Paper

Strengthening the Links Between Research and Teaching: Cultivating Student Expectations of Research-informed Teaching Approaches

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Abstract

This article contributes to the pedagogical literature in drawing on findings from an institutional survey exploring perceptions of research-informed teaching, to examine how links between research and teaching can be suitably strengthened. Whilst the integration of research and teaching in higher education can provide valuable ways of enhancing the student learning experience, establishing such integrative links can be complex and problematic given different practices and levels of understanding. Definitions of 'research-informed' teaching indicate variations with respect to the active involvement of students in research that can be compounded by disciplinary traditions. The survey provided an indication of the extent to which research-informed teaching was practised at the University of Birmingham and thus an insight into understanding and practices. In particular, it offered insights into the ways in which research-informed teaching relationships were interpreted and embedded within disciplines, the barriers/difficulties to linking research and teaching and the perceived impact on the student learning experience. The findings suggest that understanding with respect to research-informed teaching was variable, with a lack of understanding among students of precisely *what* it constitutes identified as being a key issue. In this paper we discuss the type of approaches that could support more active student engagement in the curriculum and call for the sharing of more curriculum examples from within the disciplines.

Introduction

Teaching approaches that are considered to be 'research-informed' are considered to be central to undergraduate and postgraduate learning within Russell Group universities. As an example a recent publication by the Russell Group (Russell Group, 2014) reports that the experience of learning within an research-intensive environment through bringing together the activities of 'research' and 'teaching and learning' within an institution offers significant and tangible additional benefits to students which can help them *'take their thinking to a new level and develop skills they need for a wide range of careers'* (Russell Group, 2014:29). It is argued however that this 'experience' does not happen automatically and *'requires academics and universities to take proactive steps to bring them together'* (Russell Group, 2014:29). This paper considers proactive steps that can be taken to help ensure these activities are suitably embedded in the student learning experience at the University of Birmingham. It draws on an analysis of selected findings from an institutional survey undertaken in 2011/12 by the Centre for Learning and Academic Development (CLAD, 2012) to investigate:

- How research-informed teaching is understood and practised across different disciplines in the University.
- What the perceived enablers and barriers/difficulties to linking research and teaching are considered to be.

- What factors are perceived to limit the impact of research-informed teaching on the student learning experience

The survey built upon previous project work carried out by the university including a survey to determine what types of enquiry-based learning approaches were employed by staff to help identify potential barriers to its future development within the institution (McLinden & Edwards, 2011). The findings therefore have relevance to future institution-wide strategic developments in serving to highlight ways in which the links between teaching and research can be strengthened to ensure they are understood from both a staff and student perspective.

Research and Teaching Links in Higher Education
Research Teaching Nexus

The notion of a *'symbiotic relationship between research and teaching constituting the very core of higher education'* (Robertson 2007:542) has served as an important cornerstone for many higher education institutions, with these two core strands of activity commonly referred to as a 'research-teaching' nexus. The term is attributed to Neumann (1994) who makes reference to a 'nexus' in a study exploring the relevance to university students' learning experiences. As reported by Cleaver, Lintern and McLinden (2014), the concepts underpinning this relationship have been debated, developed and refined extensively since Neumann's original article (for example Brew 2003; 2006) and more recently examined in relation to particular disciplinary activities (for example Spronken-Smith & Walker, 2010) and ontological/epistemological perspectives (for example Robertson, 2007). Further, as Robertson (2007) reports, recent policies driven by economic imperatives and accountability demands have served to forge a potential divide between research and teaching.

Cleaver *et al.* (2014) note that of significance in helping to *facilitate* the relationship between teaching and research has been the report of the Boyer Commission in the USA (Boyer, 1998) that called for *'a new model of undergraduate education'* at research-intensive universities. A key conclusion of the Commission was that research should be the basis of all learning at university and that the *production* of knowledge should not be an exclusive activity, but rather one that all members of an institution can participate in. Further, the report recommended that undergraduates who enter research-intensive universities should engage in discovery based activities as 'active' participants, that include opportunities to learn through enquiry.

Since the publication of this influential report, there have been a number of attempts to illustrate the complex nature and multifaceted nature of the relationships between teaching and research. Cleaver *et al.* (2014) report that a frequently cited example is the typology developed by Griffiths (2004) to help understand what is meant by linking teaching and research. Jenkins and Healey (2005) note that this typology is structured

around four different approaches to show a different relationship between teaching and research:

- Teaching can be *research-led.* In this relationship, the curriculum is structured around subject content with content selected to be directly based on the disciplinary interest of teaching staff. The emphasis tends to be on understanding research findings rather than research processes.
- Teaching can be *research oriented.* In this relationship, the curriculum is structured to place emphasis on understanding the processes by which knowledge is produced in a particular discipline. Attention is given to the teaching of enquiry skills and on developing a 'research ethos'.
- Teaching can be *research-based.* In this relationship, the curriculum is mainly designed around activities that are enquiry led in nature with the potential for interactions between research and teaching emphasised.
- Teaching can be *research-informed.* In this relationship teaching draws on systematic enquiry into the teaching and learning process itself.

