

The research–teaching nexus revisited

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Universities have a dual role: they are the key locations for research as well as higher education. These are obviously complementary in that students are learning in the environment where the latest discoveries are being made or discussed. However, the two make very different demands on staff attention, particularly since 1986 when the UK government linked funding directly with research outputs through the ‘Research Excellence Framework’ (as it is currently known). This effectively made teaching the lesser sibling of the two, and education suffered as a result. Furthermore, there is no guarantee that a successful researcher will make a successful teacher and vice versa, even though academia is full of people who do manage both. Gourlay and Oliver provide an overview of how this ‘nexus’ of research and teaching has been positioned in recent years, and the various ways that people have attempted to think through the relationship between the two. One result of these discussions and experimentation, as they explain, has been a significant expansion in what we understand ‘education’ (and particularly ‘*higher*’ education) to be. Versions of ‘research-based education’ have been somewhere in the conversation for centuries, even if it has proven harder to implement than one might have thought.

Introduction

This chapter explores the idea of the research–teaching nexus, which provides the foundation for research-based approaches to education, such as UCL’s Connected Curriculum.

Although this is an idea that can be traced back across two centuries, it remains controversial, and its feasibility is still questioned. However, research has developed an increasingly sophisticated account of the various strands that this ‘nexus’ consists of, and how students experience it. These

strands will be reviewed to identify opportunities for building connections between research and teaching.

Research-based education

Many contemporary discussions of learning and teaching in higher education involve contrasting ‘passive’ or ‘transmissive’ approaches to teaching – such as lectures – with ‘active’ forms of learning, in which students are asked to make, do or perform in particular ways. Such discussions are well intentioned, reaching for an important principle – that learning involves more than simply receiving information – but unfortunately, these ideas of ‘engagement’ or ‘participation’ can be deeply ideological, and even naïve, where they ignore important but solitary or invisible activities that are vital to higher education, such as reading and thinking (Gourlay, 2015).

One challenge to these discussions is that they ignore what people actually do when they study, relying on preconceptions rather than evidence. What this suggests is that, if higher education is in any way about knowledge – about what it is, how it is made, what its limits are, whose ends it serves, and so on – then it is important that students come to understand the ways in which knowledge is produced, shared and defended. As Mary Henkel has argued, the value of research-informed teaching and learning arises from:

- a) the acquisition and critical appreciation of substantive knowledge in the context of assumptions that that knowledge is partial and in process of development and revision within a regulated environment;
- b) understanding of the processes through which that knowledge is acquired;
- c) learning the skills to practise ‘disciplined inquiry’ sanctioned by an epistemic community or institution. (Henkel, 2004: 29)

In other words, the value arises from learning how to *be* historians, chemists, linguists, and so on.

These principles are central to the idea of research-based education. Initiatives such as UCL’s Connected Curriculum (Fung, 2017) promote the idea that students should learn not just by hearing about research, but by learning how to be researchers. This involves changing their relationship to disciplinary knowledge: they should, through their education, learn how to undertake research within their discipline themselves, and in so doing, develop a sense of their own identity as a researcher.

The Connected Curriculum consists of six dimensions, which are to be enacted by students learning through research and enquiry (Fung, 2017):

1. Students connect with researchers and with the institution’s research
2. A throughline of research activity is built into each programme
3. Students make connections across subjects and out to the world
4. Students connect academic learning with workplace learning
5. Students learn to produce outputs – assessments directed at an audience
6. Students connect with each other, across phases and with alumni.

To understand what it is that this initiative is intended to achieve, and to make sense of why it was necessary to ‘close the divide between teaching and research’ (UCL, 2015) in the first place, it is helpful to place this discussion in a broader historical context. In particular, it is important to frame this in terms of the ‘research–teaching nexus’, which has come to stand as an important principle in determining the role of the university within society.

