

# Navigating Between Teaching, Learning and Inquiry: Developing Students as Researchers

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*The research universities have often failed, and continue to fail, their undergraduate populations, thousands of students graduate without seeing the world-famous professors or tasting genuine research. Boyer Commission (1998, pp. 5-6)*

We applaud [John Carfora's](#) aim to explore how “teaching, empirical research, and inquiry-based learning intersect inside and outside the classroom.” Our argument, in the article below, is that a central way to achieve this is to focus on the student experience of the curriculum. In contrast to Carfora, we would point to the research and policy perspectives that demonstrate that research and teaching often clash and or fail to connect in the student and faculty experience of higher education (Jenkins, 2004).

Relatedly we share [Michael Theall's](#) perspective that “engagement in scholarly and creative activities can inform good teaching, I do not think the connection is automatic.” However, we would point in addition to the key importance of the need for structural changes at national, institutional and departmental levels to make such connections; including, as Michael indicates changes in the faculty reward culture. In a range of publications we have explored how these connections can be made to benefit both students and faculty. In particular we argue that departments and course teams need to re-engineer the undergraduate curriculum to bring students into the worlds of research.

## **Developing Students as Researchers**

*... universities should treat learning as not yet wholly solved problems and hence always in research mode. (Humboldt, 1810, as cited in Elton, 2005)*

*Teaching and research are correlated when they are co-related. ... [One way to achieve this is to] exploit further the link between teaching and research in the design of courses. (Brew & Boud, 1995, p. 272)*

*We want all students to access the benefits exposure to teaching informed by research can bring. ... We believe an understanding of the research process – asking the right questions in the right way; conducting experiments; and collating and evaluating information – must be a key part of any undergraduate curriculum. (Rammell, 2006, p. 3)*

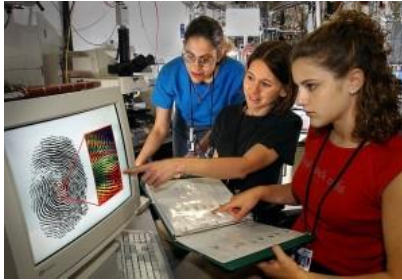


Figure 1, Faculty researcher with students. Retrieved from <http://www.flickr.com> under Creative Commons use.

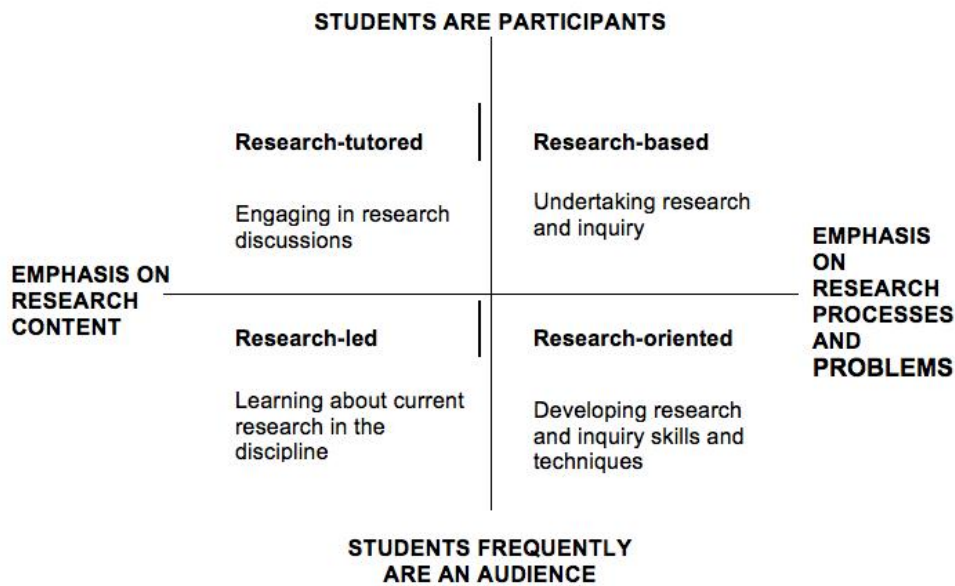
Our argument can be simply stated: *all* undergraduate students in *all* higher education institutions should experience learning through and about research. This applies to all students in higher education, including those taking higher education courses in community colleges. While recognising that there are other goals the curriculum should support (e.g., student employability, civic engagement), students learning in ‘research mode’ should be *central* to the curriculum. In many national systems funding and support for research has both devalued the importance of teaching and effectively moved many undergraduate students and academic staff out of the worlds of research. Refocusing the undergraduate curriculum on bringing students into the worlds of research can both ensure that what

