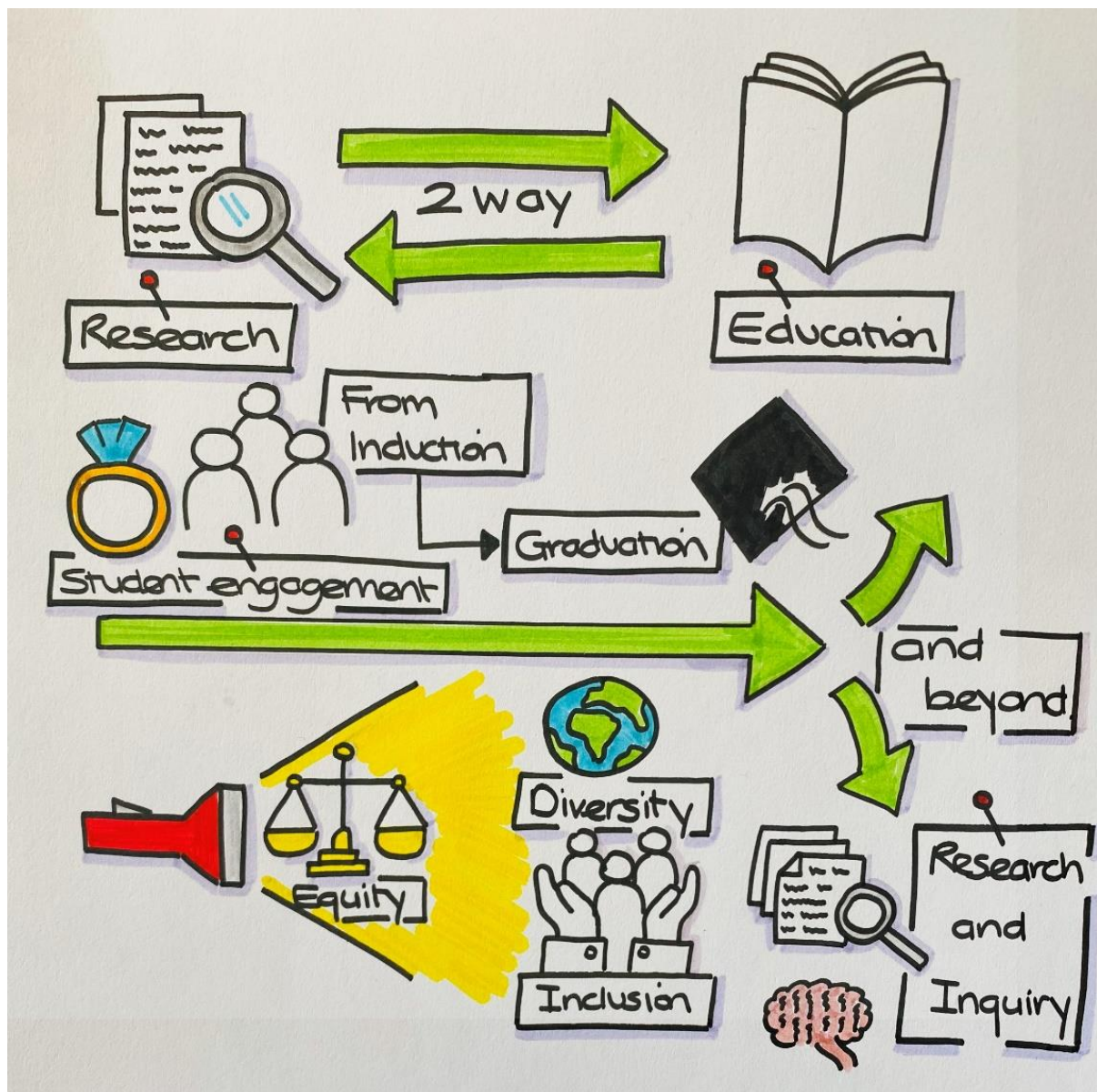


THE RESEARCH-EDUCATION NEXUS: ENGAGING STUDENTS IN RESEARCH AND INQUIRY

A report for the University of Westminster

MICK HEALEY



The research-education nexus: Engaging students in research and inquiry

This report offers both a scholarly review and a practical guide to the strategies and practices that support the development and implementation of the research-education nexus, both within the UK and internationally, through the active engagement of students in research and inquiry. It explores the complexity of the research-education nexus, also commonly referred to as the research-teaching or teaching-research nexus, which encompasses a wide range of contemporary issues in higher education. Central to this concept is fostering student engagement from induction through to graduation via curricular and co-curricular research and inquiry, conducted both individually and collaboratively.

The report addresses a broad spectrum of themes, including disciplinary and interdisciplinary approaches, professional and work-based learning, community engagement, knowledge exchange, and innovations in learning and teaching. It contributes to the global discourse on higher education, exploring the evolving roles of students as researchers, inquirers, partners, scholars, producers, and agents of change. Increasingly, students are viewed as active participants within the research and educational communities of their institutions.

Commissioned by the University of Westminster (UK), the report is intended for two interrelated audiences—within Westminster and across the broader higher education landscape. It aims to inform and inspire dialogue among academics, professional staff, institutional leaders, academic developers, and students about embedding student research and inquiry in educational practices. These conversations need to be responsive to disciplinary, institutional, and national contexts. The debates will raise critical questions about the future of higher education in the mid-21st century, amid growing global uncertainty, polarisation, and supercomplexity, as well as the challenges of marketisation and treating students as consumers. Themes include the democratisation of knowledge, the flattening of traditional academic hierarchies between staff and students, inclusivity, and the transformative potential of emerging technologies.

At over 70,000 words, with more than 65 boxed mini-case studies and over 450 references, the report presents a thorough and detailed analysis and guide covering the last 25 years on how engaging students in research and inquiry supports and sustains the research-education nexus.

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Endorsements

"This report is a towering achievement of scholarship. It is well-written and accessible, offering myriad insights and practical advice drawn from Mick Healey's wide-ranging career as an activist-prophet for the global undergraduate research (UR) movement. He has masterfully woven together theories and practice of UR, case studies from diverse institutions, and predictions for future UR development. The central conclusion of the report rings resoundingly true: "With the democratisation of knowledge and a shift from hierarchies to networks, where innovations are guided by enduring educational values, the research-education nexus is arguably even more central to the survival and prosperity of higher education." This report should be a primary resource for higher education faculty and administrators seeking to expand and democratise undergraduate research ecosystems, increase student success, and link academic institutions with the communities they serve." *Elizabeth L. Ambos, Ambos Consulting, Executive Officer (retired), Council on Undergraduate Research, US*

"This is a comprehensive, thoughtful and inspiring read. I really enjoyed engaging with it, especially the numerous university examples that bring the theory to life. The content is strong and well-developed. This is a significant and rich piece of work." *Kelly Matthews, Professor of Higher Education, University of Queensland, Australia*

"Mick's longstanding scholarly contributions have enriched higher education research, policy and practice on a global level for many years. I particularly appreciate his focus on research-enriched education with learners at the heart." *Kerri-Lee Krause, Chief Commissioner, Tertiary Education Quality and Standards Agency, Australia*

"Professor Mick Healey is highly respected around the world for his deep knowledge of the research-education nexus. His insights, underpinned by theoretical depth and breadth, are rich in practical examples of emerging practices from across the higher education sector. This report is rich in material to inspire colleagues to explore and articulate effective ways of engaging students in research and inquiry within and across disciplines. The report is broken up into clearly signposted sections, making it possible for colleagues to find the sections that are of immediate relevance to them." *Dilly Fung, Emeritus Professor, LSE, UK*

"Like so much of Mick Healey's work, this report benefits from his considerable capacity to look across and synthesize resources. This report will make a significant contribution to understanding the research-education nexus and support variously positioned practitioners in working to develop this important approach." *Alison Cook-Sather, Director of the Teaching and Learning Institute at Bryn Mawr and Haverford Colleges, US*

"This report provides a comprehensive overview of impactful approaches to engaging meaningfully with the research-education nexus, drawing on a range of global case studies, and setting a bold vision for the future. It outlines a compelling case for effective practices at the course, discipline, and institutional levels, which will catalyse transformation in curriculum design and the student experience. It is essential reading for anyone leading or working in higher education today. I think it is brilliant – a real tour de force. I enjoyed reading it immensely and found it extremely thought-provoking." *Johnathan Eaton, Pro-VC (Learning & Teaching), University of Cumbria, UK*

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I remain responsible for the content and views expressed, unless otherwise attributed.

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Executive summary and key recommendations

“... the research/teaching nexus ... definitely qualifies as one of the most talked about terms in contemporary higher education policy and research.” (Tight, 2016, 305)

“undergraduate research should ... be at the center of the undergraduate experience.”
(Hodge et al., 2007, 1)

The research-education nexus

The research-education nexus, also commonly referred to as the research-teaching nexus or the teaching-research nexus, is a multifaceted concept that requires careful unpacking. Its terminology and interpretations vary widely across countries, institutions, disciplines, and individuals. The term ‘education’ is preferred to ‘teaching’ because education is a broader concept encompassing the process of developing knowledge, skills, and values in students, while teaching is a specific method or approach used to support that education.

The central argument of this report is that **the most effective way to strengthen the research-education nexus is through the active engagement of students in research and inquiry. A strengthened research-education nexus, in turn, leads to improved student understanding and learning outcomes.** A fundamental conceptual shift is required: moving away from viewing students as passive recipients of their lecturers’ research towards recognising them as active participants and stakeholders within the institution’s research community, where their research experience mirrors their lecturers.

This report **adopts an inclusive and context-sensitive definition of the research-education nexus—one that encompasses student engagement from induction to graduation, through curricular and co-curricular research and inquiry, conducted both individually and in groups. It addresses a range of issues, including disciplinary and interdisciplinary approaches, professional and work-based learning, community engagement, knowledge exchange, and learning and teaching.** Furthermore, it considers the two-way relationship between research and education, exploring not only how research informs education but also how education can enrich research.

Aim, focus, and audience

This report offers both **a scholarly review and a practical guide to the research-education nexus.** Its primary aim is to inspire academic and professional staff, at the University of Westminster and across higher education institutions in the UK and internationally, to reflect on and celebrate existing practices, while also critically exploring opportunities for innovation within their disciplinary, institutional, and national contexts to engage students further in research and inquiry.

A key intention of this work is to inform policy and practice at Westminster by drawing on global developments and exemplars. At the same time, it seeks to contribute to broader international debates around the evolving roles of students as researchers, inquirers, partners, scholars, producers, and agents of change. The co-sponsorship of this report by the Deputy Vice-Chancellors for Education and for Research and Knowledge Exchange at the

University of Westminster signals a strong institutional commitment to fostering dialogue about how and why the research-education nexus should shape the University's future direction.

Accordingly, **the report is written for two overlapping audiences: those within the University of Westminster and those across the wider higher education landscape.** Its primary readership includes university leaders, academic staff, researchers, academic developers, professional staff, and students in both national and international contexts. While the report has a broad scope, chapter 1—*The University of Westminster Context*—is one of the few sections focusing explicitly on Westminster. It informs the rationale for the report's aims, scope, and conceptual frameworks.

Attention in the last 15 years

I last undertook a comprehensive review of the literature on the research-education nexus in 2009 (Healey & Jenkins, 2009). Since then, undergraduate research has come of age as a field of inquiry. There has been a substantial growth in the volume of published work on the topic, accompanied by several notable shifts in emphasis. **Over the past 15 years, eight key areas have emerged as particular focal points of attention:**

1. Shifting the emphasis from the elite model of undergraduate research aimed at selected students, particularly in the sciences, to mainstreaming student research and inquiry in the curriculum aimed at all students in all subjects.
2. Broadening the definition of what counts as research, as seeking new knowledge for society, to include using inquiry to learn about what is new knowledge for students, and recognising that students may be involved in research and inquiry in work-based learning, community-engaged learning, and knowledge exchange.
3. Rethinking how empowering students to explore through research and inquiry can be implemented from day 1 of their courses, and how the design and assessment of final-year projects and dissertations may be more flexible to meet the needs of students from diverse subject areas and types of institutions, including college-based higher education.
4. Giving increased attention to developing strategies for embedding the research-education nexus across institutions and programmes.
5. Seeing student research as part of the wider topic of students as partners, in which relationships between students and staff, and with other students, are at the forefront.
6. Extending the focus on engaging students in discipline-based and interdisciplinary research to include their participation in pedagogic research and the scholarship of teaching and learning, and seeing students as change agents in education.
7. Emphasising equity, diversity, and inclusion in student research and inquiry.
8. Supporting staff supervising and mentoring student research, and engaging students in completing the research cycle through involving them in celebrating and disseminating research processes and findings.

This report represents a synthesis of work undertaken in these areas and how they fit into the earlier literature on the research-education nexus.

Approach to writing

I have revisited references, many of which I first read when researching and writing about the topic, for a series of articles and reports co-authored with Alan Jenkins between 2000 and 2018. In preparing this report, I updated my knowledge and understanding of the nexus by searching and reading recent literature and integrating it with earlier key references. On reflection, I realise that most of my publications and presentations over the last 30 years fit within the framework presented in this report.

An indication of the importance of the topic is given by the **reference list that contains over 450 items**. Yet, as the quote above from Tight indicates, that represents only a tiny proportion of the literature. A search of Google Scholar, the most comprehensive academic search engine (Healey, M. & Healey, R. L., 2023), using the terms “research-education nexus” OR “research-teaching nexus” OR “teaching-research nexus” gives 7,760 hits, and no doubt this would be extended considerably if search terms were added to include broader definitions of research. Around 1,200 items are included in the bibliography I have maintained for the last two decades (Healey, 2025a). The items cited in this report include, arguably, most of the more significant references on the research-education nexus, with a slight bias to UK sources and references relevant to the University of Westminster.

Over 65 boxed mini-case studies are included. Several describe practices and policies that are no longer current, and the original webpages no longer exist. In higher education, it is uncommon for initiatives to continue for more than 5-10 years because funding runs out and/or their originators and supporters move on to other roles, often in different institutions.

Examples of practice do not necessarily become redundant or outdated. While they may no longer be in active use, their original, purposeful design often means they remain just as relevant and appropriate today. Revisiting such practices can offer valuable insights and inspiration for current challenges.

Key features

In summary, the key features of the research-education nexus in higher education include:

- Students are active participants in the institution’s research community
- Students engage in research and inquiry into disciplinary and interdisciplinary questions, work-based and community-engaged learning, knowledge exchange, and enhancing learning and teaching
- The nexus spans curricular and co-curricular experiences
- The nexus is aligned with the student life-cycle, from day one to graduation and beyond
- Student research is considered part of the broader topic of students as partners, in which relationships between students and staff and with other students are at the forefront
- Equity, diversity, and inclusion underpin the nexus
- The nexus is context-dependent
- The nexus includes supporting staff to supervise and mentor student research, and engaging students in celebrating and disseminating research processes and findings

The key diagram that gives the framework for the report is **Figure 2.1 Engaging students in research and inquiry**. A copy has been reproduced on the back cover of the report to emphasise its importance.

Summary of chapters

1. **The University of Westminster context** – The University of Westminster aims to lead in integrating research and education through a strong research-education nexus. It promotes student engagement in research and inquiry, shifting students from passive recipients to active participants. This approach supports Westminster's vision that all its students will benefit from learning in a research-rich environment by 2029.
2. **Aim, focus, and frameworks** – This report aims to produce a review and guide to the research-education nexus. It is a nuanced and contextualised concept. I argue that all undergraduate students should have the opportunity to learn through and about research and inquiry. A modified version of the Healey (2025a) model provides the framework for the report (Figure 2.1). Engaging students as researchers and producers of knowledge overlaps with many other pedagogies in HE, including *students as partners*; *employability*, *enterprise*, and *entrepreneurship*; *service and community-engaged learning*; and *knowledge exchange*, all of which may involve students engaging in research and inquiry.
3. **The benefits, challenges, risks, and experiences of engaging students in research and inquiry** – It is essential in higher education that we consider systemically the benefits, challenges, and risks faced by students and staff in engaging students in research and inquiry, as they are closely related. We need to encourage students and staff to take calculated risks. Half of the original 10 *high-impact practices (HIPs)* involve students in elements of research and inquiry. The challenge is to make these HIPs potentially available for every student. All students stand to gain from the skills they learn from engaging in research and inquiry, which are integral to professional life in the 21st century. There are also risks for students and staff engaging in research and inquiry that need to be managed. Non-engagement of some students is the prime risk. Research highlights that students' experiences of research and inquiry are nuanced, vary by type of institution, and change over the student life cycle.
4. **Unpacking the research-education nexus** – There is not one nexus, but rather many relationships. Each term – research, education/teaching, and nexus – needs unpacking, as does the phrase 'research and inquiry'. The most cited study about the relationship between teaching and research, by Hattie and March (1996, 529) found that "the common belief that teaching and research are inextricably intertwined is an enduring myth. At best, teaching and research are very loosely coupled." Many later studies have emphasised that a strategic approach needs to be adopted if the benefits of the synergies between research and education are to be met. The impact of teaching on research has attracted far less attention. One American study found that doctoral students who engaged in both teaching and research showed markedly greater improvement in their ability to formulate testable hypotheses and design sound experiments, suggesting that the act of teaching enhanced the quality of their research.

Two complementary forms of *undergraduate research* are offered by *undergraduate research opportunity programmes* (UROPs), which provide an elite co-curricular model, and *course-based undergraduate experiences* (CUREs), which mainstream research experiences for all students within the curriculum. *Inquiry-based learning* (IBL) has many features in common with CUREs. An important distinction lies between IBL courses, where students contribute to the creation of new knowledge for society—a key feature of academic research—and those where they discover existing knowledge that is new to them, although the boundaries between the two are blurred. The chapter then outlines Brew’s (2006) inclusive scholarly knowledge-building communities model, which describes the relationship between teaching and research. The chapter concludes with a brief discussion of the national contexts in which the initiatives discussed in the next four chapters sit.

5. ***Institutional strategies*** – The founding ideas about the research-education nexus are usually credited to Humboldt (1810). He argued that universities treat scholarship as not yet completely solved problems, whether in research or teaching. Universities shifted from spaces where teaching and research coexisted in relative harmony during the twentieth century to environments where the two became increasingly antagonistic. Some indications suggest the pendulum is beginning to swing back in the other direction. However, the number of institutions that have developed effective strategic approaches to mainstreaming research-based curricula, which have been embedded across most or all of the institution, is still small. Well-known strategies include *the student as producer approach at Lincoln University*, *the inquiry-based learning curriculum at McMaster University*, *the student as scholar initiative at Miami University*, and *the research-based connected curriculum at UCL*.
6. ***Disciplinary and interdisciplinary practices*** – Differences in the research-education nexus between academic disciplines are closely linked to how knowledge is structured within each field. Although there is evidence of disciplinary differences in the research-education nexus, these can be overstated. There are significant differences within disciplines reflecting the kind of institution and the personal biography of the individual. It may be easier at the natural science end of the discipline spectrum to involve students in research *processes*, while at the humanities end, there are more opportunities to involve them with the research *products*. A counter view is that disciplinary distinctions are no longer a sufficient basis for explaining differences in how research is experienced, with the increasing importance of interdisciplinary research and a shift between ‘Mode 1’ research and ‘Mode 2’ knowledge production. Decisions about implementing the research-education nexus within disciplines and interdisciplines are primarily taken at the department and course team levels. This is illustrated by 10 mini-case studies of disciplinary and interdisciplinary practices, as well as numerous discipline-specific references to the research-education nexus in disciplines taught at Westminster and other universities.
7. ***Initiatives by level and year of study*** – It is argued that preparing students for the final-year project or dissertation should begin on day 1 of the degree course. Both students and staff/faculty should be offered choices regarding the type of final-year projects and dissertations they undertake or supervise, as well as the form and nature of the outputs

being assessed. Twelve mini-case studies of practices at first-year undergraduate level, final-year undergraduate level, and Master's level are included.

8. ***Across programme initiatives*** – Too often, students experience research and inquiry haphazardly through the curriculum and may encounter similar practices in various courses in different years, with no attention given to progression. If departments and course teams are going to be serious about implementing institutional policies to promote the research-education nexus, it is essential that they are strategic about how students progress through their programmes in terms of their capabilities to undertake research and inquiry and their research-mindedness. A helpful distinction may be made between *structured*, *guided*, and *open* kinds of IBL, depending on the level of scaffolding.

The work of Baxter-Magolda (1992, 2012) on the *student development journey towards self-authorship* is helpful in planning program-level initiatives. Vertically integrated projects are another way of developing across programme links. Embedding a rich variety of research-teaching links from the outset of a programme is essential for achieving *pedagogic resonance*. The *Research Skills Development framework* helps academics conceptualise how they can explicitly facilitate student research skill development.

In assessing students' research and inquiry, there is a shift in focus from assessing learning to assessing for learning and assessing *as* learning. There is no need to adopt a one-size-fits-all approach. There is also a fundamental misalignment between the intended learning outcomes and the assessment practices in undergraduate research projects. Most of the intended learning outcomes valued by supervisors relate to the process of conducting research, whereas the assessments they use primarily evaluate the quality of the *outcome*. This suggests more attention needs to be given to assessing research processes. The chapter's themes are illustrated through six mini-case studies. The chapter ends with a table of strategies for integrating research and inquiry into programmes.

9. ***Students as change agents through engaging in pedagogic research and the scholarship of teaching and learning*** – There is a growing interest in students as partners (SaP) initiatives, where students act as *change agents* through engaging in *pedagogic research* (PedR) and the *scholarship of teaching and learning* (SoTL) projects, and drive educational transformations. Student-staff partnerships in PedR and SoTL share many characteristics of high-impact practices associated with undergraduate research. One of the five principles of good practice in SoTL is conducting projects in partnership with students (Felten, 2013). Some departments allow students to undertake their final-year project or dissertation on a pedagogic topic associated with the teaching of their discipline. Several universities have cross-institutional students-as-change-agents initiatives. The chapter concludes with a list of seven guiding questions for student-staff partnerships in SoTL, though many would also apply to research and inquiry partnerships in general.
10. ***Equity, diversity, and inclusion in student engagement in research and inquiry*** – Equity, diversity, and inclusion (EDI) have become a movement in higher education, although they have recently come under political attack in the United States. EDI is a key policy at the University of Westminster. It underpins student engagement in research and

inquiry. Inclusion is the primary motivator for the relative shift from the elite model of undergraduate research to the embedded model. It is essential to avoid 'othering' and stereotyping. These practices risk treating individuals with shared traits as if they are all the same. In reality, people embody multiple identities, and these intersecting factors can result in just as many differences within a group as there are similarities. A distinction may be made between 'selected partnership' and 'inclusive partnership' processes. The chapter discusses the application of EDI principles to student-staff partnership work, drawing on specific studies and practices. They also have the potential to be applied to student research and inquiry initiatives.

11. ***Supervising and mentoring, and celebrating and disseminating student research and inquiry*** – Supervising and mentoring student research differs significantly from other forms of teaching; academic staff require dedicated support and guidance to navigate these roles effectively. Supervision refers to a task, whereas mentoring suggests a more holistic process focused on student development. A wealth of advice is available for supervisors, mentors, and students. Supervisory practices often vary between and within departments as to the autonomy students are given. Tensions between the teaching role of the supervisor and their role as first marker suggest that the two roles might be separated, and supervisors should not assess the work of students they have supervised. Navigating the tension between fostering student autonomy and ensuring adequate staff support is difficult but crucial. The relationship between students and their mentors can be key in developing positive outcomes for both parties. It is common, however, for there to be a mismatch in the expectations.

Celebrating and disseminating the conclusion of a final-year project or dissertation is a valuable part of the overall research journey. Making student work public is one of the most effective ways to raise its quality. A wide variety of dissemination formats is available to student researchers. Most attention has been given to *undergraduate research conferences and journals*. Students benefit significantly from involvement in both, as they do from organising undergraduate research conferences and publishing undergraduate research journals. The chapter ends with a list of strategies for enhancing engagement with undergraduate research dissemination.

12. ***Ways forward for integrating research and education*** – With the democratisation of knowledge and a shift from hierarchies to networks, where innovations are guided by enduring educational values, the research-education nexus is arguably even more central to the survival and prosperity of higher education. Undergraduate research has the potential to be transformative, equipping students with the skills and mindset necessary to navigate and contribute to a complex and uncertain world. Promoting students as active partners in research and inquiry offers a meaningful alternative to the consumer-oriented model of education. The rapid advancement of artificial intelligence (AI) has, to some extent, flattened traditional hierarchies between staff and students, as both groups find themselves learning and navigating this complex landscape together. In the age of AI, where academic integrity is increasingly under strain and uncertainty continues to grow, sustaining strong human relationships in the learning process is more important than ever.

Various topics are discussed under the heading of implementing research-education policies, including: *learner-centred leadership*, *motivating staff and students*, *developing communities of practice*, *models of change in higher education*, *the Change Academy approach*, and *applying a theory of change approach*. Although resource availability remains a key issue in promoting the research-education nexus, many challenges can be traced to departmental and institutional cultures and practices. This leads on to a discussion of managing the risks of engaging students in research and inquiry. Following two further mini-case studies, focused on the *process* of embedding the research-education nexus—one at the institutional level and the other at the course level—the chapter concludes with a discussion of the role of academic developers in implementing student research and inquiry.

The report concludes with a chapter outlining a set of broad, institution-wide recommendations that emphasise the value of a consolidated approach to strategy development, implementation, and review. Links to earlier places in the report where further details about strategies for mainstreaming student research and inquiry, as well as the principles underpinning them, are given. For ease of reading, the six key recommendations are reproduced below.

Key recommendations

The following six recommendations for embedding the research-education nexus across the institution through engaging students in research and inquiry apply potentially to many higher education institutions, including the University of Westminster. However, which ones are adopted, and the details of the initiatives, depend on the institution's nature and its stage in integrating the research-education nexus and engaging its students in research and inquiry. Many of the recommendations focus on initiating or continuing conversations about the research-education nexus, clarifying its meaning within disciplinary, institutional, and national contexts, and transforming the culture at both departmental and institutional levels.

1. Embrace an inclusive and context-sensitive definition of research and inquiry

Promote a broad understanding of research and inquiry that encompasses both the generation of new knowledge for societal benefit and the development of personal understanding through diverse forms of inquiry-based learning, which include disciplinary and interdisciplinary approaches, professional and work-based learning, community engagement, knowledge exchange, and learning and teaching.

2. Recognise, share, evaluate, and celebrate existing practices

Establish a clear baseline of current activities and experiences related to student and staff engagement in the research-education nexus. This can be achieved through initiatives such as practice-sharing forums ('swap shops'), curating and publishing online examples of innovative practice, evaluating the outcomes, and conducting research into the lived experiences of students and staff regarding research and inquiry.

3. Facilitate dialogue and action planning

Organise workshops, masterclasses, and other interactive events to clarify the meaning and scope of the research-education nexus. These sessions should showcase effective practices for engaging students in research and inquiry and support the development of context-

sensitive implementation plans. A wide range of stakeholders, including senior leadership, course leaders, academic and professional staff, academic developers, and students, should be involved in these conversations.

4. Embed student-staff partnerships within the research-education nexus

Foster meaningful student-staff partnerships by involving students in the co-design and implementation of research and inquiry initiatives and related policies. Initiatives should be underpinned by principles of equity, diversity, and inclusion, and supported through structured mentoring and supervision, celebration of student contributions, and student engagement in research dissemination. A priority should be developing a student-facing, web-based guide, co-created by students and staff, providing accessible support for undertaking various forms of research and inquiry.

5. Develop a systemic, strategic and inclusive approach to student engagement in research and inquiry

Design and implement a holistic, systemic approach that will motivate both staff and students. This will include a coherent range of curricular and co-curricular opportunities that enable students to progressively acquire research and inquiry skills and experiences throughout their academic journey, from first year to graduation. Such opportunities should be embedded across academic programmes, ensuring alignment with disciplinary and interdisciplinary approaches to knowledge creation and dissemination. Institutions should require that student engagement in research and inquiry is explicitly integrated into the validation and revalidation processes for all programmes. Appropriate rewards and recognition for engaging in research and inquiry are essential for both staff and students.

6. Establish institutional leadership for the research-education nexus

Create a dedicated unit or group within the university with responsibility for advancing the research-education nexus. Aligned with institutional strategies for both research and education, this unit or group should be adequately resourced and empowered to collaborate across academic departments and professional services, including learning support, IT, library services, quality assurance, employability, inclusion, community engagement, research, and knowledge exchange. The group should also partner with students and student representation bodies, such as the Students' Union. Its remit should include the development, coordination, and evaluation of initiatives aimed at transforming institutional and departmental cultures to embed student research and inquiry at all levels and to promote a systemic and strategic approach to embed the research-education nexus across the institution through both CUREs and UROPs. Organisationally, the unit should reflect and bridge the institution's research and education portfolios, ideally situated at their intersection. Some of the questions such a group might address include: What is the business case for the University's engagement in undergraduate research expansion? What are their potential markets? How can expanding undergraduate research help them be more successful?

I conclude this executive summary with a quote, which I often use to close my workshops, in memory of [Angela Brew](#) (1943-2025). She inspired many of the ideas discussed in this report.

“The notion of inclusive scholarly knowledge-building communities invites us to consider new ideas about who the scholars are in universities and how they might work in partnership.” (Brew, 2007, 4)

Glossary of terms

Community-engaged learning – An educational approach that integrates academic study with meaningful community engagement, where students collaborate with community partners on societal issues, sharing skills and knowledge to have a positive social impact as part of the curriculum to gain academic credit. In the United States, the terms *service-learning* and *community-based learning* are more commonly used. The National Co-ordinating Centre for Public Engagement (2025) notes that various alternative terms exist, including “*community-engaged learning, authentic learning and education for sustainable development*. Different terminology exists across different disciplines, including *work-based learning, live projects, citizen science, consultancy, co-production, and science communication*.”

Course-based undergraduate research experience (CUREs) – A scalable model where students conduct research in the context of a formal course, thus mainstreaming undergraduate research within the curriculum and making these opportunities available for all students. They may be contrasted with the Undergraduate Research Opportunity Programmes (UROPs), which are seen as an elite model for engaging students in undergraduate research (Malachowski et al., 2024). Both terms originated to describe practices in North America.

Inquiry-based learning (IBL) – This refers to educational approaches centred on self-directed inquiry or research. Through small- or large-scale investigations, students actively and creatively engage with the central questions and challenges of their discipline, supported by academic staff and learning development professionals. IBL encompasses a range of methods, including case studies, problem-based learning (PBL), fieldwork, and various experiential learning projects. A defining feature of IBL is the use of open-ended tasks that encourage exploration and allow for multiple interpretations or solutions. In this model, all teaching resources and activities are intentionally designed to support the inquiry process. Rooted in constructivist and socio-cultural learning theories, IBL is promoted as a pedagogical approach that fosters student engagement with the processes of knowledge creation and co-creation. It is widely recognised as an essential strategy for enhancing the connection between teaching and research in higher education (Levy, 2008). In this report, IBL is used as a generic term including *case-based learning, inquiry-guided learning, problem-based learning, project-based learning, research-based learning, and team-based learning*, as a pedagogy that “enables students to experience the processes of knowledge creation” (Spronken-Smith, 2008, 1).

Knowledge exchange – According to the Office for Students (2020), “Knowledge exchange is a process that brings together academic staff, users of research and wider groups and communities to exchange ideas, evidence and expertise. ... it includes a broad range of activities [such as]:

- partnerships between universities and major manufacturers
- industry-related curriculum development
- work placements for students
- graduate start-ups supported by incubator spaces at providers.”

Pedagogic research (PedR) – Refers to formal, systematic research into teaching and learning processes, often with the aim of contributing new, generalisable knowledge to the academic field of education or a specific discipline (Ashwin, 2020).

Research-education nexus – Often referred to as the research-teaching nexus (RTN) or teaching-research nexus (TRN). This report adopts an inclusive and context-sensitive definition—one that encompasses student engagement from induction to graduation, both individually and in groups, through curricular and co-curricular research and inquiry. The research-education nexus addresses a range of issues, including disciplinary and interdisciplinary approaches, professional and work-based learning, community engagement, knowledge exchange, and learning and teaching (adapted from Childs et al., 2010).

Research-based education – “Education in which structured opportunities are created for students to learn through research and active (i)nquiry at every level of the curriculum” (Fung, 2017, 1).

Research-led education – Students learn about current research in the subject or discipline (Healey, 2005a).

Research-oriented education – Students learn how knowledge is constructed in the subject or discipline through skills and methods courses (Healey, 2005a).

Research-tutored education – Students engage actively with current research in their field through discussion and analysis (Healey, 2005a).

Scholarship of teaching and learning (SoTL) – Involves three essential and integrated elements: “engagement with the scholarly contributions of others on teaching and learning; reflection on one’s own teaching practice and the learning of students within the context of a particular discipline; and communication and dissemination of aspects of practice and theoretical ideas about teaching and learning in general and teaching and learning within the discipline” (Martin et al., 1999, 327).

Student as producer – “Seeks to re-engineer the relationship between teaching and research to consolidate and restate the public values of academic life, emphasizing the role of students as collaborators with academics in the production and representation of knowledge and meaning” (Neary, 2014, 28).

Student as scholar – “Where scholar is broadly conceived as an attitude, an intellectual posture, and a frame of mind derived from the best traditions of an engaged liberal education. [This] requires a culture of inquiry-based learning infused throughout the entire liberal arts curricular and co-curricular experience that starts with the very first day of college and is reinforced in every classroom and program. ... progressing from an *instructional paradigm* that emphasizes telling students what they need to know, to a *learning paradigm* that emphasizes inquiry in shaping how students learn what they need to know within the traditional academic context, and culminating in a *discovery paradigm* that encourages students to seek and discover new knowledge, emphasizing inquiry with no boundaries” (Hodge, 2008, 2–3, emphasis added).

Students as partners (SaP) – “Collaborative working with students as partners is about building meaningful relationships that challenge traditional teacher-student dynamics and breaks down hierarchies to reposition students and staff as colleagues and peers to one another” (Healey, R. L., 2023, 6; see also Cook-Sather et al., 2014).

Students as change agents – Emphasises students’ role as active collaborators and co-creators, highlighting their potential to drive educational transformations, and empowers students to investigate issues they consider important, propose solutions, and implement meaningful change (Dunne & Zandstra, 2013).

Undergraduate research – “An investigation or creative inquiry that is mentored and done by undergraduates to make a scholarly or artistic contribution to knowledge” (Council on Undergraduate Research, 2021).

Undergraduate research opportunity programme (UROP) – UROPs originated in the United States, primarily focusing on STEM disciplines, but many schemes have expanded them to other disciplines. They offer an intensive undergraduate research experience, in which students engage in a multi-week, open-ended project beyond the classroom. Summer provides the ideal opportunity for this kind of immersive work. Research experiences can profoundly influence students’ knowledge, self-confidence, and preparation for careers or graduate studies, both within science and in other fields. A key element in defining undergraduate research experiences is the mentorship model, where novice researchers work closely under the guidance of experienced faculty or graduate students (Laursen et al., 2012). As a co-curricular activity, they are seen as an elite model for engaging students in undergraduate research.

Work-based learning (WBL) and work-integrated learning (WIL) – WBL and WIL are both educational approaches that integrate real-world work experiences with academic learning, but they differ in their focus and implementation. WBL emphasises authentic workplace experiences, while WIL focuses on purposefully integrating theory with practice within a curriculum (Atkinson, 2016). There are many types of WBL, including internships, placements, apprenticeships, and volunteering.

1. The University of Westminster context

The University of Westminster aspires to “become a leading institution in the understanding and modelling of the nexus of research and education in a modern university.” (University of Westminster, 2022a, 10)

1.1 The research-education nexus

The research-education nexus, often referred to as the research-teaching nexus (RTN) or teaching-research nexus (TRN), is a complex concept that requires unpacking, as the terminology used varies across countries, institutions, disciplines, and individuals. This can be confusing. Views on the benefits and drawbacks of integrating research and education vary between individual academics and policymakers, in part because they have diverse motivations and approaches and use the terms ‘research’, ‘education’, and ‘teaching’ in different ways. Given this complexity and confusion, it is not surprising that “while the teaching-research nexus may be thriving in the imagination of UK academics, in practice, it is fragile” (McKinley, 2021, 1038). Yet, as Barnett (2017) argues, **the issue of the relationship between teaching and research is vital as it raises “the profound and much wider matter as to what it is actually to be a university”** (p. vi). In co-sponsoring this report, the DVCs for Education, and Research and Knowledge Exchange at Westminster recognise the critical importance of stimulating conversations across the University about why and how the research-education nexus should help define the vision of the University.

This publication argues that **engaging students in research and inquiry is the most effective way to develop the nexus, and a strengthened research-education nexus leads to improved student understanding and learning outcomes.** There needs to be a conceptual shift from treating students as a passive audience for their lecturers’ research to engaging them as active participants and stakeholders in a research community where their research experience mirrors their lecturers. Here, I adopt **a broad perspective on the research-education nexus, which is context-dependent and encompasses students using research and inquiry to create new knowledge for society and to learn about existing knowledge that is new to them. Moreover, it is recognised that students may undertake research and inquiry through community-engaged learning (CEL), knowledge exchange (KE), and the scholarship of teaching and learning (SoTL), as well as through disciplinary and interdisciplinary investigations.** The report draws on the literature on the research-education nexus to provide practical guidance on various ways in which students may be engaged in research and inquiry. I explore the impact of both research on education and the effect of education on research.

The report should be of interest to higher education leaders, lecturers, academic developers, researchers, professional staff, and students in the UK and internationally, as well as within Westminster. It will form an essential resource for preparing a separate guide for students.

1.2 Westminster research-education nexus strategies

Outlining the context at the University of Westminster at the beginning of this report provides the rationale for the aim, focus, and frameworks that feature in the following chapter.

Westminster is a modern university with four campuses in London. It has 21,000 students from 169 nations. Courses are organised into three colleges: Design, Creative and Digital Industries, Liberal Arts and Sciences, and Westminster Business School. The focus is on practical, career-focused learning. The University's strategy – *Being Westminster 2022-2029* – focuses on actions that reflect the institution's three core principles of being **progressive, compassionate, and responsible** (University of Westminster, 2022b). These principles inform the institutional priorities of **wellbeing, inclusion, and sustainable development**. These principles and expectations are translated into a set of priorities for the education mission of the University, as detailed in the *Educational Strategy*:

We will offer **personalised and authentic education**, underpinned by an **inclusive curriculum**, to enable all our students, from all backgrounds, to engage in **transformative learning** and to succeed in their studies and professional lives (University of Westminster, 2023a, 6).

The University of Westminster is committed through *Being Westminster* that by 2029, **every student will have “the opportunity to experience and benefit from learning in a research and knowledge exchange environment”** (University of Westminster, 2022b, 5). This report aims to provide a scholarly guide to the research-education nexus that supports staff and students in achieving this goal.

The University's Research & Education Strategy is based on six principles:

- Westminster students are researchers
- Westminster research helps make our courses special
- Doctoral (PhD) researchers embody the interface of research and education
- We carry out research on education
- We provide education on research
- Research is for everyone.

Several educational endeavours follow (Table 1.1).

To oversee the strategic direction, priorities and initiatives associated with the research-education nexus at Westminster, the University has established a *Research and Education Steering Group* co-chaired by the DVC Education and the DVC Research and Knowledge Exchange. This report aims to contribute to the work of this Group.

Table 1.1 University of Westminster educational endeavours for the research-education nexus

-
- Become a leading institution in the understanding and modelling of the nexus of research and education in a modern university
 - Provide curricular and cocurricular opportunities for students to engage in research and knowledge exchange (KE)
 - Clarify and communicate to current and future students, as well as colleagues, the benefits of studying in a research and KE-rich environment
 - Incentivise colleagues to explore creative ways of using research and KE to support authentic and active learning and assessment
 - Embed research and KE in both new and revalidated courses to enrich authentic learning
 - Develop initiatives each year which work across our research, KE and education workstreams to promote student engagement with all aspects of research and KE, including enterprise and entrepreneurship
 - Support our students to test and validate ideas for businesses and social enterprises through the continued expansion of Westminster Enterprise Network (WeNetwork), in alignment with our employability strategy
-

Source: University of Westminster (2022b, 10)

1.3 Westminster research-education nexus practices

Westminster has a track record of developing innovative research-education initiatives.

These include [Broad Vision](#), an art/science research and learning programme that ran from 2010-2015; [Gene Editors of the Future](#), which has so far provided training in gene-editing for over 700 participants, including undergraduates, postgraduates, doctoral researchers, postdoctoral fellows, and technicians as a free extracurricular opportunity; and [Students as Researchers](#), a new programme that brings together students (undergraduate, master's and doctoral) to work on paid research projects and support them in enhancing their skills, networking, and employability. Two long-standing initiatives are the [Students as Co-creators](#) programme (Box 1.1) and the [Democratic Education Network](#) (Box 1.2). Vertically integrated projects are discussed in chapter 8, and the emphasis Westminster places on equity, diversity and inclusion is discussed in chapter 10.



Box 1.1 ‘Students as Co-creators’ provides opportunities and resources for students and staff to work together on research projects at the University of Westminster, UK

Research projects may be [disciplinary-based](#) or [pedagogic to enhance learning and teaching](#). Most projects are undertaken in teams of two to four students and at least one academic staff member. The Students as Co-Creators (SCC) team supports the teams and can provide up to £500 for project costs. Student partners are also awarded a £150 bursary. At the end of the project, all participants are invited to a celebration and showcase event to present their work and receive formal recognition for their participation. Students as co-creators may also undertake [curriculum design projects](#). Student participants have the opportunity to develop their independent research skills and put them into practice by actively working on novel research endeavours with staff members. Students and staff can build their professional relationships, acquire new knowledge, and generate research outputs by working together. It works within the [Student partnership framework](#) and the [Co-creator principles](#). In 2023-24, the SCC team facilitated 41 projects with 208 students and 76 staff partners.

Source: [Students as co-creators](#); Araneta et al. (2022);

<https://blog.westminster.ac.uk/studentpartnership/>

Box 1.2 Students lead, manage and deliver collaborative local and global projects as part of a Democratic Education Network (DEN) at the University of Westminster, UK

DEN is a platform that promotes collaboration between students and faculty members by providing links to various ethnic communities in London and universities worldwide. It aims to build on the diversity of the University’s students to further encourage democratic engagement through a collective approach to their education, helping students recognise and communicate their achievements through collaborative working.

DEN’s projects include an online magazine, an annual book, an international student conference, a YouTube channel, and international field trips. Currently, it runs 30 projects in 10 countries. Recently, it introduced two modules available to students at the School of Social Sciences and the College of Liberal Arts and Social Sciences.

DEN began with minimal funding as an international community project led by Dr Farhang Morady, which engaged students in politics and international relations. In 2016, the Quintin Hogg Trust provided substantial funds for DEN to manage a growing number of projects. In 2019, DEN was a runner-up for the Students’ Experience Award at the prestigious [Guardian University Awards](#). DEN is supported by The Centre for Education and Teaching Innovation (CETI) and Equality, Diversity, and Inclusion.

Source: <https://blog.westminster.ac.uk/den/>

Many Westminster students are involved in [work-based learning and knowledge exchange projects](#) that may involve them in applied research and inquiry. The University also has a [Public and Community Engagement Strategy](#) that commits it to sharing research, knowledge, and facilities for the mutual benefit of all. This can involve students and professionally and academically employed staff working in partnership with communities and co-producing new knowledge (Pitchford et al., 2021). Boxes 1.3 to 1.6 give a few examples.

Box 1.3 UN's International Organization for Migration and University of Westminster internship partnership

The University of Westminster has a long-standing partnership with the United Nations' International Organization for Migration (IOM), one of the fastest-growing United Nations agencies that responds to multiple challenging displacement crises worldwide. The partnership, established in 2022, provides exclusive long-term internship opportunities for Westminster students at IOM offices worldwide.

The internships run for six to nine months and are fully funded by the University, the Quintin Hogg Trust and donors, such as the Westminster alumnus Ken Subraj. The internships are open to undergraduate and postgraduate students from across the University, providing them with exposure to global policy-making platforms and an excellent start to their career journeys. The interns gain invaluable professional experience and skills, as well as the opportunity to live and work in a diverse and multicultural environment. Some interns progress into full-time employment opportunities at IOM after completing their internships, demonstrating the impact and quality of the programme.

Source: <https://www.westminster.ac.uk/business-services/research-and-innovation/clients-and-case-studies/uns-international-organization-for-migration-and-university-of-westminster-internship-partnership>

Box 1.4 Students and staff at the University of Westminster team up with employers to address the climate crisis

Carbon Impact Project inspires students to help seven organisations – including charities, an architectural design consultancy and a global law firm – reduce their carbon footprint. In October 2021, as part of an innovative sustainability project, the University of Westminster's Careers and Employability Team joined forces with the Sustainability Team to plan and run a pilot Carbon Impact training programme in collaboration with [Speak Carbon](#). The initiative, delivered between January and March 2022, saw students engage directly with employers to develop business-focused solutions to real-life sustainability challenges. It was one of just three initiatives shortlisted by the Association of Graduate Careers Advisory Services (AGCAS) for the 2023 [Sustainability Impact Award](#).

Source: <https://www.westminster.ac.uk/business-services/research-and-innovation/clients-and-case-studies/students-and-staff-team-up-with-employers-to-address-the-climate-crisis>

Box 1.5 Hackathon – Humanities students put their ideas to the test to shape the future at the University of Westminster, UK

Student teams of four took on workplace challenges set by six different employers, including charities and corporations, at Westminster Enterprise Network's annual Humanities Hackathon. How can the BBC best hear from and represent a range of views, on anything from the Downing Street party scandal to the cost of living, in a singular piece of video content? How can Mind appear more relevant to younger people and people from racialised communities? How can Rare Disease UK raise awareness of rare diseases? These were some of the questions posed to English, French, History, Languages, and Linguistics students in April 2022 at Shaping the Future – the annual Humanities Hackathon – by an impressive lineup of employers, including Meta, Channel 4, BBC News, Mind, Brand Advance, and WaterAid.

The event was organised by the University of Westminster's Westminster Enterprise Network – [WeNetwork](#) – which brings together colleagues, students, graduates, businesses, employers and external partners to share their experience and expertise for mutual benefit. Student teams had to compile a three-minute elevator pitch, presenting their ideas and solutions to the employers, who chose one group each to advance to the final. The finalists then had the opportunity to pitch their ideas to over 100 'live' audience members at the University's Regent Street Cinema. Assessment was based on their ability to identify problems during the discovery phase of the discussion.

Ideas from the finalists were submitted as presentations or mind maps, and the WaterAid team declared the winner. Designing a music festival campaign to drive awareness and action on water and climate issues in the lead up to COP27, students' innovative ideas included an interactive app and exhibitions in toilet queuing and cubicle areas to educate festival attendees about WaterAid's focus, namely water, sanitation and hygiene.

Source: <https://www.westminster.ac.uk/business-services/research-and-innovation/clients-and-case-studies/hackathon-humanities-students-put-their-ideas-to-the-test-to-shape-the-future>

Box 1.6 Westminster's Centre for Social Justice Research launch work-based learning projects

The University's Centre for Social Justice Research (CSJR) will move forward with a series of work-based learning projects in collaboration with leading social justice organisations, following funding from the Quintin Hogg Trust in January 2025. Established in 2023, the CSJR aims to understand contemporary social inequalities and challenge the power relations and institutions that sustain them to bring about meaningful social change. As part of this mission, colleagues within the CSJR have developed a series of collaborations with leading social justice organisations to provide opportunities for undergraduate and postgraduate students seeking employability experience working in the social justice and civil society sector.

This semester, over 30 students from across the [School of Social Sciences](#) will have the opportunity to develop research and employability skills as part of the CSJR projects, which will lead to opportunities for paid internships with the organisations over the summer. In addition to providing students with opportunities to develop transferable employability skills, the projects offer opportunities for collaborative research and knowledge exchange among students, academics, and partners.

Source: <https://www.westminster.ac.uk/news/westminsters-centre-for-social-justice-research-launch-work-based-learning-projects>

Summary

- **Strategic integration of research and education:** The University of Westminster aims to become a leader in modelling the research-education nexus, engaging students actively in research through curricular and co-curricular activities, and fostering a culture where research enriches learning and vice versa.
- **Institutional framework and vision:** Guided by the *Being Westminster 2022–2029* strategy, the University embeds research and knowledge exchange in its teaching, promoting inclusive, authentic education aligned with principles of progressiveness, compassion, and responsibility.
- **Innovative practices and initiatives:** Westminster implements a variety of pioneering programmes—like Students as Co-creators, Democratic Education Network, and Students as Researchers—to support student engagement in research, skill development, and employability, underpinned by dedicated institutional support and governance.

Providing the context of the University of Westminster at the beginning of this report establishes the rationale for the aim, focus, and frameworks presented in the next chapter.

2. Aim, focus, and frameworks

All higher education institutions and all degree programs should educate all students to understand how knowledge is constructed through research and to understand the research process. Knowledge should be presented as tentative, uncertain and of utter fascination.” (Jenkins, 2001, 19)

2.1 Aim and focus

This report seeks to provide a review and guidance on the research-education nexus. Its purpose is to inspire academic and professional staff at higher education institutions worldwide, including the University of Westminster, to both celebrate their current practices and critically explore new ways to innovate within their disciplinary and institutional contexts, thereby engaging their students further in research and inquiry.

My argument, as expressed in the quote that began this chapter, is that **all undergraduate students should have the opportunity to learn through and about research and inquiry** (Healey & Jenkins, 2009). This may be achieved by learning to become informed (‘learning about research’), to prepare (‘learning for research’), and to explore (‘learning through research’) (Trempp & Hildbrand (2022, 95).

