# Linking Teaching and Research through Engaging Students in Research and Inquiry: International Perspectives

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For us the best way to respond to Boyer's (1990, xii) famous call "to move beyond the tired old teaching versus research debate" is to engage our students in research and inquiry. There is a growing amount of evidence for the effectiveness for student learning of treating them as potential producers and not just consumers of knowledge.

*All* undergraduate students in *all* higher education institutions should experience learning through and about research. The key to mainstreaming undergraduate research and inquiry, we argue, is to integrate it into the curriculum.

"Developing the Student as Scholar Model requires a fundamental shift in how we structure and imagine the whole undergraduate experience. It requires, as a minimum, the adoption of the Learning Paradigm in everything from the first introductory course through the final capstone experience. It requires a culture of inquiry-based learning infused throughout the entire liberal arts curriculum that starts with the very first day of college and is reinforced in every classroom and program." (David Hodge, President Miami University Ohio, *et al.*, 2007, 1)

Fig 1: The nature of undergraduate research and inquiry

STUDENTS ARE PARTICIPANTS

RESEARCH TUTORED

ENGAGING IN RESEARCH DISCUSSIONS

RESEARCH BASED

UNDERTAKING RESEARCH AND ENQUIRY

EMPHASIS ON RESEARCH CONTENT

RESEARCH LED

LEARNING ABOUT CURRENT RESEARCH IN THE DISCIPLINE

RESEARCH ORIENTATED

DEVELOPING RESEARCH AND INQUIRY SKILLS AND TECHNIQUES

EMPHASIS ON RESEARCH PROCESSES AND PROBLEMS

STUDENTS FREQUENTLY ARE AUDIENCE

**However, examples given here are where students are active participants**

Source: Amended from Healey (2005, 70)

## *Research-tutored: engaging in research discussions*

**Student group work assignments based on analysis of current Geoscience discipline journal article analyses at the University of Adelaide, Australia**

This Do-It-Yourself (DIY) Interactive Multimedia (IMM) project is an exercise in knowledge engineering used in a final-year undergraduate Structural Geology course. Two or three students work collaboratively on the development of a multimedia-based analysis of one international journal article, interrogate and summarise the text, but also become familiar with the figures, diagrams, plates, tables and simulations and animations that may be available on the author's website. Students have to devise a question to the author(s) and to email that question. Authors generally reply positively to the questions and occasionally a general dialogue occurs. The exercise has now run continuously for eight years and has been carried out by about 400 students. This has left a legacy of about 150 IMM modules providing interesting summaries of much of the last eight years of cutting-edge research in Structural Geology.

*Further information*
James (2003)

## *Research-based: undertaking research and inquiry*

**Inquiry-based learning introductory course for Social Sciences had a significant impact on students' subsequent performance at McMaster University, Canada**

This first-year course for Social Sciences has been running since the late 1990s. It is typically taught in groups of no more than 25 students, subdivided into groups of four or five students. All of the groups have the same curriculum, reading material, and process of assessment. The classes meet for 12 three-hour concurrent sessions. Students investigate aspects of a broad social science theme, such as 'self-identity', and address a common inquiry question, such as: 'Why do images of ethnicity, race, gender, sexuality, age, class, or abilities help to create aspects of personal and community identity?' Students have to propose their own inquiry question, such as: 'Why do some children apparently become violent after watching violent cartoons while others seem to be unaffected?' They then investigate the question through a process that involves developing and testing hypotheses using secondary sources. There is strong research evidence of the positive impact of this inquiry course on the subsequent performances of students at McMaster University.

*Further information*
Justice *et al.* (2002, 2007a, 2007b, 2009); socserv2.mcmaster.ca/Inquiry/CourseOutline.htm

## *Research-led: learning about current research in the discipline*

**Introducing students to academic staff research: Department of Geography, University College London (UCL)**

All year one students in Geography at UCL do an assignment in which students interview a member of academic staff about their research.

- Each tutorial group is allocated a member of academic staff who is not their tutor.
- Tutorial groups are given three pieces of writing by the member of staff along with a copy of their CV.
- Before the interview, students read these materials and develop an interview schedule.
- On the basis of their reading and the interview, each student individually writes a 1,500 word report on: a) the objectives of the interviewee's research; b) how that research relates to their earlier studies; and c) how the interviewee's research relates to his or her teaching, other interests and geography as a whole.

*Further information*
Dwyer (2001)

## *Research-oriented: developing research skills and techniques*

**Embedding inquiry-based learning in a skills module concerned with sustainability at the University of Gloucestershire, UK**

'Skills 4 Sustainability' is a first-year course in which skills for inquiry-based learning is embedded in a module on sustainability. The module is delivered by a team of eight tutors to about 150 students with no formal lectures. Students are organised into tutor groups according to their subject specialism. Students inquire into and develop a proposal for improving the sustainability of the University, which they must research and present as a group. The best proposal from each tutor group goes forward to the *Green Dragons' Den* for consideration by an expert panel comprising the University Vice-Chancellor, the Director of Institute for Sustainability and a local business manager. Half the module marks are given for the creation of an individual e-portfolio, which requires students to reflect on sustainability issues, their own position and action they might take to improve their own sustainability, both environmentally and as a learner.

*Further information*
Swansborough *et al.* (2007)

**References:** All references may be found in: Healey, M and Jenkins, A 2009 *Developing undergraduate research and inquiry*. York: HE Academy 152pp www.heacademy.ac.uk/assets/York/documents/resources/publications/DevelopingUndergraduate_Final.pdf