As noted by Cleaver *et al.* (2014:11), Healey (2005) drew on these first three approaches and replaced the broader notion of *'research-informed teaching with that of research-tutored which emphasises learning that is focused on students writing and discussing essays and papers'.* The nexus that emanates from each of these relationships is captured along two axes, one of which shows a continuum with an emphasis on 'research content' at one end, to an emphasis on 'research processes and problems', and the other from approaches that are considered to be 'student focused' to those that are 'teacher-focused' (Figure 1). Jenkins and Healey (2005) report that learning and teaching activities will frequently involve a mixture of these four approaches, the particular blend very much dependent on the context in which an activity is structured.

The 'nexus' between research and teaching is complex, as illustrated through the dimensions presented in Figure 1, and indeed has been described as an *'unstable terrain'* by Robertson (2007:543). Departmental-level research and teaching activities are often organised separately, for example via separate committees for teaching and research. Hence there may be structural and perceptual barriers in integrating undergraduate students into the departmental research community and involving them in research and enquiry (for example Coate, Barnett, & Williams, 2001; Durning & Jenkins, 2005).
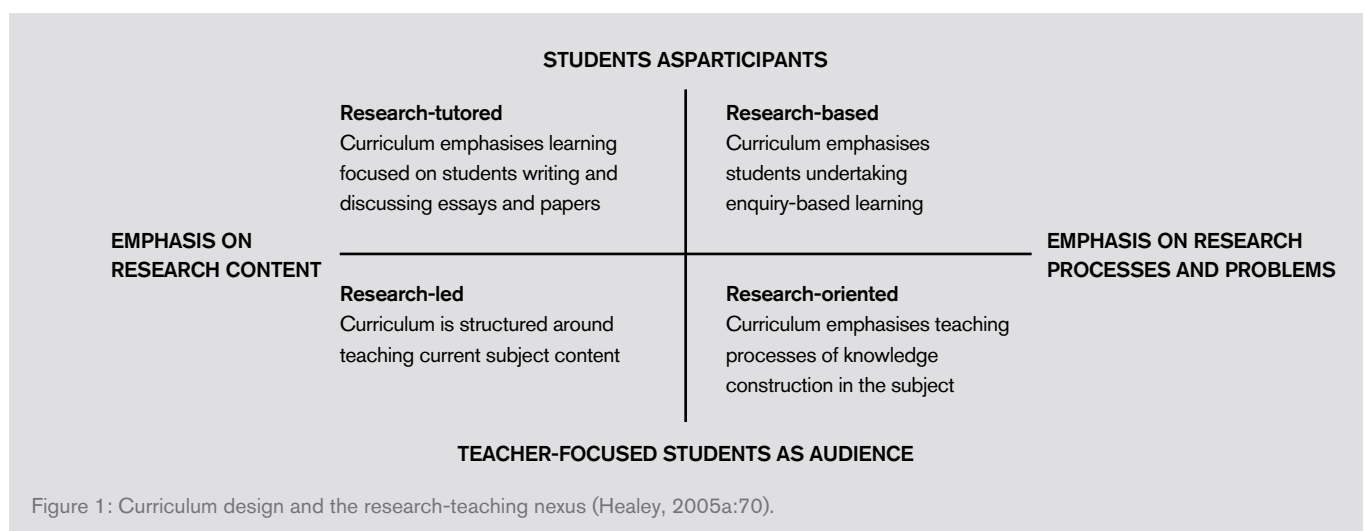
Consequently as noted by Jenkins (2004) there may not be a simple functional relationship at a department level between 'quality' in research and 'quality' in teaching. It has also been noted that it may be difficult to make strong connections between staff research and learning, as staff research may be too far ahead of the undergraduate curriculum, for example in some of the sciences (Jenkins, 2004).

Jenkins (2004) reports that students tend to vary in their attitudes to staff research depending on their academic orientation to their studies, noting that disciplinary variations tend to occur in teaching-research relations which are shaped by how disciplinary communities conceive the nature of knowledge, research and teaching, the forms of pedagogy and curricula in different disciplines, and for some disciplines, the impact of professional organisations and student interests on the content and practices of the disciplines. It was within this complex pedagogic landscape that the University undertook a survey to investigate the nature of the relationship between research and teaching within the institution through a survey of staff and students.