The research-education nexus is nuanced and context-dependent. There is no single definition. Institutions and individuals should select a definition that is fit for purpose in a particular learning culture and research context, considering the implications for students, disciplines, fields, communities, and the institution. In their student engagement literature review, Trowler and Trowler (2010, 6) noted, "Contextual differences mean that what works in one place may not work, and may even be counter-productive, in another”.

This report primarily focuses on undergraduates as researchers, as it is at this level that the most significant challenges arise in designing opportunities to engage them in research and inquiry. PhD and MPhil students, by definition, undertake research. They may play a key role in mentoring undergraduate researchers and acting as teaching assistants. Some consideration is also given to engaging taught Master's students in research and inquiry.

Until recently, the [Council on Undergraduate Research](#), based in the United States, defined undergraduate research as: “**An inquiry or investigation conducted by an undergraduate student that makes an original intellectual or creative contribution to the discipline.**” Reflecting the broadened scope for undergraduate research, scholarship, and creative inquiry, as well as attention to equity, diversity, and inclusion, they redefined it as “**a mentored investigation or creative inquiry conducted by undergraduates that seeks to make a scholarly or artistic contribution to knowledge**” (Council on Undergraduate Research, 2021). However, no one definition of undergraduate research suffices, given the variation in the **dimensions of undergraduate research** (Table 2.1). Some, for example, emphasise student-led characterisations, some faculty-led definitions, some processes, and some outcomes. Perhaps the most significant difference lies between those integrated into the curriculum for credit and co-curricular opportunities that are additional experiences, often funded by grants or fellowships during the summer or other interterm hiatuses from formal instruction, as they provide different opportunities for different students.

Table 2.1 Ten dimensions for framing the context of undergraduate research

Student, process-centred	↔	Focus	↔	Outcome, product-centred
Student-initiated/voluntary	↔	Motivation	↔	Staff-initiated/mandatory
All students	↔	Inclusivity	↔	Selective
Curriculum-based	↔	Setting	↔	Co-curricular fellowships
Team or group	↔	Collaboration	↔	Individual
New knowledge	↔	Originality	↔	Original to the student
Multi-or interdisciplinary	↔	Content	↔	Discipline-based
Professional audience	↔	Audience	↔	Campus/community audience
Partnership	↔	Staff-student relationship	↔	Supervision
Unpaid	↔	Compensation	↔	Paid

Source: Walkington (2016a, 4); adapted from Beckman & Hensel (2009, 40); and Healey & Jenkins (2009, 69)

Undergraduate research programmes may be mapped by how much they reflect these different continua. There are many similarities between undergraduate research and inquiry-based learning, particularly the more open-ended versions of inquiry (Healey & Jenkins, 2009; Spronken-Smith, 2010). Levy and Petrulis (2012) importantly point out that undergraduates may learn about *existing* knowledge through undertaking inquiry as well as creating *new* knowledge. A range of ways research may influence teaching is included in Table 2.2.

Table 2.2 Ways research may influence teaching

1. Bringing data and findings from staff research into the curriculum
2. Developing students' appreciation of research in the discipline
3. Developing students' research skills (explicitly, in addition to other disciplinary and generic skills)
4. Using assignments that involve elements of research processes (e.g. literature reviews, bidding for grants, drafting bids or project outlines, analysing existing project data, presenting at a 'conference')
5. Using teaching and learning processes that simulate research processes (e.g. project-based modules, dissertation modules, problem-based learning)
6. Giving students the opportunity to work on research projects alongside staff (e.g. as a research assistant)
7. Giving students first-hand experience of commercial consultancy (e.g. as an 'intern', as work-based learning, as a consultant assistant or as a supervised consultant)

Source: Healey (2005a, 187)

Zimbardi and Myatt (2014) identify four **models of curricular-based undergraduate research** (Table 2.3).

Table 2.3 Characteristics of curricular-based undergraduate research models

Model	Brief description
Apprenticeship	Students work under the direct supervision of an academic staff member, in an area related to the academic's current research or expertise.
Industry project	Students focus on a complex problem they are likely to encounter in their profession.
Inquiry project	Students undertake the entire research process with a focus on learning disciplinary content and processes of knowledge production.
Methods course	Students engage in truncated versions of the research process, with a focus on a broad range of methodological processes commonly used in the discipline.
Mixed model	Combines features of two of the above models.

Source: Zimbardi & Myatt (2014, 239)

This report adopts an inclusive and context-sensitive definition of the research-education nexus—one that encompasses student engagement from induction to graduation, individually and in groups, through curricular and co-curricular research and inquiry. It addresses a range of issues, including disciplinary and interdisciplinary approaches, professional and work-based learning, community engagement, knowledge exchange, and learning and teaching (adapted from Childs et al., 2010). As Colbeck (1998, 660–661) found in the US: “The broader the university definition of what counts as research, the more faculty are able to integrate research and classroom-oriented teaching”.

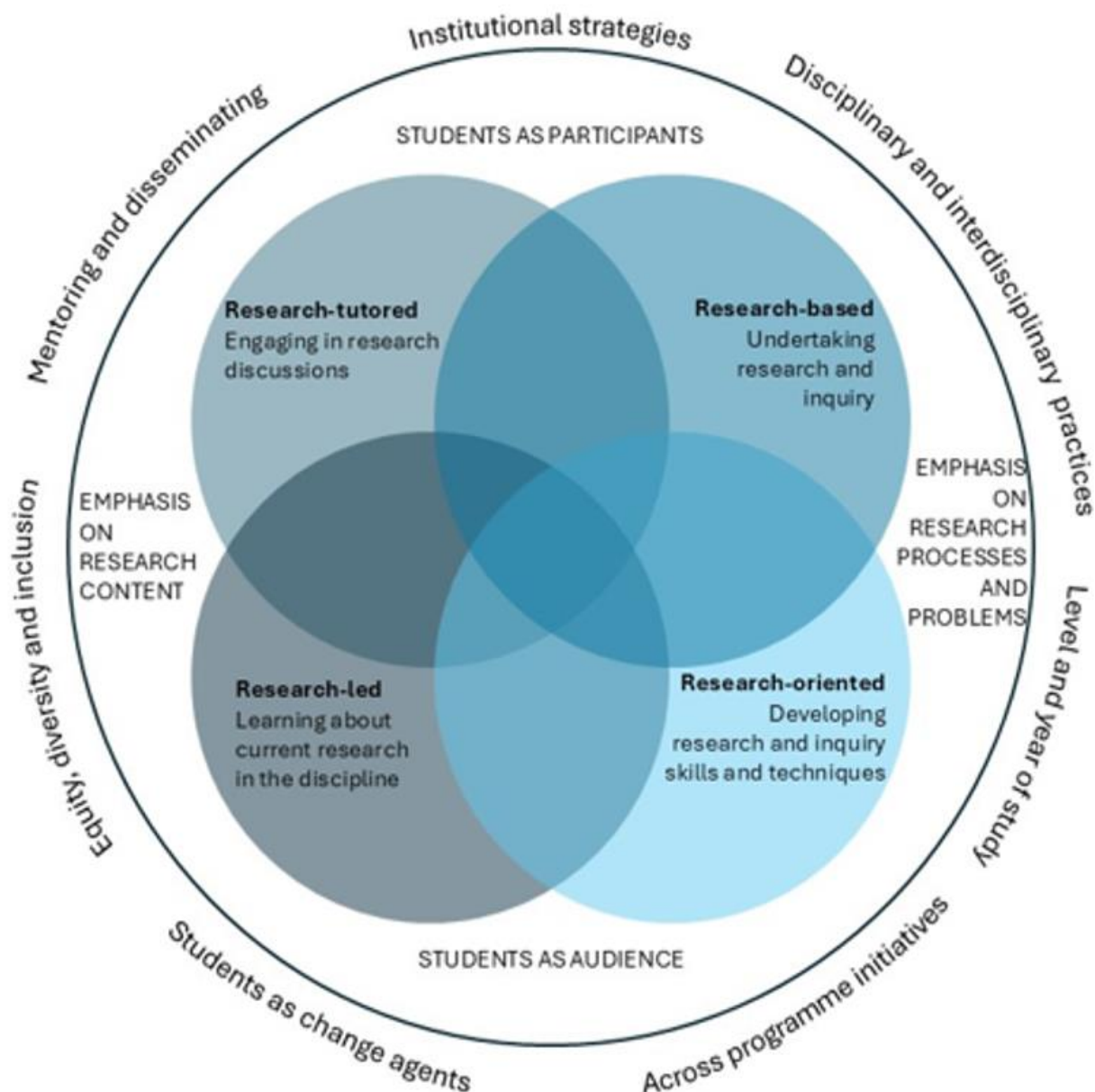
In *Scholarship reconsidered*, Boyer (1990) challenged US higher education to “break away out of the tired old teaching versus research debate” (p. xii). He argued that research and scholarship can take the forms of discovery, integration, application, and teaching, and these should also apply to the efforts of undergraduates.

2.2 A framework for the research-education nexus

Building on the work of Griffiths (2004), Healey and Jenkins (Healey, 2005a; Healey & Jenkins, 2009) identify **four overlapping ways of engaging undergraduates with research and inquiry** (Figure 2.1):

- Learning about current research in the discipline (Research-led)
- Developing research skills and techniques (Research-oriented)
- Undertaking research and inquiry (Research-based)
- Engaging in research discussions (Research-tutored)

Figure 2.1 Engaging students in research and inquiry

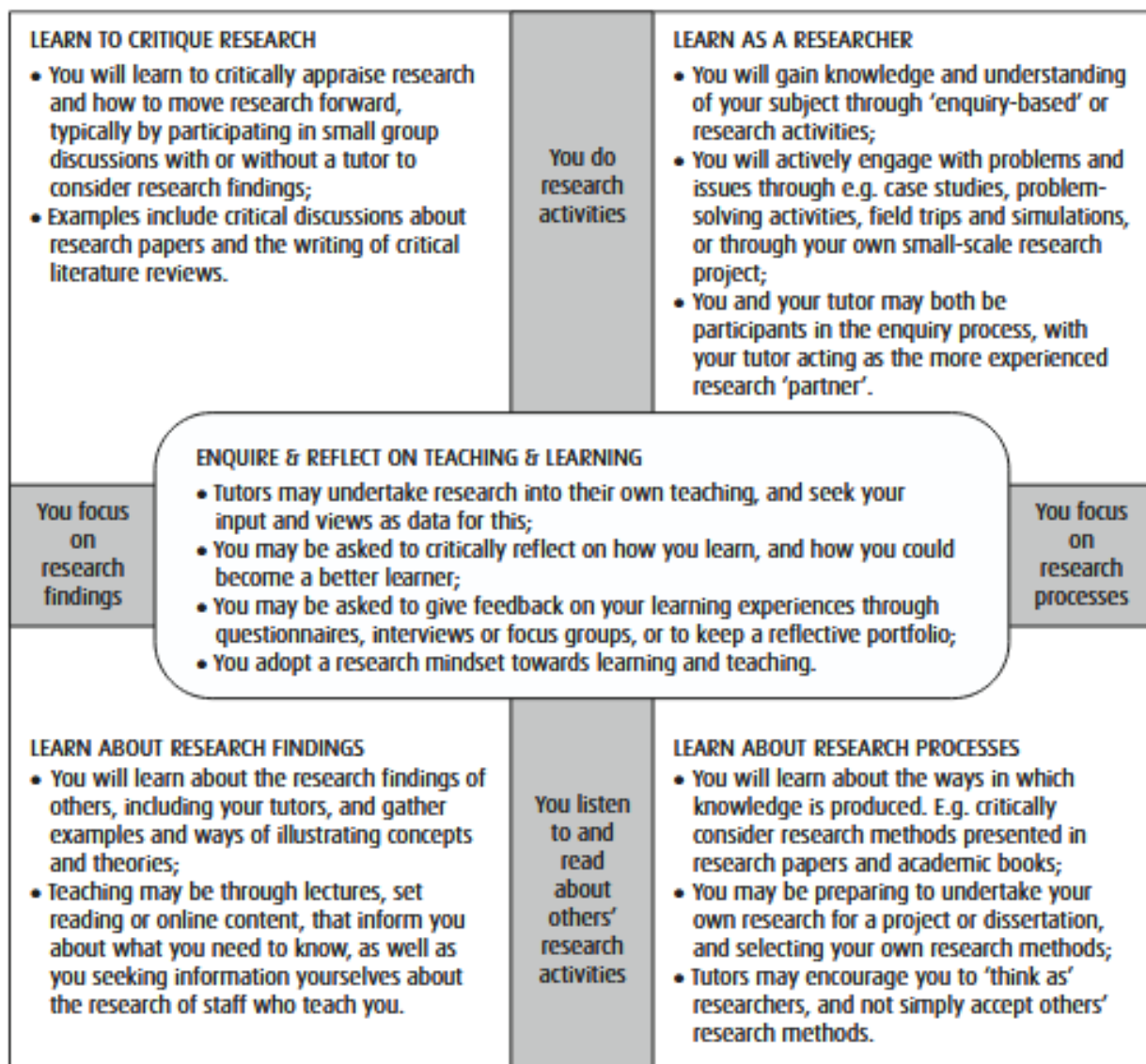


Source: Adapted from Healey (2005, 7) and Healey & Jenkins (2009, 70)

This is the most frequently cited model in the literature (Elken & Wollscheid, 2016). The diagram has two axes. The first axis classifies how students may be engaged in research and inquiry according to the extent to which students are treated primarily as the audience or as

participants. The second axis classifies the approach as emphasising research content, or processes and problems. All four ways of engaging students with research and inquiry are valuable, and each element should be included in a well-rounded curriculum. However, too much higher education tends to focus teaching and learning on the bottom half of the model, despite considerable evidence of the benefits students gain from spending more time on activities towards the top half (see chapter 3). Each of the four ways of integrating research and inquiry into student learning is illustrated with an example below. A variation on the model has been developed by Edwards and McLinden (2017) (Figure 2.2).

Figure 2.2 Approaches to research-informed learning described from a student perspective



Source: Edwards & McLinden (2017, 20) adapted from McLinden et al. (2015, 27)

Research-led: Learning about current research in the discipline

Students can engage with current research in the discipline in various ways, including lectures, academic staff-led seminars, laboratories, and coursework. A more active approach to learning about current research is illustrated in Box 2.1.

Box 2.1 Popularising science research to undergraduates at McGill, Canada

The Science Faculty at McGill has introduced a '**Soup and Science series**' at the start of each fall and winter term. Each day, 4-6 professors from different disciplines talk about their research, one after the other, for no more than 3 minutes. Then, students and professors have lunch together, providing opportunities for them to chat and learn more. The 3-minute maximum means the professors focus on just the most interesting part, without too many details, and the format encourages students to chat with professors to find out more. This has many benefits: professors are demystified and humanised, students discover new fields in various departments, students gain a better understanding of what research entails, and students realise they can be part of this process. An added advantage is that professors may find colleagues in other departments working on related topics.

Sources: Correspondence with Victor Chisholm; Bachelder (2015)

Research-oriented: Developing research skills and techniques

Assisting undergraduates in developing research skills and techniques is a key aspect of the intellectual journey of students as they mature into researchers. It is rather worrying, though, that in one study, only between a quarter and a third of final-year students at both research-intensive and less research-intensive institutions report that they feel they had developed these skills despite most of them having undertaken compulsory courses in research techniques (Turner et al., 2008). Course lectures, practical and laboratory classes, and coursework are standard modes of teaching research skills and techniques. The following example illustrates an innovative approach to integrating inquiry-based learning skills into a sustainability project (Box 2.2). Another example is the first-year practical course in geography at Coventry University, which was changed from weekly practicals, focusing on teaching techniques and skills, to four- or five-week group projects. In this learning-by-doing model, students learnt techniques and skills (Healey, 1992).

Box 2.2 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 are embedded in a module on sustainability**. The module is delivered from weeks 1 to 12 of the first semester 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 students are prepared for their inquiry-based project through various learning 'how-to-learn' activities in the preceding weeks. The best proposal from each tutor group advances to the Green Dragons' Den for consideration by an expert panel comprising the University Vice-Chancellor, the Director of the Institute for Sustainability, and a local business manager. Half of the module marks are allocated for creating an individual e-portfolio, which is built up throughout the module, requiring students to reflect on sustainability issues and the position and actions they might take to improve their own sustainability, both environmentally and as learners.

Source: Healey & Jenkins (2025, 45)

Research-based: Undertaking research and inquiry

Research-based learning may be contrasted with traditional teaching methods (Table 2.4). A shift to pedagogies that emphasise students undertaking research and inquiry has implications for designing campus-based learning spaces (Healey, 2022). The course on comparative education policy at Harvard has led to the publication of a book each year, in which graduate students present their research solutions to educational challenges worldwide (Reimers, 2025). Most research and inquiry projects students undertake last only the length of their course. In the History of Science course at UCL, students inherit the work of the previous cohort until publishable work is produced (Box 2.3).

Table 2.4 Characteristics of inquiry-based classroom versus traditional classroom

	Traditional classroom	Inquiry based classroom
Characteristics	• Teacher centered • Passive learner • Emphasis on right answers • Rhetoric of conclusions • Lots of memorization • Students are empty vessels that need to be filled • Students work as individuals	• Student centered • Active learner • Alternative hypotheses are elicited • Conceptual and process oriented • Student has prior experiences that can be built upon • Group work/peer teaching are the norm
Implications for teaching and learning	• Curriculum begins with the parts of the whole. Emphasizes basic skills. • Strict adherence to a fixed curriculum is highly valued. • Materials are primarily textbooks and workbooks. • Learning is based on repetition. • Teachers disseminate information to students; students are recipients of knowledge. • Teacher's role is directive, rooted in authority. • Assessment is through testing, correct answers. • Knowledge is seen as inert. • Students work primarily alone.	• Curriculum emphasizes big concepts, beginning with the whole and expanding to include the parts. • Pursuit of student questions and interests is valued. • Materials include primary sources of material and manipulative materials. • Learning is interactive, building on what the student already knows. • Teachers have a dialogue with students, helping students construct their own knowledge. • Teacher's role is interactive, rooted in negotiation. • Assessment includes student works, observations, and points of view, as well as tests. Process is as important as product. • Knowledge is seen as dynamic, ever changing with our experiences. • Students work primarily in groups.

Source: Elken & Wollscheid (2016, 29) citing Cheesman (2015, 51, 54)

Box 2.3 Undergraduates build on the research of previous students at University College London, UK

Students in a course on the History of Science at UCL are involved in a project to integrate teaching and research at the undergraduate level. The chief innovation is the **mechanism of inheritance**: each year, students receive a body of work produced by the previous group of students and make improvements and additions; this process can be repeated until publishable materials are produced. This is part of a system of learning that enables students to function as a real and evolving community of researchers. First developed in a final third-year course, the course was opened to second years, to enable interested students “to continue their work as part of their dissertation, and to strengthen the diachronic community by having the previous year’s students present when the next cohort take the course” (Chang 2007, 21).

Sources: Chang (2005, 2007)

Research-tutored: Engaging in research discussions

Engaging in discussion is a key way to develop understanding. Traditionally, this occurs through staff-led academic tutorials and seminars in higher education. Students may also contribute to wider research community discourses (Box 2.4).

Box 2.4 Involving first-year English students in the international research community at the University of Gloucestershire, UK

At the University of Gloucestershire, Arran Stibbe invites **students to assume the identity of a researcher from the outset of their time at the university**. In the EZ102 Language & Ecology module, the students can share their insights with the wider research community. The research community, in turn, has something to gain from student contributions because students can critically analyse aspects of their language and culture that others have yet to examine. The students are encouraged to participate in the international research community by working with the Language & Ecology Research Forum, the leading international forum for research in ecolinguistics. The Forum links together a network of scholars, has an online journal, a range of resources and a dedicated section for the EZ102 module. The approach works best when students become critically aware of texts they are familiar with, rather than struggling to understand new genres.

Sources: Arran Stibbe; <https://www.ecoling.net/>

The four ways of engaging students in research and inquiry are not mutually exclusive. For example, undertaking research and inquiry, as well as engaging in research discussions, are effective ways to learn about current research in the discipline and develop research and inquiry skills and techniques. It has been suggested that the model can be viewed as a progression from a degree course, from the bottom left to the top right. In contrast, I argue that students should gain experience in each circle each year, though the balance may change. In the outer circle of Figure 2.1 are four levels at which the research-education nexus plays out: institutional, disciplinary and interdisciplinary, level and year, and across the programme. I examine each of these in a separate chapter later in the report. An example of how different ways of engaging students with research and inquiry are implemented across one programme, English at De Montfort University, is shown in Box 2.5.

Other complementary frameworks for the research-teaching nexus have been proposed by Brew (2003; 2006; 2013).

2.3 Frameworks for other pedagogies that overlap with the research-education nexus

Engaging students as researchers and producers of knowledge overlaps with many other pedagogies in HE, including **students as partners** (Benenson & Johnson, 2024; Haripottawekul & Wang, 2025; Healey et al., 2014a; Healey, M. & Healey, R. L., 2024a); **employability, enterprise, and entrepreneurship** (Gunn, 2010; Naicker & Singh, 2022; Pittaway, 2009; QAA, 2018); **service and community-engaged learning** (Lancaster et al., 2011; Mason O'Connor et al., 2011; NCCPE, 2025; Pawson et al., 2022; Reynolds et al., 2010); and **knowledge exchange** (Cotton et al., 2024; SQW, 2023); all of which may involve students engaging in research and inquiry. However, these pedagogies are broader than this. Here, my focus is just on initiatives within these pedagogies that involve students in research and inquiry. Separate frameworks have been developed for these pedagogies.

Students as partners

Student engagement in research and inquiry is part of the broader topic of students as partners, and much can be learnt from the literature on students as partners regarding how best to engage students, particularly the values underpinning partnership (Marquis, 2017). The most cited framework on this topic was published by the HE Academy in the UK, drawing on the work of Healey et al. (2014a) (Figure 2.3). The bottom half of the framework identifies students as partners in research and inquiry into subject-based research, and pedagogic research and the scholarship of teaching and learning (SoTL). Around the outer circle are nine partnership values (Table 2.6). It is crucial that students involved in research and inquiry partnerships with staff and other students have explicit discussions about these values (e.g., Archer-Kuhn & MacKinnon, 2020). The relative importance of each may vary in different contexts, and additional values may be more suitable in specific partnerships.

Marie (2018, 30) argues that research-based education and student-staff partnerships “can work together to strengthen each other.” An example of students' engagement in SoTL projects is the Students as Associates for Learning and Teaching at the University of Sheffield, who undertook pedagogic projects relevant to their Faculty (Box 2.5).

Table 2.5 The integration of different ways of engaging students in research and inquiry in the BA English programme at De Montfort University, UK

→ Indicates an activity that progresses from the previous year (sequential coherence), for both topic and research-informed approach

Year 1	Year 2	Year 3
Shakespeare is taught on a compulsory introductory course in four strands, including 'adaptation' (a key area of research at DMU). Adaptation is taught by academic staff and PhD students working in the field, using key publications of the school, including two international journals edited by members of staff. (RL, RO) Students are introduced to a range of approaches to Shakespeare's plays, looking at Shakespeare through dramatists' adaptations and taught by published scholars in both Shakespeare and adaptation. (RL) Students start with a structured staff led project, then progress to a more independent, student led project. Year 1 scaffolding takes the form of staff setting the research questions, and providing online resources.	→ Students can elect to take a 30-credit option in Rewriting Film and Literature which continues from the first year and draws on the module leader's specialist interest in Victorian adaptations. The module leader's book on adaptations of <i>Wuthering Heights</i> is a key text. (RL) The range of texts widens and students are encouraged to challenge the views of their tutors and others. (RT) The tasks become more independently designed; students work in groups to reflect on different approaches to a text and its adaptation. (RL/RO/RB) → Students find their own articles to answer a staff set research question.	→ Students can further their interest in adaptation by taking a 15-credit module in Radical Contemporary Adaptations and/or Studies in Literature and Film, utilising the Centre for Adaptations' most recent research outputs. (RL) → In the final essays on the adaptations modules and in the undergraduate dissertation students set their own research questions and choose appropriate texts for study. This is a deliberately planned 3-year programme for developing independent research skills. (RB) The work involves the interrogation of different methodologies and the practical application of these. Students may opt to write screenplays with their own critical reflections on these. (RO/RB) Students present their work at a 'Dissertation Conference' and take turns leading discussions in the 3rd year Adaptation module. They are able to both teach and learn from their peers, developing skills in presenting and responding to research. (SoTL)

Source: Edwards & McLinden (2017, 14), based on a contribution by Deborah Cartmell

Table 2.6 Partnership values

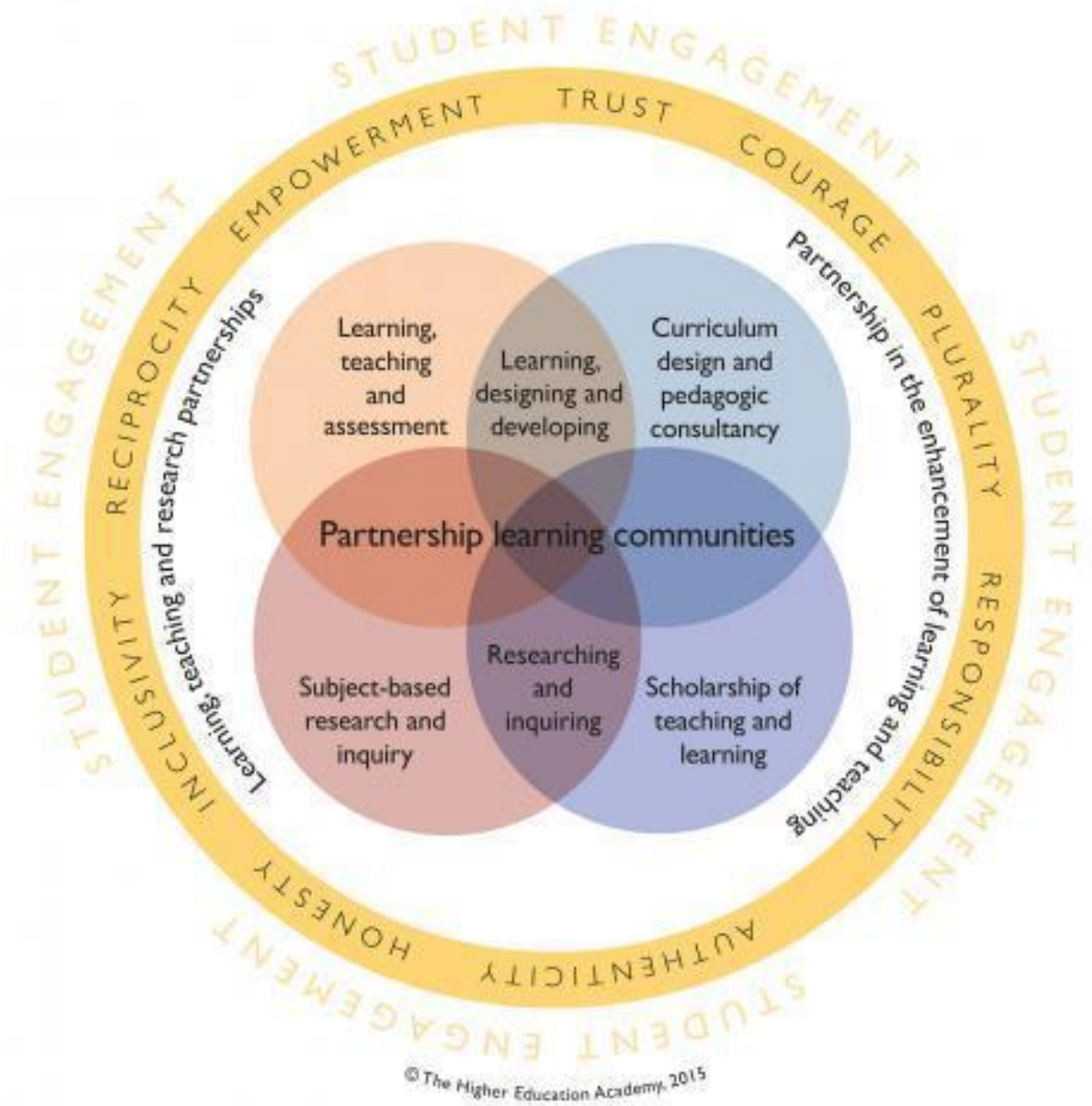
Authenticity: the rationale for all parties to invest in partnership is meaningful and credible.	Honesty: all parties are honest about what they can contribute to partnership and about where the boundaries of partnership lie.	Inclusivity: there is equality of opportunity and any barriers (structural or cultural) that prevent engagement are challenged.
Reciprocity: all parties have an interest in, and stand to benefit from, working and/or learning in partnership.	Empowerment: power is distributed appropriately and ways of working and learning promote healthy power dynamics.	Trust: all parties take time to get to know one-another and can be confident they will be treated with respect and fairness.
Courage: all parties are encouraged to critique and challenge practices, structures and approaches that undermine partnership, and are enabled to take risks to develop new ways of working and learning.	Plurality: all parties recognise and value the unique talents, perspectives and experiences that individuals contribute to partnership.	Responsibility: all parties share collective responsibility for the aims of the partnership, and individual responsibility for the contribution they make.

Source: Higher Education Academy (2015)

Box 2.5 Students act as Associates for Learning and Teaching (SALT) at the University of Sheffield, UK

The SALT scheme ran from 2011-2018. Each year, around 50 students were employed as part of the scheme. **SALTs worked in partnership with staff on projects aimed at developing and improving students' learning and teaching experiences.** SALTs worked on projects relevant to their Faculty or the Institution in a flexible way that can fit around their timetable. Each SALT team is given a project brief. They then work together, in partnership with staff, to shape and deliver their project. Each team had a Lead SALT, whose role was to oversee the team's progress throughout the year. The students were paid for 50 hours of work during the academic year, an average of 2-3 hours a week during term time. SALTs were different to Academic Reps and Union Councillors. SALTs were not expected to represent students nor sit on committees. Some carried out research or consultation with students as part of their projects.

Figure 2.3 Students as partners in learning and teaching in higher education - An overview model



Source: Higher Education Academy (2015) based on Healey et al. (2014a, 25)

Employability, enterprise and entrepreneurship

There is a growing interest in the benefits of engaging in research and inquiry for employability, enterprise and entrepreneurship, as indicated in the two frameworks in Table 2.7 and Figure 2.4. The first suggests that enhancing research-teaching linkages may improve the development of employability attributes, while the second presents a **work-integrated learning and research (WIL-R) framework**. The latter is novel in that it links undergraduate research and work-integrated learning programs.

In the UK in 2022-23, 2.2% of students who progressed to higher education or training participated in an apprenticeship at level 4 or higher. These students spend 80% of their time training in the workplace. Engaging these students in research and inquiry needs to be integrated with the job they are doing.

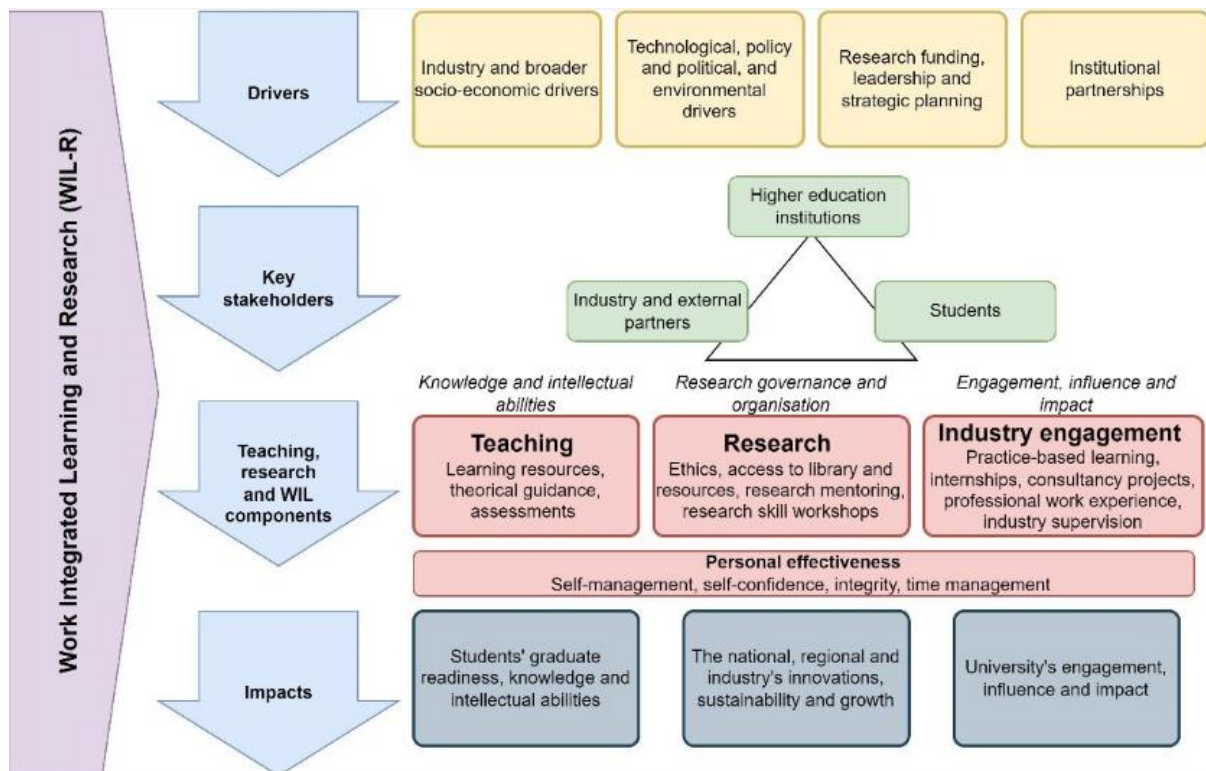
Three examples of linking research and inquiry with employability, enterprise and entrepreneurship follow. At Sheffield Hallam University, all final-year students in the Department of Finance, Accounting and Business Systems undertake a consultancy project (Box 2.6); while East Coast College, Great Yarmouth, UK, has a *Scholarship Intern Programme* in which students are paid to work on staff research projects (Lea et al., 2020). At Georgia State University, inquiry-based learning (IBL) was used to develop science students understanding of invention, innovation, and commercialisation processes (Pittaway, 2009). Fung (2017, 84-100) provides a useful discussion of the connection between workplace learning and research-based education.

Table 2.7 Enhancing research-teaching linkages as a way to improve the development of employability attributes

Meaningful links through course design?		
In common to the discipline:	Complementary to employability and work-related learning	Employability standalone: career skills
How do students learn how to: • do the subject? • understand the subject? • interact in the classroom as appropriate to the subject?	How do students learn how to: • adapt what they learn in the classroom to situations outside of the academy? • be and act in different places such as an institutional or corporate environment? • present themselves professionally?	How do students learn how to: • do CVs? • find out about jobs? • write job applications? • reflect on aligning strengths with careers? • present themselves professionally?
← Enhancing research-teaching linkages →		

Source: Gunn (2010, 5)

Figure 2.4 Work-integrated learning-research (WIL-R) framework



Source: Permani et al. (2025, 5)

Service and community-engaged learning

The National Co-ordinating Centre for Public Engagement (NCCPE) (2025) says the engaged university has four aspects (Figure 2.5):

- Public engagement with research
- Engaged teaching
- Knowledge exchange and sharing
- Social and civic responsibility

Box 2.6 Final-year students undertake consultancy projects for businesses at Sheffield Hallam University, UK

All 300 final-year students in the Department of Finance, Accounting and Business Systems undertake a 20-credit consultancy project. Students complete real-world consultancy interventions for organisations in small teams over a semester. This process culminates with a group submission also presented to clients and guests. Additionally, students compile their reflections on the development of their learning and employability skills. A series of lectures and personal academic supervisors support them.

Consultancy projects are primarily sourced by the cross-university Venture Matrix team. However, students may also source their own projects from previous work placements and personal networks. Academic colleagues are also encouraged to source opportunities. Where possible, students select their team members, their academic supervisors and the project they will undertake. These arrangements were made in the previous semester. Around 50 projects are completed for organisations of all sizes and across many sectors each year. Notable inclusions are The Post Office, Charles Stanley Wealth Managers, Enterprise Rent-A-Car, Santander, Yorkshire Bank, The Salvation Army, Mayflower Engineering, G3 Re-Marketing, Ribble Packaging, DB Schenker and The Association of Corporate Treasurers.

The consultancy project is assessed based on a 30% group report, a 30% group presentation to the client, and a 40% individual reflection on their learning as a result of participating in the consultancy intervention. Student achievement is high; 80% of students typically achieve a 'good honours' pass, and First Time Pass rates range from 97% to 100%.

Source: [David Jones](#)

Figure 2.5 The engaged university



Source: NCCPE (2025)

Students may be engaged in research and inquiry in each of these aspects. For example, at Portland State University, all students undertake a community-based learning Senior Capstone (Box 2.7). Outreach initiatives involving students emphasise communicating effectively about

complex ideas to diverse audiences, “bridging the gap between researchers and the public” (Coleman & Graham, 2025, 7). [Science shops](#) are one way to bridge the gap between science and society. They work directly with communities to take their questions and translate them into research projects. Notable examples can be found at Queen’s University Belfast and the University of Ulster in the UK, as well as the University of Groningen in the Netherlands. The Community Research Initiative at UCL supports Master’s students and their supervisors to partner with community organisations on their dissertation projects (Owen & Pitchford, 2023).

Box 2.7 All students undertake a community-based learning senior capstone at Portland State University, US

During the final year, **each undergraduate student is required to participate in a senior capstone**, which is the culmination of the university studies program. The senior capstone is a community-based learning experience that a) provides an opportunity for students to apply the expertise they have learned in their major to real issues and problems in the community; and b) enhances students’ ability to work in a team context necessitating collaboration with persons from different fields of specialisation. Each student works with a team of fellow students and faculty members. Each senior capstone must result in some form of summation, closing project, or final product that puts closure to the student’s experience.

Source: <http://www.pdx.edu/unst/senior-capstone>; Fernández et al. (2018)

Knowledge exchange

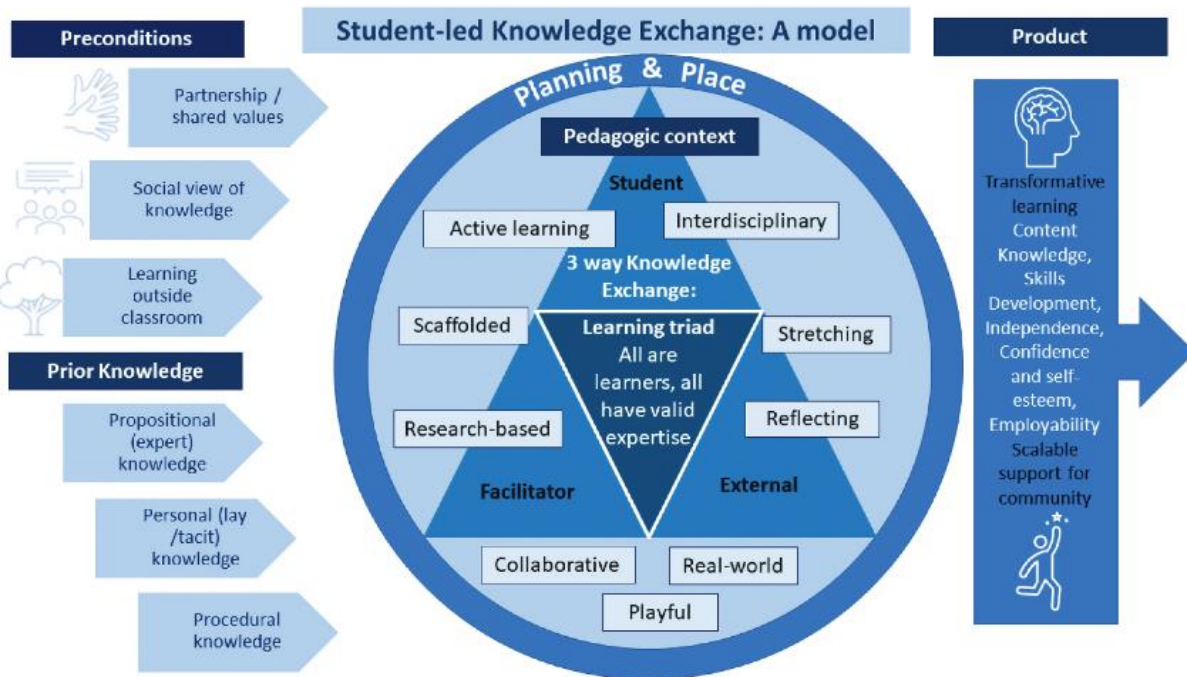
Figure 2.6 presents a model of student-led knowledge exchange alongside a case study of student-led knowledge exchange developed at Plymouth Marjon University (Box 2.8).

Box 2.8 Developing a student-led knowledge exchange model from health and wellbeing clinics at Plymouth Marjon University, UK

Using a project exploring student-led health and wellbeing clinics, the team developed a **student-led knowledge exchange (SLKE) model in undergraduate teaching and learning** (Figure 2.6). The initial phase of the work consisted of a stakeholder analysis exploring the role of undergraduates in KE in which students took a leading role in engaging with external service users (i.e. “patients”). Unlike much knowledge exchange, SLKE involves an exchange in the truest sense of the word: not only does it enhance the learning of the students, but simply having them present also makes the other parties more open to learning and adds value to the activity. The student’s position is a liminal one. They are neither entirely givers nor receivers of knowledge but contribute to and catalyse multi-directional KE through interaction with patients and university staff in a learning context. The multi-directionality of KE resists the implicit or explicit hierarchies evident in much of the literature on this topic. Using the SLKE model can help faculty design authentic learning opportunities for students.

Source: Cotton et al. (2024)

Figure 2.6 A model for student-led knowledge exchange



Source: Cotton et al. (2024)

Summary

- **Aim and focus:** The report aims to inspire and guide higher education staff in engaging undergraduate students more deeply in research and inquiry across varied disciplinary and institutional contexts.
- **Inclusive and contextual understanding:** Emphasises that the research-education nexus is flexible and context-sensitive, with no single definition, and includes both curricular and co-curricular approaches to undergraduate research that develop critical thinking, creativity, and engagement.
- **Frameworks for engagement:** Presents multiple overlapping models—including the widely cited framework (research-led, -oriented, -based, and -tutored)—and connects the research-education nexus to broader pedagogies, such as students as partners, employability, community engagement, and knowledge exchange.

The framework(s) used affect the challenges, benefits, risks, and experiences of engaging students in research and inquiry. These are discussed in the next chapter.

3. The benefits, challenges, risks, and experiences of engaging students in research and inquiry

“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” (Brew, 2007, 7).

In the last two decades, undergraduate research has been recognised as a ‘**movement**’ (Healey & Jenkins, 2009, 3; Karukstis, 2019, 46), a ‘**touchstone**’ for the integration of research and education (Craney et al., 2011, 92), and a ‘**high-impact practice (HIP)**’ (Kuh, 2008) that is scalable (Malachowski et al., 2024). Half of the original 10 HIPs involve students in elements of research and inquiry (first-year seminars, collaborative assignments, undergraduate research, service learning, and capstone courses). The challenge is to make these HIPs potentially available for all students, not only those in small institutions where small classes predominate, or at a small scale in large institutions (Healey & Jenkins, 2018; Kuh & O’Donnell, 2013). Brew (2007), as quoted at the beginning of this chapter, argues that all students may benefit from engaging in research and inquiry, a perspective that is not limited to those students wishing to pursue postgraduate studies (Johnson & Rifenberg, 2025a).

The benefits of undergraduate research go well beyond a student’s time in higher education (Johnson & Rifenburg, 2025b). Some alumni may continue to contribute to student research by returning to give talks about their experiences and how they have affected their careers. Some may also mentor or advise existing students undertaking research and inquiry projects on campus or in work-based learning contexts (Fung, 2017).

3.1 Benefits, challenges, and risks of engaging students in research and inquiry

In higher education, it is essential that we consider systemically the benefits, challenges, and risks faced by students and staff when engaging students in research and inquiry (Kerri-Lee Krause, personal communication, June 10, 2025). They are interrelated, and in developing effective strategies to promote students as researchers, university leaders need to consider both. Conventionally, *challenge* denotes an obstacle or difficulty that must be actively tackled through effort and adaptation. *Risk*, by contrast, refers to the possibility of adverse outcomes, such as loss of resources, reputational damage, reduced student satisfaction, or diminished learning gains (Praver, 2023). By distinguishing risks (potential for harm) from challenges (obstacles to be overcome), institutions can more precisely allocate resources. However, there is a danger of seeing risks as something negative to be avoided. Kelty and Bunten (2017) argue that:

“Encouraging students to consider new, diverse, even uncomfortable ideas is needed to develop a critically informed view of the world and establish one’s own values and beliefs. ... Sustained, systematic emphasis on risk-taking in higher education is key to promoting innovation, critical thinking, life-long learning, and moral-ethical development” (publisher’s blurb).

Phrased this way, we need to support students (and staff) to take risks by providing safe, supportive environments where failure is seen as a learning opportunity.

Krause (2007) lists **five conceptions of the teaching-research nexus that are beneficial to students and staff** (Table 3.1) Evans and Evans (2021) concisely classify **three significant areas of positive outcomes for students associated with participation in undergraduate research**: (a) learning gains (course-specific or broader skills such as critical thinking); (b) enhanced personal characteristics such as self-efficacy and self-esteem; and (c) likelihood for future success (persisting to graduation and acceptance into graduate/professional school). A recent study provided clear evidence of the last of these benefits. Haeger et al. (2024), using the matched comparison group and undergraduate researchers in STEM ($n = 2,727$) for six four-year public universities, found that:

“When being compared with like-peers and controlling for background characteristics and prior academic performance, students who participated in undergraduate research were twice as likely to graduate in 4 years and over 10 times as likely to graduate in 6 years. We also found that equity gaps in 4-year graduation rates for students of colour, low-income, and first-generation students were cut in half for undergraduate researchers. At 6 year, these gaps were completely closed for undergraduate researchers” (p 1).

Table 3.1 Five conceptions of the teaching-research nexus (TRN)

-
1. The TRN epitomises teaching and learning in higher education
 2. The TRN engages and motivates students
 3. The TRN develops important graduate attributes
 4. The TRN prepares students for future employment
 5. The TRN offers professional benefits for academic staff
-

Source: Krause et al. (2007, 2-6)

More specifically, engagement in an undergraduate research program (UROP) in the sciences can lead to students thinking and working like scientists, promoting personal and professional growth, fostering a career in science, developing essential skills, and clarifying career goals (Laursen et al., 2012). Laursen and colleagues (2012) claim that “Undergraduate research is one of many educational innovations that are good for students but hard on faculty” (p. 37). More than half of faculty comments on the costs and benefits of UROPs, from interviews with 85 faculty research advisors, focus on the **inherent challenges of involving undergraduates in their research programs**: issues of time and effort; lowered productivity; the inexperience and turnover of student lab workers; the limitations of campus research resources; and the demands and opportunities of the summer research season as juggled against time for other intellectual work, family, and relaxation (Laursen et al., 2012).

As Brew (2007) indicates in the quote at the beginning of this chapter, **all students stand to gain from the skills they learn from engaging in research and inquiry, which are “central to professional life in the twenty-first century”** (p. 7). A similar point is made by Gros et al. (2020, 117): “Fostering a research attitude is fundamental in the education of critical and

proactive professionals.” A long list of potential benefits for students of engaging them in research and inquiry is listed in Table 3.2, including improved outcomes and engagement, the feeling of inclusion in the academic community, promoting independence and critical thinking skills, and enhanced understanding of how knowledge is created and the nature of knowledge in their discipline. A study at the University of Plymouth examining the benefits and risks of research-informed teaching employed semi-structured interviews with 15 staff members and an online questionnaire completed by over 250 undergraduate students (Gresty et al., 2015). Students identified two key positive impacts of engaging with research-informed teaching: increased subject knowledge and improved independent research skills.

Staff who engage their students in research and inquiry also have the **potential for their teaching and research to benefit** (Table 3.2). Two examples of positive impacts are: First, two academics from the UK and the US reflected: “We have found that working with undergraduates in research is one of the most fulfilling aspects of our academic lives” (Campbell & Cameron, 2021, 124). Second, an evaluation of the Centre for Teaching and Learning (CTL) students-as-partners program at Penn State University concluded that the CTL Scholars program established students as agents of their own learning, promoted equitable relationships between students and faculty members, and potentially contributed to both teaching transformation and research productivity (Shank & Cruz, 2023). More broadly, staff at Plymouth University reported considerable positive impacts on well-being and motivation when adopting research-informed teaching (Gresty et al., 2015).

There are also risks associated with **students and staff engaging in research and inquiry that need to be managed**. Staff in the Plymouth research identified **non-engagement of some students as the primary risk associated with their research-informed teaching practices, including non-attendance, student distraction, dull lecture delivery, the introduction of research too soon, excessive novelty**, and demotivation of less able students (Gresty et al., 2015). Two risks were identified as particularly significant for student learning: curriculum bias and the impact of research engagement on the student experience. The first refers to an over-focus on research engagement to the detriment of other aspects of the curriculum. However, the majority of students emphasised the positive impacts of curriculum bias, perceiving better quality teaching and learning due to the greater knowledge, enthusiasm, confidence, and passion of the teacher resulting from greater familiarity with areas of expertise. The second relates to the possibility that student learning outcomes may not be met, resulting in poor teaching quality and student confusion (Gresty et al., 2015).

Careful planning is needed for the potential benefits of integrating inquiry-driven research into student learning to be realised and the risks managed. These depend on the quality of the course design. A good example of a carefully designed course that had a positive impact on student success is the first-year inquiry course in social sciences at McMaster University. It taught learning ‘how-to-learn’ skills through IBL (Box 3.1).

