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# Integrating Research and Undergraduate Teaching

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A number of people have criticized the emphasis that universities and colleges in the USA place on research. Such critics see research and teaching in opposition, and claim that an emphasis on research has led not only to a decline in the amount of time professors spend on teaching, but also in the quality of undergraduate education.

These critics point to the fact that there is an inverse relationship between one's rank as a researcher and the amount of time spent teaching undergraduates. Even those who are not top researchers, and who therefore spend more time in the classroom, are suspected of cutting corners on teaching when they need to produce publications that will be rewarded with tenure or promotion. If teaching and research could be combined, the dilemma would be solved, and researchers would be back in the classroom. Thus it seems instructors would do well to involve undergraduates in their research. Unfortunately, critics could see this as another way that self-serving academics have devised to promote their own interests at the expense of providing undergraduates with a sound general education.

This criticism loses its force once one sees that the critics are operating with a too narrow conception of research, the idea that research is only as the discovery of "new facts." This conception is embodied in phrases such as "pushing forward the frontiers of knowledge," or "adding to our stockpile of knowledge." And

specialization is (arguably) the result of the race to discover new facts. But even though some research may have this character, it is false that all does. In many fields, such as philosophy, research never involves this type of discovery. Rather, the job of the scholar is to cast what we already know or think we know in a new light, by linking it to other things we know, or by uncovering the hidden presuppositions of what we believe, usually with the aim of forcing us to reevaluate our claims to knowledge. Such integrative thinking may be the stock-in-trade of the philosopher, but it also has a role to play in every other field of knowledge. Integrative thinking should be encouraged, even at the introductory level. Moreover, this sort of thinking is something that one can expect students to do long before one can expect them to break new ground in any discipline.

I would like to describe some of the benefits and difficulties I have encountered in my attempt to integrate my research and teaching in an introductory logic course. My introductory logic students work in groups on semester-long research projects. The research that these students are involved in belongs to the scholarship of integration, rather than the scholarship of discovery (Boyer, 1990). It is highly unlikely that most instructors will ever teach a student who will break new ground in their field. However, what most students can begin to do is to think about what role one body of knowledge or skill can play in other fields of knowledge.

For instance, can what my students study in formal logic cast any light on the structure of natural languages, such as English or French? Can it be used in the construction of psychological models of human reasoning? Does formal logic embody canons of good reasoning, in the sense that we ought to reason in accordance with formal rules of inference, even if in fact we do not? How has formal logic been used to illuminate problems in the foundations of mathematics? In what sense is logic at the heart of every modern computer?

It is more important to give students practice in thinking in an integrative way than to worry about the quality of the end products. Many students in large introductory courses are there because such courses fulfill general education or other distribution requirements. Most see such courses as hurdles which must be jumped, spending a

minimum amount of time needed to get by, believing their time would be better invested in courses in their majors. But if students see a course as being linked to the contents of their other courses, this gives them an incentive to work harder.

There are, of course, also difficulties. Introductory classes are likely to be large. One cannot supervise and assess large numbers of research projects every term. This can be ameliorated by having students work in groups. Another problem is that students in introductory courses do not yet know much about the mechanics of research. Not knowing what constitutes research makes it difficult to conduct research! Some may even lack such basic skills as how to search a library catalogue effectively. And, even if they can find sources which are relevant, they sometimes do not know how to extract what they need from such sources. Explicit instructions laying down the steps that need to be followed are necessary to enable most students to get results.

The most difficult problem in integrating teaching and research is that textbooks at the introductory level do not support the integrative thinking. Thus the research that I require my students to do is seen by some as a task separate from the problems and exercises that are set from the textbook. (A problem of integration once again!). This also means that in order to answer the sort of integrative questions that I pose, my students have to go to outside sources which may be too advanced. Students need to be encouraged to ask for help when they experience difficulties understanding some source material. Allowing students to communicate via an electronic bulletin board can be useful, because they can get help relatively quickly, and not waste time tracking down the professor. It also seems important that when students are forced to articulate their questions in writing, they often find that they or one of their group members can solve the problem without the professor's help.

In order to successfully integrate teaching and research we may have to drastically restructure the undergraduate curriculum. But short of such drastic restructuring, instructors can bring teaching at the introductory level in line with their research activities through an emphasis on the scholarship of integration, creation of small working groups, and instruction and practice in research skills for novices to

the field.

## Reference

Boyer, E. (1990). *Scholarship Reconsidered*, Princeton University Press.