Description of Survey

An online survey was conducted amongst academic staff and undergraduate and postgraduate students at the University, between November 2010 and February 2011, to investigate how research-informed teaching is currently understood and practised across different disciplines in the University. The survey was undertaken within the remit of a broader institutional educational enhancement project (McLinden & Edwards, 2011) and was designed to address the following research questions:

1. How is research-informed teaching understood and practised across different disciplines in the University?
2. What are the perceived enablers and barriers/difficulties to linking research and teaching?
3. What is the impact of research-informed teaching on the student learning experience?
4. What factors are perceived to limit the impact of research-informed teaching on the student learning experience?

STUDENTS ASPARTICIPANTS

	Research-tutored Curriculum emphasises learning focused on students writing and discussing essays and papers	**Research-based** Curriculum emphasises students undertaking enquiry-based learning	
EMPHASIS ON RESEARCH CONTENT			**EMPHASIS ON RESEARCH PROCESSES AND PROBLEMS**
	Research-led Curriculum is structured around teaching current subject content	**Research-oriented** Curriculum emphasises teaching processes of knowledge construction in the subject	

TEACHER-FOCUSED STUDENTS AS AUDIENCE

Figure 1: Curriculum design and the research-teaching nexus (Healey, 2005a:70).

1. Learning about the research of others

- Students learn about research findings through a curriculum content which consists largely of staff or current disciplinary research interests.
- It can provide examples and ways of illustrating ideas, concepts and theories.
- Some or a lot of the teaching may rely on information transmission, for example through traditional lectures or set reading. There may be a focus on memorising the key facts that have emerged from research in the discipline.
- Also known as research-led teaching.

2. Learning about research processes

- The curriculum emphasises as much the processes by which knowledge is produced as knowledge that has been achieved, for example learning about, and critiquing, different research methods.
- Students learn about how to undertake their own research within their discipline and staff try to engender a research ethos through their teaching, for example by encouraging students to begin to think like researchers, and not simply accept others' research findings as given.
- Also known as research-oriented teaching.

3. Learning as researchers

- The curriculum is largely designed around enquiry-based activities.
- Enquiry-based learning can be described as learning that arises through a structured process of enquiry within a supportive environment, designed to promote collaborative and active engagement with problems and issues; examples include case studies, problem-solving activities, field trips and simulations.
- The differentiation between teacher and student roles is minimised: both are participants in the enquiry process, with the teacher acting as the more experienced 'partner'.
- Also known as research-based teaching or enquiry-based learning.

4. Critiquing others' research

- Focuses on the critical appraisal of research and moving research forward.
- Students typically participate in small group discussions with or without a teacher to consider research findings.
- Examples of this include critical literature reviews and critical discussions about research papers.
- Also known as research-tutored teaching.

5. Enquiring and reflecting on teaching and learning

- Teachers engage in critical reflection on, and enquiry into, their own teaching, and approach their teaching as a scholarly activity informed by the research of others.
- Learners reflect on their approaches to learning and actively work to develop their capacity to become more effective learners.
- The processes of reflection and enquiry can apply to all types of teaching and learning.

Figure 2. Research categories of research-informed teaching used in survey.

The survey employed an amalgamation of the Griffiths (2004) and Healey (2005) research categories when asking respondents to select the type of research-informed teaching they had used at Birmingham (Figure 2). The survey was advertised on the University's web portal, via posters, leaflets and emails to College Educational Enhancement Fellows, Directors of Education and/or teaching project board members with a request to forward the information about the survey to academic staff and students. Students were given the opportunity to enter a prize draw for an Amazon voucher, as an incentive to complete the survey.

A full description of the research design, methodology and findings is presented in the final project report (CLAD, 2012). For the purpose of this article we are interested in a key finding highlighted in the project report, namely a perceived lack of understanding amongst both staff and students of *what* research-informed teaching is. In particular, the findings suggested that both staff and student respondents tended to equate research-*informed* teaching with research-*led* teaching, where the curriculum content is informed by current research, which may then be transmitted to students, often using a traditional, didactic approach. In fact the types of research-informed teaching that student and staff respondents were most unsure of were: 'learning in research mode' (research-based or enquiry-based learning) together with 'critiquing others' research' (research-tutored teaching). The project report recommended that it would be beneficial for staff and students to be made more aware of definitions of research-informed teaching