Table 3.2 Potential benefits for students and staff of engaging students in research and inquiry

Benefits for students

- Improves student outcomes
- Improves student engagement
- Helps students see their studies as current, stimulating and exciting
- Enables students to answer the questions that they want to ask
- Makes students feel included within an academic community
- Inducts students into research communities

- Promotes students' independence and confidence
- Provides students with experience of collegiate working
- Develops students' transferable skills of finding, creating, synthesising and presenting information
- Provides experience of problem-solving
- Develops students' skills of critical analysis and ability to make judgements and come to conclusions
- Enables students to develop their reflexivity as they think about what they are learning and how

- Helps students to recognise rapid changes in knowledge
- Introduces students to appropriate or dominant research methodologies in their subject
- Models the ways in which new knowledge is generated in their subject
- Promotes students' intellectual development through, for example, enabling exploration of epistemological issues as students not only learn how knowledge is created but the nature of knowledge in their discipline (e.g. whether knowledge is certain, or tentative and interpretive)

Benefits for staff

- It is a way of bridging the divide between teaching and research within Universities
- It can help us with our research as students can collect or analyse data
- The process of teaching about research with which we are engaged can help us to refine our thinking or conceptual ideas and to evaluate our methodologies
- We gain new perspectives on our research from our students or the process of teaching our students
- Teaching about research and enquiry can generate ideas and issues that are followed up in our research.

Source: University of Reading (nd)

Box 3.1 Inquiry-based learning introductory course for Social Sciences had a significant impact on students' subsequent performance at McMaster University, Canada

McMaster University began offering a first-year course in Social Sciences based on inquiry in the late 1990s. It is typically taught in groups of no more than 25 students assigned to an instructor, subdivided into groups of four or five students. All groups have the same curriculum, reading material, assessment process, and goals, which are outlined in a detailed compendium. The classes meet for 12 three-hour concurrent sessions. Class time consists of a combination of exercises and tasks designed to build students' critical thinking abilities and allow time for students to share ideas about their individual inquiries with their peers. 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 become violent after watching violent cartoons while others seem to be unaffected?' They have to justify why the question is important in relation to existing literature. They then investigate the question through a process that involves developing and testing hypotheses using secondary sources. There is substantial research evidence of the positive impact of this inquiry course on students' subsequent performance at the University. *Sources:* Justice *et al.* (2007a, 2007b, 2009a; 2009b); Vajoczki (2010); for a more recent version of the course, see: http://www.youtube.com/watch?v=i9idE_uClpc

3.2 Student experiences of research and inquiry

Several investigations have explored the student experience of research and inquiry. Here I will focus on five studies.

One of the most comprehensive studies **examined the awareness, experiences, and perceptions of final-year undergraduate students regarding research** (Turner *et al.*, 2008). It drew on data from over 500 students across three universities in the UK and Canada, spanning two research-intensive and one teaching-focused institution. As expected, students at the research-intensive universities demonstrated greater awareness of institutional research activity and the research engagement of their instructors. However, four less predictable findings also emerged. First, institutional type did not consistently predict students' direct research experience. Second, there were no significant differences between institutions in students' reported development of research skills. Third, students at the research-intensive universities noted both more pronounced positive and negative effects of research on their learning. Finally, across all three institutions, students identified conducting their own research projects as the most effective learning method.

An extension of the analysis of data from the 'new' UK university included five small-group interviews, as well as a questionnaire completed by almost 200 students (Healey *et al.*, 2010). They found that many participating students perceived clear benefits to their learning from staff research, including being taught by enthusiastic staff, enhanced staff credibility, and the reflected glory of being taught by well-known researchers. However, they also perceived disadvantages, particularly regarding staff availability, and did not believe that staff research should take priority over their own needs as learners. They recognised that **their awareness of the nature of research and the development of research skills increased most when they were actively involved in undertaking research projects**. Several students also perceived

benefits for their future employment from participating in research activities. One of the student respondents tellingly noted that “*We are the university at least while we are here.*”

The ‘new’ UK university survey was repeated seven years later, during which a major initiative had begun to promote active and inquiry-based learning across the curriculum (Short et al., 2010). A comparison of the two surveys showed, despite some caveats, a clear increase in both students’ research awareness and direct research experience. Additionally, there was a noticeable rise in positive perceptions regarding the benefits of staff engagement in research for student learning. These findings highlight the **positive impact of institutional efforts to strengthen the connection between teaching and research and reflect progress in embedding active learning by involving students in research and inquiry-based activities.** A copy of the *Student experience of teaching and research questionnaire*, used in the last three articles, is available at <https://www.healeyheconsultants.co.uk/resources>.

Another study drew on a **three-year qualitative study that followed 40 students through their whole student lifecycle** (Clark & Hodosy, 2019). They found that students’ conceptions and experiences of the research–teaching nexus (RTN) evolved over time and were shaped by, and interpreted through, other aspects of their lives. Their responses to the nexus were nuanced, encompassing positive and negative reactions. The findings reveal that the RTN possesses both inclusive and exclusive dimensions, experienced differently depending on students’ broader contexts. In other words, students’ understandings and experiences of the RTN are not solely determined by pedagogical strategies or curriculum design. Instead, they are influenced by students’ evolving personal interests, experiences, emerging career aspirations, and the broader landscape of higher education policy and practice in which learning and teaching occur.

Finally, one study focused on the **experiences of first-year undergraduates on degree programmes in the arts, humanities and social sciences** (Levy & Petrulis, 2012). This qualitative study found that the students experienced inquiry and research in four distinct ways. Research, as ‘*gathering information*’ and ‘*exploring others’ ideas*’, was associated with learning by engaging independently with a knowledge base. Research, as ‘*evidencing and developing students’ own ideas*’ and ‘*making discoveries*’, was associated with an emergent sense of participation in knowledge-building, understood as the potential to bring something personal or new to an area of study.

Summary

- **Benefits:** Student engagement in research fosters critical thinking, independence, transferable skills, and professional readiness. It enhances student outcomes, boosts motivation and retention (especially for underrepresented groups), and deepens learning by promoting active, inquiry-based approaches. Staff also benefit through enriched teaching, fresh research perspectives, and increased satisfaction.
- **Challenges and risks:** Common challenges include resource constraints, time demands on faculty, student inexperience, and balancing research with curriculum coverage. Risks involve potential curriculum bias, student disengagement, unmet learning outcomes, and reputational issues. However, risk-taking in learning, when supported in safe environments, can promote innovation and growth.

- ***Student experiences:*** Students value research experiences most when actively involved, noting increased skills, confidence, and employability. Experiences vary across institutions and disciplines, shaped not only by teaching methods but also by personal and contextual factors. Active and inclusive approaches, along with institutional support, can significantly enhance student engagement with research.

The findings discussed in this chapter suggest that the benefits, challenges, risks, and experiences are contextualised, not least by the meaning of the research-education nexus, and the form the research and inquiry takes. Unpacking these is the topic of the next chapter.

4. Unpacking the research-education nexus

“There are multiple possible meanings of the ‘teaching-research nexus’, but slippage between meanings is prevalent. For example, it is often unclear whether authors are referring to the influence on teaching and learning of students doing research, staff doing research, staff practices being informed by research, the curriculum being informed by contemporary research, the research culture of a particular context and so on.” (Trowler & Wareham, 2007, 5)

4.1 The meaning of the research-education nexus

The research-education nexus and related terms, such as the teaching-research nexus and research-teaching nexus, are complex concepts with multiple meanings, as indicated in the above quote from Trowler and Wareham. Although the terms are used interchangeably in this report, I prefer ‘education’ to ‘teaching’ because education is a broader concept encompassing the process of developing knowledge, skills, and values in students, while teaching is a specific method or approach used to support that education.

There is **not one nexus, but rather many relationships**. Jenkins (2004) concludes his *Guide to the research evidence on teaching-research relations* with the reflection that “perhaps I overstate or distort these relationships by referring to ‘a’ or ‘the’ teaching-research nexus” (p. 30). The phrase has “consistently been ambiguous” (Hassaniyan, 2024, 4). Halliwell (2008) provides an overview of the literature on the nexus from a Canadian perspective. For a critical overview of the recent history of the research-teaching link in higher education, see Malcolm (2014). **Each term — research, teaching, education, and nexus — needs unpacking, as does the phrase ‘research and inquiry’**. It is difficult to make generalisations because ‘it depends’ on how these different components are defined (Healey, M. & Healey, R. L., 2018).

Concepts of research

According to Brew (2001, 21), “there is no one thing, nor a set of things which research *is*.” She goes on to identify **four different conceptions of research** that academics may hold, according to whether the researcher is present or absent and the aim is primarily to produce an outcome or to understand (Brew, 2003) (Figure 4.1):

- Trading view – A CV view of the academic marketplace
- Domino view – A view of how knowledge progresses one domino at a time
- Layer view – A cake view of research, adding a few crumbs onto the existing layer of knowledge
- Journey view – The story of the researcher's journey

Academics may hold more than one of these views. **Those who emphasise a trading view of research are perhaps the least likely to develop a research-education nexus** as students are absent from this conception, whereas they may feature to an extent in each of the other conceptions.

Figure 4.1 Relationships between conceptions of research

Research is oriented towards: ↓	Research aims to: ↓	The researcher is present to, or the focus of, awareness	The researcher is absent from, or incidental to, awareness
External products	Produce an outcome	Trading view	Domino view
Internal processes	Understand	Journey view	Layer view

Source: Brew (2003, 6)

Concepts of teaching/education

According to Trigwell and Prosser (2020), the most common distinction made about concepts of teaching is between:

- An information transfer / teacher-focused approach
- A conceptual change / student-focused approach

Academics who follow a student-focused approach are more likely to engage students in research and inquiry than those who adopt a teacher-focused approach. Bloomster et al. (2014) confirmed this, finding that teachers who embrace more student-centred educational philosophies were more likely to implement practices that actively engage students in research and the academic community.

Using the term ‘education’ as against ‘teaching’ broadens the debate and explicitly includes a wider range of actors.

“The term ‘education’ emphasises the link between education and agency. ‘Teaching’ focuses on what the teacher does, while ‘education’ opens the possibility of considering the entire educational lifecycle and the interdependence of learners in that context, whether they be students, teachers, leaders, professional staff, or external stakeholders (e.g., industry representatives)” (Kerri-Lee Krause, personal communication, 10 June 2025).

Relationship between concepts of research and concepts of teaching

There is also some evidence that relationships exist between the concepts academics hold about teaching and those they hold about research. For example, **lecturers who have a trading view of research are more likely to adopt an information transmission approach to teaching, while those who have a journey view of research are more likely to adopt a student-focused approach to teaching** (Trowler & Wareham, 2007).

Brew (2006) argues that **research and teaching share a common enterprise** – “knowledge building within social contexts; specifically scholarly communities” (pp. 136-137). The

challenge is to ensure that students, at both the undergraduate and postgraduate levels, are welcomed into these communities and seen as full members.

The meaning of nexus

Trowler and Wareham (2007) note that the term 'nexus' is also often understood in various ways, ranging from students' views of staff conducting research to students themselves participating in different forms of research. They also indicate that a range of other terms are often used interchangeably—such as link, inform, support, enhance, add value to, integrate, or integration—despite significant differences between them. A recent Dutch study prefers the term 'synergy' to 'nexus' (Daas et al., 2024).

The distinctions academics make between teaching and research are not always clear. Colbeck (1998) found that, on average, academics spend around one-fifth of their time serving the dual purposes of teaching and research.

4.2 The relationship between research and teaching

This is a **contentious area with strong views held about whether a relationship exists and whether it is beneficial**. Kinchin and Kandiko Howson (2019) conducted a meta-analysis of studies carried out by student researchers across nine academic disciplines, where students interviewed academics about their perspectives on the research-teaching nexus. The analysis of these studies highlights the diversity of opinions among academics, even within the same department, regarding the importance of connecting research and teaching. Badley (2002) takes a strong position that goes beyond complementarity, arguing that teaching and research are in effect the same activity (inquiry), simply with different audiences. Light and Calkins (2015, 347) similarly see research and teaching “as analogous practices with a common essential goal: the advancement of learning and knowledge.” They distinguish three general categories of academic learning: research excellence, teaching effectiveness, and academic excellence. Four extreme views about the relationship between research and teaching are stated in Table 4.1.

Table 4.1 Linking research and teaching: Different views

“Our view is that university research often detracts from the quality of teaching. We regret the continuing elevation of research and the systematic neglect of the quality of instruction.”
(Pocklington & Tupper, 2002, 7 – about Canada)

“Courses taught by those at the cutting edge of research will necessarily be of higher quality than those taught by those merely using the research results of others – whatever the apparent quality of their style of delivery. Furthermore, if teaching is undertaken by researchers the linkage is automatic, even if, as is often the case they are not always teaching about their own narrow research specialism.” (Lee, 2004, 9 – with particular reference to geography in UK)

“The teaching-research nexus may be viewed as a core trope of university education: there is a fundamental relationship between the scholarships of teaching and of research, and that this differentiates universities from other forms of higher education.” (Boyd et al., 2012, 15)

“The teaching-research nexus is dead.” (McKenzie et al., 2018, 19)

A common view among academics is that they would like there to be a relationship between teaching and research, but it is not always practical (McKinley, 2021). The problem with many of these views is that they are personal and lack evidence to support them.

The impact of research on teaching

Many studies have conducted correlation analyses between the number of publications staff have, as an indicator of research quality, and their students' satisfaction scores with their teaching, as an indicator of teaching effectiveness. These have been carried out in many disciplines, countries and types of institutions and have consistently shown close to zero correlations. Hattie and Marsh (1996) carried out the most cited study. In a meta-analysis of correlational studies involving university academics, 58 research articles encompassing 498 correlations were reviewed. They found a weak overall correlation of +0.06. They concluded that **“the common belief that teaching and research are inextricably intertwined is an enduring myth. At best, teaching and research are very loosely coupled”** (Hattie & Marsh, 1996, 529).

The UK government used this study to justify establishing teaching-only institutions (DfES, 2003). However, Hattie and Marsh (2004) strongly argued they had misinterpreted the study's findings. Indeed, they concluded their original study with the following policy recommendation, which appears to have been ignored by the UK government:

The strongest policy claim that derives from this meta analysis is that universities need to set as a mission goal the improvement of the nexus between research and teaching. The goal should not be publish or perish, or teach or impeach, but we beseech you to publish and teach effectively. The aim is to increase the circumstances in which teaching and research have occasion to meet, and to provide rewards not only for better teaching or for better research but for demonstrations of the integration between teaching and research.

Examples of strategies to increase the relationship between teaching and research include the following: Increase the skills of staff to teach, emphasising the construction of knowledge by students rather than the imparting of knowledge by instructors [...] develop strategies across all disciplines that emphasise the uncertainty of the task and strategies within the disciplines [...] ensure that students experience the process of artistic and scientific productivity” (Hattie and Marsh, 1996, 529, 533 and 544; cited by Jenkins, 2004, 12).

Many later studies have emphasised that **a strategic approach needs to be adopted if the benefits of the synergies between research and education are to be met** (e.g., Brew, 2006; Daas et al., 2024; Jenkins & Healey, 2005).

The impact of teaching on research

The research-education nexus mainly focuses on how research can enhance teaching. There has been far less attention given to the impact of teaching on research (Krause, 2008; Daas et al., 2024). Indeed, there is much more scepticism about a relationship in this direction. This is well illustrated by Matthews and Kotzee (2022), who employed discourse analysis of submissions from UK higher education institutions to the Research Excellence Framework

(REF) and the Teaching Excellence Framework (TEF). They found that “while universities emphasise the value of research to their teaching, they do not always emphasise (or sometimes even decry) the influence of teaching on research” (pp. 1-2). **Although it is common for the link between research and institutional learning and teaching strategies to be highlighted, research strategy documents often fail to mention undergraduate engagement in research.** “To open up research strategies to provide research-based undergraduate education and support and develop undergraduate research requires radical mind-shifts” (Brew, 2006, 146).

Students hold similar views about the unidirectional relationship between research and teaching. In a survey undertaken by the British Academy (2002), 92% of students from all disciplines perceived the connection between research and teaching as a one-way relationship, where research informs teaching. This limited view indicates a lack of awareness about the reciprocal nature of the research-teaching nexus. As a result, the idea that teaching can also influence research—and that students could play an active role in the research process—is not clearly conveyed or exemplified, representing a missed opportunity.

There is limited evidence of the beneficial effects of teaching on research. One piece of research that went viral among academic developers upon publication was a study of first-year science doctoral students in the United States, which compared the quality of research proposals after one year, for students who undertook some teaching with those who did not (Feldon et al., 2011). They found that **students who engaged in both teaching and research showed markedly greater improvement in their ability to formulate testable hypotheses and design sound experiments.** This is strong evidence to present to supervisors, many of whom discourage their students from teaching, suggesting that encouraging students to engage in teaching may enhance the quality of their research. The rationale behind this finding is that teaching helps students put their research into a broader context and enhances their communication skills.

Others back up this argument. Griffiths (2004) argues that engaging in teaching may foster reflection and deeper learning, thereby enhancing research capabilities; while Healey (2005a) suggests that inquiry-based and research-led teaching encourages academics to stay current and reflective, reinforcing their own research thinking. Brew (2006) found evidence in several UK universities that faculty who involved students in research (e.g., via project supervision or research-based courses) often reported increased research output and enthusiasm. In the context of an Irish research-intensive university, Brennan et al. (2019) proposed a framework for developing the student as a researcher within a ‘community of scholars’ whereby teaching enhances research and research enhances teaching.

Harland (2016) proposes the concept of ‘**teaching-led research**’ in which staff construct courses that directly and positively influence their research. He contends that this concept is fundamental to the modern research university, yet challenging to implement without intentional design of teaching and learning practices to support it. One promising approach, he argues, is to **treat undergraduates as researchers**, allowing them to learn through active engagement in research.

Charles (2018, 25) takes this idea a stage further and distinguishes between:

1. *Teaching-based research*: that takes pedagogy as the object or content of traditional research activities for dissemination via talks and publications
2. *Teaching-informed research*: that is motivated and extended by the interactions that follow from teaching that area of research
3. *Teaching-led research*: that potentially transforms or reforms the character of research and the research disciplines themselves

4.3 The meaning of undergraduate research and inquiry

Undergraduate research and inquiry are also contentious concepts. Some view them as complementary and overlapping terms, the meanings of which have become more flexible over time, as illustrated in chapter 2 with the evolution of the definition of undergraduate research by the US Council on Undergraduate Research (Healey & Jenkins, 2009, 15-29; Malachowski et al., 2024). Others use the terms interchangeably (e.g., Levy et al., 2010; Perrella et al., 2020; Spronken Smith & Walker, 2010), while some consider inquiry a broader term that encompasses undergraduate research (Lee, 2012).

The openings for students to engage in research and inquiry vary between co-curricular undergraduate research opportunity programmes (UROPs) and curriculum-based initiatives or course-based undergraduate research experiences (CUREs), the two main ways students experience ‘**discovery learning**’ (Healey, M. & Healey, R. L., 2024b).

Undergraduate research opportunity programmes

Generally, research-intensive institutions have more resources than other institutions to run UROPs as part of the *co-curricular* experience (John & Creighton, 2011). For example, 80% of undergraduates at MIT partake in their UROP. A variety of terms are used to describe students undertaking co-curricular research projects. In the UK, for example, Imperial follows MIT and has an [Undergraduate Research Opportunity Programme](#); UCLAN uses the term [Undergraduate Research Internship Scheme](#), while Lincoln has an [Undergraduate Research Opportunities Scheme](#). Internationally, British Columbia offers a Multidisciplinary Undergraduate Research Program in Health. Indiana University–Purdue University Indianapolis has a Diversity Research Scholars Program, and the University of Queensland provides [Summer and Winter Research Programs](#), including funded scholarships.

UROPs originated in the United States, primarily focusing on STEM disciplines, but many schemes have expanded them to other disciplines and, as we saw above, to other countries. They offer an intensive undergraduate research experience, in which students engage in a multi-week, open-ended project beyond the classroom. Summer and other interterm sessions provide the ideal opportunity for this kind of immersive work. Research experiences can profoundly influence students’ knowledge, self-confidence, and preparation for careers or graduate studies, both within science and in other fields. A key element in defining undergraduate research experiences is the mentorship model, where novice researchers work closely under the guidance of experienced faculty or graduate students. However, tensions can arise between faculty members’ educational objectives for students and their own needs for scholarly productivity (Laursen et al., 2012).

One problem with UROPs is that they are an elite model, available to a limited number of students. Without targeted funding for minoritised groups, they can be exclusive. This is one reason why increasing attention has been paid to mainstreaming student research and inquiry experiences in the curriculum, also known as course-based undergraduate research experiences (CUREs) in North America.

Course-based undergraduate research experiences

These provide a scalable model where students conduct research within the context of a formal course, thereby mainstreaming undergraduate research within the curriculum and making these opportunities available to all students (Healey & Jenkins, 2009; Malachowski et al., 2024; Ruth et al., 2023). One particular form of CURE is *the Directed Studies Course*, which several universities in North America offer. They are 1-2 semester-long courses, involving one-on-one instruction focusing on student-led, independent research (Hvenegaard et al., 2013).

Ambos et al. (2024a) point out that CUREs, by moving undergraduate research from an exclusive opportunity at the curricular margins to an integrated curricular-required experience, the CURE model:

“is inclusive and can be made more welcoming to all students. Through authentic engagement of all faculty, staff, and students, not only will undergraduate research be more accessible and benefit more stakeholders, research-rich curricula and pathways through these curricula will also become more essential.” (p. 176)

One of the most thorough initiatives to promote CUREs was undertaken over six years by the Council on Undergraduate Research Transformations Project team. It aimed to develop scaffolded, backwards-designed, research-rich undergraduate curricula by integrating fundamental research with ongoing professional development and collaborative team coaching. The US initiative involved 12 institutions and 24 departments—two from each institution—across biology, chemistry, psychology, and physics disciplines. Through this project, six key institutional factors emerged as most influential in driving curricular and cultural transformation: institutional mission and identity, institutional culture, institutional dispositions, realising synergies, resource engines, and change leadership. Institutions that achieved the greatest success in their transformation efforts recognised the importance of these elements and strategically leveraged them to accelerate progress, embed lasting change, and sustain their newly developed curricula and academic cultures (Ambos et al., 2024a, b). An earlier Australian project examined the design and implementation of an *Authentic Large-scale Undergraduate Research Experience (ALURE)* (Rowland et al., 2016, 2019).

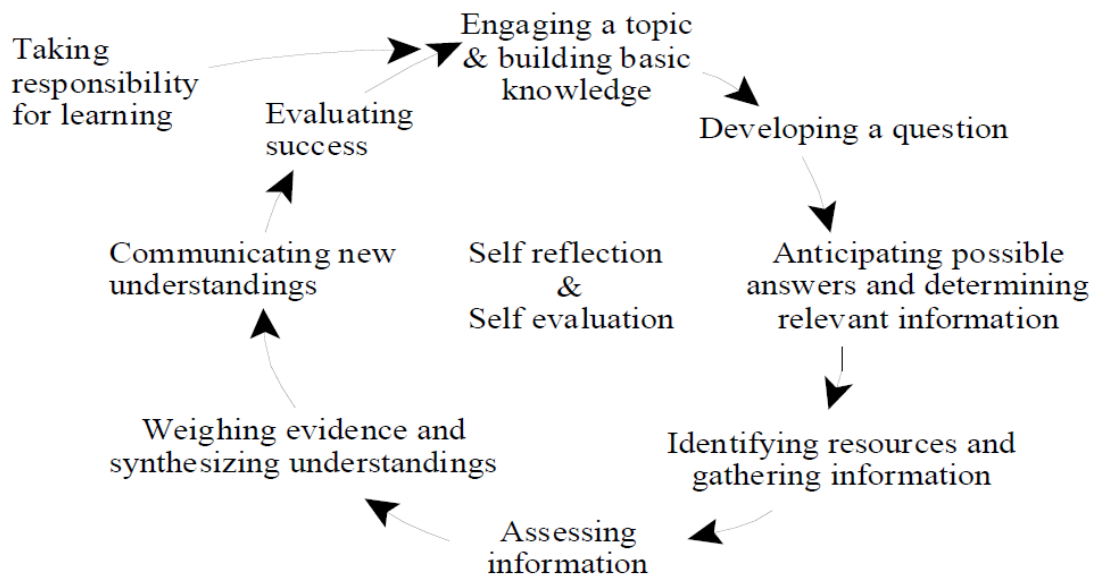
CUREs and UROPs are complementary rather than competing models of undergraduate research. Taking CUREs as a first or second-year undergraduate can act as a step toward applying for a UROP in the third or fourth year (Bangera & Brownell, 2014).

Inquiry-based learning

Inquiry-based learning (IBL) is sometimes used as an alternative term, particularly in the UK, to CUREs. In other contexts, CUREs are seen as involving students working on research projects

within the context of a course, while IBL emphasises students' own questions and investigations. According to Justice (2007a, 202), IBL “refers to a range of instructional practices that promote student learning through student-driven and instructor-guided investigations of student ‘centered’ questions” (Figure 4.2). Here, **IBL is used as a generic term that includes case-based learning, inquiry-guided learning, problem-based learning, project-based learning, research-based learning, and team-based learning.**

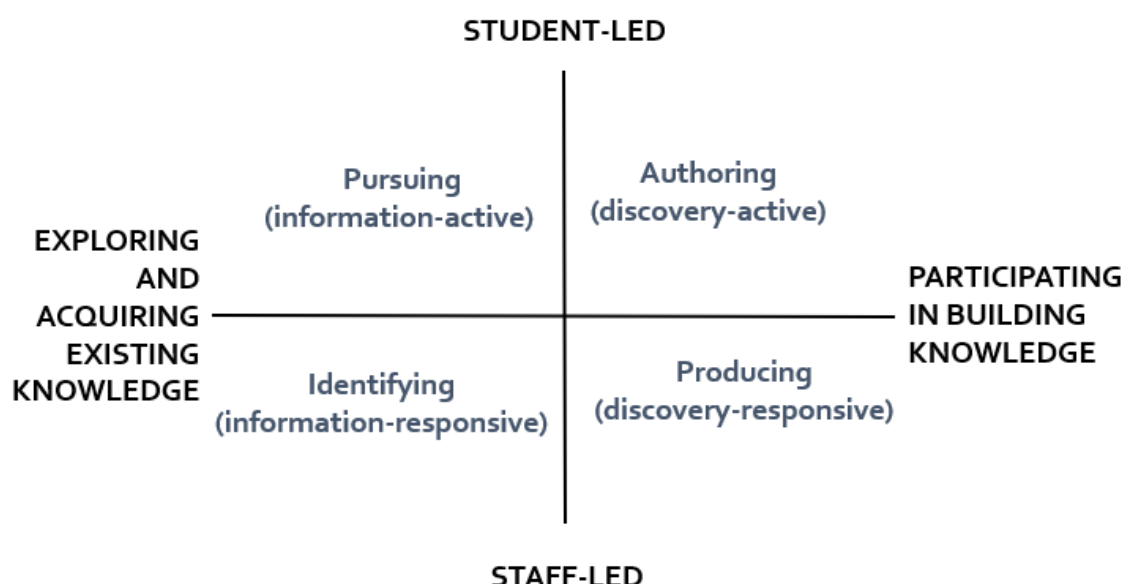
Figure 4.2 The inquiry process



Source: Justice et al. (2007a, 203)

Levy and Petrulis (2012) draw a critical distinction between whether students undertaking inquiry are contributing to the creation of new knowledge for society—a key feature of academic research—or are discovering existing knowledge that is simply new to them. However, the boundaries between these two **are blurred** (Figure 4.3). An inquiry-based learning planner that emerged from their work is presented in Appendix A.

Figure 4.3 Inquiry-based learning: A conceptual framework



Source: Based on Levy & Petrulis (2012, 97)

In an analysis of IBL practices at McMaster University, Perrella et al. (2020, 95) distinguish between the *scaffold model* that “describes programs with an enduring culture of undergraduate research and inquiry by means of its integration throughout entire undergraduate curricula”, and the *bookend model* that “focuses on programs that focus primarily on early introduction and future application of undergraduate research and inquiry practices.” This analysis built on an earlier documentary study of 545 course outlines from the Faculty of Social Sciences at McMaster (Vajoczki et al., 2011).

Descriptions of learning tasks identified as examples of IBL were analysed from 224 university teachers across various disciplines at three Australian universities (Aditomo et al., 2013). The results reveal that despite the varied language and types of tasks associated with IBL, there are only a few distinct task formats and a broadly shared understanding of inquiry among university educators (Table 4.2). Additionally, the study indicates that **IBL is implemented across a wide range of disciplines, in both undergraduate and postgraduate coursework, in classes of varying sizes, and universities with different levels of research intensity.**

Values are foundational to student-staff partnerships in IBL, with trust playing a central role. **IBL fosters a learning environment where intellectual risk-taking is encouraged and supported, creating opportunities for trust to be actively negotiated and developed throughout the process.** The ability of students “to freely question into and embrace the freedom to pursue their own potentiality and transform as a learner is the essence of a pedagogy of trust” (Archer-Kuhn & MacKinnon, 2020, 9).

Table 4.2 Forms of IBL tasks

-
1. Scholarly research
 2. Simplified research
 3. Literature-based inquiry
 4. Discussion-based inquiry
 5. Applied research
 6. Simulated applied research
 7. Enactment of practice
 8. Role-playing
 9. Other
-

Source: Aditomo et al. (2013, 1246-1249)

4.4 Inclusive scholarly knowledge-building communities as the foundation of the research-education nexus

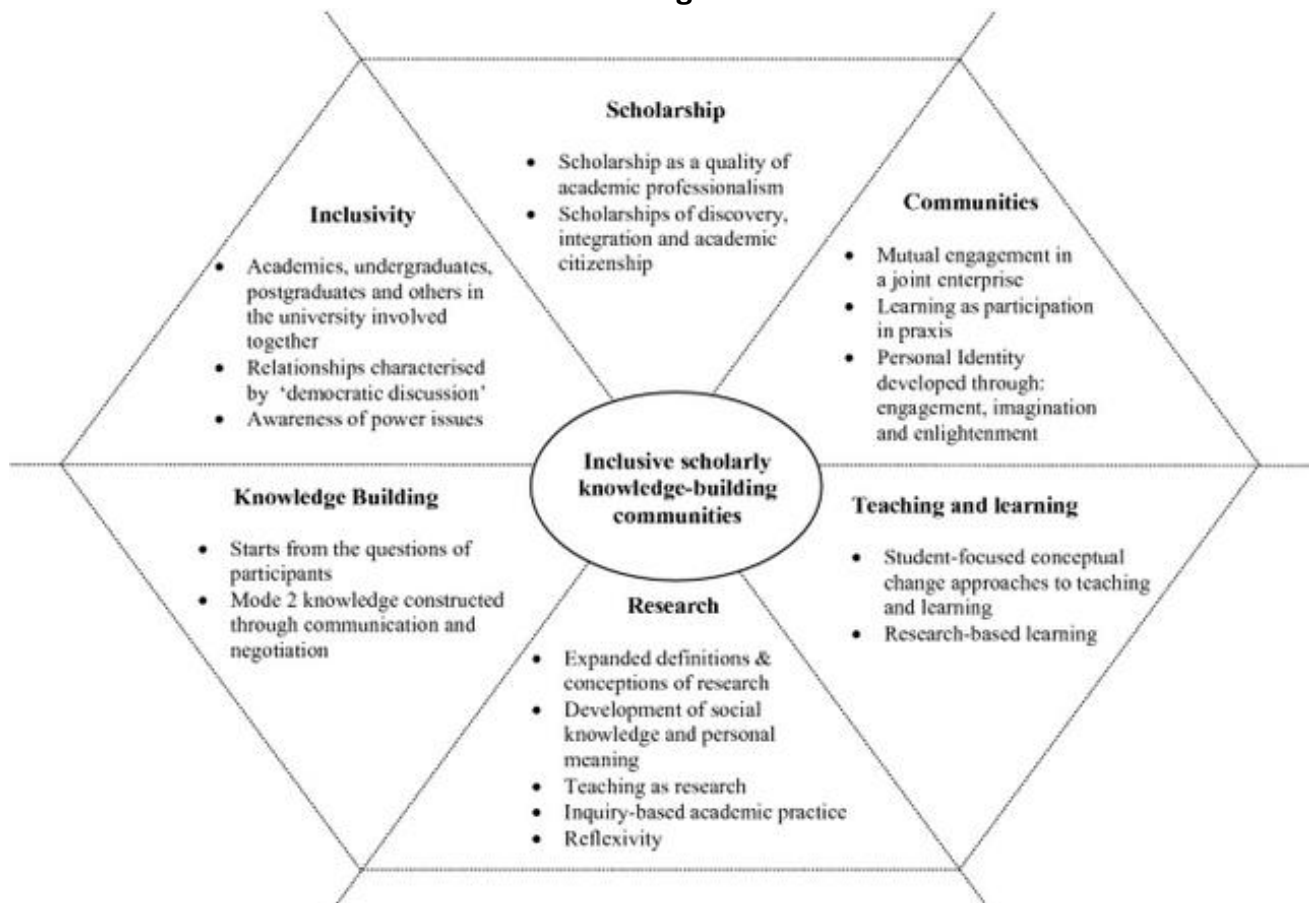
I credited the late Angela Brew at the end of the executive summary for developing the inspirational concept of *inclusive scholarly knowledge-building communities*. This concept is central to her model of the relationship between teaching and research (Figure 4.4) (Brew, 2006). The model is presented as a hexagon in which six components—teaching and learning, research, knowledge building, inclusivity, scholarship, and communities—form the basis of a dynamic model “focused on the socially related meaning-making processes of all participants as learners and knowledge-builders whether they are students or academics” (p. 31). It can be applied at the individual, group or institutional levels. Brew’s model contrasts with the traditional teaching and research divide, which focuses on the actions of individuals and the assumptions of academics.

4.5 National contexts

The research-education nexus is a complex and nuanced concept. The next four chapters examine the range of ways in which it is enacted in practice by institutions, disciplines, and interdisciplines, as well as year- and level-initiatives, and across programme initiatives. Before addressing these, it is appropriate to comment briefly on the varied national contexts in which these initiatives occur. Although national strategies and policies are not the focus of this report (see, e.g., Dandridge, 2023), **national systems can play a crucial role in supporting institutions in engaging students with the research world** (Healey & Jenkins, 2009, 2018).

In the UK, funding for research and teaching is a responsibility of the central government. Unfortunately, the two functions are housed in different departments, which can result in competition and separate policies rather than policies to encourage synergies and linkages. This is well illustrated by the history of research assessment, where the only impact excluded from the Research Excellence Framework (REF) is the impact on student learning (Brown, 2010; McNay, 2023). Although the UK Research and Teaching Forum, chaired by Roger Brown, was unsuccessful in changing the policy of the REF, it was influential in the Higher Education Funding Council for England allocating £40 million to institutions to develop research-informed teaching environments, with funds allocated inversely proportional to an institution’s research funding (D’Andrea, 2016; Jenkins & Healey, 2016).

Figure 4.4 Inclusive scholarly knowledge-building communities: A model of the relationship between teaching and research



Source: Brew (2006, 32)

In the US and other systems, the role of government, while still significant, may be less direct; however, other national organisations can play central roles, as do State-level authorities in Australia and Provinces in Canada. For example, in the 1990s, the US National Science Foundation (NSF) reviewed all its grant procedures to ensure undergraduate and postgraduate students were included in funded research projects. These include the [Research Experiences for Undergraduates](#) program, which supports intensive research by undergraduate students in any area of research funded by the NSF. Moreover, any grant proposal submitted to the NSF must address the [Broader Impacts](#) on society, one of which is improving STEM education. If the research councils in the UK were to adopt a similar approach, it would help stimulate a closer link between research and education.

Nevertheless, **there are several strategies that national and state systems could enact that promote undergraduate research and inquiry** (Table 4.3).

Table 4.3 National strategies for developing undergraduate research and inquiry

-
1. Fund high-quality learning resources to support student research and inquiry
 2. Ensure quality assurance and enhancement systems support undergraduate research and inquiry
 3. Ensure research funding supports research dissemination and undergraduate research
 4. Target research opportunities to students in particular disciplines
 5. Target research opportunities to students from under-represented groups
 6. Encourage disciplinary and professional associations to support undergraduate research and inquiry
 7. Recognise and value student organisations playing a leading role
-

Source: Healey & Jenkins (2018, 9) based on Healey & Jenkins (2009, 106)

Summary

- **Multiplicity and ambiguity of the nexus:** The research-education nexus (often interchangeably referred to as the teaching-research nexus or research-teaching nexus) encompasses various relationships, including students conducting research, being informed by research, and thinking like a researcher, as well as curricula shaped by contemporary research. These diverse interpretations, as well as the different meanings ascribed to the terms research, education, teaching, and the nexus, cause conceptual ambiguity, making generalisations difficult.
- **Bidirectional but uneven relationship:** While research is often seen as enhancing teaching, evidence of a reverse influence (teaching enhancing research) is limited but growing. Student-focused approaches and integrated models, such as Course-Based Undergraduate Research Experiences (CUREs), foster a more inclusive and reciprocal nexus. However, structural and cultural barriers persist.
- **Need for strategic and inclusive frameworks:** Effective integration of research and education requires intentional design at individual, institutional, and national levels. Brew's model of *inclusive scholarly knowledge-building communities* and initiatives, such as Undergraduate Research Opportunity Programmes (UROPs) and CUREs, exemplify how teaching and research can be synergistically connected within supportive policy and cultural contexts.

The following four chapters examine the various ways in which the research-education nexus is implemented across institutions, academic disciplines and interdisciplines, different year levels, and programme-wide initiatives.

5. Institutional strategies

“... universities should treat learning as not yet wholly solved problems and hence always in research mode.” (Humboldt 1810, translated 1970, quoted by Elton 2005, 110)



Source: Author's photo

5.1 The evolution of the research-education nexus at the institutional level

The founding ideas about the research-education nexus are usually credited to Humboldt, whose quote at the founding of the University of Berlin in 1810 (now known as Humboldt University of Berlin) begins this chapter (Elton, 2005). However, for an idea that has been advocated for over two centuries, it seems that research-based education has been surprisingly challenging to implement” (Oliver & Gourlay, 2018, 32).

“Humboldt was concerned with both research and teaching, and he established a fundamental dichotomy – not between research and teaching, but between university and school – according to which the university, in contrast to school, treats scholarship always in terms of not yet completely solved problems, whether in research or teaching, while school is concerned essentially with agreed and accepted knowledge. The consequence, as he says in a most thought-provoking comment of his memorandum, is that in universities the teacher is then not there for the sake of the student, but both have their justification in the service of scholarship” (Elton, 2010, 68).

Barnett (2003) suggests that **universities shifted from spaces where teaching and research coexisted in relative harmony during the twentieth century to environments where the two became increasingly antagonistic**. This report argues that one way to rebuild this connection and help students cope with the ‘supercomplexity’ of the twenty-first century is by actively involving them in research (Barnett, 2000). Such involvement should be thoughtfully adapted to reflect the diversity and complexity of knowledge construction across different academic disciplines (Healey, 2005a). In a later article, Barnett (2017) identified **three unifying interests that suggest the pendulum is beginning to swing back in the other direction**:

1. *Improving undergraduate education*: There is a growing emphasis on enhancing the quality of undergraduate education by developing students’ cognitive skills, thereby improving overall programme outcomes
2. *Student involvement in research*: Students are increasingly expected to contribute directly to the university’s research efforts, thereby supporting and advancing institutional research productivity
3. *Reassessing the teaching-research divide*: University administrators are beginning to question the long-standing separation between teaching and research, which was once promoted as a strategy for increasing efficiency; in reality, categorising activities, facilities, infrastructure, and staff exclusively as either ‘teaching’ or ‘research’ functions may lead to inefficiencies in managing a university’s complex resources

Institutions across the higher education landscape differ widely. A common distinction is made between **research-intensive and teaching-intensive providers**, as well as those that emphasise a mixture of research and teaching. Many higher education providers claim in their mission statements, strategies, and websites that they have a *research-based curriculum* following Humboldtian tradition. It is often assumed that undergraduate students benefit from the research culture of universities (Table 3.1). However, **institutional policies for teaching and research may hinder the development of effective research-teaching links by and course teams**. While institutional research and teaching policies may proclaim the links between teaching and research, the practical strategies often overlook these issues, particularly in their promotion policies, which can create ‘firewalls’ between teaching and research, thereby devaluing the role of teaching (Healey & Jenkins, 2018). In research-intensive universities, it is common for less research-active staff to bear heavier teaching loads (Gerschwind & Brostrom, 2015), and there has been a growth in education-focused appointments (McKinley et al., 2021). Embedding research and inquiry in the curriculum is common in less research-intensive universities, where it is viewed as an effective active learning pedagogy, regardless of whether staff members are research-active or not. In research-intensive universities, the rewards for research are higher than for teaching, and more traditional dissemination teaching methods often predominate (Jenkins & Healey, 2012).

It is also worth remarking that **institutions are increasingly using the research-education nexus in their marketing and recruitment activities**. As Marginson (2013) notes: “Research – and its integration with learning and teaching in the form of the RTN – is now seen as a crucial marketing and recruitment tool in order to increase prestige, ‘brand power’ and resource accumulation” (p. 358; cited by Clark & Hordósy, 2019, 424).

5.2 Institutional examples of embedding the research-education nexus

Over the past twenty-five years, the growing understanding of these issues has begun to shape effective institutional policy interventions. These have been mainly through institutional *teaching* policies, but various institutions have now developed innovative and effective ‘comprehensive’ strategies that promote student research and inquiry (Table 5.1). Nevertheless, although growing, the number of institutions that have developed effective strategic approaches to mainstreaming research-based curricula, which have been embedded across most or all of the institution, remains small (Healey & Jenkins, 2018). In an effort to distinguish themselves from competing institutions, they have developed a range of terms to describe their approaches. For example, for a period, the University of Sydney used the term *research-enriched learning and teaching* to describe its institutional education strategy because it could not find any other universities using the same terminology. Although the approaches differ in detail, they all share a vision of students actively producing and creating knowledge and understanding, rather than consuming knowledge in a dissemination education model (Serekoane et al., 2022).

Here, I will highlight some innovative practices at three of these institutions. First, one of the most impressive institutional strategies for developing research-based education is UCL’s *connected curriculum* (Box 5.1). Second, the University of Lincoln has become renowned for adopting the *student as producer* philosophy, associated with the work of Mike Neary, as its institutional strategy (Box 5.2). Finally, David Hodge, President of Miami University in Ohio, US, introduced the concept of the *student as scholar*. He was responsible for converting the largest recruiting courses at Miami to inquiry-based learning (Box 5.3).

Many universities provide opportunities for their undergraduates to work as researchers alongside staff. At the University of Queensland, student research experiences are viewed as an employability initiative, and they are coordinated by Student Enrichment and Success (SES) in conjunction with university research units, including the Institute for Teaching and Learning Innovation. Students may undertake pedagogic research projects, as well as discipline-based and interdisciplinary research projects (<https://employability.uq.edu.au/summer-winter-research/find-project>). Other universities, such as Northampton, provide specific pedagogic research initiatives for students (Box 5.4).

Table 5.1 Institutional examples of embedding research and inquiry

Higher education provider	Institutional approach	Further information
Humboldt University of Berlin, Germany	Research-based education	Deike et al. (2014)
Maastricht University Netherlands	Extending problem-based learning to research-based learning	Bastiaens et al. (2017)
McMaster University, Canada	Problem-based, undergraduate research and inquiry-based learning	Cuneo et al. (2012); Justice et al. (2009a); Perrella et al. (2020)
Miami University, US	Student as scholar	Hodge et al. (2011); Taylor et al. (2012)
Olin College of Engineering, US	Group project-based entrepreneurial engineering design projects	Kerns (2004)
Quest University, Canada	Research-based education	Helfand (2016)
Roskilde, Denmark	Problem-oriented project-based learning	Andersen et al. (2015)
Rhodes University, South Africa	Teaching, research, and service nexuses	Muthama & McKenna (2023)
University College London, UK	Research-based education and the connected curriculum	Fung (2016; 2017)
University of Adelaide, Australia	Small group discovery experience	University of Adelaide (2012)
University of Applied Sciences Amsterdam, Netherlands	Research-education connections	Griffioen (2023)
University of Hull	Connecting research and teaching through curriculum and pedagogic design	Cleaver & Willis (2017)
University of Lincoln, UK	Student as producer	Crawford et al. (2015); Neary (2014)
University of Westminster, UK	Research-education nexus	University of Westminster (2022a)

Source: Updated from Healey & Jenkins (2018, 58)

Box 5.1 From research-led to research-based education: Developing a connected curriculum at University College London, UK

“At University College London, our top strategic priority for the next 20 years is to close the divide between teaching and research. We want to integrate research into every stage of an undergraduate degree, moving from research-led to research-based teaching”

Michael Arthur, president and provost (2014, 22)

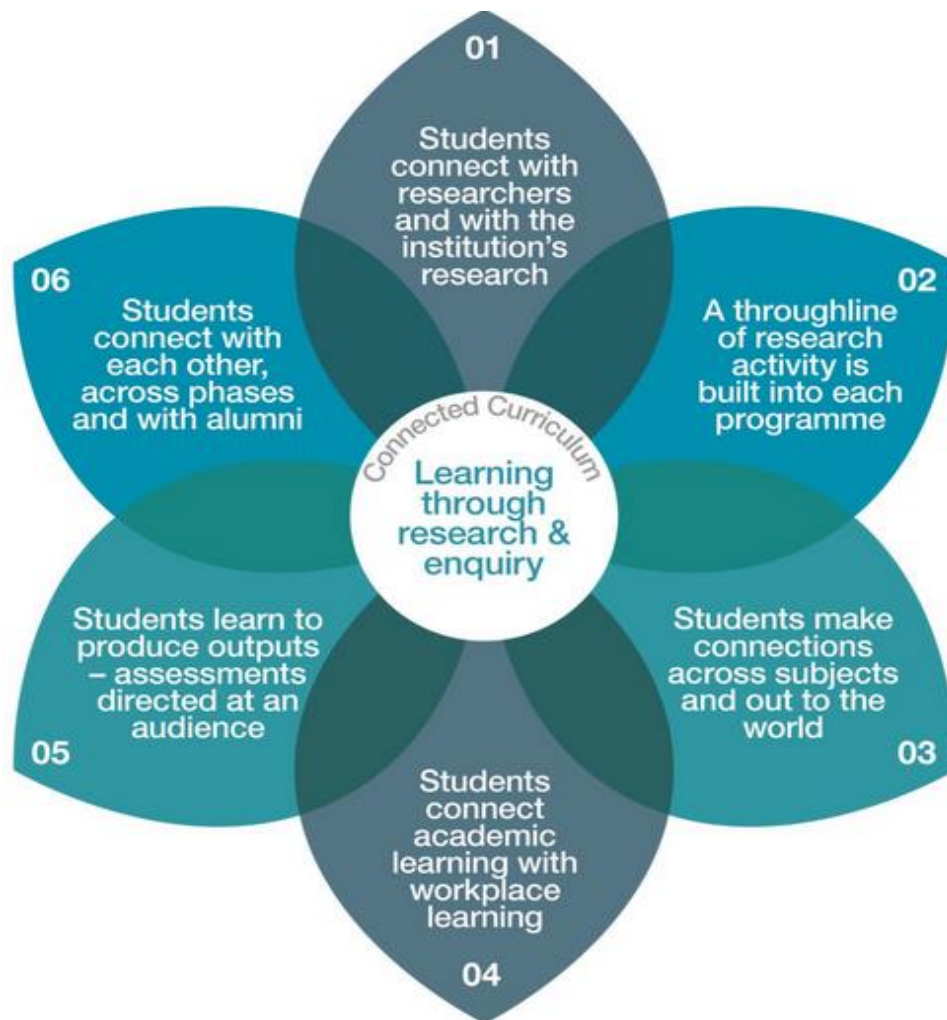
UCL has developed a ‘Connected Curriculum’ initiative whereby, **over five years, all undergraduate programmes of study have a profile of ‘research-based’ characteristics.**

The connected curriculum has six dimensions based on the core principle of learning through research and inquiry (Figure 5.1). “The six dimensions of the Connected Curriculum build on a commitment to the integration of education and research for the benefit of all. The focus is not just on the ‘effective’ learning of individuals, but also on higher education as a values-based, research-education ecosystem that needs to be developed as a connected whole” (Table 5.2) (Fung, 2017, 8).

The initiative, coordinated by the Centre for Advancing Learning and Teaching (CALT), requires revising the criteria for promotion so that excellence in education is as significant to advancement as excellence in research and innovation. The implementation also involves reviewing all programmes and designing clear strategies for working more closely with students, who can act as partners and change agents. A guide was developed which presents four benchmark descriptors (a-d) for each of the six Connected Curriculum dimensions: a) Beginning, b) Developing, c) Developed, and d) Outstanding, to help departments map their progress in implementing the Connected Curriculum in taught programmes.

Sources: Arthur (2014); Carnell & Fung (2017); Fung (2016; 2017); Fung & Carnell (2017); Tong et al. (2018)

Figure 5.1 UCL's Connected Curriculum Framework



Source: Fung (2017, 5)

Box 5.2 Curricula are organised around the concept of student as producer at the University of Lincoln, UK

Student as producer is central to the learning and teaching philosophy at the University of Lincoln. In this approach, **the emphasis is on students producing knowledge in partnership rather than just consuming it**. The focus of student as producer is the student, working in collaboration with other students and academics in real research projects or projects which replicate the process of research either in or outside of their discipline. Staff and students can apply for development funds through the Undergraduate Research Opportunities Scheme (UROS) to support work that further embeds the principles of the student as producer at Lincoln. This approach has made research-engaged teaching a priority within the institution. As new courses are developed and existing ones undergo re-validation, staff and students are asked to consider student as producer in terms of the following key principles:

- Discovery – students learning through their own inquiry;
- Collaboration – working together to develop knowledge and understanding;
- Engagement – being part of a community of staff and students;
- Production – students as producers of knowledge rather than consumers.