The history of the research–teaching nexus

The idea of the research–teaching nexus is commonly traced back to the work of Wilhelm von Humboldt in the early 1800s. When Humboldt was given responsibility for reforming Prussian education, he did so by reacting against the dominant, conservative model of universities. He believed that approaches in use at the time merely reproduced existing knowledge instead of helping students to learn how to discover it for themselves. His alternative to this took as its central principle the idea of students developing as independent researchers:

Just as primary instruction makes the teacher possible, so he renders himself dispensable through schooling at the secondary level. The university teacher is thus no longer a teacher and the student is no longer a pupil. Instead the student conducts research on his own behalf and the professor supervises his research and supports him in it. (Humboldt, 1964)

This idea became influential in shaping ‘research universities’: institutions that marked themselves out through their active engagement with the discovery, not just the preservation, of knowledge. Although this view has persisted, and still influences contemporary debates, it has not done so without challenge. For example, as Halse *et al.* (2007: 727) describe, John Henry Newman proposed in his *Idea of a University* (1852) that the capacity to research and to teach were quite distinct and, indeed, ‘not commonly found in the same person’. Nonetheless, Humboldt’s vision was

still argued to form an ideal for universities; it even influences contemporary discussions about the role of the university in society.

One place in which such arguments can be uncovered are discussions about the nature of scholarship. These can be exemplified by Boyer's framework (1990), which drew on a study of the activities of the professoriate to create an integrated model of academic practice. This model explicitly attempted to overcome the perceived structural divisions between research and teaching by offering a more nuanced, integrated account of different *forms* of scholarship. Boyer elaborated these as the scholarships of discovery, integration, application and teaching. This offered a far richer set of possibilities than the previous binary that set research against teaching and started to make the idea of a 'nexus' more meaningful. Previous research had tended to create a one-directional account of the relationship between research and practice: research happened first, and teaching about it happened later. Discussion of links between the two therefore focused on bringing research into the curriculum, rather than on bringing teaching into research. Boyer's account raised other possibilities, such as the idea that scholarly insights from teaching might generate research questions, or that the challenges of application might give rise to new discoveries. This interplay of possibilities started to describe the complexities that might shape a 'nexus', rather than simply characterizing this as a gateway or point of passage.

This move away from an 'either/or' account of the relationship between research and teaching proved strategically important. Clark (1997), for example, developed this idea in response to the 'incompatibility thesis', which proposed a zero-sum account of academic work by suggesting that time spent on research was necessarily taken away from teaching, and that, consequently, academics who do research were abandoning students. As an alternative, Clark developed the idea of the 'research-teaching-study nexus', based on the idea that some academic activities might be understood in several different ways:

Research activity can and does serve as an important mode of teaching and a valuable means of learning. [...] In its strongest and most normative form the thesis becomes a claim that student involvement in research is an efficacious way to educate throughout the educational system and the great mass of students, as well as the elite performers, for the inquiring society into which we are rapidly moving. (Clark, 1997: 242)

While this account offered a more sophisticated model of the various relationships that might link research and teaching, it has only been partially successful in defending these. The idea that teaching and research are in some way intrinsically linked has come under increasing pressure from policy, funding and the demands of specialization. For example, developments in policy internationally focused on preparing students for work, or on the creation of educational and research markets, have made it hard to sustain connections between research and teaching (Zubrick *et al.*, 2001). Similarly, the selective investment of research funding in elite institutions – a move justified on the grounds of promoting international competitiveness – has led to associated questions about whether all undergraduates need to be taught in a research environment (Healey *et al.*, 2010).

As a consequence, whatever the ideal might be, at a practical level the current situation is such that many currently believe that research and teaching ‘are not just distinct but incompatible in the working lives of today’s academics’ (Henkel, 2004: 20).

A lack of evidence

Part of the reason that the existence, let alone the value, of the research–teaching question continues to be queried is that it remains very difficult to provide evidence of its benefits. Neumann (1994), for example, reviewed work carried out over the previous decade, and concluded that this had failed to generate persuasive evidence of a link between research and teaching, let alone the benefits of that link. These studies were mostly surveys, and relied on self-reported accounts of work patterns in order to explore academics’ work preferences, time usage and reward systems. However, surveys of students also failed to show any convincing evidence: it seemed that, at that point, students were either unaware of their teachers’ research activities, or saw little relevance in them. Five years later, Brew (1999) similarly found little empirical evidence of such connections.

This paucity of evidence led Hattie and Marsh (1996: 533) to describe the research–teaching nexus as ‘an enduring myth’. Rather than abandoning it, however, they challenged institutions to pursue ‘improvement of the nexus between research and teaching ... to increase the circumstances in which teaching and research have occasion to meet’.