approaches and be provided with examples of good practice within the institution. It was also recommended that students should be made aware of the different types of research-informed teaching and associated skills they will experience at Birmingham and be reminded of this throughout their programme of study. The report concluded that however well justified may be the claims to be offering 'research-informed' teaching, there is a risk of disappointing the expectations of the students if staff are unable to fully explain when and why they are being taught through a diverse range of 'research-informed' approaches, appropriate to their disciplines, highlighting that it cannot be assumed students will recognise research-informed teaching when they experience it without tutor clarification and/or explanation. Drawing on the recommendations outlined in the project report, we consider generic examples of the ways in which research informed teaching can be conceptualised in order to support both staff and student engagement with a particular focus on an undergraduate student experience.
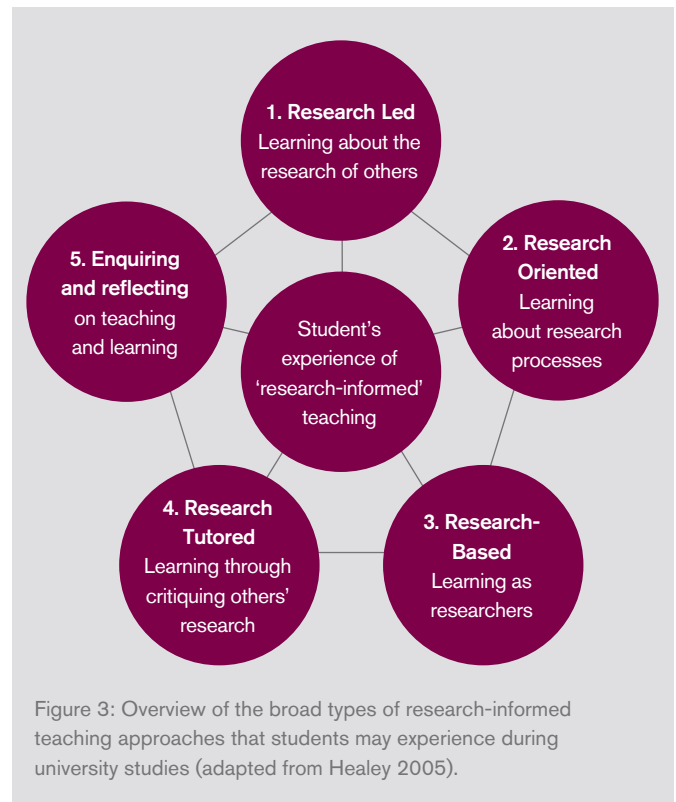
Exploring Approaches to Research-informed Teaching

The findings outlined in the project report serve to highlight that establishing integrative links between undergraduate research and teaching can be complex given different practices and levels of understanding amongst students and staff. Drawing on the dimensions outlined in Figure 1, we map out an overview of the broad types of undergraduate research-informed teaching approaches that students may experience during their studies at a research intensive university

(Figure 3). This overview serves to highlight the nature of the relationship between the different approaches thereby underlining that *'research and teaching are linked in many different ways, so engagement with research can take place at any stage of a degree programme'* (Russell Group, 2014:31).

Generic examples of the ways in which research-informed teaching can be presented to students to help cultivate expectations of different types of research-informed teaching approaches that may be drawn upon during their studies are presented in Figure 4.

As highlighted in the Russell Group report, there can be significant benefits for students in developing approaches that *'focus on students becoming active participants in the production of knowledge, rather than passive recipients or consumers'* (Russell Group, 2014:29). Table 1 provides a summary of how such 'active participation' could be undertaken in relation to 'research-led' teaching (that is learning about the research of others) within a 3-year undergraduate degree to show how this approach need not rely entirely on lectures or seminars. Rather the curriculum is designed to provide students with a progressive and increasingly active role in finding out about the research of others in a given department, programme or other unit of activity at different points in their learning pathway.

Figure 3: Overview of the broad types of research-informed teaching approaches that students may experience during university studies (adapted from Healey 2005).

1. Learning about the research of others (research-led teaching)

- Through this approach you learn about the research findings of others including your tutors. The content will consist largely of staff disseminating their current disciplinary research interests.
- This approach can provide examples and ways of illustrating ideas, concepts and theories.
- Some of the teaching may rely on information transmission, for example through lectures or set reading as well as seeking information yourselves about the research of staff in your College.

2. Learning about research processes (research-oriented teaching)

- In this approach, your learning experiences emphasise the processes by which knowledge is produced. Examples include learning about, and critiquing, different research methods with reference to research papers, journals, academic text books.
- You may be learning about how to undertake your own research within your own discipline in preparation for example for starting a project or dissertation.
- Your tutors may try to engender a research ethos through their teaching, for example by encouraging you to begin to 'think as' researchers, and not simply accept the research findings of others as a given.