These principles are enabled through assessment, citizenship, employability, pedagogy and curriculum, resources, skills, space, and technology. The University of Lincoln also promotes students as active partners in quality enhancement through working collaboratively with staff, recognising that students are experts in their student experience. The University of Lincoln was the first to introduce a specific, institution-wide Student Engagement Strategy, placing the [*Student as Producer*](#) philosophy at its core. [Case studies](#) of student engagement / student as producer are available.

Sources: <http://studentasproducer.lincoln.ac.uk/>; <https://lalt.lincoln.ac.uk/student-as-producer/>; Crawford *et al.* (2015); Neary (2010); Neary (2014); Neary *et al.* (2014)

Table 5.2 The Connected Curriculum in 20 questions

Dimensions	Key questions for departments and programme teams
Core principle Students learn through research and enquiry	1. Are students encountering specific questions addressed by researchers and learning to articulate their own research questions, at every level of study? 2. Can we adjust our teaching methods, student assessments and other aspects of departmental practice to prioritise engaging all students actively in research and critical enquiry?
Dimension 1 Students connect with researchers and with the institution's research	3. Do students have regular opportunities to learn about the institution's research, and other current research relevant to their studies? 4. Are students meeting with researchers and engaging with their work? 5. Are students exploring the intellectual, policy-related, practical and ethical challenges associated with current research, and recognising their relevance to professional life more widely?
Dimension 2 A throughline of research activity is built into each programme	6. Is there a well designed core sequence of modules, units and/or learning activities through which students steadily build their research skills and understandings, and is this explicit to students? 7. Are students explicitly challenged to make intellectual connections between different elements of their programme? 8. Can students have some flexibility and even take risks with their research-related activities, for example by working towards a Showcase Portfolio for which they can curate their best work?
Dimension 3 Students make connections across disciplines and out to the world	9. Is the programme of study structured so that students need to step outside their home discipline(s) and see through at least one other disciplinary lens? 10. Are students required to make explicit connections between disciplinary perspectives, for example by collaborating with students of other disciplines to analyse evidence and issues? 11. Through making interdisciplinary connections, are students challenged to address complex global challenges?

(continued)

Table 5.2 (continued)

Dimensions	Key questions for departments and programme teams
Dimension 4 Students connect academic learning with workplace learning	12. Are all students on the programme(s) able to analyse the ways in which their academic learning is relevant to the world of work? 13. Do students have explicit opportunities to prepare for the workplace, for example through meeting alumni, shadowing, and work placements, and where appropriate through critiquing the notions of work and professionalism in society? 14. Can students articulate effectively the skills and knowledge they have developed through their research-related activities and through their wider studies and experiences, and showcase these to future employers?
Dimension 5 Students learn to produce outputs: assessments directed at an audience	15. Are some student assessments outward-facing, directed at an audience, thereby enabling them to connect with local and/or wider communities (whether online or face-to-face)? 16. Are student assessments across the programme suitably varied, enabling them to develop a range of skills including expertise in digital practices and communications? 17. Are students required to revisit and use feedback on their tasks, both formative and summative, in order to improve their work?
Dimension 6 Students connect with each other, across phases and with alumni	18. Do students have frequent opportunities to meet and participate in collaborative enquiry with one another in diverse groups? 19. Are they building connections with students in other year groups, for example through events or mentoring schemes? 20. Can students meet and learn from diverse alumni, and build a strong sense of belonging to an inclusive research and learning community?

Source: Adapted by Carnell & Fung (2017, 5-6) from Fung (2017, 146)

Box 5.3 Mainstreaming undergraduate research and inquiry at Miami University, Ohio, US

Miami University moved from a teaching and learning paradigm to a discovery paradigm, supporting the development of **students as scholars**. The **TOP 25 project**, begun in 2007. Over a four-year period, the TOP 25 Project involved the largest recruiting courses (actually 29) being rewritten as inquiry-based courses. Each course was allocated \$35,000 to fund curriculum revision. Learning technologists and educationalists supported the faculty teams involved.

Key to this initiative is the **student as scholar** model in which institutions are “progressing from an *instructional paradigm* that emphasizes telling students what they need to know, to a *learning paradigm* that emphasizes inquiry in shaping how students learn what they need to know within the traditional academic context, and culminating in a *discovery paradigm* that encourages students to seek and discover new knowledge, emphasizing inquiry with no boundaries” (Hodge, 2008, 2–3, emphasis added).

Responses to survey questions show that the Top 25 courses promote active, engaged learning. Compared to students in the traditional sections, students in the redesigned sections report:

- More frequently discussing ideas from class with others outside of the classroom;
- Spending much more time working with other students on projects during class time;
- Spending less time memorising facts and ideas; and
- Spending more hours on their coursework and working harder than they thought they would to meet faculty expectations.

The top 25 courses also place a greater emphasis on higher-level thinking skills. Compared to students in the traditional sections, students in the redesigned sections report more frequently:

- Supporting their ideas and beliefs with data or evidence;
- Making judgments about the value of information, arguments, or methods by examining how others gathered and interpreted data and assessing the soundness of their conclusions;
- Synthesising and organising ideas, information, or experiences into new, more complex interpretations and relationships; and
- Working on a project or paper that requires integrating ideas from various sources.

Many faculty not involved in the Top 25 project also adopted similar changes. Because the redesigned courses are creating new expectations among students, they are now arriving in class expecting to be challenged and ready to take more responsibility for their own learning. See also Table 8.1.

Sources: Hodge *et al.* (2009; 2011); Taylor *et al.* (2012); Ward & Dixon (2008)

Box 5.4 Engaging students in pedagogic research projects at Northampton University, UK

URB@N stands for 'Undergraduate Research Bursaries at Northampton'. It is an innovative scheme developed by the university where **students are selected to work as paid researchers on a pedagogic research project in partnership with a staff member**. Following an initial pilot in 2009, the scheme has run annually since and is an embedded part of institutional scholarship activity. Also known as (P)URB@N, postgraduate students have been included in the scheme since 2019. Each project has a named staff member from academic or professional services who acts as a supervisor. Rather than being discipline-focused, research projects are centred on learning and teaching and are explored through student voices. Staff are encouraged to propose research questions that have the potential to benefit the department, faculty, and/or institution and that will ultimately have a positive impact on the student experience. Students selected for the scheme work with staff members on design, data collection, analysis, and dissemination. Upon successfully completing the project, students receive a tax-free bursary payment of £500. Some examples of the topic areas investigated in previous projects have included:

- Student experience of transition to and within the university
- Student use of assessment feedback
- Issues surrounding seminar participation
- Engagement with e-resources and online communities
- Student mental health and well-being
- Perceptions and experiences of active blended learning
- Inclusivity in the curriculum
- Support for international students

Sources: <https://mypad.northampton.ac.uk/te/urban/>; Butcher & Maunder (2014); Maunder (2015); Maunder (2021)

Over the last decade, there has been a growing interest in a broader, more comprehensive form of research and scholarship in the college-based higher education (CBHE) sector, which is less typical in higher education as a whole (Eaton, 2015; Healey et al., 2014b; Lee et al., 2020). For example, at West Herts College, they research the need for a local sports development project in a work-based module (Box 5.5).

Box 5.5 Linking first and second-year assessment strategies through researching the need for a local sports development project in a work-based learning module at West Herts College, UK

In the second semester of their first year, Foundation Degree in Sport Studies (FDSS) students develop a project proposal to research the need for a local sports development project. Students complete a project proposal form, which is then presented to a panel for assessment. In year two, students are encouraged to approach employers with their year one sports development project proposals to fulfil the requirements of their double-semester work-based learning (WBL) module. On average, seven out of ten students take advantage of this opportunity, with others seeking projects related to marketing and management. Within WBL, students are required to network with employers to find a niche in the employers' market. Students develop, implement, analyse, and reflect on their implemented project proposals, and this forms the basis for a 5,000-word mini final project. The nature of the inquiry-based project in year one enables learners to thoroughly research and investigate their potential projects before implementing them in year two, clearly demonstrating study progression and academic skill development. Examples include: a proposal to increase female sports participation, which resulted in a cricket enrichment programme at a local secondary school for year eight female pupils and an employment opportunity for the FDSS student; a proposal to increase Sikh community sports opportunities, which resulted in a varied sports enrichment programme at a local primary school within a Sikh community.

Sources: Correspondence with Charlotte Gale; Healey et al. (2014b, 24)

5.3 Approaches to mainstreaming student research and inquiry across institutions

We created a typology of institutional approaches to mainstreaming student research and inquiry by examining examples of institutional embedding practices and policies (Healey & Jenkins, 2009, 80-81). Within this broader framework, we identified activities that academic developers may find relevant to their institutional context (Table 5.3).

In presenting this typology, we recognised that the combination of appropriate strategies varies between institutions and national systems. The central message here is for academic developers to be aware of the range of possible strategies and decide which to prioritise, given their local context (Mathieson, 2019). As Brew and Cahir (2014) argue, based on their study of two Australian universities, academic developers seeking to embed undergraduate research need to recognise that this is a long-term process and that institutional and national priorities will change. Hence, it may be necessary to reshape the form of undergraduate research promoted to reflect such changing priorities.

Table 5.3 Strategies for mainstreaming undergraduate research and inquiry across institutions

A. Develop supportive institutional strategies and policies

- Ensure that undergraduate research and inquiry are clearly recognised in these strategies; this applies particularly to institutional teaching and research strategies, but other policies, such as decisions supporting student employability and community engagement, may also offer possibilities for intervention

B. Encourage and support student awareness and experience of undergraduate research and inquiry

- Ensure that early career and continuing professional development courses explicitly include strategies to support undergraduate research and inquiry
- Work with student organisations to help them become partners in promoting undergraduate research and inquiry

C. Ensure institutional practices support undergraduate research and inquiry

- Intervene to ensure quality assurance, quality enhancement, and institutional assessment processes and policies support students as researchers
- Align student support from library, information, and communication technology services, and laboratories with needs of students undertaking undergraduate research and inquiry

D. Encourage academic staff awareness and support and reward engagement with undergraduate research and inquiry

- Provide support to academic staff with regard to professional development so that they are encouraged to become engaged in undergraduate research and inquiry
- Intervene in institutional policies to provide incentives and rewards for academic staff to support undergraduate research and inquiry, particularly through workload planning, institutional and departmental promotion policies and decisions

Source: Healey & Jenkins (2018, 59) based on Healey & Jenkins (2009, 80-81)

Brew (2006, 161) argues that **“The separation between what undergraduate students are doing and what academics are doing presents one of the most important challenges in developing a research-based higher education curriculum.”** She advocates that developing research-based curricula means moving beyond isolated, one-off research activities embedded in traditional courses. It involves a more holistic approach, considering the entire student experience and how it aligns with the research and scholarship of academic staff. This includes opening up spaces where students and staff can meet, inviting undergraduates to departmental seminars, and displaying staff and student research outputs in public areas. Universities that adopt such integrated, systematic approaches are taking meaningful steps toward bridging the divide between teaching and research, and, as we saw in chapter 2.3, increase both students’ research awareness and direct research experience.

Summary

- **Evolution of the research-education nexus:** Humboldt's vision of integrating research and teaching in universities is foundational, but the challenge of implementing this idea persists. The divide between research and teaching has been growing over time. However, recent shifts in university strategies aim to reintroduce research-based education, focusing on improving undergraduate education, involving students in research, and reassessing the traditional divide between teaching and research.
- **Institutional challenges and approaches:** Although many universities claim to have a research-based curriculum, institutional policies often create barriers between teaching and research. Research-intensive institutions prioritise research over teaching, often at the cost of effective integration. However, some institutions have developed innovative strategies (e.g., UCL's *Connected Curriculum*, University of Lincoln's *Student as Producer*) to embed research-based education across their programs.
- **Mainstreaming research and inquiry:** A typology of institutional approaches to integrating student research and inquiry highlights the diversity of strategies. Academic developers must tailor their approaches to local contexts and recognise that embedding research in the curriculum is a long-term process. Effective integration extends beyond isolated activities, necessitating a holistic approach that aligns student experiences with staff research, promotes collaboration, and bridges the divide between teaching and research.

This chapter has focused on various institutional strategies to promote the research-education nexus. How these strategies play out within each institution depends on the nature of the disciplinary and interdisciplinary courses they house. The next chapter discusses this.

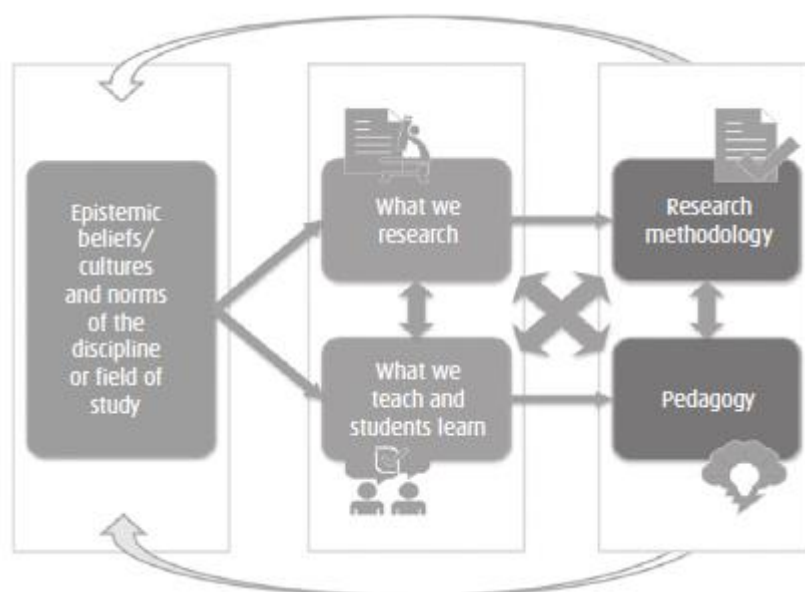
6. Disciplinary and interdisciplinary practices

“academic departments are central to developing the links between research in the discipline and student learning ... [for this is where] students’ intellectual development and staff identity can and should be developed by departments focusing on the ‘nexus’.” (Jenkins et al., 2007, 2)

6.1 Disciplinary practices

Disciplines have distinct approaches to their research and pedagogy that reflect their subject matter (Cleaver et al., 2018; Kreber, 2009) (Figure 6.1). Hence, it is unsurprising that the research-education nexus can vary between disciplines. In Smeby’s (1998) study, humanities and social sciences academics were likelier to believe there was a relationship between teaching and research than academics in medicine, natural sciences, or technology. This, he explained, was because research in the humanities and social sciences was less specialised than research from other disciplines and, therefore, easier to link to undergraduate teaching.

Figure 6.1 Connecting research and teaching in disciplinary communities



Source: Cleaver (2014) cited by Cleaver & Wills (2017, 148)

This finding was confirmed by Robertson and Blacker (2006). They argue that **differences in the research-education nexus between academic disciplines are closely linked to how knowledge is structured within each field**. In disciplines with a high level of agreement on foundational principles, such as physics, knowledge is generally built cumulatively. Consequently, there tends to be a hierarchical relationship in which research informs teaching, which in turn supports student learning. In contrast, in disciplines with less consensus, such as English, the structure of knowledge is more open and accessible, allowing students to engage with it earlier, often through conducting their own research. Colbeck (1998) concludes that it is challenging to bring research into the classroom in ‘hard’ disciplines, such as the physical sciences and engineering, for two reasons: their hierarchical knowledge structures often make

advanced research inaccessible to undergraduates, and rigid curricula can stifle the introduction of new material.

Although there is evidence of disciplinary differences in the research-education nexus, these can be overstated. For example, Zimbardi and Myatt (2014) examined whether there were disciplinary biases in the use of the four curricular models of undergraduate research they identified (Table 2.2) using the soft-hard, pure-applied continua (Becher & Trowler, 2001). They found that most categories of disciplines employed each model, although some discipline types used specific models more frequently than others. For example, the model of undergraduate research most frequently employed by the applied disciplines was the industry project model, while hard and pure disciplines favoured apprenticeships. This suggests that “academics can be encouraged to use examples of undergraduate research activities from a range of different disciplinary contexts when designing or refining their curricula” (p. 245).

This suggests that students in the social sciences, humanities, and the arts may find it easier to understand the latest research, but may have fewer opportunities to work alongside staff than those studying science, technology, engineering, and mathematics. In other words, **it may be easier at the natural science end of the discipline spectrum to involve students in research processes, while at the humanities end, there are more opportunities to involve them with the research products** (Healey, 2005; Healey et al., 2023). This difference is also reflected in how staff treat their graduate students. In STEM disciplines, supervision is often viewed as an integral part of the research process. In contrast, in the humanities and social sciences, supervision is more frequently regarded as an aspect of teaching (Kyvik & Smeby, 1994).

While the growth of interdisciplinary and multidisciplinary approaches opens new possibilities (Healey et al., 2023), “most academics teach in departments defined by disciplines and most students take courses in departments defined by disciplines” (Middendorf & Shopkow, 2018, 2). Therefore, **many students and staff still view their academic identity in terms of their discipline or profession** (Healey, 2000; Healey & Jenkins, 2003). While noting the disciplinary forces shaping how students experience the teaching-research nexus in Table 6.1, it is important to recognise that there are **significant differences within disciplines, reflecting the type of institution and the personal biography of the individual** (Trowler & Wareham, 2007).

Table 6.1 Disciplinary ‘forces’ shaping how students experience the teaching-research nexus

-
1. *Research and teaching cultures and attitudes* – Disciplinary communities have distinct cultures and may differ in their attitudes to the roles of research in teaching
 2. *Research organisation* – E.g., team-based (sciences) vs individualistic (humanities)
 3. *Research and scholarship connections* – In some disciplines (e.g., the humanities), the boundaries between research and scholarship may be less defined than in the sciences. It may, therefore, be easier to connect staff research and curriculum content in some disciplines than in others
 4. *Disciplinary research frontiers in relation to the curriculum* – Staff research in some disciplines may be too difficult for undergraduate students to understand
 5. *Hierarchical disciplinary knowledge structure* – When the disciplinary knowledge structure is very hierarchical, it may not be feasible to engage undergraduate students in disciplinary inquiry until later years
 6. *Disciplinary concepts of knowledge and ontology* - How individuals see knowledge shapes the teaching-research relations they perceive and construct
 7. *Student perspectives and expectations* – Students’ motivation for study and expectations of university learning will shape their attitudes to research and problem-solving activities
 8. *The role of professional societies and accreditation requirements* – Professional requirements for accreditation may support or impede teaching-research linkages in the curriculum
 9. *The role of practice in shaping knowledge and the curricula in professional disciplines* – If professional knowledge of practice is valued over developing research skills and knowledge, then an emphasis on teaching-research linkages may be seen as an impediment
 10. *The role of Mode 2 knowledge in professional disciplines* – In some disciplines, teaching-research linkages may need to emphasise staff consultancy-based research, dissemination and application over the research process
-

Source: Based on Krause et al.’s (2008, 27-28) summary of Jenkins et al. (2007, 34-40)

Numerous publications have addressed the research-education nexus in various disciplines. Table 6.2 gives examples structured around subjects and disciplines taught in the three Colleges at the University of Westminster, along with some examples of the research-education nexus for disciplines not taught at Westminster.

Table 6.2 Examples of the research-education nexus in disciplines

A. Taught at Westminster

Business School

Accountancy – Lubbe (2014)

Built Environment and Construction – Durning & Jenkins (2004); Griffiths (2004); Pan et al. (2012)

Business – Cargill & Cunningham (2024); Harvey (2022); Malcolm (2008); Stöblein & Kanet (2016)

Economics – Cortinhas & Stlefenhofer (2022); McGoldrick (2007)

Music – Wiley (2022); Young (2022)

Tourism and Event Management – Deale (2019); Edelheim (2017)

Design, Creative and Digital Industries

Architecture – Carnell (2016); De Walsche (2018); Ebert et al. (2022); Smith (2020)

Art & Design – Bage (2019); Bennett et al. (2010); James (2017); Wareham & Trowler (2007)

Computer Science – Fife (2010); McGill et al. (2012); White & Irons (2007)

Design – Britt (2013); Godau & Beling (2022); McLaughlan et al. (2021)

Media Practices – Dooley et al. (2020)

Liberal Arts and Sciences

Biological Sciences - Brownell & Kloser (2015); Smallhorn et al. (2015); Spronken-Smith et al. (2011)

Criminology - Strudwick (2019); Strudwick & Young (2023)

English – Kinkead (2019); Symonds (2021)

History – Kelly (2014); Sleeter et al. (2019)

Humanities – Kyvik (2015)

Languages & TESOL – McKinley (2019); Whittle (2019)

Law – Arvanitakis & Matthews (2014); McKenzie et al. (2018); Walker (2013)

Politics – Lam (2024); Lightfoot & Piotukh (2014); Moseley & Connolly (2021)

Psychology – Limniou et al. (2019); Lippmann (2021); Robertson et al. (2011)

Sciences - Kirkup & Bonfiglioli (2011); Rowland et al. (2019)

Social Sciences - Cuthbert et al. (2012); Ruth et al. (2021)

B. Taught in other universities

Geography, Earth and Environmental Sciences – Healey (2005b); Spronken-Smith & Hilton (2009)

Engineering - Magnell & Geschwind (2019); Stamou et al (2019); Stappenbelt (2013)

Medicine – Howell (2021); Imafuku et al. (2018); Vereijken et al. (2018); Wallace et al. (2018)

Nursing – Naidoo et al. (2023); Pezaro et al (2021)

Physical Sciences – Abraham et al. (2022); Hua & Shore (2013); Snyder (2022)

Social Work - Archer-Kuhn (2020); Jacob (2018)

Teacher Training – Afdal & Damsa (2018); Perines & Hidalgo (2022); Wang et al (2023)

Six mini-case studies follow, examining the research-education nexus in tourism, business studies, biology, art and design, history, and public administration (Boxes 6.1-6.6). See also Boxes in Chapters 7 and 8 for other disciplinary examples.

Box 6.1 Business students contribute to solving sustainability challenges at Nottingham Trent University, UK

How can universities help businesses to combat climate change? In a unique partnership, Nottingham Business School (NBS) has teamed up with Nottingham-based social enterprise NetPositive to do precisely this. As part of their core curriculum, **final-year undergraduate students act as consultants to local businesses, helping them to reduce Greenhouse Gas Emissions and achieve Investor in the Environment (iiE) Accreditation.** While learning about related underlying research and theories, students directly apply these to the organisations allocated to them. Based on their research, the students also develop new ideas, contributing to the existing knowledge of how to reduce greenhouse gas emissions. Students can also choose to focus their final research project, which runs in parallel with the consultancy project, on 'Greenhouse gas reduction and management' or any related topic, such as sustainable innovation. In 2014, the 10-week programme was run in collaboration with 150 final-year students and 32 organisations and local businesses. The programme builds on a greenhouse gas management project, which has been run by NBS since 2011, involving over 200 students and 50 companies, ranging from shopping centres to Indian restaurants.

The students work in groups of 4-5 and attend weekly teaching sessions, which include a 60-minute lecture followed by a 60-minute seminar. They develop working relationships with their allocated business outside of class, undertaking at least one site visit. Feedback is provided by businesses and tutors to enable students to improve their final presentations and reports, which are then collectively presented to tutors and companies. Businesses have commented positively on the students' professional work, particularly their evidence-based, innovative ideas for reducing carbon emissions. Ideas have ranged from plans for a carbon-free Christmas in a shopping centre to innovative ways to reduce lift usage and change employee behaviour.

NBS also offers, in partnership with NetPositive, an international summer school where students from across the globe help local businesses gain iiE Accreditation. The latest summer school led other universities to implement this approach in their respective institutions worldwide. NBS was awarded the Guardian University Award 2015 in Business Partnership for this project.

Sources: Correspondence with Petra Molthan-Hill; <http://www.theguardian.com/higher-education-network/2015/mar/19/business-partnership-category-winner-and-runners-up>

Box 6.2 Modelling the research experience: Tourism students' virtual conference at the Universities of Lincoln and Wolverhampton, UK

Every year, **final-year tourism students at the Universities of Lincoln and Wolverhampton participate together in a live virtual conference as part of their final-year assessment.** A conference is a valuable vehicle for extending insight into the process and practice of knowledge creation and dissemination, and for students to participate as research disseminators. Information technology has made it possible: during the specified one-week timeframe, students across two campuses can come together at their convenience to participate in a joint effort to disseminate research findings and engage in dialogue about their research. Feedback from students has been very positive and encouraging. Two qualified web designers built the site and have been available to address any technical issues. The teaching staff provided support throughout the conference. Students submit a full conference paper, but only a summary discussion paper appears on the website. Each student must also post a comment on another conference paper, in true conference dialogue tradition.

Source: Healey & Jenkins (2025, 37)

Box 6.3 First-year students pose questions through observation in biology at ANU, Australia

In groups of 12–20, students conduct this exercise while **walking through the nearby Australian National Botanic Gardens with a demonstrator (TA)** as part of the 350-student introductory class on Evolution, Ecology and Genetics. The exercise takes 2 to 3 hours, plus additional time to write up the results afterwards. **It gives first-year students the freedom to start thinking like scientists, stimulates their curiosity, and encourages them to engage with their peers.** Students are taken for a short walk through the gardens and encouraged to observe their surroundings. They are then sent off ‘solo’ for around 30 minutes to write down 10 questions (e.g., Why do eucalyptus leaves dangle?). Each student then reads one or more of their questions to the group, and together, the students and tutor restate the question as a hypothesis (e.g., eucalypt trees in arid environments have leaves that dangle at steeper angles than those in wet environments) and design an experiment to test that hypothesis. The exercise builds confidence and comfort with the experimental process, demonstrates what makes a ‘good hypothesis’, and begins to get students thinking about elements of experimental design.

Source: [Adrienne Nicotra](#)

Box 6.4 Developing authentic undergraduate research in art & design at Nottingham Trent University, UK

The Critical Practices Modules are integrated throughout the students' undergraduate degree, spanning years 1, 2, and 3. The teaching process in Years 1 and 2 develops this focus on research and collaborative learning. The modules focus on critical and contextual thought and practice in the context of an undergraduate design programme. **The teaching starts from the presupposition that the research process as an inquiry should have primacy and that the modes of development and exposition should be 'authentic' to the research context.**

Authenticity in the context of a creative art and design programme is therefore understood to include creative art and design practice. Student research is as likely to be situated in the context of developing creativity in the context of a Primary School, or practically applying Bakhtin's notion of carnival to flashmobs, or it might be focused on deconstructing Wagnerian Stenography, or analysing the visual language of Jacobean play texts. The final-year major research project has been revalidated to replace a written dissertation with a three-part structure:

- A 'research document' in any form relevant to the research. This can include the traditionally written dissertation, but has also included video, animations, documented performances, artefacts and business plans. These are usually integrated into written texts.
- An abstract of 750 – 1500 words articulates the fundamental aspects of the research project (research question, methodology, findings, and conclusions).
- A seminar presentation which frames the research for a live audience, where the student responds to questions that arise from the research.

Source: Healey (2025b, 8)

Box 6.5 Wikipedia and lying about the past at George Mason University, US

'Lying About the Past' is an advanced history course where students construct false Wikipedia articles or edit current ones in ways that involve creating fake documents, interviewing fictitious experts, and constructing documents; in short, creating historical hoaxes. Thus, one group of students using "newspaper databases ... identified four actual women murdered in New York City from 1895 to 1897, victims of broadly similar crimes. They created Wikipedia articles for the victims, carefully adhering to the site's guidelines. They concocted an elaborate story of discovery" (Applebaum, 2012). T. Mills Kelly, who designed and teaches the course, explains to students that "learning about historical fakery, lying, and hoaxes, we all become much better consumers of historical information. In short, we are much less likely to be tricked by what we find in our own personal research about the past." The course has been a subject of media attention and heated discussion among the Wikipedia and academic communities.

Sources: Appelbaum (2012); Kelly (2014);

http://globalaffairs.gmu.edu/courses/1124/course_sections/6500;

www.timeshighereducation.co.uk/story.asp?storycode=420711

Box 6.6 Facilitating knowledge exchange, knowledge building, research competence, and digital literacy through a student-led Wikipedia group project in an undergraduate class of public administration in Hong Kong

This case study offers an in-depth account and analysis of a student-led Wikipedia group project carried out in a large undergraduate public administration course at a research-intensive university. Targeted at senior undergraduate students, the project highlights how Wikipedia assignments can uniquely enable students to bridge the divide between academic and public knowledge. By transforming information from scholarly, often paywalled sources into freely accessible, high-quality public content, students help broaden access to knowledge.

The project is grounded in four core educational principles: knowledge exchange, knowledge building, research competence, and digital literacy. These principles are embedded within a cohesive learning sequence that includes key assignment components and supportive tasks. The study concludes with practical recommendations designed to maximise learning opportunities and foster an engaging educational environment when using Wikipedia as both a teaching method and a classroom resource.

Source: Lam (2024)

6.2 Interdisciplinary practices

In the previous section, I argued that disciplines play a crucial role in the research-education nexus. A counterview is given by Brew (2001, 23), who argues that it is **“no longer appropriate to base explanations about differences in the experience of research primarily on disciplinary distinctions”**. This is, in part, because of changes in the structure of knowledge, which are increasing the importance of interdisciplinary research (Gibbons et al., 1994).

Gibbons et al. (1994) suggest a shift between ‘Mode 1’ research and ‘Mode 2’ knowledge production. Their studies suggest that knowledge creation is no longer primarily the preserve of universities but increasingly occurs in R&D units of commercial companies, consultancy firms, research institutes and independent think tanks. Jenkins and Zetter (2003) summarise this shift well:

“In a knowledge society, research is context specific and multidisciplinary rather than pure and discipline based; it has social relevance rather than being hypothesis led; it uses fuzzy, rather than empirically based data; it is problem solving rather than deductive. In what might be termed the commodification of knowledge, how knowledge is managed, synthesized and adapted become as important as knowledge itself. This requires not only a familiarity with the traditional academic researcher skills such as rigorous methods of inquiry and verification, but new skills, above all in organizing the deployment of knowledge in practical situations and using a knowledge base to derive solutions to new problems, rather than advancing the internalizing world of knowledge itself” (p. 11).

The last few decades have seen a growth in interdisciplinary studies in higher education. Most universities offer interdisciplinary degrees as part of their portfolios. For example, the *integrated science courses* at Leicester and McMaster collaborate and have a student exchange program (Gretton et al., 2022). [UCL](#) offers an integrated engineering programme,

whereas engineering degrees at Manchester include an *integrated foundation year*. UCL also has the [Bachelor of Arts and Sciences](#). Popular interdisciplinary degrees are offered in many institutions, including international business, climate change, gender studies, food engineering, environmental science, and sport science. The *Times Higher* has a spotlight guide on [interdisciplinarity in teaching](#). Engaging students in research and inquiry is a common pedagogy in interdisciplinary studies.

Interdisciplinary research is “a source of evidence to help address global social challenges, and a valuable basis for research-informed university teaching” (British Academy, 2016, 8). Four examples illustrate the integration of research and inquiry into interdisciplinary programmes (Boxes 6.6-6.9). Other examples are discussed by Fung (2017, 69-83).

Box 6.6 Interdisciplinary inquiry-based learning (IDIBL) focused on action research in the workplace at Bolton, UK

The IDIBL framework project at the University of Bolton developed an undergraduate and postgraduate module framework for inquiry-based learning, which includes final-year honours projects. The student is viewed as an action researcher who must identify an opportunity for improvement within their work context. Learners support each other in an online community to combine study with work. The modules contained within the framework focus on process and generic concepts and outcomes rather than subject content. **A personalised inquiry is developed through a negotiation process between the individual learner and the course staff to include learning activities and assessment products that meet the module requirements and are informed by the learners’ professional practice.** The student then plans the action they will take, undertakes it in their own work context, evaluates the action, and revises the plan.

Source: Powell & Olivier (2012)

Box 6.7 Community project work in architecture and built environment at the University of New South Wales, Australia

In 2007, the **Architecture programme trialled an outreach program/course that engaged upper-level students in community-oriented research and learning.** In 2011, the **FBEOutTHERE!**, course offerings became an integral aspect of a faculty interdisciplinary learning initiative that Year 3 students are required to undertake. Shaped by the needs of community partners, the Faculty define a range of projects for student teams. The projects are interdisciplinary and consist of both research and design phases. For example, a local housing project required students to learn how to research traffic flows, pedestrian behaviour and how community groups saw these issues. The students proposed designs to manage traffic better and ensure community involvement, and then presented their findings to community groups.

Sources: Corkery & Quinlan (2011); Quinlan *et al.* (2008)

Box 6.8 Human trafficking and migrant smuggling working group at the University of Queensland, Australia

In 2011, the University of Queensland's School of Law and the School of Political Science and International Studies established a faculty research group to analyse migrant smuggling in Australia. Each semester, between 12 and 18 students join the group to conduct an independent research project on topics related to human trafficking and migrant smuggling, under the guidance of the course coordinators. Members of the working groups may receive academic credit for their research or participate as volunteers, mentors, or alumni. Participation in the group enables students to gain research experience and exposure to different research methodologies while contributing to Faculty research on critical contemporary issues.

Sources: Anon (2012); Curley & Schloenhardt (2014);

<http://www.law.uq.edu.au/migrantsmuggling>;

<http://www.law.uq.edu.au/human-trafficking-working-group-members>

Box 6.9 Bridging the divides: An interdisciplinary perspective on the teaching-research nexus and community engagement at the University of Western Sydney, Australia

This project examines how the principles of design thinking can enhance the connection between teaching and research, while **making the case for extending this relationship to include meaningful community engagement**. Set within an ongoing interdisciplinary project on young people and civic participation, the research offers a powerful platform to foster mutually beneficial ties between the classroom, scholarly inquiry, and the broader community. Such connections don't happen by default—they require thoughtful planning and a strong sense of purpose. Drawing on teaching experience in sociology and law, and reflecting on a co-design approach used to study youth citizenship, we demonstrate how design thinking can be a transformative tool for deepening the bond between teaching and research. Ultimately, we argue that authentic and sustained community engagement must be a central part of universities' mission to stay relevant in today's rapidly evolving world.

Source: Arvanitakis & Matthews (2014)

Box 6.10 Involving students in interdisciplinary interactive media consultancy projects at Miami University, Ohio, US

Interactive Media Studies at Miami University is an interdisciplinary program including Computer Science, Engineering, MIS, English, Marketing, Graphic Design, and Education, that brings together students and faculty to investigate how interactive media informs and transforms their disciplinary perspectives. The program began in 1996 and utilises problem-based learning and team-oriented projects to help students apply their theoretical knowledge to innovative digital solutions for paying clients. Approximately 100 students participate in the program each year. The students work in groups of up to 20. Redesigning the organisation's website is a common project. The students decide how to divide tasks; typically, groups undertake development, design and marketing. The programs are team-taught, with the last two weeks dedicated to debriefing and discussing what has been learned. The students are generally in class for four hours a week, but spend many more hours, for example, visiting clients, conducting research, or participating in user testing. They present their findings to the client upon project completion. Commercial companies are charged around \$20,000 per project, while non-profit organisations and charities are charged around \$5,000. They found the client did not take it as seriously when no charge was made. From the client's perspective, they get out-of-the-box thinking that they would never obtain from a consulting firm. The clients typically end up with something that far exceeds their expectations. The students find it surprising and challenging to manage the changes which commonly occur during the development stage of the project.

Source: Healey & Jenkins (2025, 68-69)

6.3 Strategies to promote the research-education nexus by departments and course teams

Decisions about implementing the research-education nexus within disciplines and interdisciplines are primarily taken at the department and course team levels. However, departments, disciplines, and programmes do not necessarily neatly align, particularly with the growth of interdisciplinary centres (Rosowsky & Keegan, 2020). Departments and course teams have a range of strategies open to them to promote undergraduate research and inquiry (Table 6.3).

Table 6.3 Departmental and course team strategies to mainstream undergraduate research and inquiry

-
1. Review understanding *and practice of undergraduate research and inquiry*
 2. Develop a set of related curricula interventions, such as the ones identified by the Boyer Commission (1998):
 - *Make research-based learning the standard*
 - *Construct an inquiry-based freshman year*
 - *Build on the freshman foundation*
 - *Culminate with a capstone experience*
 3. Offer undergraduate research and inquiry as a pervasive and early element of the curriculum
 4. Give students experience of undertaking research and inquiry with different levels of independence
 5. Link undergraduate research and inquiry to student employability
 6. Ensure assessment practices and policies support students as researchers
 7. Include all students in some practices and be selective in others
-

Source: Healey & Jenkins (2018, 57) based on Healey & Jenkins (2009, 70–73).

Summary

- **Disciplinary practices:** Academic disciplines shape how research and teaching intersect, with differences in knowledge structure, research organisation, and curricular integration. Humanities and social sciences more readily link research to teaching due to the accessibility of knowledge structures, whereas science and engineering often face challenges due to the hierarchical nature of knowledge and rigid curricula. However, cross-disciplinary examples show flexibility and overlap in applying research-based teaching methods.
- **Interdisciplinary practices:** Interdisciplinary education is growing in response to real-world, complex problems that transcend traditional disciplinary boundaries. Mode 2 knowledge production emphasises socially relevant, collaborative, and applied research, requiring new pedagogical approaches. Interdisciplinary degrees and research projects provide rich opportunities for engaging students in inquiry and problem-solving.
- **Departmental strategies:** Academic departments play a key role in fostering the research-education nexus by implementing strategies tailored to both disciplinary and interdisciplinary contexts. These include embedding undergraduate research in curricula, leveraging staff research for teaching, and aligning course design with evolving disciplinary and professional expectations.

Disciplinary and interdisciplinary approaches to the research-education nexus are experienced by students differently, depending on the level and year of study, as discussed in the following chapter.

7. Initiatives by level and year of study

“Undergraduate research experiences have typically been opportunities reserved for more advanced students, as an approach to allow them to apply their knowledge and work relatively independently. However, efforts to expand the inclusion of students historically underrepresented in higher education and to scale HIP experiences broadly helped usher in early educational opportunities for research, including the first semester of students’ first college year. The benefits of students’ early engagement in undergraduate research relative to student retention, self-efficacy, and graduation rates are well-documented” (Ambos et al., 2024a, 7).

To reinvent the undergraduate curriculum, research-based education should be at the heart of the venture (Ramsden, 2008). However, it is too late to leave giving students the experience of undertaking research and inquiry and developing the necessary discipline-based skills until the final-year project or dissertation (FYPD). **Preparing students for the FYPD should begin on the first day of the degree course**, as argued in the above quote. This chapter explores examples of developing the research-education nexus at the beginning and end of undergraduate courses, as well as within postgraduate programmes.

7.1 First-year undergraduate research and inquiry courses

Two examples of embedding research and inquiry into first-year courses are presented here. The first example is a case study of how 1,500 first-year students at the University of Sydney, Australia, were engaged in IBL, contributing to an international project on the causes of asthma (Box 7.1). The second mini-case study originates from the University of Saskatchewan, Canada, where first-year students across various disciplines are provided with research experiences (Box 7.2). Other mini-case studies of first-year students engaging with the research-education nexus may be found in Boxes 2.2, 2.4, 3.1, 6.5, and 8.1.

Box 7.1 1,500 first-year biology students are involved in research at the University of Sydney, Australia

First-year Biology students at the University of Sydney contribute to understanding the prevalence of asthma in certain parts of Sydney. Each student learns to pour an agar plate, which they take home and expose in their backyard over a 10-minute period, to collect a sample of airborne fungal spores in the atmosphere. There are 1,500 students in the class, and they live all over the Sydney metropolitan area. Once the fungi have grown into colonies, students learn to use a key to identify them, and the class results are converted into maps showing the distribution of the different species. This generates new knowledge, which they discuss online with an international expert and feed into research programs on allergens. The students reported a better awareness of research and their involvement than those involved in a practical course with traditional textbook demonstrations and practical exercises. Charlotte Taylor describes **a thousand students as an 'ideal' size of a research team for carrying out research of this nature**.

Source: http://www.mq.edu.au/ltc/altc/ug_research/research_curriculum.htm

Box 7.2 First-year students engage in research at the University of Saskatchewan, Canada

In classes of 50 to 350 students, first-year students develop a researchable question, conduct a discipline-relevant investigation, and share their findings. These research experiences are in fields as diverse as business statistics, environmental studies, astronomy, animal bioscience, kinesiology, geography, history, and academic skills classes. Projects can consist of an assignment spanning at least three weeks or fully integrated across a curriculum. With the guidance of experienced students who work as research coaches, first-year students learn from content experts or examine existing, emerging, or historical data and artefacts to explore topics of interest to them.

A sample research question for an individual might be, 'Can the Zika virus-carrying mosquito survive in the current Toronto climate?' Students in social sciences classes work in groups of four to twelve to develop research questions of interest to them, which are answered by class members through online surveys. For example, a research question can be, 'Are class members who reside in rural areas more physically active than those who reside in urban centres?' In other classes, students examine issues in the media, such as popular films, world events, or controversial topics, such as 'How many years would it take to recuperate energy savings equivalent to the start-up costs of installing solar panels in an average, local residence?' The data from questionnaires or other primary sources leads students to conduct literature reviews and synthesise and evaluate results. To communicate findings, students create research posters, develop web pages, deliver in-class presentations, or exchange ideas and reflect on what they have learnt throughout their class-based research experience.

Depending on the instructor and learning outcomes, assessment of learning can include formative feedback and/or marks for participation in activities which lead the groups to complete milestones and projects, on students' developing critical thinking and reflective skills key to becoming scholars, and through exam questions that link course content with the research conducted. Faculty have access to paid research coaches, curriculum and instructional design specialists, and a program evaluation protocol, which fosters a culture of integrating research and teaching, as well as a community of scholars.

Sources: Sangster et al. (2016);

<https://vpresearch.usask.ca/students/undergraduate/undergrad-research-opportunities/first-year-research-experience-fyre.php>

7.2 Final-year projects and dissertations

The FYPD is the most common way undergraduate students gain research and inquiry experience. A *dissertation* in the UK usually refers to an undergraduate honours project. Most undergraduates undertake an honours project for their Bachelor's degree, typically accounting for 20-40% of the final-year credits. Usually, it is a single-authored, 8,000- to 12,000-word piece of work. It has traditionally been seen as the gold standard for higher education. Still, it is under pressure for reform as student participation rates have increased, the numbers studying professional disciplines have grown, and staff-student ratios have deteriorated (Healey et al., 2013a). *Final-year projects* are broader than the traditional honours dissertation and engage students in a significant amount of independent research or inquiry. The term *capstone project* is commonly used in North America and Australasia to refer to integrative final-year projects. Only about half of college seniors in the US completed or are expected to complete some form

of ‘capstone’ or culminating experience. (Kuh et al., 2017). The term capstone is increasingly being used in the UK.

There is evidence of learning gain from taking a final-year dissertation. One UK study analysed over 5,000 graduating students from 2012 to 2016 at a UK university that requires a research project comprising 25% of final-year credits. It found that students achieve better grades on research projects than in the average of other modules. This improvement is greater for students with lower prior achievement, women, and students in the natural sciences, although smaller for Asians and students who declare a disability (Parker, 2018).

Final-year projects differ from ‘traditional’ dissertations. According to Healey et al. (2013a), they are wider in their:

- *conception* (e.g. collaborative projects as part of a research group; consultancy projects)
- *function* (e.g. synthesising capstone projects; preparatory projects for transition into a profession)
- *form* (e.g. student group projects)
- *location* (e.g. employer and community-engaged projects)
- *how they are disseminated and assessed* (e.g. through exhibitions, undergraduate research conferences and other forms of public engagement)

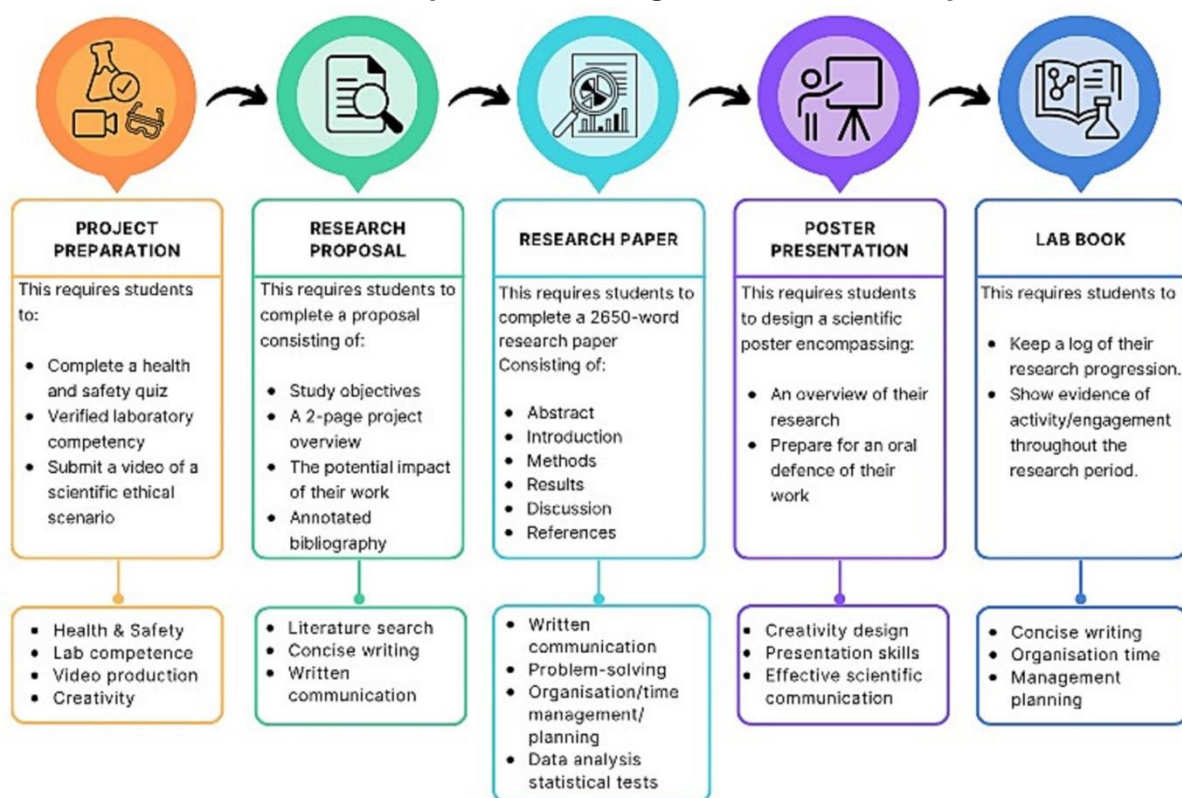
Healey et al. (2013a, 7) argue that:

“both students and staff/faculty should be given choices in the kind of FYPD they undertake/supervise and in the nature of the outputs assessed. This is ... the best way to meet the varied needs of increased numbers of students in higher education and the pressure on staff resources to supervise them. This approach is likely to motivate a wider range of students than the one-size-fits-all mode, which characterises most FYPD, and hence increase the probability that more students will experience transformational learning.”

It is becoming more common to offer students a range of project formats. Students in biosciences at the University of Leeds, UK, have a choice of 12 alternative final-year projects—individual laboratory projects; group laboratory projects; computer simulation projects; bioinformatics (plus) projects; critical review projects (with linked grant proposal); therapeutic or scientific audits; survey projects; science and society projects; science communication and public engagement projects; educational development projects; digital resources projects; and commercial projects (Healey & Jenkins, 2025, 80-81).

Many FYPDs are assessed solely on the final outcome—the written report—but **a range of outputs is becoming more common.** At Aston University, UK, in Biosciences, the project module is a 40-credit module, with 15 credits allocated to project preparation. This consists of a lab competency assessment and a health and safety quiz (Pass/Fail), an ethics video (11.25% of the subject mark) and the research proposal (26.25%). The remaining 25 credits comprise a research paper (37.5%), a poster presentation (18.75%), and a lab book, which contributes to the project supervisor’s mark (6.25%) (Figure 7.2).

Figure 7.2 Bioscience project module assessments and the associated key transferable skills developed at each stage at Aston University, UK



Source: Rana et al. (2024)

Seven examples follow of the development of alternative FYPDs from product design, history, art & design, law, business and management, languages, and bioscience (Boxes 7.3-7.9). See also Boxes 2.7 and 6.3.

Box 7.3 Giving students alternative assessment options for undertaking a product design project at Nottingham Trent University, UK

The module consists of several possible routes. Assessment is based on a learning contract negotiated and agreed between the tutors and students. This contract stipulates the content of work, enabling students to complete one of the following options:

- Option 1: a 10,000-word dissertation and students produce a poster summarising their work.
- Option 2: a 5,000-word conference paper with a supporting presentation that is delivered to peers and tutors.
- Option 3: a conceptual project with a 5,000-word critical justification. In addition to a written outcome, students are required to produce illustrations or simulations.

Prior to students undertaking their chosen assignment, there is a three-week intensive period when students are required to complete their learning contract. The contract identifies what option the student will complete, what they hope to learn and how that learning will be demonstrated. The module involves students using a wide range of primary and secondary research skills. Throughout the year, the direct contact students have with tutors is mainly limited to group or sometimes individual tutorials, where the tutor acts as a ‘consultant’, advising on their proposals, work in progress, what knowledge or skills should be developed, how to tackle certain issues and who students should approach for further information. Occasionally, there will be content common to all students, which will be delivered through lectures, for example, covering approaches to research. There are also opportunities for students to present their work in progress to a panel of tutors and peers to obtain feedback.