The situation seems to have changed very little in the following years. Focusing on a vocational university, Healey *et al.* (2010) found most students remained unaware of research at their institution throughout the course of their studies. Many students said they were disappointed about this, because they believed staff involvement in research would increase their

understanding of the subject, and that teaching would be more effective if their lecturers involved them in aspects of the research process.

However, rather than concluding from these studies that the research–teaching nexus does not exist, researchers began to explore the possibility that it had not been adequately theorized. In other words, the difficulty in finding evidence for the existence or effects of the research–teaching nexus was at least in part due to the ongoing ambiguity of the term. Without specifying this idea in such a way that it can be made visible, it will remain impossible to study. For this reason, subsequent studies approached the topic differently, trying to explore different ways in which the nexus was understood and enacted, in order to develop a better theoretical account of this phenomenon.

Exploring the character of the research–teaching nexus

These new approaches to studying the research–teaching nexus involved documenting people’s experiences of points of connection and looking closely at pedagogic practices that seemed to involve research in some way. In spite of the managerial pressures and resource constraints that contributed to separating these areas of academic work, work was undertaken that began to explore and document the wide range of relationships that connected research and teaching, including perceptions of the ways in which they could be integrated, or even have positive influences on each other (Coate *et al.*, 2001).

Henkel (2004), for example, explored the different ways in which people understood these connections, and drew four conclusions that helped to scope out an agenda for work in this area:

1. Although general belief in the research–teaching nexus was widespread, the term has been used inconsistently, making it hard to evidence.
2. There are disciplinary differences in the prevalence of this belief. These include differences in whether the nexus was seen as a pedagogic construct, or as part of academics’ personal identity. There were also differences in whether it was seen as a one-way process (flowing from research to education) or a two-way process (in which education could also influence research).
3. These discussions were primarily teacher-focused.
4. One underlying motivation was that many academics were passionate about their subject. This passion was seen as driving both research and their commitment to the research–teaching nexus.

As a consequence of this refocusing, studies began to focus in closer detail on areas such as inquiry-based learning (e.g. Healey, 2005), which seemed to enact the kinds of pedagogy called for by Humboldt almost two centuries earlier. This more fine-grained work began to reveal the complex and often ‘taken for granted’ ways in which research and teaching were interlinked. Neumann, for example, developed an account that explained the research–teaching nexus in terms of:

A multi-level relationship between teaching and research operating on three levels that have been termed:

- Tangible: the transmission of knowledge and skills
- Intangible: the transmission of approaches and attitudes to knowledge
- Global: the direction given to course offerings by departmental research activity. (Neumann, 1994: 324)

Neumann’s study of students’ experiences managed to show some evidence for the existence of each of these areas. For example, tangible connections were visible where lecturers were working at the forefront of knowledge and shared this work in their teaching, as well as in lab-based courses where students tried out cutting-edge techniques of the kinds used in research projects. Intangible connections were frequently conveyed by means such as lecturers’ enthusiasm for their subject, or through the pedagogy of courses that encouraged students to adopt a questioning, critical approach to their topics. The global nexus was visible in areas such as the range of topics on offer within a course, which reflected the expertise of appointed staff within a department.

Neumann also noted that the relative visibility of these different levels of relationship was influenced by several things, including the practices of the discipline; the year of study; and also the ability and motivation of the students, with those who were interested in further study or in becoming academics themselves showing most awareness of the links between research and teaching.

These observations helped to overturn some of the earlier scepticism about the research–teaching nexus. Clark, for example, had sought to locate the research–teaching–study nexus in the context of ‘the advance laboratory (or seminar)’ or dissertation work (Clark, 1997: 243); the possibility of finding this within undergraduate lectures, for example, was explicitly rejected. Neumann’s work served to confirm the importance of laboratories

and seminar work, but opened up the possibility that connections between research and teaching might be found even in initial undergraduate classes.

The influence of disciplines in shaping the relationship between research and teaching has become increasingly important in these studies. Griffiths (2004), for example, drew on work in the sociology of knowledge to argue that participation in research-based teaching is likely to be harder where the knowledge base is codified, largely uncontested and where programmes of inquiry take highly specialized forms; whereas it will be easier where the focus is on interpretation, where there are competing frameworks of understanding, and where multiple disciplines explore common problems within applied or vocational fields. However, although these characteristics might affect a student's opportunities to participate in research, they would have less influence on whether teachers present recent research, for example.