they experience is *higher education*, but also assist faculty and support staff (e.g., librarians to work in a scholarly research environment). Our argument is more fully developed with a wide range of international case studies in Healey and Jenkins (2009).

Our interest in developing students as researchers originated through our explorations over the last few years into ways to enhance the linkage between teaching and discipline-based research. Our experiences suggest that one of the most effective ways to do this is to engage our students in research and inquiry; in other words, to see them as producers not just consumers of knowledge. However, for us the key to mainstreaming undergraduate research is to integrate it into the curriculum.

### Is Undergraduate Research for All Students?

Your answer to this depends on how you define undergraduate research. If you restrict it to the creation of new knowledge, often through working with staff, such as part of a laboratory research team, then the experience is likely to be limited to a few select students. However, if you conceive undergraduate research as students learning through courses, which are designed to be as close as possible to the research processes in their discipline, then it can be for all students. The focus then is on student learning and on being assessed in ways that mimic how research is conducted in the discipline, for example, through undergraduate research journals and student research conferences and exhibitions. In these cases, what is produced and learned may not be new knowledge *per se*; but it is new to the student and, perhaps more significantly, transforms their understanding of knowledge and research. In terms of Figure 1 the emphasis is on the student learning in ‘research-based’ and ‘research-orientated’ modes.



**Figure 1.** The nature of student research and inquiry. Source: (Healey & Jenkins, 2009, p. 7).

The argument as to whether undergraduate research is for all or selected students is in part a political question - to whom and for what, do national systems and institutions allocate resources, in particular faculty time? But for us it is largely an educational and/or philosophical question as to the nature of *higher* education. We are persuaded by the arguments of those, such as Ron Barnett (2000), that what distinguishes *higher* education is the emphasis on helping students to live in a super complex world and that the curricula task is for “lecturers (to) adopt teaching approaches that are likely to foster student experiences that mirror the lecturers’ experiences as researchers” (p. 163).

**The Research Evidence**

There is growing international research on teaching and discipline-based research relations. In brief this shows that the asserted close interconnection between research and the curriculum is professed more than it is delivered, and in Brew’s (2006) powerful phrase too often undergraduate students are “at arm’s length” from the worlds of university research (p. 52).

Particularly important to our argument here is the research of Baxter Magolda. Based on a detailed interview-based study of students’ intellectual development during and after university, she has argued that university curricula need to support student and citizen development from

...absolute knowing (*where*) students view knowledge as certain; their role is to obtain it from authorities (to) contextual knowing(*where*) students believe that knowledge is constructed in a

*context based on judgment of evidence; their role is to exchange and compare perspectives, think through problems, and integrate and apply knowledge. (Baxter Magolda, 1992, p. 75).*

However, too often curricula “frame learning as the passive acquisition of knowledge” (Baxter Magolda, 2008).

We have gathered a large collection of ‘interesting’ international examples of mainstreaming undergraduate research from a range of disciplines, institutions and national systems (Healey & Jenkins, 2009). A small selection is shown in Table 1.