Source: Healey (2025b, 6)

Box 7.4 History students contribute research findings to a website at Victoria University, Canada

Micro History and the Internet is a learner-centred, research-oriented course. The main activity is **primary archival research on various aspects of life in Victoria**, British Columbia, from 1843 to 1900. Students work in small groups to conduct the research and eventually publish their findings on the website called “Victoria’s Victoria”.

Source: Healey (2025b, 7)

Box 7.5 The new model dissertation helps art and design students prepare for a digital age at Buckinghamshire New University, UK

The new model dissertation offers art & design students the chance to propose creating either a ‘standard format’ study of 6,000-8,000 words or its direct equivalent in an ‘alternative format’, where the only limitation is that the format must exist in the professional world. We assert ‘**all dissertations are equal**’, meaning that, irrespective of format, they are required to embody five common principles; and are assessed according to identical assessment criteria.

Source: <https://www.youtube.com/watch?v=xNeLC-lpX7I>

Box 7.6 Virtual law placement: Experiencing work-integrated learning in diverse law graduate employment workplaces virtually at Queensland University of Technology, Australia

The virtual law placement enables law students to research and explore various work environments now available to law graduates, including international work placements.

Students are assessed by submitting an application for their preferred placement, contributing to an online discussion forum, participating in the project, and submitting an e-portfolio reflection. Students work as part of a team on a real-world law workplace project, such as an internet-based intellectual property dispute, listing a public company, or conducting research on access to justice for juvenile offenders in Thailand. Students apply legal knowledge and skills to complete a real-world workplace project in a team, utilising online communication technologies to enable virtual, rather than physical, presence at the workplace and engagement with other workplace participants, including the virtual placement's workplace supervisor.

Source: Davies & Shirley (2007)

Box 7.7 Charity fundraising final-year project in business and management studies for enhancing employability at the University of Bradford, UK

This module was designed with two broad outcomes in mind:

- to give students the knowledge and expertise they needed to perform well in the graduate selection process; and
- to add to their CV activities, which would give them something to talk about at an interview and stretch the development of their skills.

The former was delivered via classroom teaching, whilst the latter was seen as the product of **planning and delivering fundraising initiatives for one of a small number of charities.**

Students variously undertook football matches, disco nights, cake stalls, fashion shows, etc, and on a significant number of occasions, obtained corporate sponsorship to cover certain expenses. The emphasis of the module is on the practical demonstration of skills, and students are required to present an analysis of their work and its rationale in an 'Apprentice Boardroom' at the end of the module. The assessment criteria included their presentation skills, team performance, and task performance. Whilst teams that raised larger sums of money typically did better than those that did not, the amount raised was not part of the assessment. Assessment was through a formal presentation undertaken in front of three employers as well as tutors and team documentation (minutes of meetings, accounts, receipt from the charity involved, evidence of communication with the charity, risk assessment of health and safety for the activities proposed, feedback from the mentor and two-side reflective account) submitted one week before the presentation. The documentation indicated potential questions that could be asked at the presentation.

Source: Healey (2025b, 18)

Box 7.8 Language students work in teams on international market research projects at Leeds Metropolitan University, UK

For almost 15 years, **all final-year undergraduates on language degrees at Leeds Metropolitan University have worked in teams of four over a whole year to undertake international market research projects on behalf of local businesses**, following project briefs prepared for them by the managers in those businesses. The students practise the whole range of skills they have developed on their course (applied languages, team-working, time management, research, project management, data analysis, report-writing, presenting recommendations and so on) in a real-world environment based on genuine commercial needs and products.

The students appreciate that they are not working on a case study but with actual products and professionals who teach them about expectations in a professional environment. Over the years, those products have included fashion jewellery, specialist woven fabrics, language services, bathroom equipment and even high-speed, crash-proof shutter doors. Students are particularly fascinated by company or factory tours, as for many of them, it will be the first time they have ever seen behind the facade of a business. The employers also prize the experience, as they receive valuable research that assists them with their strategic development of international markets.

Source: Healey (2025b, 19)

Box 7.9 Bioscience final-year project at Durham University, UK

Bioscience students at Durham University have a choice of three different types of final-year project.

(a) Laboratory-based projects: These provide **an opportunity for students to link to staff research projects**. Many students have the opportunity to work in the research laboratories alongside postgraduate and postdoctoral researchers, and all students have access to the full range of research facilities in the School. The project spans 5 weeks of full-time research, during which students are assigned tasks that can yield concrete results. Many undergraduate projects have generated data that has subsequently been incorporated into scientific papers, with the student as a named author. The project is assessed through a report written as a mini-thesis and a short presentation. This module provides students with a taste of scientific research and exemplifies the School's commitment to delivering research-based education.

(b) Biology Enterprise: Biology Enterprise (BE) is a project-oriented module based on research in a commercial context, with self-selecting groups of 5 or 6 students working together. It is a collaborative venture between Durham Business School and the School of Biological and Biomedical Sciences. **The learning context for BE follows the real-life scenario of forming a biotechnology spin-out company from an academic biosciences research group.** Within this context, BE aims to introduce students to: key processes of business start-up, specifically in the context of a spin-out of an innovation generated as a result of biological research; key factors and considerations that influence the decision-making process of the commercialisation of biotechnological innovation; the necessary skills, knowledge and resources required to take biological innovation from concept through to credible commercial propositions; the purpose of a Business Plan and, using a self-generated idea, how to prepare and present a Plan for a research-led biotechnology spin-out. A core component of BE is an in-depth desk study of a biological topic to collate, review, critically appraise and present the scientific research evidence that underpins the self-generated idea for the biotechnological product or process. The content of this module provides an introduction to key business processes, including idea generation, market research, intellectual property protection, and raising finance, as well as developing individuals' teamwork, project planning, time management, and transferable skills.

(c) Biology in Schools: The Science into Schools module attracts students who see their future in science education or other communication-based activities such as journalism. As for the other research project options, it is research-led, but in this case, the research takes the form of a systematic inquiry into the teaching and learning process. **Students are required to prepare materials for teaching science in secondary schools** and interact with teachers and pupils. After an initial training period, students spend at least 4 hours per week for 10 weeks in a local school. They are expected to graduate from classroom observation, to assist in teaching, and to have the opportunity to undertake whole-class teaching. They will also devise a special project in Biological Sciences for the school, which they will implement and assess. The module is assessed through a journal of activities, reports, a presentation, and a report by the host teacher. This module focuses on developing communication skills, teamwork, and interpersonal skills. This module is only available to a limited number of students, determined by participating schools.

Source: Healey (2025b, 45-46)

7.3 Master's courses

Dissertations may also be undertaken as part of taught Master's degrees, though not all (Krause et al., 2008). They are distinguished from Bachelor's degrees by the concept of *mastersness* (Figure 7.3):

“Regardless of the discipline, mastersness can be considered identifiable by the scale, intensity and complexity of research ... The master's-level student population uses a much wider span of research techniques and methods. Students also have greater control over the actual research, being involved in defining and planning the work” (QAA 2013a, 5).

Figure 7.3 Facets of mastersness



Source: QAA (2013a, 1)

Three examples of Master's level projects follow (Boxes 7.10-7.12).

Box 7.10 Students taking the MA Luxury Brand Management program may undertake a consultancy project instead of a dissertation at Regent's University, UK

The MA in Luxury Brand Management at Regent's University, London, offers students the option of undertaking a consultancy project instead of a more traditional dissertation. This option provides an additional opportunity to apply the knowledge gained on the programme in a practical and real way, as well as a chance to develop their own skills base and enhance their employability in the sector. **Students work on a live project, which the client must complete now, acting as management consultants and working within time constraints to develop costed proposals and recommendations that the client may well adopt.** The consultancy project has an increasing number of students wishing to pursue this route, and employers regularly request repeat projects. The key challenge in terms of 'mastersness' is ensuring that the consultancy projects are sufficiently complex yet not too onerous for the students in the time allowed.

Source: QAA (2013b, 7-9)

Box 7.11 Students in the *Making the Most of Masters* (MMM) partnership may undertake work-based projects instead of dissertations at the Universities of Aberdeen, Edinburgh and Stirling, UK

Making the Most of Masters (MMM), a partnership between the Universities of Aberdeen, Edinburgh and Stirling, aims to enhance student employability and attributes by providing opportunities for master's students to undertake work-based projects as an alternative to the traditional master's dissertation. Working with taught postgraduate (PGT) programmes, MMM seeks to instil personal responsibility in learning, and the initiative supports both programme staff and PGT students in making the most of the experience. **The placement differs from a traditional undergraduate placement or period of work experience because it must fulfil the assessment criteria for a master's dissertation.** Projects can involve data analysis, modelling, reviews, method optimisation and comparison, equipment development, and laboratory or fieldwork, depending on the business needs, the student's interests, and the programme requirements. In addition to the research competency required to produce a master's dissertation, students must demonstrate professionalism when producing a piece of work on behalf of an external organisation. The student takes ownership of assessing the project's feasibility and planning accordingly, managing the relationship between themselves, their academic supervisor, and external supervisor, and ensuring their dissertation is completed on time and adheres to the expectations and requirements of both parties. This is evidenced by the fact that many organisations treat the student as they would an external consultant, and many academic supervisors can take a more 'light touch' approach than with a traditional dissertation.

Source: QAA (2013b, 15-18)

Box 7.12 Creating research teams and belonging among Master's students at Uppsala University, Sweden

At Uppsala University, **Master's students are integrated into the institution's research teams.** Students are also organised in research nodes, where researchers from different departments hold meetings concerning a common study area to share and discuss work from various disciplines on a similar topic. The node is organised and quality assured by a researcher, but most activities and communication are conducted with and by students. Students are the node's resource for its organisation and the individual research projects conducted within its framework. The Node offers selected Master's students and researchers the opportunity for joint research, supervision, and teaching, as well as connection to international networks. A node is focused on a particular research area or topic, which several departments, programmes, and researchers share. Additionally, the node updates the research community on developments in technical skills, for example, through software workshops. By recruiting selected students to the node, researchers can include Master's students in their own research. The student's dissertation topic is framed in accordance with the current research topic of the researcher, who serves as the supervisor. The student thus becomes involved in up-to-date research projects, and the supervisor is enabled to invest teaching and tutoring effort in the Master's student, who, through their own studies, supports the researcher's work. The Master's students of the node are supported and expected to commit to state-of-the-art research alongside other researchers, e.g., writing publications, applying for grants, and organising workshops, seminars, and conferences. In short, by the end of the Master's programme, the student will be prepared for subsequent doctoral studies and to partake in a community of peers.

Source: QAA (2013b, 58-61)

7.4 MPhil and PhD degrees

Both MPhil and PhD degrees primarily focus on training individuals as researchers. Postgraduate research students may also have structured **opportunities to engage with students on taught programmes, for example, by delivering seminars on their emerging work, mentoring undergraduate and Master’s students undertaking research, and taking practical and tutorial classes as teaching assistants** (Fung, 2017; Standen et al., 2018). I have already commented in chapter 2 on the finding by Feldon et al. (2011) that the quality of their research may be enhanced by undertaking teaching. As Leung and Zou (2025, 1) conclude, from a study of the role of community in research-based education at Hong Kong University, “postgraduate students could take a more active role in supporting undergraduate student learning.”

7.5 Strategies to support staff who teach through student research and inquiry

Many of the initiatives discussed in this chapter are the responsibility of individual staff. Several strategies can be considered to support individual staff who teach through student research and inquiry (Table 7.1).

Table 7.1 Strategies to support staff who teach through student research and inquiry

-
1. Develop courses that engage students in research and inquiry from the beginning of their first year
 2. Ensure that progression in research and inquiry is built into programmes
 3. Celebrate and share what is already in place
 4. Create opportunities for faculty and students to experiment
 5. Review and enhance what is in place
 6. Ensure that initial training in teaching and subsequent continuing professional development emphasise student research and inquiry
 7. Reshape academic timetables
 8. Create alternative learning spaces
-

Source: Jenkins & Healey (2015, 31)

To successfully introduce students to inquiry-based learning, staff members must have experience with this approach themselves. “The teacher has to have experienced being the learner” (Brew, 2006, 116).

Summary

- **First-year undergraduate initiatives:** Programmes increasingly embed research and inquiry from the first semester to improve retention, self-efficacy, and graduation outcomes. Examples include large-scale inquiry-based learning (IBL) at the University of Sydney, and discipline-wide research opportunities at the University of Saskatchewan.
- **Final-year undergraduate initiatives (FYPD):** Final-year projects include traditional dissertations and diverse alternatives (e.g., group work, community-engaged projects, and exhibitions). Bioscience departments at Durham, Leeds, and Aston, as well as other departments offering various disciplines at other universities, offer flexible formats and assessments to enhance engagement, skills, and professional readiness.

- **Postgraduate and doctoral initiatives:** Master's research emphasises *mastersness* through complexity, autonomy, and varied methodologies. MPhil and PhD students are trained as researchers and may support undergraduate learning through mentoring and teaching, enhancing research-community integration.

This chapter has focused on the nature of research and inquiry at different years and levels. Sometimes, the examples are not dissimilar, reflecting that they are often developed by individuals following their interests in isolation from what is happening in the rest of the programme. In the next chapter, I make the case for adopting a more strategic approach, emphasising progression in developing research and inquiry skills across programmes.

8. Across-programme initiatives

Building a core sequence of enquiry-based learning opportunities has great promise. It can even lead to a programme-wide Showcase Portfolio, allowing students to collate and curate their best work for assessment (Fung, 2017, 56).

8.1 Approaches to designing progression into the research-education nexus across programmes

Most of the case studies of the research-education nexus that Alan Jenkins and I have collected refer to practices by individuals at the course level. There are far fewer at the programme level. **Yet if departments and course teams are going to be serious about implementing institutional policies to promote the research-education nexus, it is essential that they are strategic about how students progress through their programmes in terms of their capabilities to undertake research and inquiry and their research-mindedness** (Healey & Jenkins, 2009; Malachowski et al., 2024). **Too often, students experience research and inquiry haphazardly through the curriculum and may encounter similar practices in various courses in different years, with no attention given to progression.** Fung (2017), whom I quoted at the beginning of this chapter, refers to the need to build *throughlines* in programmes: “Each programme of study needs to be designed in such a way that students experience a connected sequence of learning activities that empower them, step by step, to apply the skills and dispositions needed to undertake investigations” (p. 6).

Preparing students for their final-year project

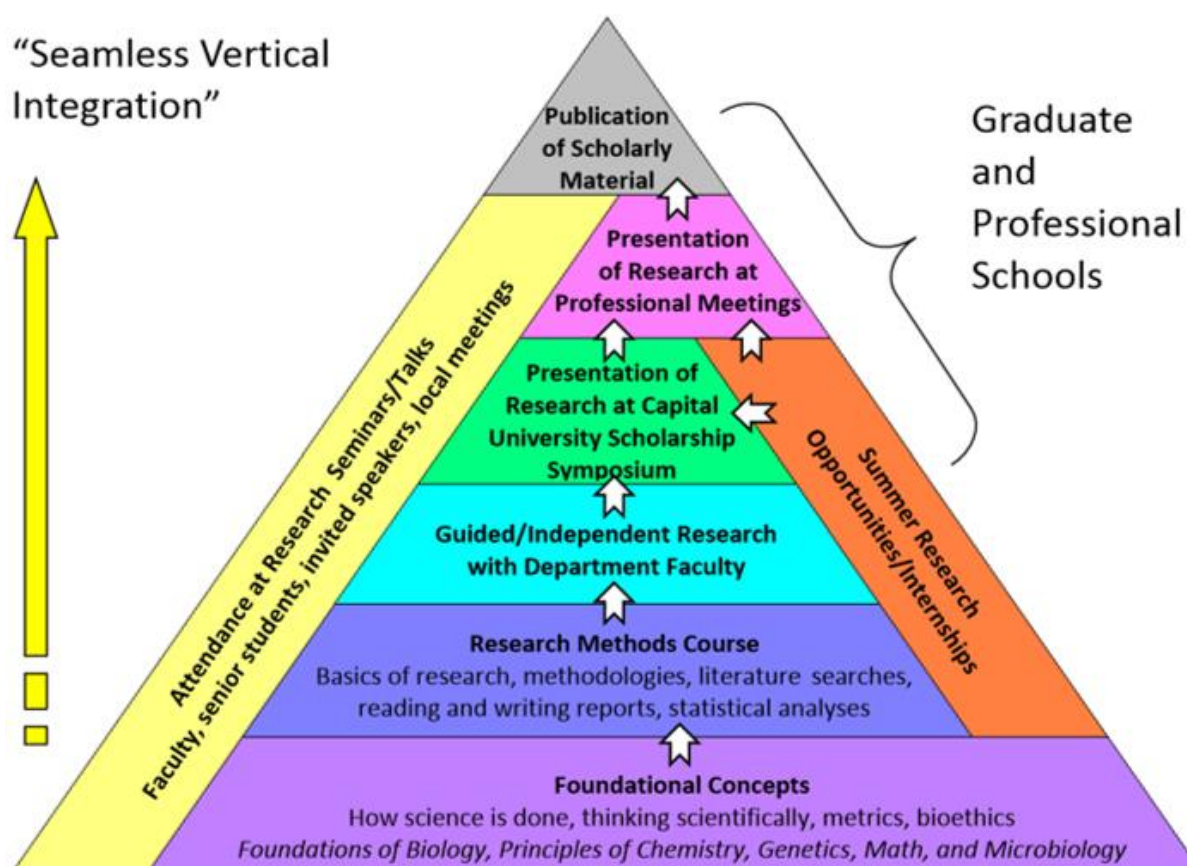
A common comment from external examiners in the UK about FYPDs is that the students do not appear to have been sufficiently prepared. This should begin from day 1 of the programme (Healey, 2013a). Shanahan (2017) makes a similar point in relation to undergraduate research capstones in the United States. She argues: “The purpose, scope, and process of research are unclear without a scaffolded curriculum leading up to it” (p. 7).

Providing students with an experience of **a team inquiry project earlier in the course can help with preparation**, as a team can undertake a more ambitious project than students working independently. The University of Utrecht offers a particularly effective approach to providing third-year cell biology students with an authentic team research experience, without requiring participation in laboratory work that typically occurs later in their studies. In this program, students collaboratively explore a research topic and methodology and co-author a PhD proposal (Healey et al., 2013a, 34).

Two examples of strategic approaches to integrating research and inquiry across programmes are given in Figures 8.1 and 8.2. Both emphasise transitioning from Year 1 to Years 3/4, focusing on foundational concepts and research methods in Years 1 and 2, shifting to inquiry-based learning to explore existing knowledge in Years 2/3, and undertaking independent research projects that contribute to new knowledge in Years 3/4. **The Natural Sciences Program at the University of Leicester and the Integrated Science Program at McMaster University have successfully jointly implemented the framework depicted in Figure 8.2 for over a decade** (Symons et al., 2017). This framework builds on the four quadrants identified by Griffiths (2004), Healey (2005), and Levy and Petrusis (2012), but reconfigures them into a diamond shape to more effectively represent students’ progression as researchers. While it still reflects a general shift from students being receivers to producers of research knowledge, the diamond layout

highlights that this development is not a strictly linear process. The lower quadrant represents activities where students primarily receive research knowledge. Typically, first-year research projects begin in the research-briefed and research-based quadrants to guide students towards a research-oriented approach by the end of the first year and ultimately into research-apprenticed models at more advanced stages.

Figure 8.1 Integration of teaching inquiry and undergraduate research across the biological sciences curriculum at Capital University, Ohio, US



Source: Cheesman (2015, 60)

The idea of there being **phases in the development of the research-teaching nexus** is taken up by Clark and Hordósy (2019). They suggest that disciplinary knowledge, relationship with researchers, experience in research practice, and the nature of independent learning all develop in phases (Table 8.1).

Table 8.1 Phases of development in the research-teaching nexus

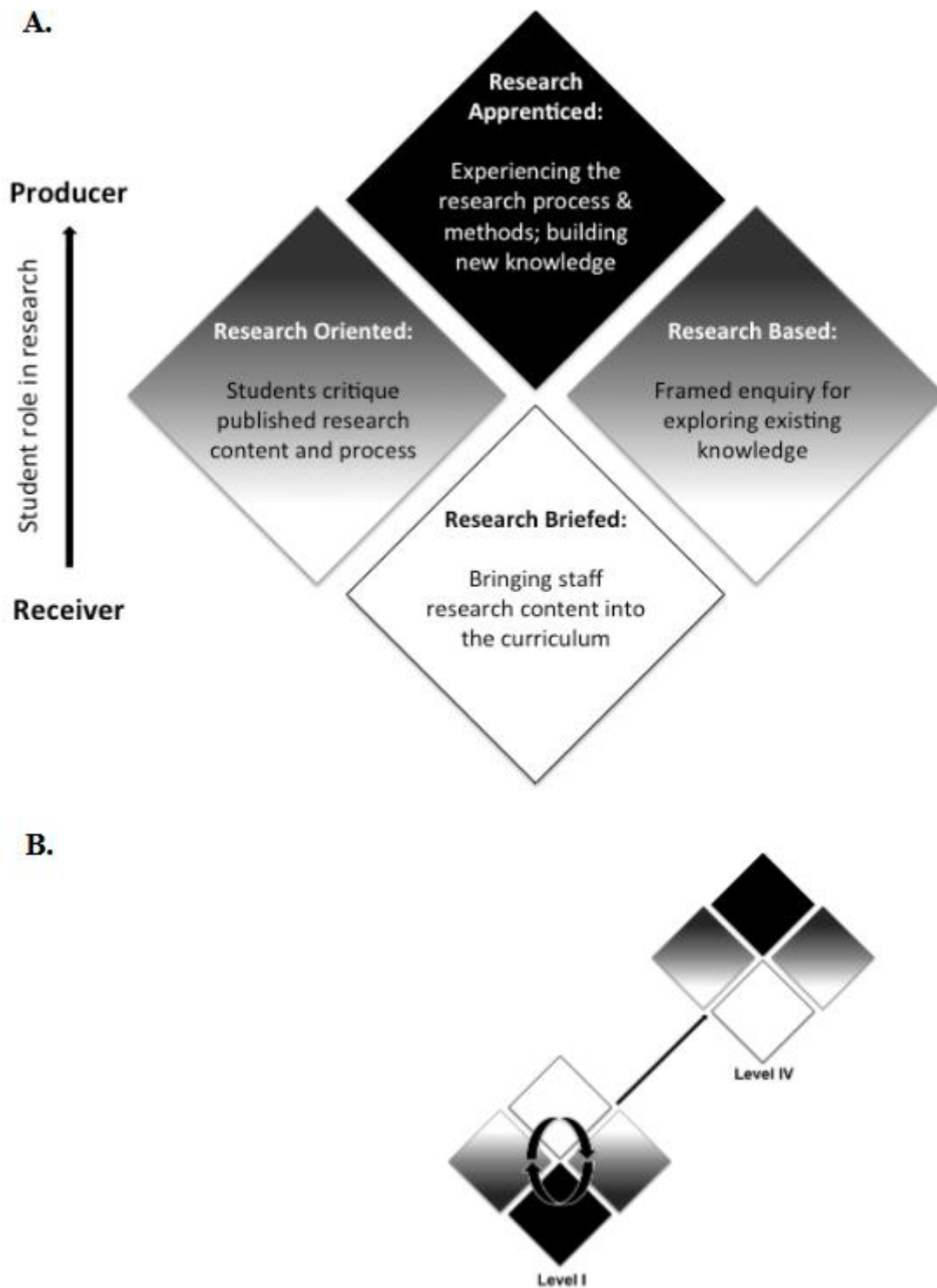
	Phase one	Phase two	Phase three
Focus of disciplinary knowledge	Broad	Selecting	Narrow
Relationship with researchers	Distant	Personable	Close
Experience of research practise	Guided	Problem-based	Generative
Nature of independent learning	Answering	Critical	Discovering

Source: Clark & Hordósy (2019, 417)

Figure 8.2

A. Research-teaching nexus portraying a continuum of student learning from the roles of research receiver to research producer

B. Concentrations of learning occurring in Levels I to IV

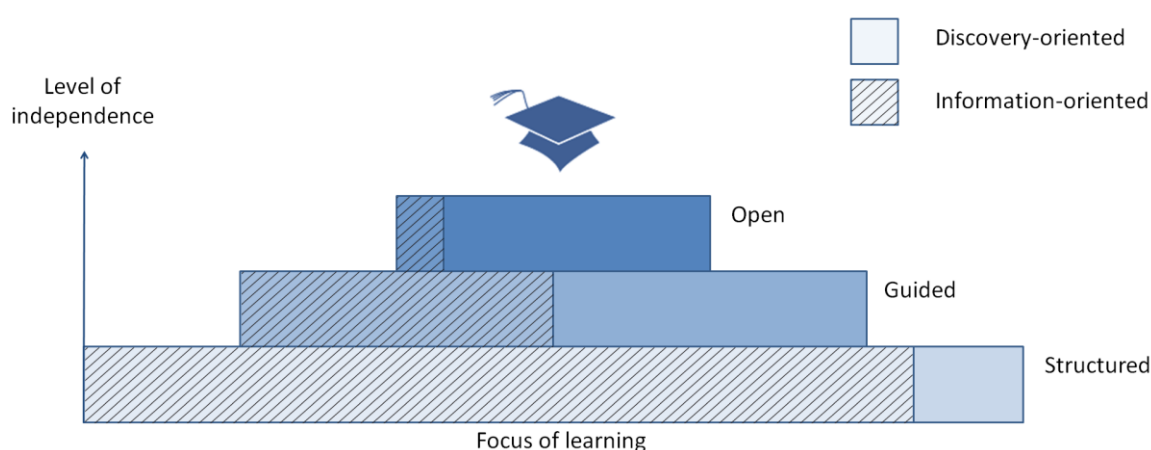


Source: Gretton et al. (2022, 262)

Level of scaffolding

A helpful distinction may be made between **structured, guided, and open kinds of IBL**, depending on the level of scaffolding (Spronken-Smith & Walker, 2010). The focus of learning shifts between predominantly information-oriented and predominantly discovery-oriented activities as students progress from structured to open IBL (Figure 8.3). The model is “deliberately constructed in a stepped fashion to illustrate the scaffolding metaphor – the wider base is where teachers provide more support for learning of inquiry skills, whilst at the top students are more independent, and there is less teacher support” (p. 736). This implies that the development of inquiry skills may be best achieved through structured inquiry in the first year, guided inquiry during the second year, and open inquiry at the third-year level (Serekoane et al., 2025).

Figure 8.3 Conceptual model showing the relation between different modes and framing of inquiry-based learning and the teaching-research nexus



Darker shading indicates strengthening of teaching-research links and enhanced learning outcomes

Source: Spronken-Smith & Walker (2010, 736)

However, the models in Table 8.1 and Figure 8.3 are arguably too linear and straightforward. I suggest that **the purpose of the first IBL experience is to motivate students rather than train them in inquiry skills, and this is best presented as an open activity, in which the purpose is for the students to enjoy the experience and want more of this method of teaching** (Healey & Jenkins, 2009). Let the students make mistakes, and then, when they are introduced to research methods in a later course, you can refer back to the feedback you gave them in the first exercise, saying, for example, “Remember I said your conclusions were over-generalised in the last exercise because you had not taken a rigorous sample (a social science class) or you did not have a control group (a science class). I will now teach you how to sample/establish a control group.” This should help students understand the necessity of learning these research methods. This strategy is well illustrated at the University of Gloucestershire, where IBL was introduced as an induction activity (Box 8.1). Motivating students is a key factor behind the examples of introducing IBL in first-year courses (Boxes 3.1, 7.1, and 7.2).

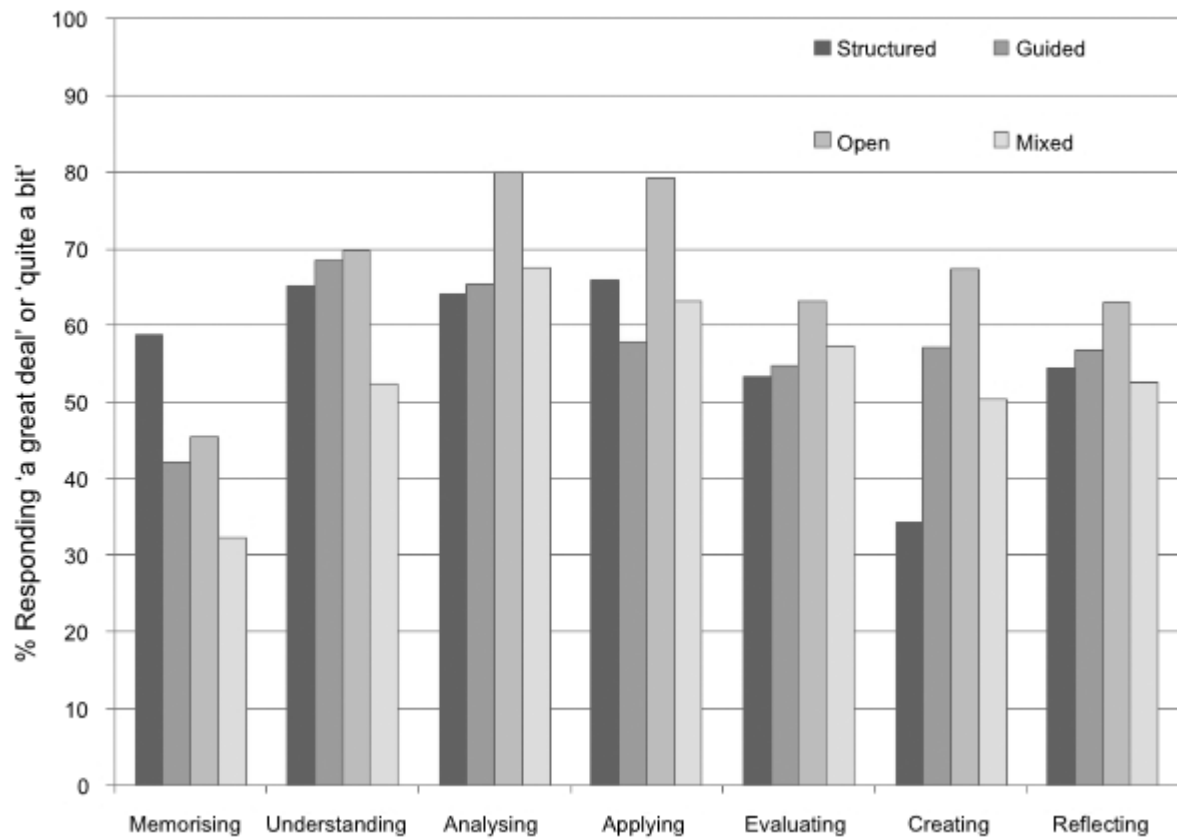
Box 8.1 Undergraduate research begins in induction at the University of Gloucestershire, UK

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 how primates at Bristol Zoo communicated. Other faculties in the University developed their own versions of undergraduate research as part of induction in later years. It has also proved a **significant staff development activity both for the many academic tutors involved in designing inquiry-led activities and for the library staff who changed their approach to library induction to support the specific student research projects**.

Source: Healey & Jenkins (2025, 103)

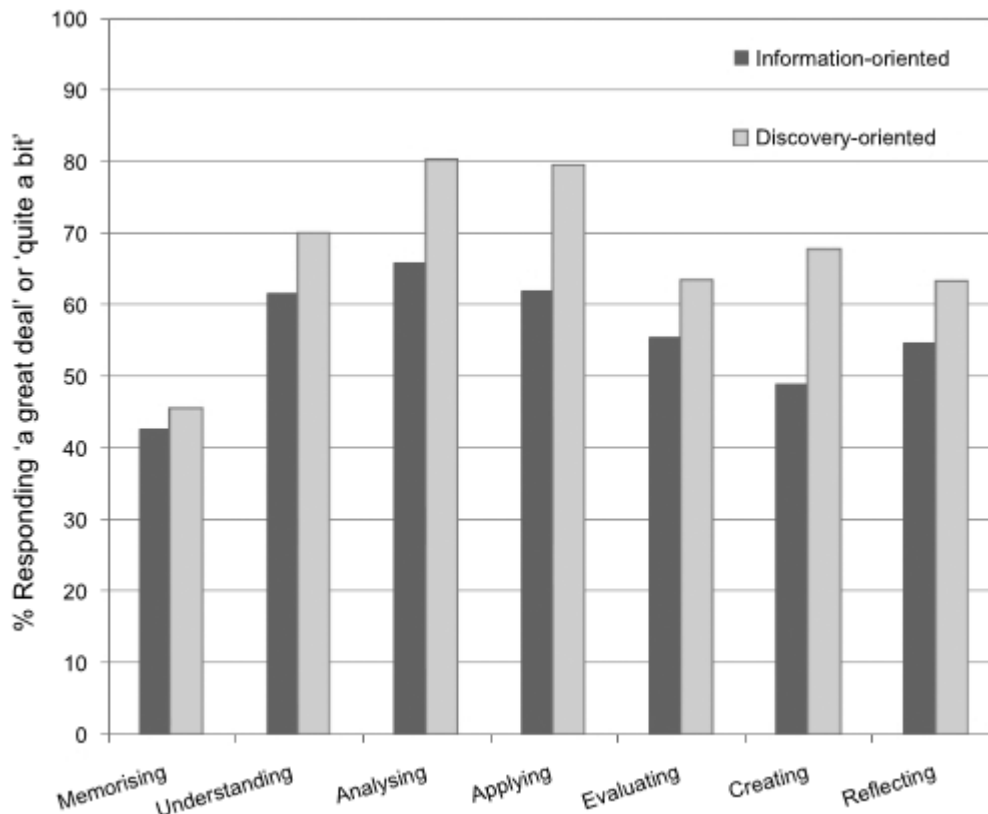
Further analysis of 940 students undertaking 15 IBL courses in New Zealand showed that using Bloom’s (1956) taxonomy of educational goals, students reported experiencing higher-level learning for open inquiry than for structured or guided inquiry. Only for memorising did a higher percentage of students report ‘a great deal’ or ‘quite a bit’ for structured inquiry than for other modes (Spronken-Smith et al., 2012) (Figure 8.4). Moreover, a higher percentage of students reported more learning for each of Bloom’s taxonomy of goals for discovery-oriented inquiry than for information-oriented inquiry (Figure 8.5). This suggests that **when designing IBL activities, it may be better to select open and discovery-oriented inquiry when possible, as they lead to higher-level learning**. Nevertheless, this “should not detract from other forms of IBL being used in a curriculum, since these arguably promote development of a range of inquiry and research skills equipping students for more advanced types of research and inquiry” (Spronken-Smith et al., 2012, 68).

Figure 8.4 The influence of mode of IBL on type of learning encouraged



Source: Spronken-Smith et al. (2012, 64)

Figure 8.5 The influence of framing of IBL on type of learning encouraged



Source: Spronken-Smith et al. (2012, 66)

The student developmental journey

The work of Baxter-Magolda (1992, 2012), at Miami University, Ohio, on the **student development journey towards self-authorship** is insightful in planning program-level initiatives. In the mid-1980s, she followed the intellectual development of a cohort of students through the four years of their undergraduate courses. This led her to argue that university curricula need to support student 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 judgement of evidence; their role is to exchange and compare perspectives, think through problems, and integrate and apply knowledge” (Baxter Magolda, 1992, 75).

When Hodge was appointed President at Miami in 2006, he found that **Baxter Magolda’s ideas about the student journey towards self-authorship provided the conceptual framework he needed to implement his ideas on ‘student as scholar’** (Box 5.3). He summarised this in Table 8.2. However, it is essential to remember that students develop at different rates. In any given year, there will be students at various stages of intellectual development, and not all students will have achieved self-authorship by the time they graduate. Hence, “it would be a mistake to map the three levels neatly to a three- or four-year curriculum” (Moore et al., 2011, 355).

Table 8.2 The student developmental journey

Developmental level	Student traits
Reliance on external references [Foundations]	Knowledge is viewed as certain Reliance on authorities as a source of knowledge Externally defined value system and identity
At the crossroads [Intermediate learning]	Evolving awareness of own values and identity and of limitations of dependent relationships
Self-authorship [Capstone]	Awareness of knowledge as contextual Development of internal belief system and sense of self-capacity to engage in authentic, interdependent relationships

Source: Based on Hodge et al. (2008)

Vertically integrated projects

Another form of programme-level initiative is **vertically integrated projects** (VIPs). “VIPs enable more experienced students to mentor others while allowing all participants to develop understanding of career pathways in research” (Pitchford et al., 2021, 126-127). Originally developed at the Georgia Institute of Technology (GTech), this teaching model was further advanced by the **University of Strathclyde**, where it was enhanced through alignment with the United Nations’ Sustainable Development Goals (SDG) Agenda 2030 and enriched by interdisciplinary collaboration via ‘horizontal integration’ across all four faculties.

“... research teams consist of undergraduate students ranging from all year groups; encouraging students to work continuously on the same project (gaining academic credit) throughout their University career. This ‘vertically integrated’ approach ensures a constant throughput of students is maintained, where ‘new generations’ of students joining the team can build on the successes of, and learn lessons from, students who have gone before them. Over time, these VIP teams can reach a critical mass and level of continuity that allows the formation of long-term research groups, consisting primarily of undergraduate students. This allows teams to address relatively bold and ambitious research challenges” (Strachan et al., 2019, 1314).

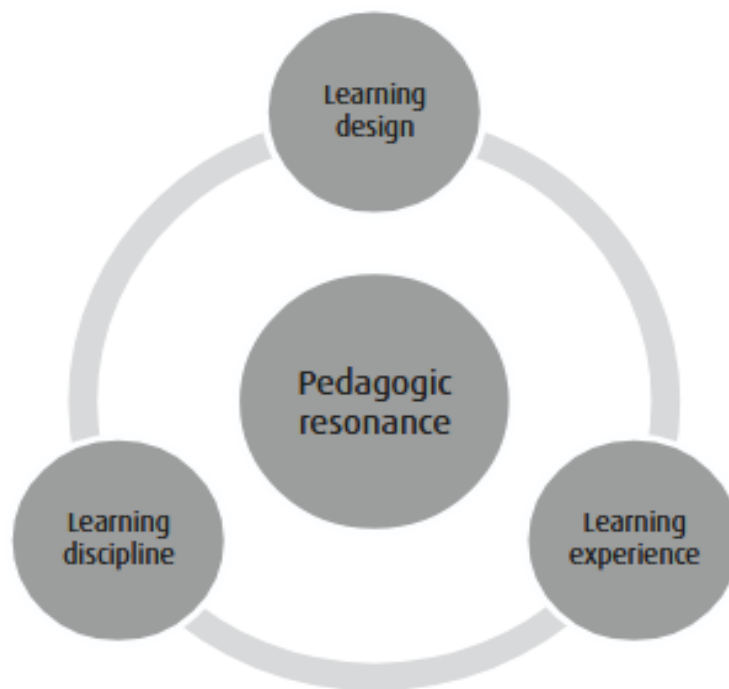
The growth in interest in VIPs is shown by [The Vertically Integrated Projects Consortium](#), which is an international group of 50 institutions from 14 countries. The **University of Westminster** has recently validated two vertically integrated modules: one at Level 4, which focuses on students developing UNESCO Education for Sustainable Development competencies in interdisciplinary teams, and one at Level 6, which focuses on students developing the capabilities required to lead, enhance, and evaluate the work of specific VIPs. Students are assigned to vertical or horizontal teams. These teams pursue research questions and projects, initially led by the interest and enthusiasm of a staff member, with partnership principles to the fore. Ideally, projects may be co-created.

Development of pedagogic resonance

Pedagogic resonance is a concept related to the connected curriculum (Box 5.1; Table 5.2). Edwards and McLinden (2017) argue that **embedding a rich variety of research-teaching links from the outset of a programme is essential for achieving pedagogic resonance**. This involves aligning the course’s learning outcomes, teaching methods and assessment (learning design), the learning activities the students will engage (learning experience), and practices and

traditions of the discipline into which the students are being initiated (learning discipline), thereby fostering a cohesive and authentic educational environment (Figure 8.6).

Figure 8.6 The components of ‘pedagogic resonance’ in the connected curriculum’



Source: Edwards & McLinden (2017, 22)

Developing students' research skills

A principle of designing research and inquiry experiences across programmes is that the development of the student's research skills progresses. **The Research Skills Development framework helps academics conceptualise how they can explicitly facilitate student research skill progress** (Figure 8.7) (Willison, 2012; Willison & O'Regan, 2007). The framework outlines a progression through various levels (1-5 is undergraduate), starting with reproducing existing knowledge, communication using everyday language, and evaluation based on predetermined criteria. As students advance, they begin to use discipline-specific language, contribute to extending knowledge, and apply self-devised criteria. Levels 6 & 7 show the framework's application at Master's and PhD levels.

Willison (2012) contends that **explicitly integrating research skill development into regular coursework can be more effective than mentored undergraduate research** in helping students develop their ability to frame research questions and motivate them to pursue further research degrees. Evidence also shows that its use “developed a variety of discipline-specific research skills and that these skills were useful for subsequent studies and especially for employment” (Willison 2012, 905). The RSD framework has also been used in workshops to design learning outcomes and pedagogical strategies applicable across all programmes and clearly demonstrate how all students can engage in research and inquiry, thereby bridging the gap in access to undergraduate research (Shanahan, 2017). However, as with the phases of development models discussed earlier in this chapter, the **RSD framework suggests a linear and unidirectional progression**, whereas students may be at different levels depending on the topic and context, and progress at different rates.

Table 8.7 Research Skill Development framework

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Researchers...

Table 1: Researcher Skill Development Framework

A conceptual framework for the explicit, coherent, incremental and cyclic development of the skills associated with researching. ©Willison & O'Regan, August 2008/October 2015

← supervisor instigated → researcher instigated → discipline leading →

		Prescribed Research Level 1	Bounded Research Level 2	Scaffolded Research Level 3	Self-Initiated Research Level 4	Open Research Level 5	Adopted Research Level 6	Enlarging Research Level 7
		Highly structured directions and modelling from supervisor prompt the researcher(s) to...	Boundaries set by and limited directions from supervisor channel the researcher(s) to ...	Scaffolds placed by supervisor enable the researcher(s) to independently...	Researcher(s) initiate and supervisor guides.	Researcher(s) determine guidelines that are in accord with discipline or context.	Researcher(s) inform others' agendas	Researcher(s) enlarge the field of inquiry.
Factors of Research	a. Embark & Clarify Respond to or initiate research and clarify or determine what knowledge is required, heeding ethical, cultural, social and team (ECST) considerations.	Curious Respond to questions/ tasks provided explicitly. Use a provided approach to clarify questions, expectations and ECST issues.	Respond to questions/ tasks implicit in directions. Choose from several provided structures to clarify questions, expectations and ECST issues.	Respond to questions /tasks generated from instructions. Choose from a range of provided structures or approaches to clarify salient elements including ECST issues.	Generate questions/aims/ hypotheses framed within structured guidelines. Anticipate and prepare for ECST issues.	Generate questions/aims/ hypotheses based on experience, expertise and literature. Delve into and prepare for ECST issues.	Identify previously unstated gaps in literature and articulate research directions and ECST issues in response to gaps.	Articulate research directions that expand or direct the field and anticipate the corresponding ECST issues.
	b. Find & Generate Find and generate needed information/data using appropriate methodology.	Determined Collect and record required information or data using a prescribed methodology from a prescribed source in which the information/data is clearly evident.	Collect and record required information/data using a prescribed methodology from prescribed source/s in which the information/ data is not clearly evident.	Collect and record required information/data from self-selected sources using one of several prescribed methodologies.	Collect and record self-determined information/ data, choosing an appropriate methodology based on structured guidelines.	Collect and record self-determined information/ data, choosing or devising an appropriate methodology.	Synthesise others' methods to formulate novel methods/ methodologies or apply existing methods to novel applications.	Generate new methods/methodologies that are used widely.
	c. Evaluate & Reflect Determine and critique the degree of credibility of selected sources, information and of data generated. Metacognitively reflect on processes used.	Discerning Evaluate sources/ information/data using simple prescribed criteria to specify credibility and to reflect on the research process.	Evaluate sources/ information/data using a choice of provided criteria to specify credibility and to reflect on the research process.	Evaluate information/data and inquiry process using criteria related to the aims of the inquiry. Reflect insightfully to improve own processes used.	Evaluate information/data and the inquiry process using self-determined criteria developed within structured guidelines. Refines others' processes.	Evaluate information/data and inquiry process using self-generated criteria based on experience, expertise and the literature. Renews others' processes.	Generate substantial research outcomes, so that ideas, practices or interpretations are cited/implemented by others.	Generate substantial research outcomes, so that ideas, practices or interpretations become foundational in field or discipline.
	d. Organise & Manage Organise information and data to reveal patterns and themes, and manage teams and research processes.	Harmonising Organise information/data using prescribed structure. Manage linear process provided (with pre-specified team roles).	Organise information/data using a choice of given structures. Manage a process which has alternative pathways (and specify team roles).	Organise information/data using recommended structures. Manage self-determined processes (including team function) with multiple pathways.	Organise information/data using self-or-team-determined structures, and manage the processes, within supervisor's parameters.	Organise information/data using self-or-team-determined structures and management of processes.	Form a research team or a team of community-based practitioners.	Form and develop research networks/communities.
	e. Analyse & Synthesise Analyse information/data critically and synthesise new knowledge to produce coherent individual/team understandings.	Creative Interpret given information/data and synthesize knowledge into prescribed formats. Ask emergent question.	Interpret several sources of information/ data and synthesise to integrate knowledge into standard formats. Ask relevant, researchable questions.	Analyse trends in information/data and synthesises to fully integrate components specified. Ask rigorous, researchable questions.	Analyses information/data and synthesizes to fully integrate components, consistent with parameters set. Fill knowledge gaps that are stated by others.	Analyse and create information/data to fill researcher-identified gaps or extend knowledge.	Synthesise others' concepts or interpretations to frame novel outcomes. May also address substantial concerns of a community.	Develop new concepts or interpretations that expand the field or discipline. May also address substantial concerns across communities.
	f. Communicate & Apply Discuss, listen, write, present and perform the processes, understandings and applications of the research, and respond to feedback, accounting for ethical, cultural, social and team (ECST) issues.	Constructive Use prescribed genre to develop and demonstrate understanding from a specified perspective. Apply to a similar context the knowledge developed. Follow prompts on ECST issues.	Use discipline-specific language and prescribed genre to develop understanding, and demonstrate it to a specified audience. Apply to different contexts the knowledge developed. Clarify ECST issues.	Use discipline-specific language and genres to demonstrate scholarly understanding for a specified audience. Apply the findings to diverse contexts. Specify ECST issues that emerge.	Use appropriate language and genre to address gaps of a self-selected audience. Apply innovatively the knowledge developed to a different context. Probe and specify ECST issues in each relevant context.	Use appropriate language and genre to extend the knowledge of a range of audiences. Apply innovatively the knowledge developed to multiple contexts. Probe and specify ECST issues that emerge broadly.	Change the conversation within the discipline/field through publicly- available communication of knowledge/understanding. Articulate and promote relevant ECST issues.	Change the direction of the conversation across disciplines/ fields. Articulate and promote ECST issues that were previously unstated.

Source: Willison (2009)

8.2 Examples of designing progression in the research-education nexus across programmes

The following mini-case studies illustrate some of the diversity of across-curriculum research-based education practices. The first discusses the *research-active curriculum* at the University of Sunderland (Box 8.2). The second shows how inquiry-based learning skills are developed across the four years of a health science program at McMaster University, Canada (Box 8.3). The following mini-case study describes how research and inquiry are integrated into the zoology curriculum at the University of Tasmania, Australia (Box 8.4). Finally, in Box 8.5, how research tasks are progressively introduced at different year levels from first year to Master's are identified in the Applied Theatre program at Griffith University, Australia. An earlier case study illustrated how the range of different ways of promoting active student involvement in research and critical inquiry is embedded across the BA English programme at De Montfort University (Table 2.6). A later case study illustrates the application of the conceptual model (Figure 8.3) to the design of the ecology programme at the University of Otago (Box 12.2). Other throughline vignettes may be found in Fung (2017).

Box 8.2 Implementing a research-active curriculum at the University of Sunderland, UK

The University of Sunderland, in 2010, revised its institutional teaching and quality assurance processes to deliver a **research-active curriculum**. At level 3, all programmes ensure that students experience a suitable synoptic activity, which helps them bring together their understanding of their discipline and professional area and prepare them for their subsequent employment and civic engagement. Implementation of this broad framework is at the Faculty level. The undergraduate curriculum is designed to promote the progressive development of graduate research attributes fostered through increasing student engagement in enquiry and understanding of research in a structured way through all levels.

In the Business School, the undergraduate programmes have been redesigned to offer a common first year, comprising an 80-credit 'super module' in which students will work in multi-disciplinary teams to research and design a business start-up and a 20-credit *Contemporary debates in ... module*, where experts from the various disciplines of business and management will lead debates on topical and controversial issues in their subject area to raise student awareness of the uncertainty, subjectivity and the dynamic nature of knowledge.

Source: Healey (2025b, 16)

Box 8.3 Developing inquiry-based learning skills across a health science program at McMaster University, Canada

The Bachelor of Health Sciences program began in 2000. An objective of the program is to have students become autonomous and independent members of the Health Sciences learning community, envisioned as a complex adaptive system. There is a concerted effort to build the entire program around inquiry. **Each year, an inquiry course is integrated with and mutually supportive of other courses that contribute to the development of inquiry skills.** The first-year inquiry is a full-year course focusing on skill development and group work. Students in this course participate in benchmarking activities, which stimulate them to form their own ideas about the skills they need to develop and to self-evaluate. Groups of students, guided by a facilitator and peer tutors, form questions based on such themes as homelessness and pursue these questions. Year-two inquiry continues skill development, usually in groups, and leads to students formulating their own learning objectives. They pursue these objectives in a year-three inquiry project. In the fourth year, students complete a thesis and can choose from several inquiry courses. One of these courses involves participating in activities, such as peer tutoring first-year inquiry students, which reinforce inquiry skills in both the tutors and those being tutored.