Healey (2005) similarly argued that there would be disciplinary variation, building his argument at least in part on an organizational or apprenticeship model:

Undergraduate students are more likely to have opportunities to work as, for example, a research assistant on a research project in a biology laboratory, than to work alongside, say, an English professor interpreting a play. (Healey, 2005: 73)

Interestingly, however, Healey's conclusions here appear to contradict those drawn by Griffiths. Further empirical work would be needed to provide evidence about the relative availability of opportunities across different disciplines.

Studies of this kind have helped to move the debate around the research-teaching nexus beyond the simple binary of whether this does or does not exist in some measurable way, and towards more complex discussions about the qualities of various relationships. Accordingly, Griffiths classified different points of connection between research and teaching according to whether they were specific or diffuse in character; whether research was weakly or strongly embedded in teaching activities; and whether the relationships were unidirectional or two-way. On the basis of this, Griffiths developed four different models of connections between research and teaching:

- Research-led teaching, where the curriculum is structured around content that reflects the research interests of staff, and the emphasis is on understanding research findings rather than research processes

- Research-oriented teaching, in which the emphasis is on learning about research, with a focus on understanding the ethos and processes of knowledge production
- Research-based teaching, where the curriculum is largely enquiry-based, connections between teaching and research are two-way, and divisions between staff and students' roles are minimized
- Research-informed teaching, which has been referred to elsewhere as the scholarship of learning and teaching; here, irrespective of what is taught, the process of teaching is itself shaped by research evidence (for example, about effective pedagogy, or the processes of knowledge production).

Healey *et al.* (2010) later modified this, substituting 'research tutored' for research-informed. This development was based on the creation of a quadrant diagram, differentiating between (on one axis) an emphasis on research processes and an emphasis on research content; and (on the other axis) treating students as participants in research or as an audience for it (Healey, 2005). In this later terminology, research tutoring involves students learning about research findings through small group discussions with a teacher.

Whilst this finer-grained analysis gave cause for optimism about the existence of the research–teaching nexus, it simultaneously gave support to some of the critiques of this idea. The concerns voiced by Newman (1852), Hattie and Marsh (1996) or Henkel (2004) about incompatibilities between research and teaching could also be revisited using this framework. What this clarified was that although there may still be connections between research and teaching in a range of different contexts, the priorities of the institution, the influence of managerial policies and the levels of resourcing available to institutions could affect the quality of these connections in important ways.

Halse *et al.* (2007), for example, drew attention to Marginson's 'charmed circle' of resourcing. Within this charmed circle, established institutional research status attracts high-performing research staff and student applications, which in turn generate resources that support more research. Those outside the circle will always be in a deficit position, and will struggle to enter. The consequence, in terms of research–teaching connections, include fewer staff able to talk about leading research, less infrastructure that could support practice and engagement, and a different profile of student motivation, all of which make meaningful connections between research and teaching harder to establish.

Their research also served to demonstrate that connections between research and teaching cannot be taken for granted, but need support and encouragement. In their study, they reviewed the profiles of recipients of national teaching awards to explore the kinds of research–teaching relationship that they had created. In this study, they found there was no clear link between the institutional mission and the receipt of a national teaching award. They also found that the majority of winners were active researchers.

Material connections

The discussions of the research–teaching nexus above either focus on qualities such as motivation, or practices such as teaching. There is very little mention of the material cultures of research or teaching, apart from the discussion in some studies of lab work. This is surprising, given that the field of Science and Technology Studies has argued for several decades that knowledge generation is shaped both by social influences and material concerns (Latour, 2005). Ethnographies of laboratory work, for example, show how scientific knowledge, far from being purely something discussed in published work, only becomes credible because such writing follows from less visible work with tissue samples, chemicals, machines, print-outs, desks full of academic papers, rejected draft manuscripts, and so on (Latour and Woolgar, 1979). Similarly, Bowker and Star (2000) have shown that the importance of infrastructure is commonly overlooked, even though it shapes practice in profound ways.