**Table 1.** Examples of ‘interesting’ curriculum interventions

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### **Coordinated interventions in zoology at University of Tasmania, Australia**

#### *Years Two and Three*

- All invited to participate in Student Research Volunteers program (<http://www.zoo.utas.edu.au/Staffpg1/summvolunteer3.htm>). Volunteers are matched with mentors, usually Postgraduate or Honours students, for short-term, in-house research placements that may offer either laboratory or field experiences.

#### *Years One, Two and Three*

- ‘Reach into Research’ seminars held several times each semester ([www.zoo.utas.edu.au/rir/rir2&3.htm](http://www.zoo.utas.edu.au/rir/rir2&3.htm)). Speakers from industry, collaborating institutions and PhD students present their research, and then all non-undergraduate audience members, except the facilitator, leave the room.

Source: (Edwards et al., 2007).

### **Miami University Ohio, US, are embedding inquiry into the largest courses**

They have instituted a Top 25 project in which over a four-year period the largest recruiting courses, mainly at first year level, are being supported to convert to inquiry-based learning.

Source: (Hodge et al., 2008).

### **Undergraduate research at University of Gloucestershire begins at induction**

In 2007 over 650 students in the Faculty of Education, Humanities and Science undertook discipline-based inquiry projects during induction week. This involved them working in small groups to collect information from the library and in the field, analyse it, present it to tutors in novel ways, and receive formative feedback. For example, the human geographers and the

sociologists researched the experience of Gloucester residents of ‘the Great Flood of 2007’. The biologists and the psychologists investigated primate behaviour at Bristol Zoo, while English Literature students visited an arboretum and explored the use of trees in literature. Social and academic activities were integrated, the students had fun, and, importantly, they made friends. The approach was developed, and initially supported, by the Centre for Active Learning (<http://resources.glos.ac.uk/ceal/pre-induction/index.cfm>). It has proved a significant staff development activity both for the many academic tutors and the library staff who changed their approach to library induction to support the specific student research projects. Over the next two years other Faculties in the University are developing their versions of developing undergraduate research as part of induction.

### **Academic journal writing in geography at Oxford Brookes is part of course requirements**

The geography programme at Oxford Brookes has developed a set of linked requirements that support all students learning to write research articles. In the second year all students undertake field-based research in a range of venues. A third-year compulsory first semester course ‘Geography Research and Practice’ has as its main assessment students writing an article of up to 4,000 words from the data collected in the second-year fieldwork (<http://www.brookes.ac.uk/schools/social/geoversity/index.html>).

Source: (Walkington & Jenkins, 2008).

### **Undergraduate research programmes at University of Michigan, US, support racial diversity and widening participation**

While the University had been successful in recruiting Afro–American students from inner-city Detroit their dropout rate was high. Special programmes were targeted at these students in years one and two to enhance their integration and academic success with significant positive impacts.

Source: (Huggins et al., 2007).

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### **Where next?**

We know of many examples of interesting practices for engaging students in research and inquiry in individual modules, but far fewer cases where undergraduate research has been mainstreamed across a course, department, institution or national system. More strategic interventions to reinvent the curriculum, such as [Miami University Ohio](#) is attempting, are needed.

We believe that undergraduate research and inquiry should be an important part of the curriculum from the day students start studying at University, and perhaps before then, as the example of the [University of Gloucestershire](#) suggests. Undergraduates should be included in

the research community, as happens with zoology students at Tasmania, and not kept ‘at arm’s length’ from the worlds of research.

Finally, we echo the perspectives of Angela Brew (2007)

*For the students who are the professionals of the future, developing the ability to investigate problems, make judgments on the basis of sound evidence, take decisions on a rational basis, and understand what they are doing and why is vital. Research and inquiry is not just for those who choose to pursue an academic career. It is central to professional life in the twenty-first century. (p. 7)*

In other words, as David Hodge (2007) President of Miami University, says, “undergraduate research should ... be at the center of the undergraduate experience” (p. 1).

### Acknowledgement

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