Source: Justice et al. (2009a)

Box 8.4 Co-ordinated interventions in zoology at the University of Tasmania, Australia

The department has developed a set of linked strategies and interventions, including:

Year One c200 students

- Workshop on the use of animals in research: Students put in the position of researcher, considering experimental design and animal ethics to complete an animal ethics application form
- Throughout the year, students are encouraged to interact with a web portal with links to 'Hot Topics' in Zoology related to lecture material

Year Two

- Over several weeks, an assessed task in which real, experimental data is given to the students for guided analysis and preparation as a manuscript for publication

Year Three

- Courses include group research projects, critical reviews of current literature, writing research grant applications, lectures from scientists outside the school, and training in scientific communication
- Zoology Research Unit individual students are matched with an academic supervisor to complete a semester-long research project
- Selected students work with staff to prepare a research paper for *Nexus Journal of Undergraduate Science, Engineering and Technology*

Years Two and Three

- All are invited to participate in the Student Research Volunteers program. Volunteers are matched with mentors, usually Postgraduate or Honours students in the School, 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. Speakers from industry, collaborating institutions School PhD students present their research, and then all non-undergraduate audience members, except the facilitator, leave the room

Source: Healey & Jenkins (2025, 74)

Box 8.5 Scaffolding of research tasks in an applied theatre program at Griffith University, Australia

Professor Michael Balfour, who teaches Applied Theatre in the Education program, **progressively introduces research tasks at different year levels:**

Year one: Students conduct background research for an applied theatre project within set parameters but do not implement the project. Students undertake a background literature review, utilising journal articles, library sources, and informal interviews with individuals who work with their target group. After completing this research, the students develop an idea for an applied theatre performance in consultation with the lecturer and prepare a two-page project proposal.

Year two: Following set guidelines, students undertake a directed performance project under the guidance of the lecturer. For example, one group of students developed a performance workshop and study notes for school children to support an exhibition at the State Library in response to a project brief outlining the Library's requirements. This activity is more challenging than the year one activity because it involves developing and presenting a performance but is directed by academic staff members.

Year three: In groups of three or four, students undertake a research project in a much more independent manner. Students:

- select and approach the organisation with which they want to work
- conduct a background literature review of previous initiatives and practices with their target group
- discuss the project with the organisation's employees
- design and implement a theatre project
- reflect on the project's effectiveness with supervision from academic staff members.

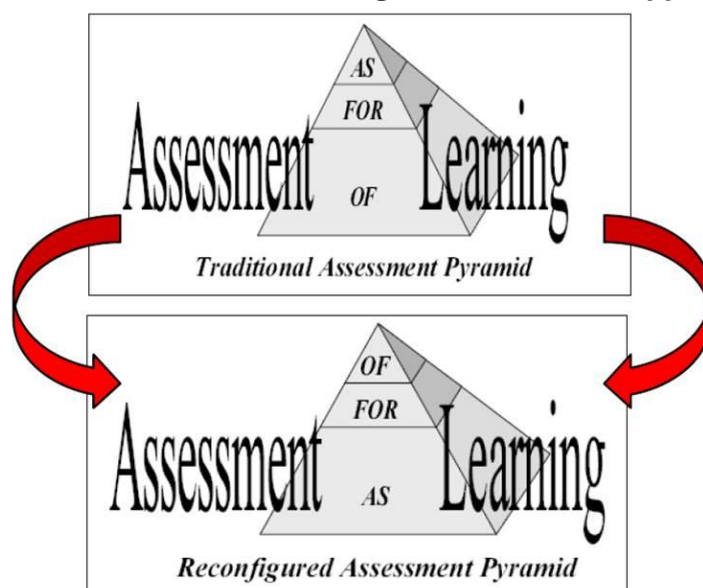
Master's level: Students at this level have previous experience in either teaching or drama. They are expected to produce work that demonstrates deeper reflection and analysis. The curriculum covers action research, ethnographic, case study, and narrative inquiry research tools to help students engage in and understand the practical work more systematically and critically.

Source: Healey & Jenkins (2025, 91-92)

8.3 Assessing student research and inquiry

As research and inquiry become increasingly integrated into the curriculum, a key issue becomes how they should be assessed, and how more emphasis may be placed on formative assessment and self- and peer-assessment as opposed to summative assessment. In other words, there is a move to **shift the balance from assessment of learning, to assessment for learning, and assessment as learning** (Healey et al., 2013a; 2014) (Figure 8.7). Whereas assessment of learning is about *summative assessment*, and assessment for learning is about *formative assessment*, "**Assessment as learning** occurs when students are their own assessors. Students monitor their own learning, ask questions and use a range of strategies to decide what they know and can do, and how to use assessment for new learning" (Harapnuik, 2020).

Figure 8.7 Traditional and reconfigured assessment pyramid



Source: [Assessment of/for/as learning](#)

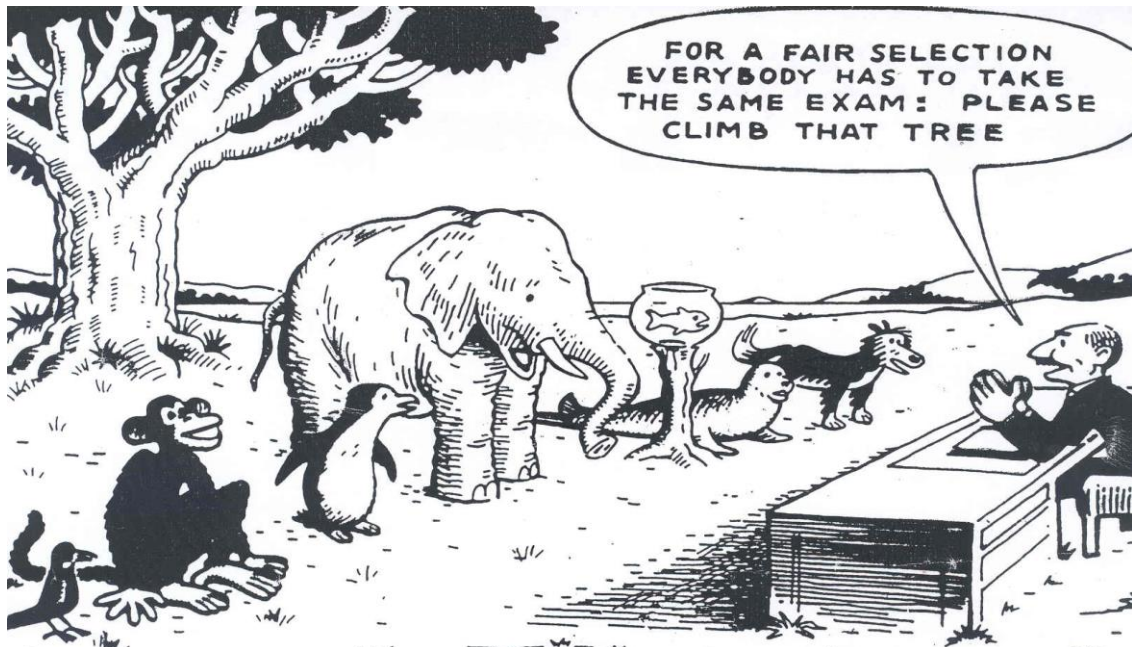
Assessment is a key driver of student behaviour. As Bevitt (2012, p. 4) notes, evidence suggests that the assessment and feedback processes used with students have a significant impact on “what, how and how much students study” (Gibbs & Simpson, 2005, p. 3). It is therefore an essential element in the learning and teaching process.

Promoting flexibility in assessment

Given the inclusive definition of research and inquiry that I have adopted in this report, and my argument that there should be flexibility in the forms that assessment takes, various assessment methods should be used. These can differ between students in the same cohort. **There is no need to adopt a one-size-fits-all approach.**

We can learn from the legislation in many countries that reasonable adjustments should be made for disabled students. Why should the choice of assessment be limited to disabled students? Why not make it available for all students? (Healey, 2003). A growing number of departments give students a choice of dissertation at the undergraduate level (Boxes 7.3 and 7.9) and the Master's level (Boxes 7.10 and 7.11). Despite giving students a selection of 12 different forms for the undergraduate dissertation in biosciences at Leeds (chapter 7), the assessment criteria (except for literature reviews) are very similar.

Variation in marking is often more significant for undergraduate and Master's dissertations than for other assignments, which makes double marking essential (Webster et al., 2001). Consistency can be improved through the **careful design of assessment criteria and marking procedures**, which should be regularly discussed within teaching teams to build a shared understanding of their meaning and application. At the same time, flexibility in applying these criteria is essential to avoid constraining students' creativity (Pathirage et al., 2007). Defining clear expectations in relation to the criteria should take into account the varying degrees of student autonomy in independent, group, and co-research models of dissertations (Hill et al., 2011). Equally crucial is **ensuring that students understand the assessment criteria**. One effective strategy is to have students evaluate sample projects or excerpts and engage in discussions about the perceived strengths and weaknesses, helping them internalise the criteria (Rust et al., 2003).



“I cannot think of anything more unfair than ... to treat all students as if they are the same, when they so manifestly are not.” Elton (2000, 1)

Assessing team projects

Team research and inquiry projects are increasingly common in the curriculum, particularly in the early years of undergraduate programmes, but they are also growing in importance as an alternative to individual FYPDs (chapter 7). Assessing group projects presents several challenges and opportunities that are discussed more fully in Healey (2024). **Many team-based research and inquiry projects combine both group and individual assessment, using a variety of methods including tutor-led evaluation as well as peer and self-assessment.**

Traditionally, the focus has been on evaluating the final **product**, such as a group report or poster, but there is a growing recognition of the importance of assessing the **group-work process**. This might include maintaining a group journal or writing a reflective essay. Tutors typically assess the final outputs, drawing on their subject expertise. In cases where projects are carried out within the classroom or laboratory setting, tutors may also evaluate the group processes through direct observation and mentorship. However, in most group projects, **the students are the only ones with complete insight into how the team functions. As a result, peer and self-assessment become essential tools for fairly evaluating the collaborative process** (Healey, 2024).

Redistributing group marks among team members can be a strong motivational strategy for all the students. High-achieving students can earn the marks they deserve, provided their peers acknowledge their contributions, while potential ‘free-riding’ students are encouraged to participate fully, knowing that their peers can mark them down (Healey & Addis, 2004).

Assessing student research and inquiry processes

Assessing the process of undertaking research and inquiry not only applies to the practice of working in teams but also to reflecting on the learning process. Wilson et al. (2016a) argue that there is **a fundamental misalignment between the intended learning outcomes and the assessment practices in undergraduate science research projects**. They undertook in-depth interviews with eight highly experienced academics who convene units through which science research projects are coordinated at a single, research-intensive institution, about what they thought was important for students to learn in their projects and what they assessed. They

grouped the intended learning outcomes into four categories: (1) the ‘nitty-gritty’ of research, (2) the research process, (3) ways of thinking and (4) confidence in/sense of self as a scientist. Interestingly, **most of the intended learning outcomes focused on the research process, whereas the assessments used primarily evaluated the quality of the outcome.** While they do not suggest abandoning formal reports, they advocate “the development of ways to make complex learning and higher-order thinking visible as an additional and substantial component of assessment, and the concomitant development of appropriate grading criteria” (Wilson et al., 2016b, 882). One way they have developed to assess the process of undertaking research and inquiry explicitly is to use a **reflective blog** (Box 8.6). There is a clear need to explore this area further in the future for a wider range of projects in different disciplines and institutions.

Box 8.6 Reconceptualising undergraduates’ experiences of scientific research as work-based learning drawing on reflective practice

“We suggest that academics involved in the provision of research experiences to undergraduate science students may benefit by reconceptualising these experiences as work-based learning. In particular, drawing on the widespread use of reflective practice in work-based learning allows for a more effective focus on process-related learning. We describe an empirical study involving the implementation of reflective blogs in which science students responded to prompt questions designed to focus their attention on how their project was progressing, the process of research and their own learning. The blogs reveal examples of students engaging in independent thinking, creative thinking and developing a sense of themselves as scientists, all qualities valued by supervisors. They also show how these combine as ‘wicked competences’ that allow students to address the complex problems and uncertainties of research. We identify characteristic patterns of reflection that indicate the exercise of such competences and suggest that these could be used as explicit evidence by academics making judgements for assessment purposes.”

Source: Wilson et al. (2016b. 869)

The problem with focusing on reflecting on the process of undertaking research and inquiry is that students who are already self-directed, self-motivated, and academically prepared are the ones most likely to succeed in this form of assessment as a learning approach. Most students rely heavily on their teachers to guide their learning and manage summative assessment (Harapnuik, 2020). These students will require considerable support to level the playing field and ensure they develop the capabilities to engage with assessment as a learning opportunity willingly and effectively.

Recommendations on assessing undergraduate research

Based on a survey of practices for assessing undergraduate research in Australasia, involving 54 survey responses and four interviews with academics, Mantai et al. (2024) developed six recommendations for undergraduate research coordinators and institutions (Table 8.3). Adopting these would help ensure the continued strengthening of the undergraduate research movement.

Table 8.3 Assessment recommendations for undergraduate research coordinators and institutions

-
- **Purpose of undergraduate research assessment:** Situate undergraduate research within the framework of assessment *for* learning due to its strong focus on feedback that drives development. Design undergraduate research assessment to develop students as researchers and realise benefits associated with undergraduate research (e.g., by integrating students in research communities).
 - **Context of assessment:** Arrange that supervision arrangements can afford the types of rich assessment interactions that build researcher development. Consider the broader context of study to develop a rich peer and collegial environment that can support students as part of their research community.
 - **Learner outcomes:** Consider individual students' professional ambitions and personal characteristics to promote intellectual growth and professional development, as well as the capacity to make judgements about their own research work.
 - **Tasks:** Align undergraduate research assessment with department and disciplinary expectations as well as programme learning outcomes and activities (e.g., by mapping out how activities and assessment clearly align with which outcomes). To meet individual student outcomes, offer personal choice in assessment form and format, or by including students in assessment design.
 - **Feedback processes:** Design feedback loops and feedforward into assessment regimes (e.g., by prompting students to actively incorporate feedback in future tasks).
 - **Interactions:** Communicate how each task and activity relates to graded assessment, learning outcomes and student development (e.g., by visualising how an activity promotes critical thinking, or by utilising reflection-based (guided or structured) assessment forms to surface learning gains). Integrate students in the assessment evaluation to inform future improvement (e.g., by surveying students on what worked, what didn't, and what was relevant/irrelevant to them).

Source: Mantai et al. (2024, 948)

8.4 Strategies for embedding research and inquiry across programmes

The initiatives discussed in this chapter are primarily the responsibility of the course leaders and the staff team who deliver the programmes. A set of four strategies they can consider implementing is given in Table 8.4. Further details can be found in Jenkins et al. (2003).

Table 8.4 Strategies for integrating research and inquiry into programmes

Strategy 1: Develop students' understanding of research

- Develop the curriculum to bring out current /or previous research developments in the discipline
- Develop students' awareness of learning from staff involvement in research (and perhaps research-based consultancy and professional practice)
- Develop students' understandings of how research is organised and funded in the discipline, institution, and profession

Strategy 2: Develop students' abilities to carry out research

- Students learn in ways that mirror research processes
- Assess students in ways that mirror research processes
- Provide training in relevant research skills and knowledge
- Ensure students experience courses that require them to do research projects, and that there is a progressive move to projects of greater complexity
- Develop student involvement in staff research

Strategy 3: Progressively develop students' understanding

- Ensure that introductory courses induct students into the role of research in their discipline and present knowledge as created, uncertain and contested
- Ensure that advanced courses develop students' understanding of research, and progressively develop their capacities to do research
- Ensure that graduating year courses require students to carry out a major research study and help them to integrate their understanding of (the role of) research in their discipline or interdisciplines

Strategy 4: Manage students' experience of research

- Limit the negative consequences for students of staff involvement in research and consultancy
- Evaluate and research student experience of research and consultancy, and feed that back into the curriculum
- Support students in making clear to them the employability elements of research and consultancy

Source: Jenkins et al. (2003, 63-64)

Summary

- **Strategic progression and scaffolding:** Embedding research and inquiry across entire programmes requires a carefully designed progression—from structured experiences in early years to open, independent research in later stages. Although to motivate students in their first experience, open-ended activities may be preferable. Scaffolded curriculum models (e.g., McMaster and Leicester) emphasise the development of research-mindedness, culminating in capstone or final-year projects.
- **Innovative and inclusive structures:** Programme-level initiatives, such as Vertically Integrated Projects (VIPs), student-led research teams, and the development of pedagogic resonance, promote interdisciplinary collaboration, continuity, and inclusivity. These structures support authentic, inquiry-based learning aligned with disciplinary practices and broader goals (e.g., UN Sustainable Development Goals).

- **Assessment aligned with inquiry:** Effective assessment strategies must evolve from traditional summative formats to emphasise formative feedback and self-/peer-assessment. Flexible, reflective assessment methods (e.g., blogs, portfolios) are essential for capturing the research process and supporting diverse learners in developing autonomy and critical inquiry skills.

In the last four chapters, I have focused on the nature of the research-education nexus at institutional, disciplinary, year, and program levels. Most of the examples I have looked at are subject-based research and inquiry. The next chapter examines students as change agents through their engagement in pedagogic research and the scholarship of teaching and learning.

9. Students as change agents through engaging in pedagogic research and the scholarship of teaching and learning

“There is a subtle, but extremely important, difference between an institution that ‘listens’ to students and responds accordingly, and an institution that gives students the opportunity to explore areas that they believe to be significant, to recommend solutions and to bring about the required changes. The concept of ‘listening to the student voice’ – implicitly if not deliberately – supports the perspective of student as ‘consumer’, whereas ‘students as change agents’ explicitly supports a view of the student as ‘active collaborator’ and ‘co-producer’, with the potential for transformation.” (Dunne in Foreword to Dunne & Zandstra 2011, 4)

9.1 Students as partners in pedagogic research and scholarship of teaching and learning

Most examples of the research-education nexus I have examined so far have concerned students investigating disciplinary-based or interdisciplinary research projects. However, students may also undertake pedagogic research (PedR) or scholarship of teaching and learning (SoTL) projects (Fanghanel et al., 2015). Many of these may also focus on specific disciplines or be referred to as *discipline-based educational research* (DBER) (e.g., Singer et al., 2012). Some departments allow students to take teaching and learning final-year projects and dissertations (FYPDs) (e.g., biosciences at the University of Leeds, chapter 7). **Research-based education and student-staff partnerships are complementary in their pedagogy and politics** (Marie, 2018). Moreover, **student-staff partnerships in SoTL share many characteristics of high-impact practices associated with undergraduate research.**

There is a growing interest in students as partners (SaP) initiatives, where students act as change agents through engaging in PedR and SoTL projects (Cook-Sather et al., 2014; Felten et al., 2013; Healey et al., 2014). As the quote that begins this chapter asserts, when students act as change agents, they become **co-producers of knowledge**. Two pioneering edited collections, highlighting students as partners in SoTL, were published in 2010 and 2011 in the US and the UK, respectively (Werder & Otis, 2010; Little, 2011). When students act as co-inquirers in SoTL, they typically engage in examining the teaching and learning experiences within their own courses and those of their peers. Two years later, Felten (2013) suggested that **one of the five principles of good practice in SoTL is conducting projects in partnership with students.**

9.2 Pedagogic research and the scholarship of teaching and learning

PedR and SoTL are two overlapping terms and are sometimes used interchangeably (Minocha, 2021). However, they have different emphases. **PedR refers to formal, systematic research into teaching and learning processes, often with the aim of contributing new, generalisable knowledge to the academic field of education or a specific discipline** (Ashwin, 2020). It employs established research methodologies and often seeks to answer broader questions that extend beyond one’s classroom or institution. **SoTL, on the other hand, focuses on systematic inquiry into one’s own teaching and students’ learning to improve practice and share findings with the wider academic community** (Boyer, 1990; Healey, 2000; Hutchings & Shulman, 1999). SoTL is typically more practitioner-driven, rooted in reflective practice, and emphasises local impact (on one’s teaching) and broader scholarly communication. A key difference lies in the purpose of the two approaches. Pedagogic research aims to build disciplinary knowledge, whereas SoTL aims to improve teaching and student outcomes and share lessons learned (Figure 9.1).

Hutchings (2000) envisions a collaborative and mutually enriching relationship between SoTL and educational research, emphasising synergistic opportunities over strict divisions. Geertsema (2016) points out the challenges educators face when SoTL is "conflated with educational research" (p. 126), cautioning that it is both unrealistic and unhelpful to expect educators involved in SoTL to achieve a level of expertise in education comparable to their mastery of their own disciplines.

SoTL intersects with Boyer's (1990) other three scholarships – discovery, integration, and application (Figure 9.2). All four can involve students in research and inquiry. However, as Bass (1999) pointed out in a classic article, there is a different attitude to having a problem when it comes to teaching.

"In scholarship and research, having a 'problem' is at the heart of the investigative process ... But in one's teaching, a 'problem' is something you don't want to have. ... Asking a colleague about a problem in his or her research is an invitation; asking about a problem in one's teaching would probably seem like an accusation. Changing the status of the problem in teaching from terminal remediation to ongoing investigation is precisely what the movement for a scholarship of teaching is all about" (Bass, 1999, 1).

Figure 9.1 The distinction between pedagogic research and scholarship of teaching and learning

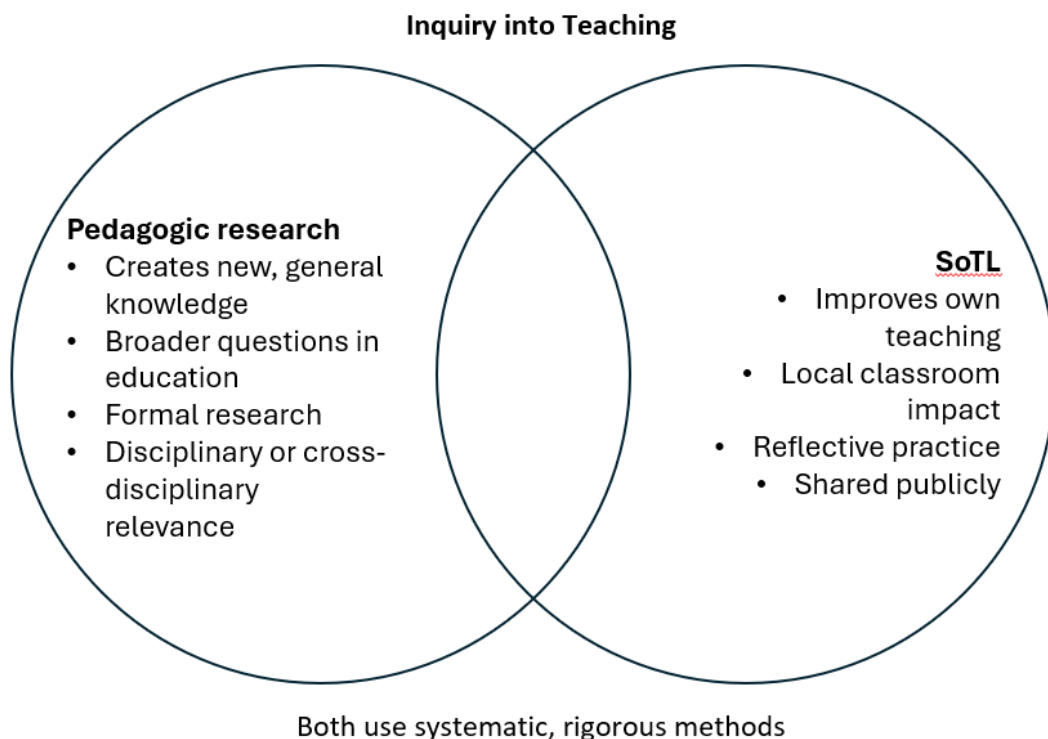
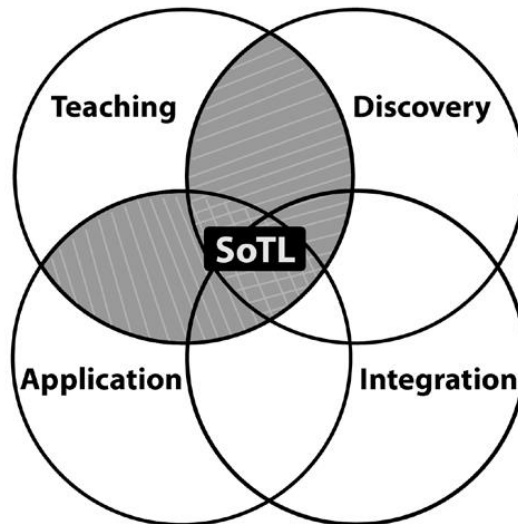


Figure 9.2 The relationship between SoTL and Boyer's other scholarships

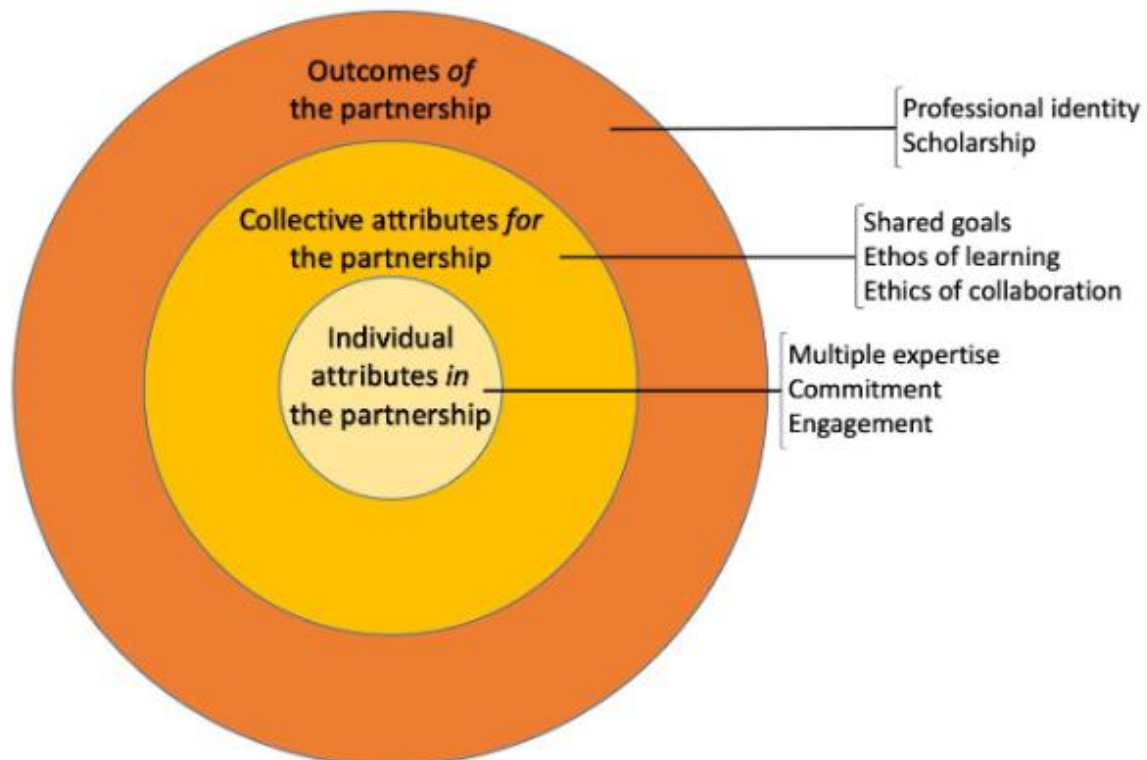


**SoTL: The Link between the Scholarships
of Teaching, Discovery, Application & Integration**

Source: Kern et al. (2015, 8)

Drawing on a two-year SoTL study, Lock et al. (2021) present a three-layer framework characterising key attributes for a successful graduate student-faculty partnership: 1) individual attributes in a partnership; 2) collective attributes for a partnership; and 3) outcomes of a partnership (Figure 9.3).

Figure 9.3 Graduate student-faculty partnership framework



Source: Lock et al. (2021, 6)

9.3 Case studies of students as change agents

The following three UK institutional case studies from Exeter, Birmingham City, and Imperial College explore programmes to support students as change agents through engagement in pedagogic research and SoTL (Boxes 9.1-9.3) (see also Boxes 2.5 and 5.4). A final case study in this chapter shifts the scale to the international level by examining how students are involved in international collaborative writing groups organised through the International Society for the Scholarship of Teaching and Learning (ISSOTL) (Box 9.4). Other examples can be found in Healey, M. & Healey, R. L. (2025).

Box 9.1 Students are engaged in shaping and leading their own educational experiences through the students as partners and change agents initiative at the University of Exeter, UK

At Exeter, projects run in partnership by staff and students are known as *Students as Partners projects*, while those run by students without staff direction are referred to as *Students as Change Agents projects*. The key concept is that **students themselves take responsibility for bringing about change, based on their own research on aspects of learning and teaching**. The approach enables students to be actively engaged with the processes of change, often taking on a leadership role. The most important aspect is the focus on research and building change on evidence-based foundations. Students from across the university have contributed to this initiative, undertaking a series of research projects on their learning and teaching environment, addressing concerns raised through student-staff liaison committees, and providing recommendations and solutions to enhance their experience. Students work as apprentice researchers; their research methods include focus groups, informal interviews and questionnaire surveys. Outcomes have been presented at annual student-staff conferences, resulting in institutional engagement with key research findings. Since the introduction of Students as Change Agents at the University in 2008, hundreds of projects have been undertaken, with over 1,000 student leads. Student research has driven organisational change, contributed to student engagement in shifts of policy and practice within the University, and supported students' graduate skills in the areas of research, project management, presenting outcomes, leadership and understanding of organisational development. For example, student projects in the Business School on the benefits students have gained from implementing technologies in the classroom have contributed significantly to the widespread adoption of streamed video and the distribution of 7,000 voting handsets to undergraduate and Master's students. A project on well-being developed by Psychology students has led to changes in student support and has informed the Personal Tutor system.

Sources: Kay et al. (2010); Kay et al. (2012); Dunne & Zandstra (2011); Sandover et al. (2012a); Dunne & Owen (2013a); <https://www.exeter.ac.uk/students/changeagents/>

Box 9.2 Students as academic partners: Enhancing quality through student engagement with staff at Birmingham City University, UK

Launched in 2009, this approach originated from a partnership between Birmingham City University and the Birmingham City Students' Union, aiming to foster a greater sense of learning community at the University. Through the integration of students into the teaching and pedagogical research communities of the University, the focus was on enhancing the student learning experience. This drive has employed over 1,500 students and involved the participation of 500 staff in 700 funded projects over the past decade. Staff and students are invited to propose educational development projects in which students can work in an academic employment setting in a paid post at the University. Students negotiate their own roles with academic/professional staff and are paid for up to 100 hours of work. **Each project is designed to develop a specific aspect of learning and teaching practice.** Typically, these may result in new learning resources, developments in curriculum design, or the evaluation of innovations and changes that have already been made. It is key to the scheme that **students are employed as partners, not assistants, and co-creators, not passive recipients of the learning experience.** Sources: Curran & Millard (2016); Freeman *et al.* (2014); Millard & Janjua (2020); <https://www.bcu.ac.uk/about-us/education-development-service/projects/sap-and-stamp> and JISC case study <https://can.jiscinvolve.org/wp/files/2014/10/CAN-BCUvFINAL.pdf>

Box 9.3 Students as partners in curriculum innovation and learning and teaching research at Imperial College, London, UK

StudentShapers is a programme developed between Imperial College, London and Imperial College Student Union to support partnership between staff and students. The programme represents the College's commitment to the Learning and Teaching Strategy, working closely with students during its implementation and beyond. StudentShapers supports projects in **Curriculum development, pedagogic enhancement and innovation or Learning and Teaching Scholarship and Research**, with the programme open to the entire Imperial College staff and student body. This includes non-faculty staff who are involved in the delivery of the student experience. Funding is provided for the students to engage in projects through bursaries, as well as covering the costs of students attending conferences, etc, to present their work.

Undergraduate and postgraduate taught students are encouraged to partner with staff to develop proposals, which they then submit for student funding. Proposals are judged against criteria with emphasis placed on authenticity of the partnership, innovative and digital learning technologies, new, evidence-based pedagogies, and ultimately impact of the project on the student experience.

Postgraduate research students can propose and undertake a project alongside their research studies that directly relates to their discipline expertise and/or research, partnering with staff to translate new research into taught curricula and offering a valuable professional development opportunity. As a research-intensive university, this is an important aspect of the programme to provide **a pathway for cutting-edge disciplinary research to be translated into the taught curricula.** 'Full-time' projects usually take place over the summer vacation, but term-time projects with much lower time commitments are also facilitated, to allow for the style and timeframe of partnership to match the context of the project best. Projects tend to fall within these distinct areas of partnership: [curriculum development](#), [educational research](#); [space design](#); or [partnership pedagogies](#).

Source: www.imperial.ac.uk/studentshapers

Box 9.4 Students involved in international collaborative writing groups through ISSOTL

International collaborative writing groups (ICWG) **aim to build the capacity of participants, including students, to work and write in international groups.** Since 2011, they have become a **signature pedagogy for the International Society for the Scholarship of Teaching and Learning (ISSOTL).** Eight or nine groups work at a distance to prepare a 2000-word outline for an online discussion running up to an ISSOTL pre-conference workshop, where groups meet for two to two and a half days. They spend time preparing their draft paper within their groups and in discussion with participants of other groups, along with some social activities as part of the workshop. Following the workshop, the groups have five to six months to complete and send in their papers for submission to the Society's international SoTL journal, [Teaching and Learning Inquiry](#).

The first ICWG was in 2012-13 linked to the ISSOTL 2012 Conference hosted by McMaster University, Canada. Seventy people from 13 countries took part, spread across nine groups, with each comprising at least one student member. Nine scholarships were provided to subsidise the costs of student members. The 2012 initiative resulted in eight publications in a special edition of [Teaching and Learning Inquiry](#), along with a [SoTL publication](#) evidencing the initiative's positive impact on participants. Subsequent events were held in Melbourne (2015) and Atlanta (2019). Starting in 2022, ISSOTL's International Collaborative Writing Group (ICWG) Initiative began a three-year schedule: one year for a cohort focused on public SoTL, one year for a cohort focused on academic writing, and one year reserved for emergent ICWG opportunities. Other ICWGs have been organised by the International Network for Learning and Teaching Geography in Higher Education and EuroSoTL.

Sources: Healey (2017); Healey *et al.* (2013b); Healey & Matthews (2017); Marquis *et al.* (2014, 2016, 2017a); Healey, M. & Healey, R. L. (forthcoming); <https://issotl.com/icwg/>

9.4 Successful student-staff partnerships in SoTL

Not all partnerships are equally successful. A team of graduate students, educational developers, and faculty members engaged in detailed self-reflection on their past and ongoing SoTL projects as an inquiry into **what it means to be in a successful student-faculty/staff partnership.** Using thematic analysis, they identified four distinct domains that can shape partnerships: (1) motivations to participate, (2) challenges, (3) power, and (4) definitions of success. In conclusion, they developed **seven guiding questions for student-staff partnerships in SoTL, though many would also apply to research and inquiry partnerships in general** (Acai *et al.*, 2017) (Table 9.1).

Table 9.1 Guiding questions for student-staff partnerships in SoTL

-
1. What motivated you to engage in this partnership and project? Why specifically did you want to be involved in a SoTL project?
 2. What are your goal(s) for being in this partnership and completing this work?
 3. What does a functional and successful partnership look like to you?
 4. What do you need from your partner(s) in order for this to be a positive working experience that will enable you to reach your goals?
 5. How should we handle any conflicts, should they arise? Who should we approach first in a conflict situation, and in what manner (in person, email...)?
 6. What is/are your desired outcome(s)? If your outcomes are focused on the process of the work/partnership as the project progresses, what specifically are you hoping to walk away having gained? If your outcomes are focused on producing a tangible outcome, what specifically are you hoping to produce?
 7. In this partnership, are there going to be specific roles for each person? If so, what are those roles, and what are the expectations of each role in the partnership?
-

Source: Acai et al. (2017, 11-12)

Summary

- **Students as co-producers and change agents:** Shifting from viewing students as passive consumers to active collaborators, students engage in pedagogic research (PedR) and the scholarship of teaching and learning (SoTL) to explore, recommend, and implement educational changes, transforming their roles into co-producers of knowledge.
- **PedR vs. SoTL – complementary approaches:** While PedR focuses on rigorous, generalisable research into educational processes, SoTL is more practitioner-focused, aiming to improve teaching through reflective, local inquiry. Both approaches value collaboration and align with student–staff partnership models.
- **Factors for successful partnerships:** Effective student-staff collaborations in SoTL depend on shared motivations, effective management of power dynamics, clear communication, and aligned goals, with guiding questions helping ensure equitable and productive partnerships. Case studies across the UK and internationally illustrate diverse and impactful applications.

One factor that has received increased attention in the last decade in SoTL is equity, diversity, and inclusion (EDI). A similar growth in interest in EDI has occurred in the education-research nexus as a whole. This is the topic of the next chapter.

10. Equity, diversity, and inclusion in student engagement in research and inquiry

“The phrase ‘undergraduate research for all’ has become a rallying cry among proponents of full inclusivity.” (Murray, 2017, 16)

10.1 The equity, diversity, and inclusion movement

As higher education in many countries has become increasingly ethnically and culturally diverse, differences in entry rates and attainment among different groups have become apparent, and concepts of equity, diversity, and inclusion (EDI) have received heightened attention (e.g., Higher Education Statistics Agency, 2023). **EDI has become a movement.** They are not just buzzwords; they matter (Day et al., 2022). Although a right-wing backlash in the United States is leading to a cutback in EDI programs and initiatives in American universities (Ellis, 2025; Wood, 2025), and a ripple effect may lead, at least in the short term, to less attention being given to EDI in higher education elsewhere, they remain critical concepts. As Cook-Sather (2024) notes, in the face of these attacks “the need to develop and refine inclusive practices is as real as ever, perhaps more so, and insisting on the continuation of this work requires clarity of conviction and courage in the face of both known and unknown threats” (p. 1).

The educational value of student diversity and the duty to support diverse student populations have been widely recognised within higher education (Murray, 2017). **EDI underpins student engagement in research and inquiry. Inclusion is the primary motivator for the relative shift from the elite model of undergraduate research to the embedded model** (Healey & Jenkins, 2009; Ruth et al., 2023). This is well expressed by Smith and Rust (2011):

“The academic community in higher education is becoming increasingly fragmented, with arguably the greatest fault line between research and teaching. This paper argues that, through the reinvention of the undergraduate curriculum to focus on student engagement in research and research-type activities, a truly inclusive community of academic practice can be created with consequent benefits to academics, to students and to support staff” (p. 115).

Student-staff partnerships are also “increasingly understood to have the capacity to contribute to equity” in higher education (de Bie et al., 2022, 21). There have been several appeals to enhance inclusivity within student-as-partners communities (e.g., Cook-Sather, 2024; Mercer-Mapstone, 2020; Mercer-Mapstone and Bovill, 2020). These have been matched by calls for a borderless, decolonised, socially just, and inclusive SoTL, and diversity in citation practices (Behari-Leak, 2020; Healey, M. & Healey, R. L., 2023). Felten et al. (2013) pointed out that, “knowing **which voices are included, excluded or silenced** in SoTL work ... is a central concern for anyone engaged in or applying the results of SoTL inquiries” (p. 66).

10.2 The nature of equality, equity, justice, diversity, and inclusion

EDI in higher education involves addressing systemic inequalities and promoting representation, belonging, and access for all. It starts with the recognition that, in reality, some people have greater access to different spaces and resources than others based on their identity, e.g., gender, race, disability, sexual orientation, etc. The language of EDI consists of several distinct but overlapping terms (Healey, 2024, chapter 6):

Equality: Treating people the same, but not everyone needs the same support; some people need more, and others need less

Equity: People are given the support that they need

Justice: Removing the barriers that people require support against

Diversity: Is about representation, including race, ethnicity, gender, age, disability, sexual orientation, religion, socioeconomic status, and more; it's about recognising and valuing the uniqueness of each person and the diverse perspectives they bring

Inclusion: Focuses on ensuring that all individuals within a diverse group feel valued, respected, and have the opportunity to contribute fully; inclusion is about engagement and belonging

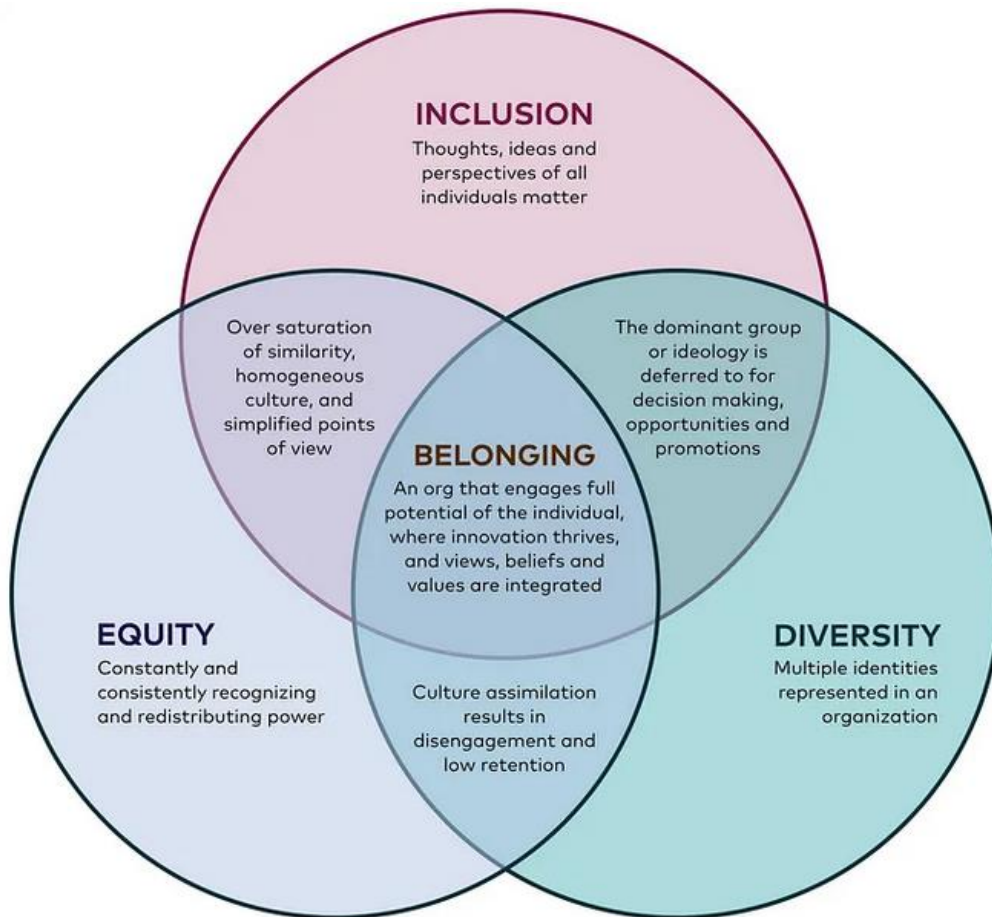
Equity, diversity, and inclusion are overlapping terms. They emphasise **a sense of belonging**, where they come together (Figure 10.1). This point is underscored by Moore-Cherry et al. (2016), who state:

“Partnership working empowers students to engage and develop a clear sense that they belong to a bigger learning community. The learning community encompasses the multiple scales at which a student is engaged, for example the module, the programme/course and, more broadly, the institution and the discipline. If a student is fully engaged, this should be evident at multiple levels and scales concurrently” (p. 86).

They go on to cite Ignatieff (1994, 25), who argues that “where you belong is where you are safe; and where you are safe is where you belong” (p. 89).

Which group is minoritised depends on the context. For example, women are a minority in undergraduate research in STEM disciplines in the United States (Murray, 2017), whereas in institutional student-staff partnerships in the UK, they are the majority (Mercer-Mapstone & Bovill, 2020). However, it is **important to avoid 'othering' and stereotyping** by categorising people based solely on characteristics like age, race, disability, gender, class, nationality, or Indigenous identity. Doing so risks treating individuals with shared traits as if they are all the same. In reality, **people embody multiple identities, and these intersecting factors can result in just as many differences within a group as there are similarities** (Healey, 2024).

Figure 10.1 The relationship between equity, diversity, and inclusion



Each element represents a different piece of the full human experience. Addressing only one or two of these falls short on gaining, what I think is the full human experience — a sense of belonging.

Source: Burnette (2019)

10.3 Equity, diversity, and inclusion in practice

As Graham (2024, 1) argues, “Diversity and inclusion are not the goal anymore: Developing inclusive practices is”.



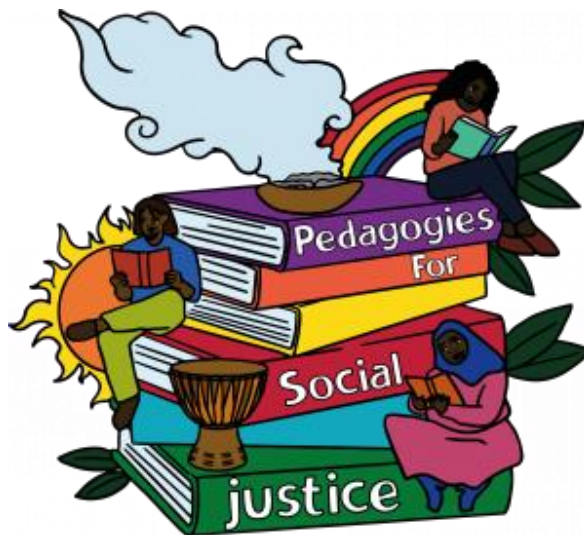
Source: Verma (2022)

EDI at the University of Westminster

Inclusion is [one of three priorities](#) at the University (chapter 1), and ‘diversity and inclusion’ is one of [four research communities](#). The [Equality, Diversity and Inclusion Committee](#) makes recommendations to the University Executive Board as to the strategic direction, priorities, and objectives for [equality, diversity and inclusion](#) at the University. Bunbury et al. (2023) discuss how to be an anti-racist ally on the university campus. “Allyship ... requires those from dominant identities to learn to listen, be mindful of their privileges and be there to support and champion those from non-dominant identities.” One aspect of EDI that has received attention at Westminster is decolonising the curriculum (Araneta et al., 2025; Fraser & Usman, 2021). There is a need to investigate how anti-racist and decolonising pedagogies play out through engaging students in research and inquiry in different schools and institutions.

The University began a five-year project on [Pedagogies for social justice](#) in 2023 (University of Westminster, 2023b).

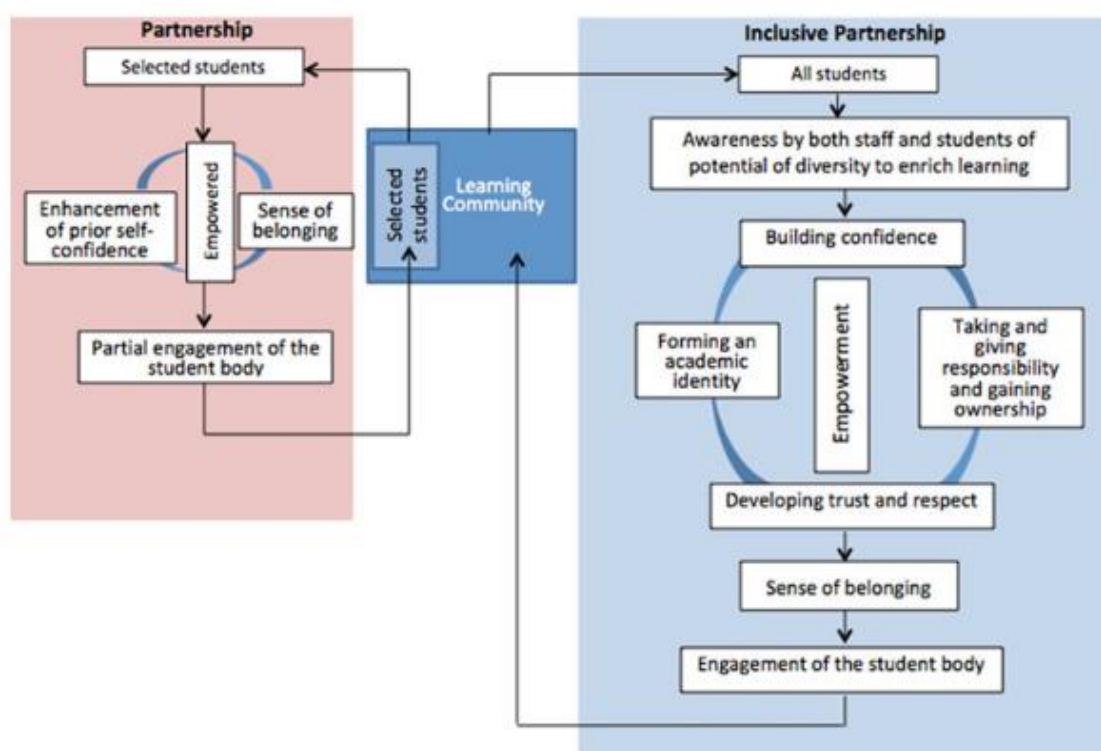
“Ultimately, partnerships as collective practices enrich our teaching, learning and research experiences. Our aim is to transform rather than reform and to decolonise rather than to diversify. In rethinking curricula, relationships and research and, at the heart of this our ways of understanding knowledge, we are reimagining our worlds as we know them” ([Pedagogies for social justice](#)).



