith, followed up this technique, creating a new area of economic research, experimental economics; this is arguably the most dramatic example of teaching influencing research.

Classroom experiments create research value by turning up anomalies that lead to research seeking an explanation, and by revealing problems likely to be encountered when running an actual experiment.

John Conlisk: "I sometimes introduced risk aversion by picking out a student and offering him or her a choice between (i) a dollar for sure or (ii) a fair coin flip between nothing and two dollars. Students more often choose the latter, in contradiction to what

economists often claim. I used a more systematic version of that class example as part of a paper on gambling."

12. Writing Textbooks

A few respondents identified the impact that writing a textbook had on their research, causing them to think through unfamiliar issues more carefully, sometimes revealing things they didn't understand that needed to be sorted out in the literature.

Hal Varian: "I struggled with what to say about the Coase theorem and ended up writing a couple of articles on that topic."

13. Research Strategy

Several respondents remarked on how their teaching had influenced the form of their research.

Steve Woodbury: "Teaching keeps research in perspective - I can think of several instances in which teaching has forced me to come to my senses and give up on a topic because I couldn't explain why it is important."

V. Conclusion

Our numerical result, that 85% of respondents believe that their teaching has enhanced their research, is dramatic. This, and the associated, unsolicited, commentary lead us to believe that our survey results have uncovered a new view of the role of teaching in economics research. This view is not evident from reading biographical material, and has not been revealed by the literature reporting correlations or lack of correlation between research and teaching. This new view is that teaching influences research, in a wide variety of ways, at least among those scholars active in the research dimension.

Of particular interest is that this view characterizes those at the top of the academic ladder. Our highest response rate was from Nobel Laureates, whose commentary heavily endorsed this view of the relationship between teaching and research. This was also evident from the responses of those at the most respected institutions. Harvard's Jeff Williamson, for example, writes: "Every hour spent getting ready for the undergraduate classroom makes me rethink the way I view my field, and I find this especially true of teaching undergraduates. Every hour spent interacting with graduate students in the classroom makes me rethink my current research. Thus, I find teaching graduates has a more immediate effect, but teaching undergraduates may possibly have a more permanent effect. In any case, I couldn't imagine functioning without either of them."

Let us finish with some qualifications. First, a reminder that our sample is not random; all respondents are accomplished researchers –the results may not apply to those who do little research. Second, the respondents are all older members of our profession. It may be that this relationship between teaching and research does not hold for younger scholars who are following a well-defined research agenda to pursue tenure and promotion. Third, it is not clear what fraction of research is affected by teaching. Some respondents indicate that teaching played a role in only one or two articles out of many. Others indicated that a sizeable fraction of their publications was affected. Still others commented that teaching had a broad, general influence on all their research. And fourth, the fact that our respondents are mainly teaching at top schools may play a substantive role in affecting the survey results – the quality of the students with whom they interact is high; the teaching influence may therefore be much stronger there than at schools with less able students.

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