These influences have begun to be explored in research on education:

Humans, and what they take to be their learning and social processes, do not float, distinct, in container-like contexts of education, such as classrooms or community sites, that can be conceptualised and dismissed as simply a wash of material stuff and spaces. The things that assemble these contexts, and incidentally the actions and bodies including human ones that are part of these assemblages, are continuously acting upon each other to bring forth and distribute, as well as to obscure and deny, knowledge. (Fenwick *et al.*, 2011: vii)

In the context of higher education, this reframing of knowledge work has brought attention back to the value of campuses, and the way in which the co-location of learners, teachers, labs, classrooms, lecture theatres, libraries, and so on is important in making higher education practical (Cornford and Pollock, 2002).

There has been relatively little recognition of this within studies of the research–teaching nexus; where material considerations are mentioned, this is often only in passing. For example, Healey *et al.* (2010) identified a range of ways in which students became aware of staff research. Some of these were expressed in purely social terms – through guest lectures or research seminars, for example. However, some material connections were also identified, although the roles these played were not explored further. These points of connection included conventional outputs of research, such as journal articles and books, but also more mundane things such as notice boards and displays, where information about projects, seminars or publications might be provided.

However, work at UCL has explored these material cultures of research and teaching. Plewes and Issroff (2002), for example, explored the kinds of resources that were used as part of teaching practice. Their studies with medics revealed the importance of a wide range of material resources in their teaching, including ‘potted specimens, x-ray displays, posters with clinical topics on, videos, plastic models, and then of course computers’. These resources are objects of analysis for researchers and professional practitioners: bringing them into an educational context allows students to rehearse those kinds of analysis in a supportive environment, gaining experience of the kinds of research practices valued in their discipline.

Subsequent work has shown the importance of material resources in a range of other disciplines, too. Learning how to handle objects is an important part of studying archaeology, for example (Sparks, 2010), and working with a specific set of skulls can provide important insights into concepts of phylogeny (Duhs, 2010). This has led to the development of a pedagogy of object-based learning, and a growing body of practical advice about how best to implement these kinds of approaches (e.g. Cain, 2010). Research has also shown that digital resources and services can also function in this way (Gourlay and Oliver, 2013). Students at UCL made extensive use of digital devices and services, many of which were also widely used by researchers. Some of these were ubiquitous but prosaic, for example office tools such as Microsoft Word or Google Docs, or search engines such as Google, but others were primarily academic, such as Google Scholar, Endnote or specialist social networking sites such as academia.edu or ResearchGate.

Taken together, these material and digital objects provide a new perspective on the research–teaching nexus, allowing points of connection to be identified by tracing the resources that cross between one set of practice and the other.

Conclusions

For an idea that has been advocated for over two centuries, it seems that research-based education has been surprisingly challenging to implement. However, part of the reason for this perception may be the lack of clarity about what research-based education consists of. This has made it difficult to provide convincing evidence one way or the other. Developing consensus around the idea of research-based education, including recognition of the sociomaterial elements of this work, may help to address this ambiguity.

Another part of the reason has been that policies and patterns of resourcing have separated out areas of academic work in order to render them transparent, accountable and manageable. At the individual level, teaching and research are often kept separate through organizational and institutional procedures, such as parallel processes for planning and rewarding activity. Institutionally, the pressures of market competition and limited resources are leading to greater specialization and differentiation. Under these circumstances, the problems of implementation become all too apparent.

However, another part of the difficulty is to do with the very general way in which these ideas have been discussed. At an abstract level, the research–teaching nexus has proved elusive; however, reframing this idea in terms of the people, things and places involved in teaching and research work has begun to show the rich web of connections that exist. Work remains to be done to explore the diversity of these connections more extensively, but focusing in on these fine-grained, day-to-day practices has already helped to develop approaches such as object-based learning that will create links between research and teaching.

Although it has taken much longer than Humboldt might have hoped, the principles of research-based education have been clearly laid out, as for example in the Connected Curriculum framework. The next steps will involve generating an evidence base that allows this idea to be interrogated critically, so that the qualities of different kinds of connection can be understood better. This will, in turn, enable the development of new pedagogic strategies that can be used to provide a better kind of research-based education for our students.

Notes

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