Developing inclusive partnerships

Moore-Cherry et al. (2016) distinguish between ‘**selected partnership**’ and ‘**inclusive partnership**’ processes (Figure 10.2). “Inclusive partnership working challenges staff to go beyond just working with the ‘usual suspects’ who self-select and volunteer to participate in various activities, and requires a re-conceptualisation of the learning and working environment experienced by all students” (p. 89). Some principles and characteristics of inclusive partnerships are given in Table 10.2.

Figure 10.2 ‘Selective partnership’ versus ‘inclusive partnership’ processes



Source: Moore-Cherry et al. (2016, 91)

Table 10.2 Some principles and characteristics of inclusive partnership

Principle	Inclusive partnership
Develop a shared vision of the desired outcome(s) from partnership working	The shared vision should demonstrate a <i>clear awareness, celebration and accommodation</i> of educational, circumstantial, disposition and cultural diversity to be inclusive of all students
Share power and responsibility within the partnership	Basic training in partnership working may need to be initially provided to ensure that <i>all</i> students feel empowered to participate, and can better develop their skills and enhance their confidence to develop deeper learning
Carefully manage and monitor the operation of the relationships	Inclusive partnerships creatively negotiate how best the range of resources/supports available can be <i>optimised to remove possible barriers or impediments to learning</i> . This may heighten engagement through creative solutions
Involve the whole university	The <i>ethos of partnership needs to run throughout the university</i> in order to be authentic and meaningful. This develops trust, which, in turn, enhances a sense of belonging, and the likelihood of successful and sustained engagement
Embrace challenges to diversify learning opportunities	Inclusive partnership <i>may encourage previously disenfranchised students</i> to take risks with appropriate and structured support, to be challenged, and illustrate to staff more creative and innovative approaches
Maintain a flexible and open-minded approach to the partnership and its outcomes	Inclusive partnerships challenge institutions to rethink hierarchical regulatory systems and promote individual autonomy and creativity. It facilitates optimal learning by <i>working with students' own intrinsic preferences, constraints, and aspirations</i>

Source: Moore-Cherry et al. (2016, 90)

In the US, participation in high-impact practices (HIPs), which include a significant amount of research and inquiry, remains inequitable, with first-generation, transfer students, and African American and Latino students being the least likely to participate (Kuh et al., 2017; Coleman & Graham, 2025). These inequalities persist despite many universities offering grants targeted at disadvantaged groups, and as these programs come under political attack, the inequalities are likely to intensify. **Selective forms of undergraduate research benefit elite groups.**

“For many schemes, it is usually the case that students who are selected are those who are successful at the interview/recruitment process – i.e. confident, articulate and usually with a fair amount of social capital. Post-scheme evaluations may demonstrate that these students achieve highly, progress to graduate employment or further study, and so on, but they were probably on this trajectory already. The students with most to gain are often those who are not successful in the recruitment process, but it may be very hard to design a process that would achieve this result whilst remaining HR compliant” (Jonathan Eaton, personal communication, 22 May, 2025).

Jonathan Eaton’s comment draws attention to an important structural issue: selective undergraduate research programmes often, albeit unintentionally, favour students who already possess social capital, self-confidence, and prior advantages. This remains a well-documented and ongoing challenge.

I asked Stephen Bunbury, a Reader (Associate Professor) in Law, and an EDI non-practising Barrister at the University of Westminster, about **being HR compliant in the UK**. He responded that:

“Yes, a programme explicitly aimed at minoritised groups can be lawful in the UK, provided it is designed in line with the positive action provisions of the Equality Act 2010. Under Sections 158 (general provisions) and 159 (which applies specifically to positive action in the workplace), institutions are permitted to take steps to address disadvantage, different needs, or underrepresentation among students with protected characteristics, as long as the action is based on clear evidence, is proportionate, and is time-limited to allow for review and adjustment. Such action should not involve the automatic exclusion of other groups” (Stephen Bunbury, personal communication, 11 June, 2025).

He pointed to how programmes like the *Freshfields Stephen Lawrence Scholarship in Law* and the *10,000 Black Interns* initiative illustrate that targeted approaches can successfully align HR compliance with equity objectives. He went on to suggest that to make undergraduate research and enrichment opportunities more equitable:

“Institutions might adopt an interest-based application process rather than a highly competitive one, thereby challenging structural barriers linked to confidence and prior advantage (Mountford-Zimdars et al., 2015). They can further promote equitable outcomes by using randomised or rotational allocation methods to prioritise under-represented groups and by offering pre-application support (such as confidence-building or preparatory workshops) to level the playing field. Finally, bias can be reduced by broadening definitions of success to include peer-led inquiry, critical

reflection, and lived experience, rather than relying heavily on traditional academic qualifications and grades, which often serve to reinforce existing advantages” (Stephen Bunbury, personal communication, 11 June, 2025).

To help bridge disparities in soft skills among student equity groups, it is ideal to address these gaps before students begin their university studies. The [University of Queensland Critical Thinking Project](#) has developed an explicit inquiry-based framework, Teaching for Thinking (T4T), to support the communication and formal assessment of critical thinking processes. In 2017, they launched the UQ Thinking Schools Network, which now comprises over 700 members from more than 130 educational institutions across Australia, the United States, and Canada. Additionally, the University of Queensland offers WRIT1999—a one-week intensive course held during the summer break for Year 11 students—to enhance their Year 12 performance and readiness for university. Eligibility for WRIT1999 requires students to be from designated schools or identify as Aboriginal or Torres Strait Islander. Participants in the program have demonstrated improved academic performance, as well as higher rates of retention and completion.

One notable benefit of scaffolding research-rich experiences throughout the undergraduate curriculum is that it requires all students to access these valued experiences (Ambos et al., 2024b; Hensel, 2023). As Zilvinskis et al. (2022) conclude, **making undergraduate research optional may be an inequitable approach**. Shanahan (2017) found that integrating research opportunities throughout the curriculum promotes equitable access to undergraduate research, particularly for students who lack social capital, free time, or the skills typically needed to pursue additional academic work. This approach helps bridge the gap between those who can engage in co-curricular research experiences and those for whom activities beyond course requirements are not feasible.

Many articles explore the reasons for promoting diversity in undergraduate research (e.g., Peifer, 2019) or provide evidence-based action steps for promoting EDI in undergraduate research (e.g., Ahmad, 2019). Others provide explicit guidance about EDI for students embarking on research experiences (e.g., McGill et al., 2021). Steckley et al. (2022) explore the extent to which Students as Partners Programs are compatible with the goals of equity, diversity and inclusion. A recent paper offers a practical framework for advancing EDI within student-staff partnerships, organised around three key themes: enhancing the inclusivity of selection processes, fostering a flexible and trust-based working culture, and actively addressing the power dynamics within these partnerships (Goh, 2025).

Shanahan et al. (2021) recommend **seven principles for leading undergraduate research (UR) programs during the mutually reinforcing crises of the pandemic, racism, partisan division, and economic austerity** (Table 10.3). These lessons are offered from the perspective of the diverse UR program at Bridgewater State University, a comprehensive, public, primarily undergraduate institution in the US, where students from underserved groups comprise two-thirds of the 11,000 students.

Table 10.3 Lessons from applying EDI principles to undergraduate research (UR) programs at Bridgewater State University, US

1. Overhaul UR recruitment, selection, and support for BIPOC (Black, Indigenous, and people of color) students
2. Support faculty and students shifting their research focus to topics of renewed urgency (e.g., effects of the pandemic, racial injustice) and seeking to decolonize their research
3. Create customized support for UR in different disciplines and on different kinds of projects, as students and faculty face disproportional challenges
4. Capitalize on the unexpected benefits of remote research and mentoring
5. Respond to the lack of assuredness with technology and lack of access to reliable connectivity experienced by faculty and students
6. Accommodate the work schedules of students
7. Offer flexibility and trust

Source: Shanahan et al. (2021, 46)

10.4 Case studies of equity, diversity, and inclusion

The following five case studies illustrate the application of EDI to students undertaking research and inquiry in partnership with staff and other students.

Box 10.1 Students co-led a research project on inclusive practice and ran an appreciative inquiry staff development session at the University of Worcester, UK

A collaborative project, led by a team of three academics and three students, **employed appreciative inquiry to explore and define effective inclusive practices** within the Institute of Education. Students played a central role by gathering data on positive aspects of the student experience, focusing on both general year cohorts and disabled students, then analysing and presenting their findings during a staff development day. The impact on staff was particularly profound, largely due to the student-led nature of the research and the strengths-based framework of appreciative inquiry. Staff feedback was overwhelmingly positive; many expressed that the approach inspired them to further develop their strengths and foster a more respectful and constructive tone in meetings.

Source: Healey R. L. & Healey, M. (2025, 5)

Box 10.2 A staff and student co-creation project on addressing the awarding gap at Leeds Trinity University, UK

This staff-student co-creation initiative was integrated into a core module designed to explore and address the awarding gap. Spanning an academic year, the project created safe, supportive spaces for final-year undergraduate students from diverse disciplines to share their lived experiences within the university. These student narratives were used to inform institutional policy and, in collaboration with staff, to **co-create resources designed to tackle the awarding gap through a decolonised and anti-racist lens**. The resources were implemented at both the home institution and two partner universities. Findings revealed that co-creation significantly enhanced students' sense of belonging, fostered meaningful peer relationships, and strengthened connections with faculty. The success of the project supports embedding co-creation practices throughout the curriculum. Furthermore, students provided clear and practical recommendations for universities to improve student outcomes and address the complex challenges associated with the achievement gap.

Source: Shakir (2024)

Box 10.3 Fostering inclusive learning in social justice at the module level at the University of Liverpool, UK

Philosophical Approaches to Conflict is a third-year, 15-credit module that invites students to critically engage with contemporary social justice issues, particularly those involving perceived, potential, or actual conflicts of rights and freedoms within diverse societies. Recent topics have included ethics and immigration, free and hate speech in media, multiculturalism, civil disobedience and protest, and sexual harassment.

Rooted in socially just pedagogy, the module emphasises student empowerment through active partnership in learning, teaching, and assessment. The module replaces traditional lectures with student-led, two-hour weekly discussion workshops. Each session features presentations by two students, who explore issues and examples of their choice within broad curriculum themes grounded in current public discourse, supported by curated resource packs. This **structure fosters inclusive and participatory learning**, encouraging students to bring their interests, experiences, and perspectives into classroom discussions and assessments. Assessment is divided across a 2000-word case study essay (45%), a 1000-word public-facing opinion piece (35%), and the presentation with accompanying materials (20%), reflecting a commitment to diverse and student-centred modes of engagement.

Sources: Jan Jobling; Healey, R. L. & Healey, M. (2025b, 6)

Box 10.4 Student-led institutional change for diversity and inclusion: Insights from the Justice, Equity, Diversity, and Inclusion (JEDI) Ambassador Program, Florida International University, US

Many diversity and educational initiatives continue to be implemented *for* or *to* students, rather than developed *with* them in genuine partnership. The *Justice, Equity, Diversity, and Inclusion (JEDI) Ambassador program* seeks to shift this dynamic by actively involving undergraduate engineering students in leading institutional change. Addressing the historical dominance of White and Asian men—and the prevailing norms favouring straight, middle-class, able-bodied individuals—the program empowers students to challenge these norms through student-driven action research. Each cohort, comprising approximately five students and spanning two semesters, receives support to design and implement impactful projects. This paper explores the key challenges and insights related to five central components of the program: (1) providing monetary support, (2) selecting students, (3) offering training, (4) guiding mentored project work, and (5) fostering impact and communication within the broader community.

Source: Secules et al. (2024)

Box 10.5 Engaging in authentic research at the undergraduate level contributes to student wellbeing, UK

Amid the growing number of university students reporting mental health challenges, this paper argues that engaging in undergraduate research can have a positive impact on **student well-being**. It proposes that authentic research experiences serve as a valuable means of fostering well-being, provided they are supported by thoughtful curriculum design and effective mentoring. Through two case studies—one from Medicine and the other from Geography—the paper demonstrates how integrating well-designed curricula and mentoring practices can enhance the authenticity of research experiences, boost student motivation, and ultimately support mental well-being. The paper further advocates for the early introduction of research-based learning in undergraduate programmes to promote a sense of belonging and nurture a learner-centred, supportive pedagogy.

Source: Walkington & Ommering (2022)

10.5 Strategies for applying principles of equity, diversity, and inclusion to partnership

Several authors have discussed the **application of the principles of EDI to student-staff partnership work** (e.g., Cook-Sather & Agu, 2013; de Bie et al., 2021; Marquis et al., 2022; Mercer-Mapstone, 2020; Mercer-Mapstone & Bovill, 2020; Mercer-Mapstone et al., 2021). I have already highlighted the discussion by Moore-Cherry et al. (2016) of the principles and characteristics of ‘inclusive partnership’ earlier in this chapter. Here, I focus on the work of de Bie et al. (2022), which synthesises much of the earlier literature. They explore four tentative principles to enhance partnership’s capacity to contribute to equity—access, disaggregation, recognition and support, and critique and responsiveness—and critically discuss the needs and selected responses (Table 10.4). They are at pains to emphasise that **the principles are tentative as they “reflect one set of ideas and one way of organizing these”** (p. 32). Marquis initially proposed the principles, and her co-authors critique them in the article, discussing some of the limitations of the proposed responses. The principles were developed in the context of students working in partnership with staff to enhance the quality of learning and teaching. They also have the potential to be applied to student research and inquiry initiatives.

Table 10.4 Enhancing partnership’s capacity to contribute to equity: Some tentative principles

Principles	Need	Selected responses
Access	To recognise the barriers to participation in partnership initiatives, including differences in awareness about opportunities available, inequitable recruitment and selection procedures, and design features that can make participation challenging for some people	• Scaling-up partnership schemes • Designing recruitment and other processes with equity in mind • Use ‘whole cohort’ approaches
Disaggregation	To account for the diverse experiences of the people participating in partnership, rather than homogenising faculty and student experiences	• Document unique benefits, challenges, and harms students and faculty from equity-denied groups may encounter while working in partnership • Value cultural diversity within and across contexts, including non-Western societies and indigenous knowledges
Recognition and support	To be attentive to ways to mitigate experiences of harm for equity-denied students and faculty, and support participants as they work toward equity in partnership	• Regular meetings of students in similar roles • Equity-specific training for students and faculty • Recognition and reward for students and faculty
Critique and responsiveness	To recognise that partnership work can be hard, alongside many beneficial outcomes, we will not get it ‘right’ all the time, and it may have critical equity-related limitations	• Seek, hear, value, and respond to critique, particularly from members of equity-denied groups • Continuing conversations about how these equity considerations might be expanded and taken up

Source: Based on discussion in de Bie et al. (2022, 22-31)

Summary

- **EDI as a foundational principle in inclusive research practices:** Equity, diversity, and inclusion are central to transforming undergraduate research from elite, selective models to inclusive, embedded practices. Inclusive partnerships and student-staff collaborations aim to foster a sense of belonging, challenge power imbalances, and promote access for minoritised and underserved students through shared vision, flexible practices, and equitable recruitment.

- **Systemic barriers and the need for proactive strategies:** Structural inequities—such as biased recruitment, lack of confidence, and unequal access to opportunities—limit participation for students from underrepresented groups. Addressing these challenges requires strategies like positive action (e.g., interest-based applications, preparatory support), curriculum decolonisation, whole-cohort approaches, and reframing success to include diverse forms of knowledge and experience.
- **Moving beyond diversity rhetoric to inclusive practice:** Institutions and educators are encouraged to shift from focusing on diversity as a goal to *developing inclusive practices* that dismantle barriers and enable all students to participate fully in research and inquiry. This includes institutional commitment (e.g., equity-focused committees and programmes), responsive partnership principles (e.g., access, disaggregation, critique), and continuous reflection on how to support groups that have been denied equity.

This chapter has explored a rapidly growing interest in the role of equity, diversity, and inclusion in student engagement, particularly in research and inquiry. The next chapter discusses supervising and mentoring, as well as celebrating and disseminating student research and inquiry.

11. Supervising and mentoring, and celebrating and disseminating student research and inquiry

“It is the mentoring that changes undergraduate research from just a university directive to a high-impact practice with the potential to transform the student experience and outcomes” (Helen Walkington, personal communication, 13 May 2025).

11.1 Supervising and mentoring student research and inquiry

Supervision is the term most commonly used in Australia, Canada, and the UK, whereas *mentoring* is the favoured expression in the United States. Both refer to “guiding a less experienced student ... through the practice of inquiry in academia, specifically within a disciplinary research question” (Walkington et al., 2022, 134). **Supervision refers to a task, whereas mentoring suggests a more holistic process focused on student development,** including professional socialisation, intellectual support, and personal and emotional support (Thiry & Laursen, 2011).

The supervisor plays a central role in navigating and managing the complexities inherent in the research-based learning process (Bowyer & Akpinar, 2022). Good supervision is “characterised by trusting relationships where students and supervisors share research interests and supervisors provide advice without undermining students’ ownership of projects, resulting in evolving supportive relationships that foster student growth” (Roberts & Seaman, 2018, 33). Supervisors are also responsible for addressing ethical and safety considerations related to the research (Healey, R. et al., 2013). When the research is embedded within the curriculum, the supervisor often assumes the dual role of mentor and examiner, delivering both formative and summative feedback throughout the student’s learning journey. Given that **supervising and mentoring student research differs significantly from other forms of teaching, academic staff require dedicated support and guidance to navigate this role effectively** (Marshall, 2009). A study of award-winning mentors found that a defining characteristic was “an ability to establish and sustain a sense of challenge, while maintaining meaningful engagement and a sense of achievement amongst students” (Walkington et al., 2020, 1519).

When undergraduate research occurs outside formal coursework, the time commitment required for supervision may not always be adequately recognised (Hensel & Paul, 2012). Supervisory and mentoring roles are often undertaken by faculty or academics; however, in research-intensive universities, particularly in the STEM disciplines, graduate students and postdoctoral researchers also commonly assume these responsibilities (Mojica, 2022; Wallin & Adwadi, 2018).

Guidance for supervisors, mentors and students

A wealth of advice is available for supervisors, mentors and students. Some recommendations for supervisors are listed in Table 11.1. A complementary list of ten salient practices of undergraduate research mentors is given in Table 11.2. Discussions with mentors suggest that they find practices 1, 5 and 9 the most challenging (Walkington et al., 2022). Nottingham Trent University has taken it a step further and offers a PgDip in Research-Informed Teaching (Box 11.1). A thematic map of the characteristics of good supervision and the threats to the student-supervisory relationship is presented in Figure 11.1. The key role of mentoring in undergraduate research opportunity programmes is emphasised by Johnson and Rifenburg (2025a).

Table 11.1 Recommendations for supervisors

1. Develop and provide clear guidance to students
2. Begin the supervision process as early as possible with students
3. Research methods training needs to precede the students' project work
4. Convene a collective, communal class briefing session at the outset of an undergraduate major project
5. Be consistent in your practice as supervisors
6. Establish clear and consistent ground rules
7. Provide guidance on the deadlines, timeframes and major milestones
8. Provide dissemination opportunities and publication outlets for students' project work
9. Explore the value of student peer-to-peer, collaborative and cooperative approaches to learning and feedback on the project as a mechanism for reducing supervisor workloads whilst adding value to student learning
10. Explore approaches to supervision

Source: Longcroft & Pratt-Adams, 2020, 144)

Table 11.2 Ten salient practices of undergraduate research mentors

1. Strategic planning in response to students' varying needs and abilities
2. Set clear, scaffolded expectations
3. Teach the skills, methods, and techniques of conducting research in the discipline
4. Balance high expectations with emotional support and appropriate personal interest in students
5. Build a sense of community among members of the research team
6. Dedicate time to one-on-one mentoring
7. Increase student ownership of the research over time
8. Support students' professional development through networking and explaining disciplinary norms
9. Create intentional, ladder opportunities for peers and "near peers" to learn mentoring skills and to broaden participation
10. Support students to disseminate findings through presentations and in writing

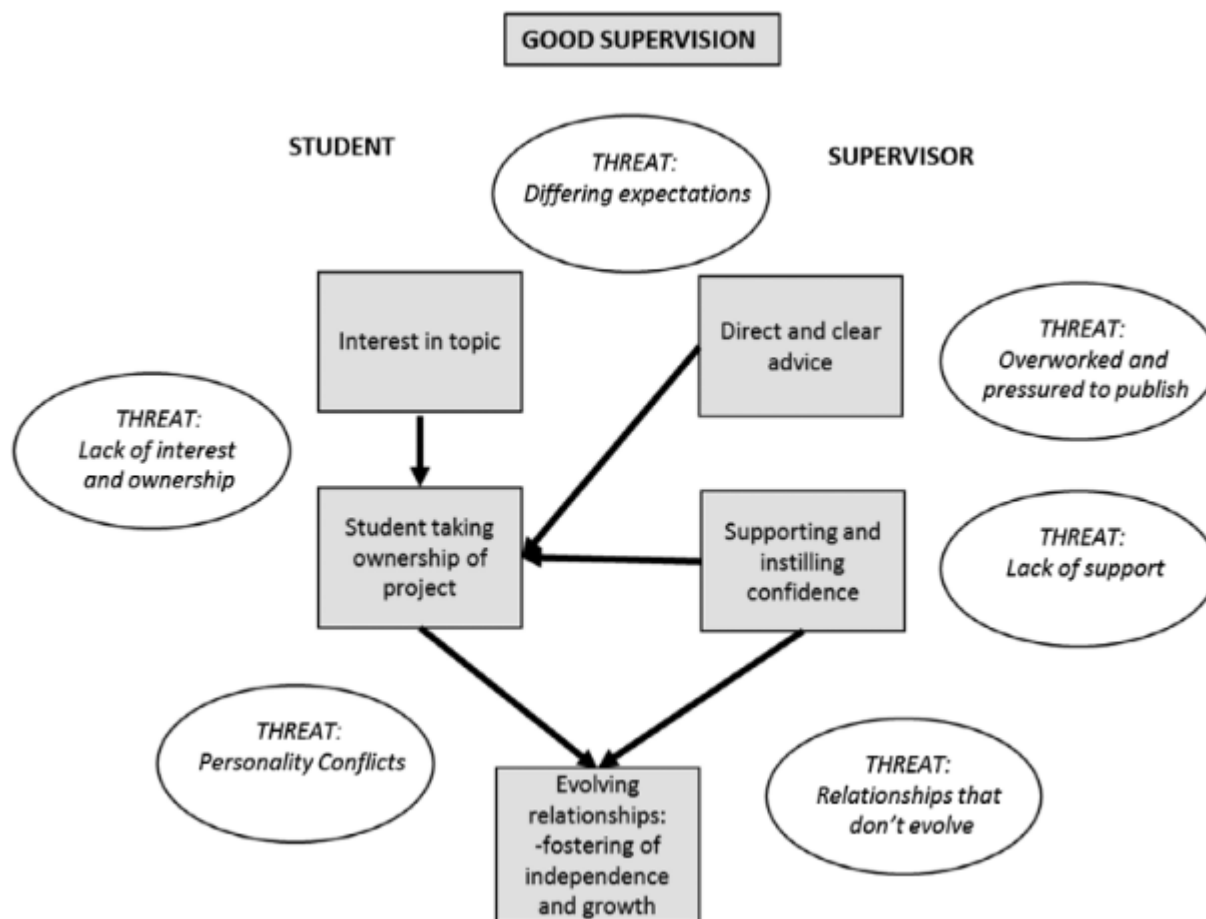
Source: Walkington et al. (2022, 134) adapted from Shanahan et al. (2015) and Walkington et al. (2018)

Box 11.1 PgDip in Research-informed Teaching at Nottingham Trent University

Nottingham Trent University offers a *PGDip in Research Informed Teaching*, which helps academic staff develop research practice skills to become better placed to teach and supervise projects at the undergraduate/postgraduate/PhD levels. It is aimed mainly at lecturers who have previously worked as practitioners before entering university teaching and have, therefore, joined the university sector as mid-career teachers. It offers a teaching and learning experience for lecturers who wish to familiarise themselves with the skills and perspectives that inform current research practice and who want to gain direct experience in conducting high-quality empirical research.

Source: <http://www.educaedu.co.uk/pgdip-research-informed-teaching-postgraduate-28250.html>

Figure 11.1 Thematic map of good supervision (shaded) and potential issues



Source: Roberts & Seaman (2018, 31)

Supervisory practices often vary between and within departments as to the autonomy students are given.

Interviews with 20 supervisors of honours dissertations in the UK in two post-1992 universities found that they often followed a three-stage process (Malcolm, 2023). This enabled supervisors to maintain initial control of the dissertation when research questions and methods were agreed upon, to extend supervisee autonomy at the central stage of conducting the research, and to distance themselves further from the written output, by, for example, limiting the chapters they would read. However, practices varied between supervisors and the process was not always made explicit to students. **The tension between the teaching role of the supervisor and their role as first marker led Malcolm (2023) to suggest that the two roles should be separated,** and supervisors should not assess the work of students they have supervised.

Many departments and universities provide guidance to their students undertaking final-year projects and dissertations (FYPDs). There are also several published generic and discipline-specific guides (e.g., Jegede et al., 2020; Seligman & Mitchel, 2023; Wisker, 2018). A novel approach was developed at the University of Newcastle, where four students, under the guidance of a staff supervisor, prepared their guide (Box 11.2). A similar project to co-produce resources that support Master's students in understanding how to disseminate their research was undertaken at UCL (Lee & Moore, 2024). Students and tutors co-created a communications toolkit and established external mentorship support with past students to enhance pastoral care. At Brunel University, they complement the subject-specific guidance on preparing a dissertation with a panel question time (Box 11.3).

Box 11.2 Engaging students in investigating research support and developing web resources at the University of Newcastle, UK

A group of students identified good practices across a large faculty in undergraduate dissertation and research modules, and then shared the models of student support identified through a web resource on which all students may draw. All second-year students were offered the opportunity to be part of the Research Project. Four students were selected and paid £200 for this. A staff member supervised the project and interns, but ensured that the students were the ones who informed the shape of the project. Students worked in pairs to identify all the relevant modules, make initial email contact, and then arrange face-to-face interviews with willing staff members. This was a major task for most of them as they had never been involved in this type of social research before. They also spoke with student representatives in each subject to gather more student views. An emergent component from the student intern contribution was their desire to create a set of quality standards for research module student support with both 'essential' elements and 'good practice' aspects.

Source: Healey et al. (2013a, 60)

Box 11.3 Dissertation question time: Supporting the dissertation project through panel discussion at Brunel University, UK

Dissertation Question Time attempts to create an informal arena for discussion, while allowing the input of voices from a range of subjects and perspectives. The workshop consists of a panel of undergraduate students, academic staff, and an academic skills advisor discussing questions from students on any aspect of the dissertation process. During the workshop, the student attendees address their questions to any panel member. The aim is to prompt open discussion, and students on the panel are particularly encouraged to lead the discussion. To encourage participation, students are invited to submit questions beforehand. The main themes from students attending the sessions involved issues over the relationship with the supervisor, confusion over structure or format and time management. The advice generated through the discussion is valuable because it complements subject-specific provision but does not attempt to replace it.

Source: Healey et al. (2013a, 61-62)

One-to-one, group, and peer supervision

One-to-one supervision is the most common model; however, with increasing staff-student ratios and the advent of enabling technologies, group supervision and peer support are becoming more popular as complementary approaches. When designing and developing FYPD modules to offer a broader range of possibilities, it is possible to incorporate diverse forms of supervisory relationships into the course structure (Healey et al., 2013a). For instance, Robson (2006) employed action research with a cohort of eight geography dissertation students at Keele University to promote their development as independent learners and peer supporters (Box 11.4).

Box 11.4 Helping students to engage more effectively with the research process in undertaking their undergraduate dissertations at Keele University, UK

Robson (2006) undertook a case study of her efforts as a supervisor, using action research, to help students engage more effectively with the research process. The study aimed to make effective changes to improve students' motivation, commitment, and achievement in completing a geography dissertation. Initial findings revealed that students felt lonely and insecure about their dissertations, and a considerable supervisory burden was placed on the supervisor. Four action research cycles were subsequently conducted with a group of eight dissertation students over the course of one academic year. The research evaluated four interventions, whereby the supervisor-researcher invited the students to: evaluate their progress; learn from examples of completed dissertations; share and support one another; and engage in peer assessment. Qualitative evidence demonstrates **a shift from a status quo of individual supervisory meetings between poorly motivated students and a frustrated supervisor to highly motivated students effectively empowered as independent self-learners and peer supporters**. It is concluded that, given the right circumstances, students can be facilitated to 'do it better themselves'.
Source: Robson (2006)

"While a pedagogy of one-to-one mentoring might be an early stepping stone to prepare students for research, collaborative mentoring may benefit both faculty and students" (Walkington et al., 2020, 1530). Graduate students sharing mentoring roles with academics could be an appropriate response in research-intensive institutions, particularly in the STEM disciplines and where interdisciplinary team projects are undertaken (Desai, 2008; Walkington et al., 2022).

"Providing a balance between student autonomy and staff support is challenging but essential" (Hill et al. 2011, 337). In projects where students collaborate with academics and postgraduates, such as within research groups, the nature of supervision differs significantly from that of a traditional dissertation (Healey et al., 2013). In these settings, students assume the role of co-researchers, often acting as apprentices. Such negotiated pedagogical approaches raise important ethical considerations, mainly due to inherent power imbalances (Le Heron et al., 2006).

Supervisory relationships

The relationship between students and their supervisors and mentors can be key in developing positive outcomes for both parties. For example, one study found that meaningful relationships significantly supported student development by fostering greater confidence and a stronger sense of competency. This enhanced sense of ability influenced students' professional self-concept, deepened their sense of belonging, and reshaped their expectations for life beyond graduation (Davis & Jones, 2020). However, research indicates that **it is common for there to be a mismatch in the expectations** held by undergraduates and their supervisors (e.g., Noor et al., 2023). This has led to calls for professional development for both parties (Baker et al., 2022; Longcroft & Pratt-Adams, 2020).

A helpful tool for shaping supervisory relationships is the *expectations framework* illustrated in Figure 11.1. When both student and supervisor complete the framework, it can facilitate open discussions about any mismatched expectations. Designed initially for postgraduate thesis supervision, the framework can be readily adapted for use with FYPDs. While particularly well-suited to individual projects, some elements may also apply to group-based assignments.

An often-overlooked aspect of supervision is the opportunity to highlight the long-term value of the skills, attitudes, and competencies students develop through their FYPD (Healey et al., 2013a). This tends to be more effectively addressed when supervisors adopt a holistic approach to mentoring.

11.2 Celebrating and disseminating student research and inquiry

Each year, from the 1990s to 2013, final-year students at the University of Sussex gathered to celebrate the handing in of the dissertations and cheer on others partaking in the *Dissertation Dash* running to hand their work in on time.



Source: <https://www.bbc.co.uk/news/uk-england-sussex-22411046>

Celebrating and disseminating the conclusion of an FYPD is a valuable part of the overall research journey (Healey et al., 2013). It publicly acknowledges the student's role as a producer of knowledge and offers a meaningful moment for celebration. Such events also bring together the wider support network—staff, peers, family—and can serve to inspire younger students (Box 11.5). When potential employers are involved, these gatherings can double as networking opportunities (Box 11.6). Therefore, planning for a celebratory element within the FYPD structure is beneficial, as it provides students with a platform to showcase their work and be recognised for their achievements. There are aspects of the end-of-year degree shows, common in art and design schools, which other disciplines might consider adapting to celebrate and disseminate their students' research. For instance, undergraduate research conferences and student-led publications can offer effective avenues for sharing and celebrating scholarly work. Every April in the United States, an undergraduate celebration week is organised by the Council on Undergraduate Research in Washington, DC, and many universities hold celebration days on their campuses (Box 11.7). The British Conference on Undergraduate Research (BCUR) was founded in 2010 and held its first annual conference at UCLAN in 2011. The conference regularly attracts over 400 participants. The best posters are presented at the Posters in Parliament event.

Figure 11.1 Supervision expectations

Read each pair of statements below and then estimate your position on each. For example, with the first statement if you believe very strongly that it is the supervisor's responsibility to select a good topic you would put a ring round '1'. If you think that both the supervisor and student should equally be involved you put a ring round '3' and if you think it is definitely the student's responsibility to select a topic, put a ring round '5'.

1. It is the supervisor's responsibility to select a project topic	1	2	3	4	5	The student is responsible for selecting her/his own topic
2. It is the supervisor who decides which theoretical framework or methodology is most appropriate	1	2	3	4	5	Students should decide which theoretical framework or methodology they wish to use
3. The supervisor should develop an appropriate programme and timetable of research and study for the student	1	2	3	4	5	The supervisor should leave the development of the programme of study to the student
4. The supervisor is responsible for ensuring that the student is introduced to the appropriate services and facilities of the department and university	1	2	3	4	5	It is the student's responsibility to ensure that she/he has located and accessed all relevant services and facilities to undertake the project
5. Supervisors should only accept students when they have specific knowledge of the student's chosen topic	1	2	3	4	5	Supervisors should feel free to accept students, even if they do not have specific knowledge of the student's topic
6. A warm, supportive relationship between supervisor and student is important for successful candidature	1	2	3	4	5	A personal, supportive relationship is inadvisable because it may obstruct objectivity for both student and supervisor during candidature
7. The supervisor should insist on regular meetings with the student	1	2	3	4	5	The student should decide when she/he wants to meet with the supervisor
8. The supervisor should check regularly that the student is working consistently and on task	1	2	3	4	5	The student should work independently and not have to account for how and where time is spent
9. The supervisor should insist on seeing drafts of work to ensure that the student is on the right track	1	2	3	4	5	Students should submit drafts of work only when they want constructive criticism from the supervisor
10. The supervisor is responsible for decisions regarding the standard of the project	1	2	3	4	5	The student is responsible for decisions concerning the standard of the project

Source: Healey et al. (2013, 65), based on Kiley & Cadman (1997)

Box 11.5 Independent Study program at the College of Wooster, US

Independent Study (IS) is a year-long project conducted by all senior students and is an integral part of the Wooster degree. Students are given opportunities to develop their skills, supporting them in completing their IS from their first year, and are offered the chance to participate in Wooster's Summer Research Program, which serves as an apprenticeship. The IS program enables students to showcase skills and abilities that employers highly value. It is an individually designed study completed in collaboration with a mentor. IS can culminate in a major research paper, an art exhibit, or a performance. Students are required to conduct a literature review and plan and carry out research in an appropriate environment (i.e., lab, theatre, or studio). At the end of their project, students make an oral presentation to defend their research. There are also opportunities for celebration. There is a hand-in deadline, *IS Monday*, which ends with an *IS parade*. The Senior Research Symposium, a celebration of IS, enables students, staff, peers, parents and community members to celebrate students' accomplishments in their senior year. It is a day when student classes are cancelled and they stage presentations and art exhibitions to demonstrate their knowledge and achievements.

Source: Healey et al. (2013a, 70-71)

Box 11.6 Learning from industry professionals and a student-led conference on contemporary issues in arts management at the Liverpool Institute for the Performing Arts, UK

The Creative Industries Conference is a final-year module that requires students to engage with industry professionals. Students research areas of interest and present their findings at a student conference. During the module, speakers at the forefront of performing arts management discuss the industry's future. Students must engage with and network among the speakers and hosts, who will lead the sessions, which include providing research packs to their peers. Most of the assessment (80%) is via a presentation at the end of the module at an annual Creative Industries Conference. Emphasis is placed on coherence, the strength of argument, and supporting evidence, rather than presentation. This unique event is attended by industry professionals, members of the public, and students from the other two years of the programme. The remaining 20% of the marks are available for criteria decided by students, for example, their interaction with guest speakers' subject matter and enhancements to the course.

Sources: Healey et al. (2013a, 57); <https://lipa.ac.uk/courses/undergraduate-courses/ba-hons-management/>

Box 11.7 Undergraduate research celebration week in the US

On November 16, 2010, the U.S. House of Representatives declared the week of April 11, 2011, as **“Undergraduate Research Week.”** Since then, the Council on Undergraduate Research has designated a week in April each year for this purpose. Many campuses hold events to celebrate undergraduate research during this week. – generally by students presenting posters, but also through talks, exhibitions or performances. These are often accompanied by talks from leading researchers in that institution or nationally. Audiences for such events include faculty, fellow students, parents, prospective students, alumni, and potential sponsors. For example, in 2024, the University of New Hampshire (UNH) celebrated its 25th annual undergraduate research conference, with over 1,600 students participating in April. Students presenting were mentored by more than 350 faculty research advisors throughout UNH.

Source: <https://www.cur.org/events-services/undergraduate-research-week/>

<https://www.unh.edu/unhtoday/2024/04/urc-celebrates-quarter-century-showcasing-student-research>

“No idea is fully formed until it can be communicated” (Boyer Commission, 1998, 24). **Making student work public is one of the most effective ways to raise its quality** (Healey et al., 2013a). The end-of-degree show is a common practice in art and design programmes. When students know that their peers, family, faculty, professionals, and members of the broader community will view their work, they are more motivated to produce their best. Strong communication—both oral and written—is essential in this context. A compelling example is the **Student Thesis Conference** in Sports Science programs at the University of Hull in the UK. This innovative dissemination model integrates a 500-delegate conference into the curriculum: first-year students attend as audience members, second-year students present dissertation proposals as posters, and final-year students deliver oral presentations of their findings (Douglas et al., 2018). “The introduction of pedagogies such as the conference that facilitate interactions between students within and between year groups can introduce a socially constructed aspect of learning, thereby providing considerable ‘added value’ to the educational experience” (Hubbard et al., 2021, 19).

Adapting the Three Minute Thesis format for FYPD students is an alternative to traditional conferences. Initially developed by the University of Queensland for doctoral researchers, this global competition challenges students to explain their research and its potential impact in just three minutes using only one PowerPoint slide (University of Queensland, nd). A similar model could be applied within departments, across faculties, or even at the institutional level for undergraduates. Another engaging dissemination strategy is to ask students to create a 30- to 60-second video explaining their FYPD project to a general audience, making research both accessible and shareable (Flaherty, 2013).

A wide variety of dissemination formats is available to student researchers (Healey et al., 2020) (Table 11.3). Most attention has been given to undergraduate research conferences and journals (Spronken-Smith et al., 2013). Presenting orally or displaying a poster at a conference can help students prepare and develop their arguments for their final-year project work (Wallengren Lynch, 2018) (Box 11.8).

Table 11.3 Research dissemination formats for student researchers

• Blogs	• Poster and paper presentations
• Video diaries	• Group wikis
• Podcasts	• Wikipedia pages
• Online conferences	• Trail guides
• Client presentations	• Web pages
• Simulations	• Journals and books
• Exhibitions and shows	• Consultancy reports
• Displays	• Face-to-face conferences e.g., departmental/national/international
• Competitions	

Source: Walkington (2016b, 3)

Box 11.8 Student poster conference linked to dissertation in psychology at St Mary's University, UK

The psychology department at St Mary's University has integrated a required poster session into the dissertation requirements. The research project – approximately 5,000 words – is submitted in April of their final year. This counts for 80% of the final mark on that course. As with many other UK institutions, work on this project is meant to start in the second year. At St Mary's, there is a required poster session in May of their second year, during which students present and discuss an initial outline of their work. This accounts for 20% of the final grade on the project and is evaluated based on visual content, presentation, and student responses to questions about their project. The poster session is run as an academic conference, with all academic staff attending, as well as first-year and third-year students. Involving first-year students both increases the number of questions second-year students have to answer and, perhaps most significantly, orients first-year students on how to carry out their research.

Source: Healey et al. (2013a, 17)

Students benefit significantly from involvement in undergraduate research conferences.

Interviews with students participating in the British Conference for Undergraduate Research (BCUR) found that they exhibited intellectual independence by adapting their work for presentation to a multidisciplinary audience, engaging in dialogue with peers and using their input for benchmarking, and they saw it as a threshold experience for the development of self-authorship (Hill & Walkington, 2016; Walkington et al., 2017). A study of students' experiences, conducted one year after they contributed to an undergraduate research conference, confirmed these benefits, with students reporting that their participation directly encouraged greater involvement in additional extracurricular activities (Little, 2020). Some universities, such as Oxford Brookes, have dedicated undergraduate research webpages (<https://sites.google.com/brookes.ac.uk/launchpad/launch-pad>).

Organising undergraduate research conferences and publishing undergraduate research journals presents a series of challenges and opportunities (Barker & Gibson, 2022; Gresty & Edwards Jones, 2012; Hart, 2012; Stone et al., 2016) (Box 11.9; Table 11.4).

Box 11.9 Third-year students produce a creative arts journal, *Offset*, at Victoria University, Australia

Offset is an annual student-run arts hub that produces a print and online creative arts journal (featuring poetry, short fiction, music, media products and fine art reproductions), an exhibition and a gala launch. As part of their capstone studies, third-year students are invited to apply, as per real-world job ads, for positions on the team (e.g. managing editor, social media manager, designer, PR, art curator). Each team receives detailed handover notes from the previous year's team and is mentored by an academic. The responsibility for sourcing works, managing production, liaising with industry and sponsors, and ultimately delivering the journal, exhibition, and launch falls squarely on the shoulders of the student team. This project allows students to work in a simulated industry environment in partnership with academics and industry figures. Initial planning takes place before the start of semester one, and the project runs continuously until the end of semester two. Students are alerted to the fact that this project will demand more of them than just about any other unit they encounter during their studies, and that it is up to them to manage the work as a team, support each other and put their hands up when they're struggling. The project ran from 2001-17 as a flagship project for the university and enjoyed the patronage of the Vice Chancellor.

Sources: John Weldon; <http://offsetartsjournal.vu.edu.au/index.php/offset>

Students may also present at conferences and submit papers to journals as co-authors with staff. In a few cases, they may co-edit journals with staff. The [International Journal for Students as Partners](#) (IJSaP) is a student-staff partnership with eight student and staff co-editor pairs based in seven countries – Australia, Canada, China, Pakistan, South Africa, the UK, and the US. It is an open-access higher education journal, founded in 2016 and published by McMaster University Press twice yearly. The focus of the journal is on the process of partnership, rather than the findings of projects, and hence provides opportunities for student researchers partnering with mentors and academic staff to reflect on how they operate in partnership. Every submission is peer-reviewed by a student and a staff member (Cliffe et al., 2017; Healey, R. L., et al., 2018; Marquis et al., 2020). The unique relationships between authors, co-editors and reviewers provide unseen opportunities for mentoring (Friberg et al., 2021). Student (and staff) reviewers receive training materials. We view IJSaP as a developmental journal, where we emphasise relational pedagogies and promote inclusive and humane practices (Cook-Sather & Healey, 2024). From 2016 to 2019, students and staff from many countries met annually at the International Students as Partners Institute (ISaPI) (Marquis et al., 2017b, 2019).

Table 11.4 Organising undergraduate research conferences and journals: Challenges and opportunities

Issue	Challenge	Possible responses
Inclusion	Strike an appropriate balance between being supportive and inclusive, but also rigorous and of high quality	Build as much support and training as possible into the pre-submission stage
Peer review	Establishing a balance between ensuring quality while being inclusive and supportive	Developmental process during presentation and review, emphasising constructive feedback Using trained students as reviewers
Submission solicitation	Soliciting and maintaining an adequate volume of submissions	Maintain continuity of faculty, staff and students Provide mentoring support
Resourcing	Requires thought and dedication, and has resource implications both in time and costs for the provider	Support at a senior level is critical, ensuring that initiatives are strategically aligned and lending credibility, institutional validation and continuity
Co-creation	Student turnover puts at risk the initiative	Need a robust recruitment system overseen by students and staff, scaffolded training for the wider journal team, and a strong mentoring system involving more experienced students working with recruits to induct them into the project
Extending boundaries	Many undergraduate research journals and conferences are discipline-based	Learning to communicate to an interdisciplinary and sometimes international audience has many benefits
Format	Switching to remote or recorded presentations can be challenging	Need for organisers, presenters and audience to be flexible where in-person presentations are not possible

Source: Based on Barker & Gibson (2022, 176-181)



“Students as partners is the radical antithesis of the consumerist mind-set in higher education. Yet students have traditionally been absent from one key arena of academia: publishing.”
(Healey, R. L. et al., 2018)

11.3 Strategies for enhancing engagement with undergraduate research dissemination

To conclude this chapter, a list of strategies for enhancing engagement with undergraduate research dissemination is given in Table 11.5.

Table 11.5 Strategies for enhancing engagement with undergraduate research dissemination

-
1. Define 'research' broadly
 2. Define 'publication' broadly
 3. Build publication into course and programme requirements
 4. Build publication into dissertation and honours-level requirements
 5. Embed the results of student publication into the curriculum
 6. Use digital technology to create a repository of work
 7. Involve students in the publication process.
 8. Co-create a culture where students want to participate and expect to be involved
 9. Highlight the employability benefits of undergraduate research
 10. Link publication opportunities to allow student progression
 11. Generate transparent rules on the quality of work necessary for dissemination in partnership with students
 12. Ensure students submit their work before leaving the institution
 13. Ensure that the publication format can accommodate a large volume of submissions
 14. Invite submissions from partner institutions
 15. Allow co-production with staff and/or peers
 16. Allow students to retain the copyright to their work
 17. Involve all members of the university community in celebrating undergraduate research outputs
-

Source: Walkington (2015, 19)

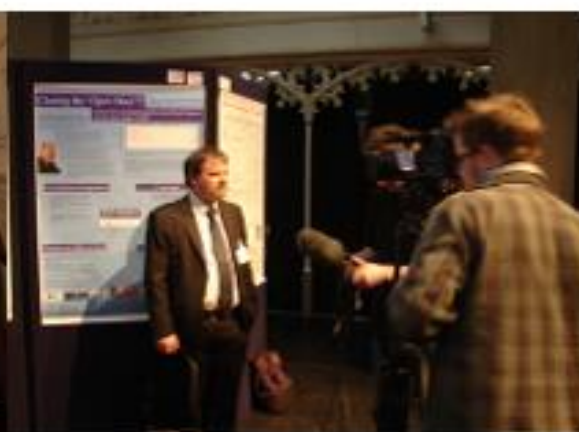
Summary

- **Supervising and mentoring:** Effective supervision involves guiding students through research while striking a balance between challenge and support, fostering autonomy, and providing ethical oversight. Mentoring extends beyond supervision to encompass emotional and professional development, necessitating tailored training and institutional support for supervisors.
- **Celebrating and disseminating research:** Recognising student research through events, presentations, and publications enhances motivation, academic identity, and visibility. Dissemination formats range from traditional conferences to innovative digital media, helping to bridge the academic, professional, and public spheres.
- **Enhancing engagement:** Embedding research and dissemination into curricula, leveraging digital platforms, encouraging co-creation and co-authorship, and fostering inclusive, student-centred practices are key strategies to increase participation and ensure the lasting impact of undergraduate research.

The next chapter explores ways forward for integrating research and education.



Judging UGR at 'Posters in Parliament'



Launch of BCUR



Two student co-editors at launch of *USaP*



Student and faculty in partnership at *ISoP*



Student and staff participants at *ISoP*

Source: Author's photos

12. Ways forward for integrating research and education

“The extent to which we value students and staff working collaboratively informs the transformative potential of partnership. This potential applies not only to individual experiences but also to the shift university cultures can make toward egalitarian learning communities. In such communities, students and staff are genuinely co-inquirers in teaching, learning and research. To realise this potential, all members of the university community will have to embrace new ways of thinking about the relationship between learners and teachers in the process of knowledge creation.” (Matthews et al., 2018, 28)



Source: Smith (2025)

12.1 Navigating uncertainty and supercomplexity

We live in an increasingly uncertain world, where universities are under political attack in many countries, finances are under considerable strain, and new technologies, such as AI, are challenging the nature of teaching, learning, and research. New models of higher education are being proposed, such as the ecological university (Barnett, 2024). **With the democratisation of knowledge (Brew, 2022) and a shift from hierarchies to networks, where innovations are guided by enduring educational values (Blessinger et al., 2025), the research-education nexus is arguably even more central to the survival and prosperity of higher education.**

Navigating uncertainty and supercomplexity in higher education requires a shift from traditional knowledge transmission to fostering critical thinking and problem-solving skills. As the quote I began this chapter argues, universities need to adapt by embracing diverse perspectives, promoting collaboration, and empowering students as active agents in their learning journey. This involves recognising the evolving nature of knowledge, moving beyond fixed narratives, and creating spaces for authentic assessment and relational pedagogy.

Globalisation and the ascendancy of a neoliberal political, economic, and cultural agenda have profoundly shaped higher education. University education is increasingly treated as a marketable commodity, with students positioned as consumers (Molesworth et al., 2010; Shukry, 2017). This commodification has had a detrimental effect on the quality of higher education. In contrast, **promoting students as active partners in research and inquiry offers a meaningful alternative to the consumer-oriented model of education** (Bovill et al., 2016; Healey et al., 2014).

Brew (2022) argues that undergraduate research engages students with pressing contemporary challenges facing democratic societies, such as the development of knowledge, the establishment of truth, and the importance of values and relationships in scientific inquiry. The

growth of undergraduate research and inquiry reflects broader shifts in knowledge production, including the breakdown of rigid disciplinary boundaries and the increasing democratisation of research. The latter is fundamental, as it prompts critical reflection on the connection between research and society, questions traditional academic hierarchies, and contests exclusive beliefs regarding who is capable of producing knowledge. She concludes that ultimately,

undergraduate research has the potential to be transformative, equipping students with the skills and mindset needed to navigate and contribute to a complex, uncertain world.

Shanahan et al. (2017) also predict that the next decade may see increased democratisation of undergraduate research, with expanded research opportunities for students from historically underserved communities, nontraditional backgrounds, and those with average or below-average academic records. These predicted shifts, although slowed down by current political conditions in the US, further **challenge elitist assumptions about who can participate in knowledge creation and promote greater equity and inclusion in higher education.**

A not dissimilar call for the future of the research-education nexus has been made by Hordósy and McLean (2022). They conclude that in a post-pandemic world, “we need to build a system that is more equitable and inclusive to both students and staff, more flexible in its organisation, strongly rooted in its wider community, less obsessed with competition, and much more collaborative in nature” (p. 392).