3. Learning as researchers (research-based teaching)

- In this approach, your learning is largely designed around 'enquiry-based' activities.
- Enquiry-based learning can be described as learning that arises through a structured process of enquiry within a supportive environment, designed to promote active engagement with problems and issues; examples include case studies, problem-solving activities, field trips and simulations.
- You may find that in this approach the differentiation between tutor and your role as a student is minimised: both may be participants in the enquiry process, with the tutor acting as the more experienced 'partner'.

4. Critiquing others' research (research-tutored teaching)

- In this approach, your learning focuses on the critical appraisal of research and moving research forward.
- You will typically participate in small group discussions with or without a teacher to consider research findings.
- Examples of this include critical literature reviews and critical discussions about research papers.

5. Enquiring and reflecting on teaching and learning

- You may be involved in other types of 'research-informed' teaching approaches as part of your studies.
- This may include supporting tutors in undertaking research into their teaching and could involve asking you to reflect on your own experiences of learning through a new teaching initiative such as a 'flipped lecture' or the use of 'clickers' to gather student feedback within a classroom.
- Tutors may ask you to then provide information about your experiences through a questionnaire, or to participate in an interview, or a student focus group.

Figure 4. Generic examples of research-informed teaching approaches.

1. Research-led teaching	Description	Relationship to curriculum design and content	Student learning experience	Examples of activities in which students are provided with role in learning about the research of others
	Learning *about* the research of others.	**a.** Research interests and or outputs from activities of institutional staff are included in curriculum.	**a.** Students learn about the research of staff on their programme or in a particular department. They have opportunities to learn about this research through curriculum content which consists of staff or current disciplinary research interests.	**Year 1:** Students structure and undertake interviews with select staff in department to find out about their current research interests, plans for future research activities, current and planned publications, etc. **Year 2:** Students structure and undertake follow up interviews with staff in department to find out about *developments* in their research interests/activities over course of year (including outputs, publications, etc.). **Year 3:** Students structure and undertake final follow up interviews with select staff in department to find out about *developments* in their research interests/activities over course of year (including outputs, publications, etc.).
		b. Research interests and or outputs from activities of staff external to the institution are included in curriculum content.	**b.** Students learn about research findings through curriculum content which draws on the work of staff external to the institution.	**Year 1:** Keynote speaker/s from external institution invited to deliver a lecture on his/her research. Students are required to undertake a preparatory activity in advance of session (e.g. read a research paper by speaker and submit three questions for discussion in plenary). **Year 2:** The keynote speaker is invited back to the institution to report back on research activities. **Year 3:** Students identify and vote for an external to speak on her research.
		c. Research interests and or outputs from research activities of students are included into curriculum content.	**c.** Students learn about research findings through content which draws on the work of student research.	**Year 1:** Year 3 students showcase their research projects/dissertations to new students within induction activities. **Year 2:** Students given opportunity to view the outputs of previous student work as they plan their own research module. **Year 3:** Year 3 students showcase their research projects/dissertations to new Year 1 students within induction activities.

Table 1: Clarifying the nature of research-informed teaching approaches (examples given for students on a 3-year undergraduate degree programme).

Conclusion

The institutional survey referred to in this paper provides the most up to date information about the different types of research-informed teaching that students experience at the University of Birmingham. The findings suggest that whilst there was substantial activity by staff in relation to the linkage between research and teaching, this was not always widely recognised by students. Indeed, the overall conclusion drawn from the final project is that while particular groups of students or programmes of study may or may not benefit from a greater use of the full range of research-informed approaches to teaching, a key issue to address is a perceived lack of understanding among both staff and students of *what* research-informed teaching is (CLAD, 2012). As such, it is argued in the project report that however well justified may be the claims to be offering 'research-informed' teaching, there is a risk of disappointing the expectations of the students if staff are unable to fully explain when and why they are being taught through a diverse range of research-informed approaches, appropriate to their disciplines. Given these conclusions, a particular challenge in developing new strategic initiatives is to find effective ways to cultivate students' expectations so they can appreciate the importance of the 'nexus' between these two core activities in relation to their particular learning experiences at a research-intensive institution. It is hoped this paper and related discussion, will serve to stimulate debate and generate discipline specific examples that can be showcased within the institution to illustrate how students can effectively engage *'in the process of solving research problems, acting and thinking as active problem solvers – and not merely as passive recipients of established knowledge'* (Russell Group 2014).

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