Higher education institutions in many Western countries are experiencing stagnant or declining enrolments (Bekhradnia, 2024). One response has been to look for students amongst the ranks of adult learners. These can range from parents with small children who have stepped out of education and now want to return to pursue a degree, to those well past the standard retirement age who want to become students once again. Such students have different motivations, life experiences, and study contexts compared with the traditional 18-21-year-old students. **The increasing diversity of the students entering higher education provides both a challenge and an opportunity to engage them in research and inquiry.** A wider range of research and inquiry opportunities needs to be designed to ensure their needs and interests are met. Beth Ambos suggests that many institutions will need to pay more attention to this growing market. She raises some intriguing questions:

“Closely tied to this notion of serving the widest possible definition of ‘student’; might micro credentials be granted for certain types of skills acquired in the course of undergraduate research participation? How would research skills and achievements be transferred between institutions via some sort of record/portfolio? How would the growing Citizen Science movement be factored into undergraduate research programming?”
(personal communication, 11 June 2025).

She concludes that the economic model for undergraduate research is ripe for expansion.

Artificial intelligence

The potential impact of artificial intelligence (AI) on higher education has garnered considerable attention over the past two years (e.g., Beckingham et al., 2024). Surprisingly little has been published as yet on how AI is impacting student-staff partnerships and undergraduate research and inquiry (Healey et al., forthcoming), though this is likely to change quickly. There is increasing emphasis on authentic practice-based research and inquiry assignments, linked, for example, to specific issues faced by communities or employers. **Excluding students from institutional discussions about AI risks portraying them as a uniform group, often framed as**

potential cheaters, which can lead to punitive, out-of-touch policies that fail to reflect students' real experiences and concerns. In a time of uncertainty and anxiety surrounding AI, adopting partnership-based approaches—similar to those used during the COVID-19 crisis (Healey, R. L., 2021; McCreadie, 2020)—can help strengthen student-staff learning communities and foster connections. The rapid advancement of AI has, to some extent, flattened traditional hierarchies between staff and students, as both groups find themselves learning and navigating this complex landscape together. **In the era of AI, where academic integrity is increasingly under strain and uncertainty persists, sustaining strong human relationships in the learning process is more crucial than ever.** Gravett (2024) highlights this need, emphasising the value of relational approaches to teaching as a meaningful response to the challenges posed by AI.

Some scholars use the metaphor of AI-student partnership to reflect the growing influence of AI in learning, likening it to the established model of student-staff collaboration. However, framing teaching as something easily replicable by machines undervalues the nuanced and relational work that educators do. We argue that **relational pedagogies between students and staff—those grounded in trust, care, and mutual understanding, and enacted through co-creation (Bovill, 2020)—must be central to how institutions respond to AI's growing role in higher education** (Healey et al., forthcoming). Meletiadou (2025) provides a helpful *Framework for Educators* that proposes five interrelated principles to guide ethical, inclusive AI integration.

Much of the discussion about the impact of AI on higher education has centred on ensuring the integrity of assessments. However, as Ellis (2024) has eloquently expressed, our role as educators is to detect learning, not detect cheating. This approach is adopted by the University of Sydney (Liu & Bridgeman, 2025). As teachers, they argue that one of our responsibilities is to teach students how to use technologies, including AI, responsibly and effectively. There are numerous opportunities to do this by engaging students in research and inquiry. In chapter 8, I argued that when assessing student research and inquiry, there is a need for a switch in balance from assessment *of* learning to assessment *for* learning and *as* learning. This could increase the attention given to assessing the process of research and inquiry, thinking like a lawyer, a historian, or an ecologist, as well as the role of AI in supporting learning.

12.2 Implementing research-education nexus policies

Learner-centred leadership

Krause (2024) makes a compelling case for *learner-centred leadership in higher education*. She places students as learners at the core of the higher education ecosystem and emphasises the role of students as partners and co-creators. Her chapter on conceptualising and renewing curriculum is relevant for mainstreaming student research and inquiry in the curriculum, as this involves changing the behaviour of both staff and students. **Although resource availability remains a key issue in promoting the research-education nexus, many challenges can be traced to departmental and institutional cultures and practices** (Ambos et al., 2024b).

Evidence of a maturing approach to the research-education nexus is one that is both systemic and strategic. As I argued in chapter 3, universities need to think systemically about the benefits and challenges faced by students and staff in engaging students in research and inquiry. They are interrelated, and in developing effective strategies to promote students as researchers, university leaders need to consider both. In other words, **it is important that leaders are intentional in developing and executing whole-of-university and/or faculty approaches to promoting active student involvement in research and critical inquiry.** These should be systemic in nature as an indicator of maturation on the part of the institution.

Specific strategies for engaging students in research and inquiry have been discussed throughout this report. These include national strategies and policies (Table 4.3), institutional strategies (Tables 5.2 and 5.3), departmental and course-level approaches (Table 6.3), staff-focused initiatives (Table 7.1), cross-programme strategies (Table 8.3), and the role of academic developers (Table 12.2). Principles for fostering student-staff partnerships are outlined in Tables 2.4, 9.1, and 10.2. Additionally, strategies for integrating principles of equity, diversity, and inclusion into student research, inquiry, and partnerships are discussed in Tables 10.3 and 10.4. These are drawn together in a set of broad institutional-wide recommendations in chapter 13 to highlight the value of a consolidated approach to strategy development, implementation and review.

One of the principles, according to Krause (2024, 35), that underpins successful learner-centred strategy leadership in HE is involving a diverse range of people and perspectives in the process of strategy co-design, co-implementation, co-monitoring, and co-evaluation. Such an approach will depend on motivating staff and students.

Motivating staff and students

Motivating colleagues and giving them ownership of practices and policies is critical in changing cultures. As Breslow et al. (2004) suggest in the context of promoting interest in SoTL:

“One of the key ways in which to engage colleagues in their development as critical and reflective teachers, in a way that goes beyond the hints and tips they may need at the beginning of their teaching careers, is ... to stimulate their intellectual curiosity. ... The asking of questions is at the heart of intellectual curiosity and engaging staff in the scholarship of teaching and learning” (p. 84).

Such changes often face resistance to change, which can take time to address (Healey, R. L. et al., 2019). Providing incentives for staff to change, in terms of reward and recognition, underpins successful change strategies.

“A smarter way of working has to be to reward those who successfully link research and teaching, by making students’ learning a more research-like activity, by emphasising the value of pedagogic research, and by ensuring that those who both research and teach are the dominant role model for an academic career” (Blackmore, 2015).

Most universities separate excellence in research and excellence in teaching in their promotion policies. If the research-education nexus is to be taken seriously, **recognition and reward policies must be explicit about excellence in linking the two, rather than insisting that they are treated separately.**

Motivating students to engage in research and inquiry is just as important as motivating staff. The key is designing effective and stimulating research and inquiry activities that cater to the varied interests of the students involved. Explaining the benefits that they will receive, particularly if this is a pedagogy with which they are unfamiliar, is crucial (see chapter 3). Recognition and reward are also important for students. Some keen students, who are relatively well-off, may be willing to volunteer. However, **to be inclusive, students should be paid or receive course credits.**

One way of sustaining the motivation of staff and students is to establish a community of practice.

Developing a community of practice

Several universities have established communities of practice to promote discussion of the research-education nexus. For example, McGill University established the *Inquiry Network*, an interdisciplinary faculty learning community that evolved from examining the connections between individual teaching and research to developing institution-wide resources to enhance student learning. Through collaboration, the community created a learning outcomes framework that instructors across all disciplines, academic levels, and class sizes could use to foster students' understanding of research and scholarship (Slapcoff & Harris, 2014). Importantly, "the members of the network, present and future, are potential agents of change in their respective disciplinary communities and in the university at large, reaching out in ways scarcely possible for a teaching and learning centre with finite resources" (p. 79).

The logic of the argument throughout this report is that engaging students in research and inquiry is the best way to promote the research-education nexus, as **students should be members of these communities of practice.** Staff-only communities, whether about SoTL, discipline-based research, or community-engaged learning, are missing out on the knowledge and experience that students bring to the table. A principle of student-staff partnership is that everyone has something to contribute. Staff may have expertise in the subject matter, but **students are experts in what it is like to be a student and the challenges they face in their particular context.** I have frequently observed student-staff partnership meetings and seen that more often than not, it is the student member or members who come up with the most interesting ideas. They are not as constrained by the departmental and institutional contexts and ways of doing things.

Models of change in higher education

There are several different models of bringing about change in learning and teaching in higher education (Trowler et al., 2003). One of the best-known is **Kotter's (2012) eight-stage Harvard Business School model.**

1. Establishing a sense of urgency
2. Creating the guiding coalition
3. Developing a vision and strategy
4. Communicating the change vision
5. Empowering broad-based action
6. Generating short-term wins
7. Consolidating change and producing more change
8. Anchoring new approaches in the culture

Whilst recognising that in practice these do not necessarily occur in the suggested sequence, they provide a checklist against which to consider different elements of change. The Council on Undergraduate Research Transformations Project (chapter 4) used Kotter's model as a framework to analyse their findings (Ambos et al., 2024a). They grouped the eight strategies into three overlapping phases: (1) create and prepare (Kotter steps 1–4); (2) engage and enable (Kotter steps 2–5—note the deliberate overlap); and (3) implement and anchor (Kotter steps 6–8). However, Trowler et al. (2003) suggest that **such rational, linear understandings of change are underpinned by an expectation that the journey will be straightforward and are usually inappropriate. Instead, they advocate a social practice model** that emphasises "any innovation will be received, understood and consequently implemented differently in different contexts" (p. 18).

Kezar (2018) identifies **four key mistakes leaders make that lead to failed change efforts** in higher education:

1. Ignoring the change process or being driven by implicit or tacit theories of change
2. Ignoring context
3. Adopting simplistic change models
4. Not grounding change in research

Trowler et al. (2003) identify **the department as the key organisational unit for change**, the intellectual ‘home’ and focus for most staff. Gibbs et al. (2008) take this further in the context of research-intensive institutions, arguing that teaching excellence can be achieved in entirely different ways involving widely contrasting styles of leadership behaviour. They conclude that **advice and guidance on leadership in teaching should pay careful attention to the context, rather than making** assumptions about the general applicability of leadership theory or advice.

The Change Academy approach to designing, implementing, and evaluating curriculum changes

A **Change Academy approach** has been effectively used to develop strategic student-staff partnership initiatives and to design, implement, and evaluate curriculum changes. Change Academy is a year-long facilitative programme developed by the Higher Education Academy and the Leadership Foundation in the UK, which **enables teams from higher education institutions to develop the knowledge, capacity, and enthusiasm for achieving complex institutional change**. It has been adapted to support departmental curriculum changes in related disciplines from various institutions (Healey et al., 2013c), students-as-partners initiatives from institutions across different countries (Marquis et al., 2017b), and curriculum changes from different departments within the same institution (Turner et al., 2021). In each programme, teams, generally of 4-6 members, two of whom are students and two staff, worked part of the time alongside each other on various facilitated exercises about implementing change (e.g., a ‘rich picture’ task designed to help crystallise and visualise project goals; an action planning exercise that helped participants identify and prioritise ideas for moving their initiative forward), and working on their own projects the rest of the time. A student and a staff consultant usually mentored each team. Turner et al. (2021) conclude that “educational developers supporting curriculum development should pay as much attention to the process as the outcome, and that **a well-designed Change Academy approach can be effective in implementing curriculum change across an institution**” (p. 150).

Applying a theory of change approach

One approach I have used with Change Academy projects and many other learning and teaching projects is to ask teams to complete a *theory of change (ToC)* template. It is a common experience that at the beginning of a change process or project, team members have different views on what is being attempted to achieve and the best way to do so. Discussion of how the team will know if they have achieved their goals is often left until late in the project's life and is frequently implicit rather than explicit.

A ToC approach helps to clarify the nature of the process or project and make evaluation explicit from the beginning (Austen & Jones-Devitt, 2023). **The ToC approach is a formative storytelling method for evaluation, which helps the team clarify what they are trying to accomplish and identify the evidence they need to collect to assess whether they have achieved the expected desired outcomes** (Hart et al., 2009). A ToC approach can be used to

explain how and why a project or initiative achieves its results. It aims to develop an understanding of the relationships between outcomes and the activities and contextual factors that may influence these outcomes. One of the attractions of the ToC approach is that it can be used to extend our understanding of a project or initiative, rather than merely auditing it. The overarching key question might be: “*What have we learnt about ...?*”. It is essentially a narrative approach, which tells the story of the initiative. Developing the framework also encourages a conversation between the team and promotes a greater shared understanding of what the project is trying to achieve and how they will know if it has done so.

12.3 Managing risks of mainstreaming research and inquiry in the curriculum

In chapter 3.1, we discussed the challenges and risks students and academic staff face in engaging students in research and inquiry. Here, we focus on the risks that universities may face in developing and implementing strategies to mainstream research and inquiry in the curriculum, and how those risks might be mitigated (Table 12.1). These risks may affect stakeholders, including students, academic staff, professional staff, employers and professional bodies differently. By identifying these potential risks, the challenge lies in devising workable ways to mitigate them. Then attention can shift from the negative connotation of risk, as we argued in chapter 3, to encouraging students and staff to take risks by providing safe and supportive environments where failure is viewed as a learning opportunity.

Table 12.1 Risks and possible alleviations that universities may face in developing and implementing strategies to mainstream research and inquiry in the curriculum

1. Resource and time constraints

Risk: Inquiry-based initiatives often demand more planning, resources (e.g., lab equipment, archives access, software), and flexible scheduling than traditional lectures.

Alleviation:

- **Phased rollout:** Start with small, discrete inquiry modules embedded in existing courses rather than full-scale redesigns.
- **Ring-fenced funding:** Establish dedicated grants for inquiry-based pedagogy and student travel to collect data, as well as the costs of presenting findings at internal and external conferences.
- **Design appropriate learning spaces:** Provide physical and online spaces to support individual and group projects.

2. Staff readiness, workload, and buy-in

Risk: Many academics lack training in inquiry pedagogy and are concerned about the added supervisory burdens. Without formal recognition in workload models, IBL supervision can lead to burnout or token implementation.

Alleviation:

- **Professional development:** Offer sustained workshops, mentorship, and peer-observation programmes on inquiry design and supervision, and pedagogical techniques that incorporate research into teaching.
- **Communities of practice:** Create intra- and inter-institutional forums for sharing research and inquiry-based learning curricula, assessments, and troubleshooting tips.
- **Workload recognition:** Explicitly count student mentorship toward teaching loads and promotion criteria.

3. Institutional and cultural barriers

Risk: Rigid curricula, accreditation requirements, and risk-averse leadership can stifle experimentation. Staff may view inquiry as ‘extra’ rather than core activities.

Alleviation:

- **Leadership advocacy:** Present robust evidence of research and inquiry-based learning impact on learning, employability, and retention.
- **Policy reform:** Introduce flexible credit structures (e.g., modular inquiry credits) and adjust assessment policies to accommodate open-ended projects.
- **Champions network:** Identify and support ‘inquiry champions’ in each department to drive localised buy-in.

4. Assessment and quality assurance challenges

Risk: Traditional exams and essays often fail to capture process-oriented skills, such as hypothesis generation, data analysis, and reflection. Poorly designed assessments can be misaligned with learning outcomes.

Alleviation:

- **Diverse assessment portfolio:** Combine portfolios, lab diaries, presentations, and peer- and self-assessment rubrics that explicitly target inquiry skills. Assess both the processes of research and inquiry, as well as their products.
- **Formative checkpoints:** Integrate milestone reviews (proposal, mid-project report, draft poster) to monitor progress and provide feedback.

5. Student preparedness and equity concerns

Risk: Students enter with varied skills in research design, literature review, and data analysis. Without support, less-prepared or under-represented students may feel overwhelmed or excluded.

Alleviation:

- **Scaffolded support:** Embed mini-units on e.g. research methods, critical reading, and statistical basics early in programmes.
- **Peer mentoring:** Pair novices with experienced student researchers or graduate-student ‘inquiry buddies’.
- **Equity responses:** Regularly review participation and outcomes data by demographic group and allocate resources (e.g., tutoring, stipends) to those who are disproportionately underrepresented. Implement universal design for learning principles to ensure accessibility for all students.

6. Strategic and systemic challenges

Risk: Engaging students in research and inquiry may be left to the final-year dissertation or capstone module, and staff interested in incorporating it within optional modules. Contributions and challenges faced by staff, students, and other stakeholders may be planned for and responded to independently.

Alleviation:

- **Programme design:** Ensure research and inquiry experiences are embedded in core modules in each year of the programme, and there is progression in student research and inquiry skills development.
- **Systemic approach:** Integrate planning of contributions and responding to concerns of students, academic staff, professional staff (e.g. librarians, academic developers, careers, student support) and other stakeholders (e.g. employers, professional bodies) together.

7. Ethical, legal, and logistical challenges

Risk: Student research may involve human subjects, proprietary data, or intellectual property issues; scheduling across campuses and balancing students’ other commitments can impede sustained engagement.

Alleviation:

- **Clear policies:** Develop transparent guidelines on consent procedures, data ownership, and publication rights for student-led projects.
- **Flexible delivery:** Offer evening/weekend labs or asynchronous online components to accommodate part-time and commuter students.
- **Centralised support:** Establish an ‘inquiry hub’ with dedicated staff to coordinate, e.g., ethics approvals, equipment booking, and access to software.

Sources: This table was initially generated with the assistance of ChatGPT, which was then checked against the literature referenced elsewhere in this report, edited, and supplemented with additional material.

By systematically addressing these risk factors, through targeted funding, staff development, policy reform, diversified assessment, equity-focused supports, a systemic approach, and robust infrastructure, universities can create sustainable, inclusive, and high-quality research and inquiry-based learning environments.

12.4 Case studies of the process of embedding student research and inquiry in an institution and a programme

Examples of embedding student research and inquiry in institutions and programmes are presented in Chapters 5 and 8, respectively. Here, two further **case studies focus on the implementation process** (Boxes 12.1 and 12.2). The second edition of *Characteristics of excellence in undergraduate research* (Council on Undergraduate Research, 2024) provides helpful advice on establishing undergraduate research offices, designing new programmes, and communicating aspirations to and requesting commitment from senior management, although primarily in a US context.

12.1 Embedding the research-education nexus at the Amsterdam University of Applied Sciences, Netherlands

As participant researchers, the authors of this edited collection integrate the literature on change management with that on linking research and education and show the importance of adopting a nuanced approach to navigating the local context, the wide range of views on the desirability of undertaking these changes, and the different perceptions of what is meant by research and connecting it to education. Significantly, they recognise that not all change is for the better. The picture that emerges is that **for change to be successful, numerous conversations between stakeholders are essential; however, these need to occur within a clear framework and a sense of direction provided by senior management**. They present a wide range of instruments that they used in stimulating the process of change. Separate chapters explore the rationales for implementing curriculum changes, changes in curriculum learning goals, and, importantly, the necessary adjustments to academic job profiles.

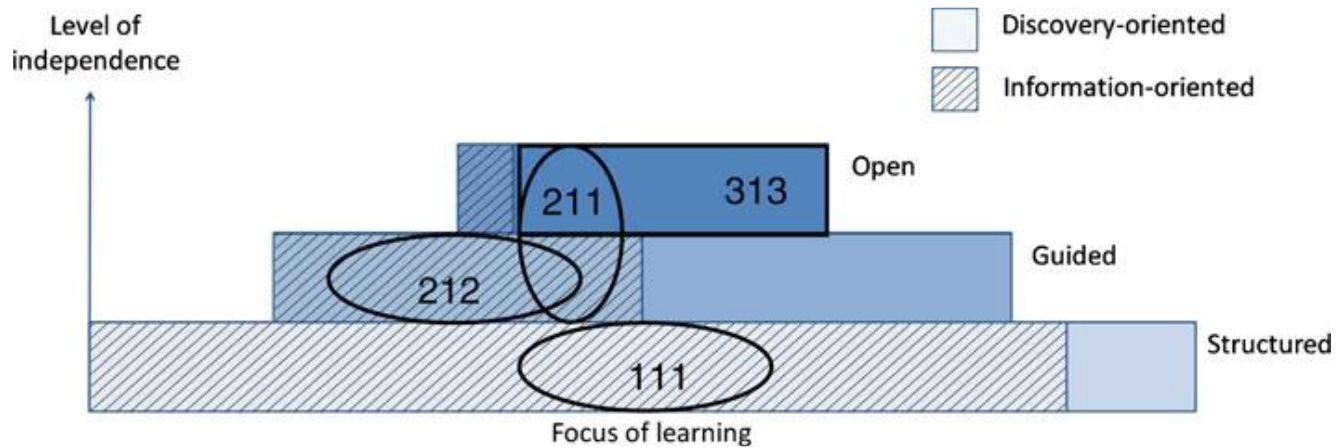
Source: Griffioen (2023)

Box 12.2 The process of embedding inquiry into the ecology programme at the University of Otago, New Zealand

At the University of Otago, ecology is taught within a modular degree structure, requiring students to complete both core ecology and other required courses. Due to this structure, faculty have direct influence over only five core ecology courses, four of which incorporate inquiry-based learning (IBL) (Figure 12.1). **In response to a national university audit emphasising research-teaching links and a program review calling for more student research opportunities, the ecology program was intentionally redesigned to embed the development of research skills throughout the curriculum.** The resulting core curriculum supports the progressive acquisition of inquiry and research capabilities. Several key factors enabled this transformation, as illustrated in Figure 12.2. External drivers, such as the audit and program review, provided a strong mandate for embedding inquiry across the degree. Internally, a dedicated program director led the initiative, supported by a community of practice (CoP) formed among engaged staff members. This CoP, facilitated by an academic developer with expertise in both ecology and inquiry, met regularly to explore the qualities of an ideal ecology graduate, foster disciplinary thinking, and implement inquiry-based teaching. Curriculum planning unfolded over months, with course redesigns taking place over several years. A final critical factor was the culture of continuous improvement, reflected in the feedback loop between the CoP and curriculum shown in Figure 12.2. This model of progressively embedded research skills offers a replicable pathway for curriculum development in other disciplines.

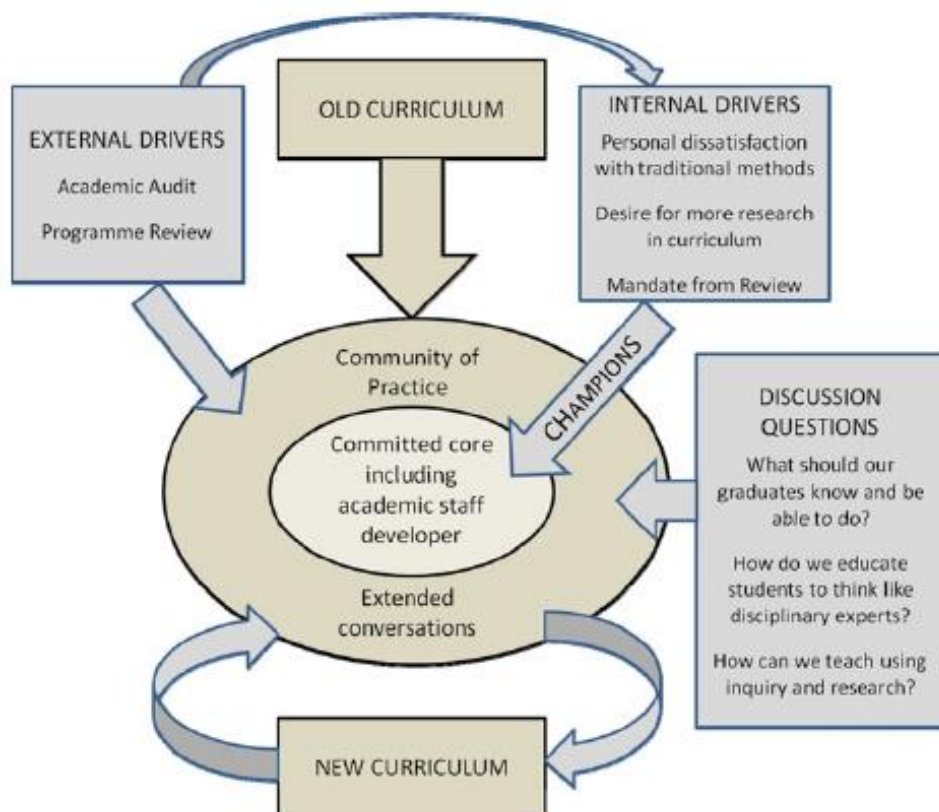
Sources: Spronken-Smith et al. (2011); O'Steen & Spronken-Smith (2012)

Figure 12.1 Mapping of ecology programme core courses (ECOL111, 211, 212 and 313) onto Spronken-Smith and Walker's (2010) model (Figure 8.3)



Source: Spronken-Smith et al. (2011, 733)

Figure 12.2 The process of embedding inquiry into the ecology programme at the University of Otago



Source: Spronken-Smith et al. (2011, 731)

12.4 The role of academic developers in designing and implementing student research and inquiry strategies

Many of the changes in student research and inquiry within higher education institutions identified in this report are led by academic developers. Given their central role, **academic developers are ideally positioned to facilitate the student-staff partnerships that underlie initiatives to implement student research and inquiry strategies** (Healey, M. & Healey, R. L., 2024a).

Academic developers may bring students and staff together to challenge the status quo and identify opportunities to disrupt and develop the curriculum (Cook-Sather et al., 2019), thus

positioning students as ‘democratic participants’ who share their voices and participate in actions to implement change (Zepke, 2023). In some cases, professional staff will partner directly with students in research projects to enhance university practices, such as at the Leeds Institute for Teaching Excellence (Box 12.3).

Brew (2006) suggests that:

“Developers have an important role in encouraging academics to work towards developing inclusive knowledge-building communities with students. In order to encourage such initiatives, developers need to inform themselves about inquiry-based learning and to have a repertoire of responses when academics ask for examples” (p. 155).

One of the intentions of this report is to provide academic developers with the arguments and exemplars that will support them in these conversations.

The variety of roles academic developers may play in supporting undergraduate research and inquiry is presented in Table 12.3. This complements the ‘Strategies for mainstreaming undergraduate research and inquiry across institutions’ shown in Table 5.3. An example of an academic developer co-teaching a course on undergraduate research in South Africa is provided by Vahed & Cruickshank (2018). A set of recommendations for academic developers supporting undergraduate research mentors is available from Hall et al. (2018).

Box 12.3 Professional staff partner with students in research and inquiry at the University of Leeds, UK

At the Leeds Institute for Teaching Excellence, our professional services team has been researching in partnership with students for the past three years. Two students with whom we have been working for the past 12 months have researched students’ perceptions of educational gain and the ways institutions can support students in recognising the gains they have made through their studies. They have presented their findings to University leadership and a working group tasked with defining and evidencing educational gain at the University, and their findings have directly influenced the work of this group. Additionally, we have undertaken research in collaboration with two other student partners to understand the impact of the pedagogic research conducted by our staff. This research has informed the development of a research impact framework, which we are currently evaluating in partnership with students. Researching in partnership with students has been hugely beneficial, as they bring their personal student experiences and disciplinary perspectives, and provide evidence-based insights that directly influence our work. Students who have participated in this type of research have reported a significant increase in sense of belonging to the wider institution through contributing to institutionally focused projects.

Sources: Emma Peasland & Ben Witz, Leeds Institute for Teaching Excellence, personal communication, 27 June 2025; <https://teachingexcellence.leeds.ac.uk/research-2/student-research-experience-placements/investigating-the-impacts-of-teaching-and-learning-research/>; <https://teachingexcellence.leeds.ac.uk/research-2/student-research-experience-placements/investigating-the-effect-of-fellowships-on-professional-service-colleagues/>; <https://teachingexcellence.leeds.ac.uk/research-2/student-research-experience-placements/the-value-of-the-university-of-leeds-education-a-student-perspective/>

Table 12.2. The role of academic developers in supporting undergraduate research and inquiry

-
1. Raise awareness and participate in the development of policy
 2. Influence the funding policies which currently exclude and undervalue undergraduate research and inquiry
 3. Open up opportunities for discussion and debates to bring about institutional change
 4. Raise issues of student learning in extracurricular undergraduate research experience programmes
 5. Provide guidance on challenges that arise when students are taken off-site to carry out research in the community, in the field or at research laboratories
 6. Carry out surveys or audits of existing practice
 7. Initiating conversations about how research experience and skills are taught across the curriculum
 8. Support academics with interpersonal challenges involved with undergraduates
 9. Support students to navigate their way through the messiness and complexity of academic life
-

Source: Based on Brew & Jewell (2012, 53–56)

Brew & Cahir (2014) explore how academic developers can ensure that the work they do concerning a specific institutional priority supports future learning and teaching strategies. They discuss two examples of efforts to integrate research and teaching, including students engaging in research, inquiry, and SoTL, to demonstrate the time needed to develop institutional understanding and how to create sustainable resources to meet the needs of changing initiatives.

Summary

- **Adapting to uncertainty, diversity, and AI:** Universities must respond to global uncertainty, rising diversity, and rapid technological change (especially AI) by fostering student agency, interdisciplinary inquiry, and equitable participation. This includes challenging traditional academic hierarchies, integrating real-world and community-based research, and shifting from consumerist models to relational, values-based education.
- **Systemic strategy and leadership for cultural change:** Effective integration of research and education requires intentional, institution-wide leadership grounded in learner-centred strategies. Success depends on motivating staff and students through recognition, inclusive partnerships, and professional development, supported by communities of practice, change management models (e.g., Kotter's), and collaborative evaluation frameworks, such as the Change Academy and the Theory of Change.
- **Managing risks and building infrastructure:** Mainstreaming research and inquiry faces challenges such as resource constraints, staff workload, assessment design, and equity. Mitigation involves phased implementation, workload recognition, diverse assessment, scaffolded student support, and clear ethical and logistical policies. Academic developers play a central role in enabling sustainable change by fostering inclusive, collaborative, and practice-oriented learning environments.

This chapter has explored the ways forward for integrating research and education. A set of six key recommendations follows for embedding the research-education nexus across the institution through engaging students in research and inquiry.

13. Key recommendations

My fundamental belief is that ideas about how research and teaching can be brought together are going to be different for each person in higher education and that developing these ideas rests on discussion that people have in their tea rooms, in departmental meetings, in research groups and course teams, in discussions with students and general or support staff, and with others outside the university. I think it is only by talking together in a spirit of inquiry about what a research-enhanced or a research-based higher education might mean in any particular context that thinking will advance.” (Brew, 2006, xii)

The following six recommendations for embedding the research-education nexus across the institution, by promoting active student involvement in research and critical inquiry, apply potentially to many higher education institutions, including the University of Westminster. However, which ones are adopted, and the details of the initiatives, depend on the institution's nature and its stage in integrating the research-education nexus and engaging its students in research and inquiry. Many of the recommendations, as reflected in the quote at the beginning of this chapter, focus on initiating or continuing conversations about the research-education nexus, clarifying its meaning within their respective disciplinary, institutional, and national contexts, and transforming the culture at the departmental and institutional levels. **A holistic approach, that is systemic and strategic, as argued in the last chapter, is essential to demonstrate a maturing approach to the research-education nexus.** The following recommendations emphasise the importance of a consolidated approach to strategy development, implementation, and review.

Recommendation 1 is about adopting a broad definition of research and inquiry; Recommendation 2 refers to sharing and evaluating existing practices; Recommendation 3 is concerned with dialogue and action planning; Recommendation 4 focuses on partnerships; Recommendation 5 is about adopting a systemic, strategic and inclusive approach; and Recommendation 6 involves resourcing and leadership.

1. Embrace an inclusive and context-sensitive definition of research and inquiry

Promote a broad understanding of research and inquiry that encompasses both the generation of new knowledge for societal benefit and the development of personal understanding through diverse forms of inquiry-based learning, which include disciplinary and interdisciplinary approaches, professional and work-based learning, community engagement, knowledge exchange, and learning and teaching.

2. Recognise, share, evaluate, and celebrate existing practices

Establish a clear baseline of current activities and experiences related to student and staff engagement in the research-education nexus. This can be achieved through initiatives such as practice-sharing forums (‘swap shops’), curating and publishing examples of innovative practice online, evaluating the outcomes, and conducting research into the lived experiences of students and staff regarding research and inquiry.

3. Facilitate dialogue and action planning

Organise workshops, masterclasses, and other interactive events to clarify the meaning and scope of the research-education nexus. These sessions should showcase effective practices for engaging students in research and inquiry and support the development of context-sensitive implementation plans. A wide range of stakeholders, including senior leadership,

course leaders, academic and professional staff, academic developers, and students, should be involved in these conversations.

4. Embed student-staff partnerships within the research-education nexus

Foster meaningful student-staff partnerships by involving students in the co-design and implementation of research and inquiry initiatives and related policies. Initiatives should be underpinned by principles of equity, diversity, and inclusion, and supported through structured mentoring and supervision, celebration of student contributions, and student engagement in research dissemination. A priority should be developing a student-facing, web-based guide, co-created by students and staff, providing accessible support for undertaking various forms of research and inquiry.

5. Develop a systemic, strategic and inclusive approach to student engagement in research and inquiry

Design and implement a holistic, systemic approach that will motivate both staff and students. This will include a coherent range of curricular and co-curricular opportunities that enable students to progressively acquire research and inquiry skills and experiences throughout their academic journey, from first year to graduation. Such opportunities should be embedded across academic programmes, ensuring alignment with disciplinary and interdisciplinary approaches to knowledge creation and dissemination. Institutions should require that student engagement in research and inquiry is explicitly integrated into the validation and revalidation processes for all programmes. Appropriate rewards and recognition for engaging in research and inquiry are essential for both staff and students.

6. Establish institutional leadership for the research-education nexus

Create a dedicated unit or group within the university with responsibility for advancing the research-education nexus. Aligned with institutional strategies for both research and education, this unit or group should be adequately resourced and empowered to collaborate across academic departments and professional services, including learning support, IT, library services, quality assurance, employability, inclusion, community engagement, research, and knowledge exchange. The group should also partner with students and student representation bodies, such as the Students' Union. Its remit should include the development, coordination, and evaluation of initiatives aimed at transforming institutional and departmental cultures to embed student research and inquiry at all levels and to promote a systemic and strategic approach to embed the research-education nexus across the institution through both CUREs and UROPs. Organisationally, the unit should reflect and bridge the institution's research and education portfolios, ideally situated at their intersection. Some of the questions such a group might address include: What is the business case for the University's engagement in undergraduate research expansion? What are their potential markets? How can expanding undergraduate research help them be more successful?

As I noted in the last chapter, more detailed recommendations are given in earlier chapters for strategies for mainstreaming student research and inquiry at the national (Table 4.3) and institutional levels (Tables 5.2 and 5.3), departmental and course levels (Table 6.3), staff (Table 7.1), across programmes (Table 8.3), and the role of academic developers (Table 12.2). Principles for undertaking student-staff partnerships are given in Tables 2.4, 9.1, and 10.2. Finally, strategies for applying principles of equity, diversity, and inclusion to student research and inquiry, as well as partnerships in general, are presented in Tables 10.3 and 10.4. There is scope for drawing

these together to highlight the value of a consolidated approach to strategy development, implementation and review.

Summary

- **Foster inclusive, collaborative cultures of inquiry:** Promote a broad, inclusive definition of research and inquiry that values diverse forms of knowledge creation, and facilitate ongoing dialogue among staff, students, and stakeholders to clarify and evolve shared understandings across disciplines and contexts.
- **Develop systemic, strategic, and equitable structures:** Embed student-staff partnerships in research initiatives, provide structured opportunities for students to progressively engage in inquiry from first year to graduation, and ensure integration of research and inquiry into programme design, validation, and institutional strategy.
- **Ensure strong leadership, resources, and recognition:** Establish a dedicated institutional unit or group to lead and coordinate research-education initiatives, adequately resourced and aligned with strategic goals. Recognise and reward staff and student engagement in research and inquiry to build sustainable, university-wide cultural change.

I hope that reading this report will help persuade senior managers, course leaders, academic developers, research leaders, individual academic and professional staff, and students, of the critical importance of stimulating conversations about why and how the research-education nexus should help define the vision of the university in the middle of the 21st century, and the key role that engaging students in research and inquiry plays in achieving this vision.

Recommended reading

Barnett (2017): This article examines the interests at work that have both promoted a separation of teaching and research, as well as their reunification, particularly in the form of undergraduate research. It exposes pathologies of this reunification program and suggests remedies.

Brew (2006): This book explores how universities can foster a more effective relationship between research and teaching, thereby enhancing research and improving teaching. Using examples, conversations, and critical inquiry, it suggests how scholarly knowledge-building communities, comprising both students and academic staff, should be developed.

Brew (2013): A framework derived from analysing and integrating models of undergraduate research within the literature, as well as investigations in different countries, is presented and explained.

British Academy (2022): Using commissioned research that draws on both qualitative and quantitative data, this study explores the implications of recent changes in the nexus between teaching and research for the quality of teaching, the quality of research, and the quality of students' learning.

de Bie et al. (2022): Share a series of "tentative principles" for working toward equity in and through student-faculty partnerships, as well as a series of critical responses to them, offered by the three co-authors.

Elken & Wollscheid (2016): The report presents some of the key arguments in existing studies by exploring various types of linkages between education and research. Proposes some input, process, and output indicators to measure the research-education relationships and their quality.

Elon University (nd): A useful collection of resources on undergraduate research.

Fung (2017): In this book, Fung argues that the Connected Curriculum framework, developed and implemented at UCL, can help create spaces for critical dialogue about educational values, both within and across existing research groups, teaching departments, and learning communities. Drawing on vignettes of practice from around the world, she argues that developing the synergies between research and education can empower faculty members and students from all backgrounds to contribute to the global common good.

Griffioen (2023): This book offers a detailed and nuanced examination of how insights into the process of change can be applied to developing research–education connections within one institution, the Amsterdam University of Applied Sciences, over a five-year period.

Healey (2005a): In this chapter, it is argued that some of the complexity and contested nature of the linkages between research and teaching reflect, firstly, differences in the way that the terms are conceptualised; and, secondly, the nature of the disciplinary spaces in which the linkages occur. Presents a model of how curriculum design can be linked to the research-teaching nexus.

Healey & Jenkins (2009): This report argues that all undergraduate students in all higher education institutions should experience learning through and about research and inquiry. In

undergraduate research, students learn and are assessed in ways that closely approximate the experience of academic staff conducting their disciplinary research.

Healey & Jenkins (2018): This article examines the levels at which academic developers can influence undergraduate research and inquiry practices by distinguishing between staff and student practices, disciplinary and departmental practices and policies, institutional practices and policies, and national and international practices and policies.

Healey & Jenkins (2025): This resource provides a regularly updated collection of frameworks and mini-case studies on *Linking discipline-based research with teaching to benefit student learning through engaging students in research and inquiry*.

Healey et al. (2013a): This report argues that all undergraduate students should undertake a final-year project or dissertation. While valuing the traditional Bachelor dissertation, which in the UK is typically an 8-12,000 word independent piece of disciplinary academic research, additional options should be available. These may differ in their conception, function, organisation, location, and nature of outputs.

Healey et al. (2014a): This report offers a pedagogical case for partnership in learning and teaching; proposes a conceptual model for exploring how students act as partners in learning and teaching; outlines how the development of partnership learning communities may guide and sustain practice; maps the territory of strategic and sustainable practices of engaging students as partners in learning and teaching across diverse contexts; identifies tensions and challenges inherent to partnership in learning and teaching, and offers suggestions to individuals and institutions for addressing them.

Jenkins et al. (2003): This practice-based guide demonstrates how academic research and academic teaching can be connected to ensure that neither operates in isolation, and each can be enhanced by the other. Addressing issues at the individual, course and institutional level, it is written for an international readership.

Jenkins et al. (2007): This report seeks to support the effective links between teaching and discipline-based research in disciplinary communities and academic departments.

Levy & Petrulis (2012): This article examines how first-year university students experience inquiry and research, and, with the aid of a conceptual framework, discusses the implications for the practice of inquiry-based learning.

Malachowski et al. (2024): This book addresses the call to improve the impacts and outcomes of undergraduate research for all students by redesigning US undergraduate curricula and the departmental, disciplinary, and institutional cultures that shape higher education

Mieg et al. (2022): This Handbook is the first truly comprehensive and systematic account of undergraduate research, bringing together diverse international approaches with attention to both theory and practice. It is split into sections covering different countries, disciplines, and methodologies. It also provides an overview of current research and theoretical perspectives on undergraduate research, as well as future developmental prospects of UR.

Moore-Cherry et al. (2016): This paper proposes the term *inclusive partnership* to conceptualise a non-selective staff–student relationship. It outlines the opportunities the concept offers and provides detailed case studies of inclusive partnerships within the geography curriculum.

Murray (2017): Draws primarily on US literature, providing a comprehensive overview of undergraduate research as a high-impact practice in postsecondary education, from its theoretical underpinnings and research base to student participation and faculty incentives.

Spronken-Smith & Walker (2010): This article examines the potential of inquiry-based learning to strengthen the teaching–research nexus by analysing three case studies. The relation between teaching and research differed significantly amongst these three cases and led to a reconceptualisation of inquiry-based learning. A model was then developed to link the focus of learning with the level of independence and the potential strength of the teaching-research nexus.

Vahed et al (2022): An edited collection of 12 papers on undergraduate research, scholarship and creative inquiry mainly from South Africa.

Walkington (2015): This report provides a clear vision of the ‘students as researchers’ approach to discipline research set within a variety of conceptual frameworks and dimensions. It provides evidence of the benefits of adopting a ‘students as researchers’ approach and has a particular focus on completion of the research cycle for students through supporting research dissemination.

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Appendix A: Inquiry-based learning planner

Designing for IBL	Questions to consider
Students	• What relevant subject and process knowledge and skills will students bring to the inquiry? How do they understand inquiry and research, and their own roles as student researchers? • How might IBL challenge them, e.g. in relation to their beliefs about their role in knowledge-creation, expectations about learning and teaching, self-confidence, skills? • What are their likely needs for support and guidance, in relation to the subject-matter and the inquiry process?
Intended learning outcomes	• Will the main focus be on students acquiring existing knowledge ('inquiry for learning') or on building new knowledge ('inquiry for knowledge-building')? • What will the balance be between subject and process learning outcomes? • Will students play a role in determining learning outcomes?
Inquiry theme	• What will students explore? How will their inquiries relate to the curriculum? • Who will establish the inquiry question – teacher, students, someone else? • Will there be a link between students' inquiries and their academic tutors' research interests? If so, will this be made explicit?
Inquiry process	• What is the appropriate scale and timescale of the inquiry? • Will the process be tightly or loosely structured by academic tutors? A step-by-step sequence of tasks, or a more flexible, emergent process? More strongly teacher- or student-designed? • Will students have choices in deciding how to approach the inquiry? • Will an established framework or protocol be used to structure the process? • Will it follow the pattern of research practice in the discipline?
Tasks	• What will the stimulus for the inquiry be (an open question; a scenario; a problem; an image; an artefact; a performance; a discussion; something else)? • How will the tasks be sequenced? Will a digital design tool be used? • What tasks will there be to help students engage with relevant theory/subject-matter (e.g. reflection; discussion; peer-to-peer information-sharing; lectures; practical workshops; laboratory sessions)? • What tasks will there be to help students develop process awareness and skills (e.g. in areas such as research methods, information literacy, group-work, reflective writing)?

Designing for IBL	Questions to consider
Assessments	• What will be assessed (research product; aspects of the process; reflection on the process)? What form will assessed outcomes take (poster; wiki; essay; design; report; film; other)? Will assessment be individual or collective? • What will the assessment criteria be? Will students play a role in establishing assessment criteria? • Who will assess (academic tutors; student peers; self-assessment; other)? How will summative feedback be given?
Information	• How will students access relevant information? What will the balance be between providing information to students, and requiring students to seek and select information themselves? • Will students be directed to information on process issues as well as discipline-based subject-matter?
Spaces	• Is there a need for a particular type of learning/teaching space during and outside of 'contact' time?
Technologies	• Which technologies will be needed and appropriate? Special equipment? Platforms for collaboration and content-creation; mobile technologies; the institutions' virtual learning environment; etc? • Will students play a role in deciding which technologies to use?
Tutoring	• Who will be involved in guidance and tutoring (academic staff; learning support professionals, e.g. librarians; student mentors; external tutors; other)? • How and when will formative and summative feedback be provided?
Peer-to-peer	• Will students work together? If so, in what way? Will there be a focus on developing an 'inquiry community'? • Will students work in partnership with academic staff or other researchers?
Dissemination	• Will students share the results of their inquiries with each other? More widely at department or Faculty level, or with a practitioner/research community beyond the university? • How will results be shared (on web, at an event, via presentations, posters, suitable peer-reviewed outlets; other)?

Source: Levy et al. (2010, 20-21)

Appendix B: A theory of change approach

There are five main components of a theory of change:

1. Current situation
2. Enabling factors / resources
3. Processes / activities / outputs
4. Desired outcomes
5. Longer-term impact.

The key component is identifying the desired outcomes (the 4th component). The outcomes refer to what will be different as a result of this initiative or project, while the outputs, products or processes associated with an initiative or project are the activities undertaken to deliver the outcomes. Hence, the outputs are best described under the third component – processes and activities.

A helpful exercise is for the team to summarise the ToC on one or two sheets of paper. Begin by stating the overall aim of the project/initiative. Then complete the five columns, each representing one of the components, starting with column 5 and working backwards. *An additional table can be compiled that maps each of the desired outcomes with the evidence that will be collected to ascertain the extent to which the outcome has been achieved.* This process may involve collecting baseline data before the project or initiative begins and may continue beyond the project's life, as many changes only become apparent a year or two after the project has finished. The ToC should be completed at the beginning of the initiative or project, at the end and, if it runs for more than a year or two, at one or more interim points. Comparing what is completed under each column provides a narrative of the initiative or project and reveals the evolving thinking of the team. As the project develops, an additional column can be added: 'Unexpected outcomes'.

An example of completed ToC frameworks is provided by Kelly Matthews' Office for Learning and Teaching, Australia's National Students as Partners programme. This is the 4th version of the Framework (Jan 2019).

The Impact of OLT National Teaching Fellowship *Students as Partners* Program: A theory of change evaluation framework, Jan 2019

Current situation <i>What is the current situation (at start of project)? Describe the rationale and list the drivers for change.</i>	Enabling Factors / Resources <i>What is needed to do the activities leading to the desired outcomes for the project?</i>	Processes / Activities / Outputs <i>What activities are required to achieve the desired outcomes for the project?</i>	Desired Outcomes <i>What will the outcomes (not outputs) of the project be for different stakeholders?</i>	Longer-term impact / outcomes <i>What long-term changes will your project achieve?</i>
Issue broadly: SaP gaining international momentum; raises questions quality of learning relationships between student and staff; questions the role of students in shaping HE Issues about translation to practice: Confusion about practices and conceptions of SaP; misunderstanding of terms and language limiting possibilities; tension between SaP as extra-curricular paid projects with partnership in the curriculum through co-creation Issue at UQ: At UQ, language of SaP embedded into policy with flagship Student-Staff Partnership program via paid projects funded; reaching beyond narrow idea to include partnership as teaching practice through co-creation in the curriculum	Time: Fellow needs time to make sense of evolving practices and new literature; Staff and students need time to engage Money: Engage students and free from other commitments; host activities; engage stakeholders; link into national and international networks Human resources: research assistant; administrative support for events Intellectual capacity: Fellow requires greater knowledge of literature and practices Fellow communication skills: Fellow requires skills in communicating vague, ill-defined concept that is often a confronting idea to science folks and senior folks	1. Maintain an Australian community of scholars linked to international networks - national community of scholars (Australian Students as Partners Network; Annual Roundtable Event; International Journal for Students as Partners (IJSaP); international Literature Review project) 2. Gather case studies of practice from across Australia - national profile 3. Learn from student-academic partnership activities - case studies (Fellow partnering w/students; TPP interviews; Student perspectives research) 4. Facilitate workshops - national profile; community of scholars (invited talks) 5. Publish and promote good practices – community of scholars	1. Adoption: Profile of <i>students as partners</i> within the higher education community in Australia shifts from awareness to practices 2. Genuine practices: New insights into <i>students as partners'</i> activities in Australia and at UQ 3. Adoption: New capacity amongst some academics and students to partner in teaching and learning activities that shape higher education 4. Community: Links among national scholars in <i>students as partners</i> research and practice connected to international networks 5. Thought Leadership: Fellow with greater knowledge and leadership around partnership work in Australian higher education	1. Sustained adoption: University policies and programs on student-staff partnerships that sustain activity 2. Genuine practices: Shift in mindset about role of students in teaching and learning 3. Adoption: Other fellows and funded projects extending partnership activities 4. Community: Opportunities for students in higher education to shape their own learning through partnership efforts 5. Thought Leadership: More voices shaping policies and practices, where engaging students in partnership has broad meaning and application in curricular and extra-curricular practices.

Sources of evidence that meet desired outcomes: (1) Involvement of others: number of case studies; number in community/network including students and staff; number of network newsletters and events; number attending events; number contributing ideas/activities/events; number of fellow links to other networks. (2) Feedback from community: via event evaluations, personal narratives, and partnership reflections. (3) Uptake of partnership work into UQ Strategy. (4) Visibility of *students as partners* in national fora, including conferences, media, policies, TTP, etc. (5) Follow-up reflection, invitations, publications.

Source: Matthews (2019) https://docs.google.com/document/d/1C6Hbw59Vb4iuGfDVZ1gFeDU4dk_himSWfCgT52hX6wU/edit?usp=sharing.

Engaging students in research and inquiry

