HERIOT WATT UNIVERSITY

Discovery and Co-creation of Learning: Sector Insights Guide

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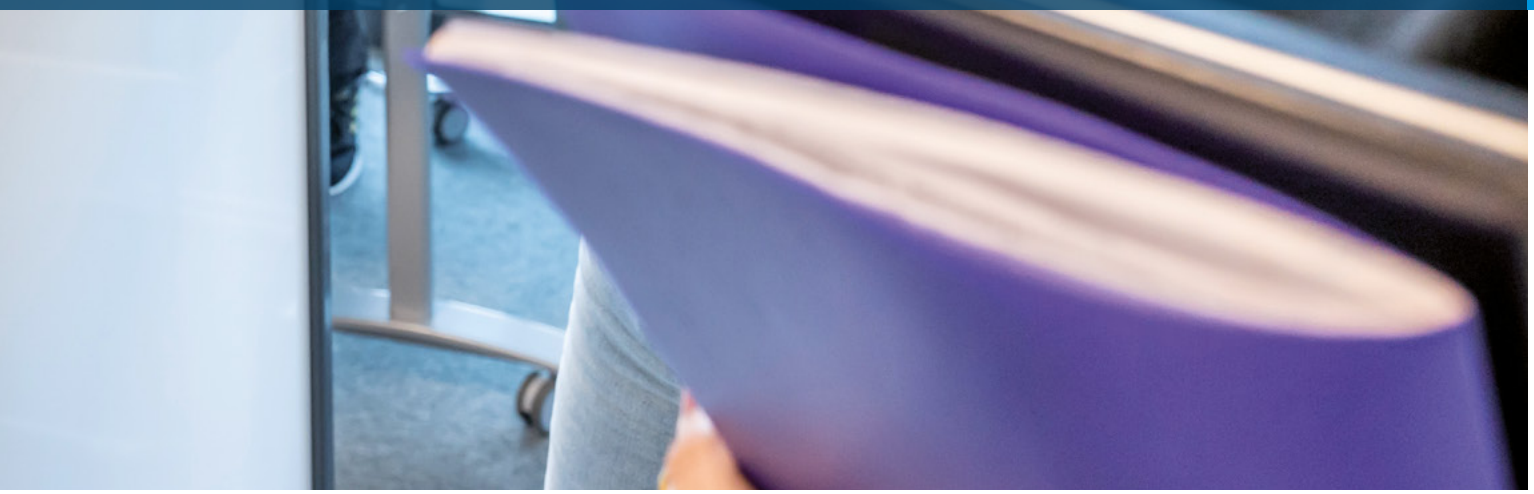


Contents

Introduction

This higher education Sector Insights Guide was commissioned by the Learning and Teaching Academy, to support Heriot-Watt University's strategic Global Changemaker Curriculum Framework and its specific dimension, 'Discovery and Co-creation'. The contribution of 'discovery learning' and 'co-creation of learning' continues to attract attention and interest in higher education, as both are evidence-based approaches that are considered effective to engage students in quality learning. This Guide is designed to offer current sector perspectives and insights on both these themes, and help advance thinking and practice for course and programme teams as they review, refine, and design programmes of study.

*Discovery and co-creation are key ways of engaging students in active learning through partnership. Whereas '***discovery'** *involves students learning through research and inquiry,* **'co-creation'** *comprises students collaborating in teaching and learning and in the development of the curriculum.*

"In discovery learning, concepts are not presented in the final form, but students are encouraged to identify what they want to know and seek out the information themselves, so the knowledge becomes meaningful learning".
(Rosnidar et al., 2021)

"Co-creation of curricula by staff and students is disruptive, challenging traditional teaching models, but it motivates and engages, can drive change and is highly rewarding for our students and staff".
(Riley & McCabe, 2021)

In each case, we will explain what is meant by the terms **'discovery learning'** and **'co-creation of learning',** discuss the benefits for staff and students, and illustrate the different forms that discovery and co-creation of learning may take. Throughout the Guide, we highlight the values that underpin these two themes and how they may be transformed into opportunities. To exemplify the range of sector-wide discovery and co-creation practices, 12 short global learning and teaching case studies are included. The case studies cover a range of academic subject areas, countries, and stages of learning at module, programme, and institutional levels. Some involve whole classes, while others involve selected individuals. They all involve students working in partnership with each other and/or with staff.

At the end of the Guide, you will find key takeaway messages and a range of further relevant reading. Additional practical case studies on discovery learning and co-creation of learning are also available on the **Healey HE Consultants website**.

01 Exploring the Discovery and Co-creation Learning Dimension

Discovery learning and co-creation of learning are two overlapping terms. **Discovery learning refers to students learning through undertaking research and inquiry** (Healey and Jenkins, 2009). In contrast, **co-creation of learning occurs "when staff and students work collaboratively with one another to create components of curricula and/or pedagogical approaches**" (Bovill et al., 2016). Both are forms of active learning (Healey and Healey, 2020) that engage students through working in partnership with staff and/or other students.

Discovery learning and co-creation of learning are both **forms of student engagement**. In terms of the student engagement continuum (Figure 1), we are primarily concerned with where students are working in partnership with each other and/or with staff. In some examples, students go beyond partnership and take control over decision-making, whereas in others they are involved but it is normally the staff that manage the initiative's direction. Students may be involved at various points along the student engagement continuum at different stages of discovery and co-creation initiatives (Healey R. L., 2024).

Partnership approaches with students are context specific and range from working with an individual student or small group of students, to working with an entire cohort. Irrespective of the size of the partnership, it is paramount that all partners learn from the collaborative partnership process and have shared accountability (Healey R. L., 2023).

It is useful to distinguish between students discovering new knowledge for themselves and discovering new knowledge for society (Levy and Petrulis, 2012). In the first, they are using inquiry as a way of learning about what is already largely known, whereas in the second they are engaged in research where the outcomes are original and uncertain. A distinction may also be made between co-creation of the curriculum and co-creation in the curriculum (Bovill and Woolmer, 2019). The former involves students "co-designing a programme or course before the programme or course takes place", while the latter engages students in the "co-design of learning and teaching within a course or programme usually during the course or programme" (p.409).

Figure 1: Student engagement continuum

	Inform	Consult	Involve	Partner	Control
Goal	To provide students with balanced and objective information to assist them in understanding the problem, alternatives and solutions.	To obtain student feedback on analysis, alternatives and/or decisions.	To work directly with students throughout the process to ensure that their concerns and aspirations are consistently understood.	To partner with students in each aspect of the initiative from identification to solution.	Students design and lead initiatives that matter to them and are in control of final decision-making.
Style	"Here's what's happening".	"Here are some options, what do you think?"	"Here's a problem, what ideas do you have?"	"Let's identify the issues and work together to develop a plan and implement a solution."	"You care about this issue and are leading an initiative, how can we support you?"

Source: Louth, Walsh, & Goodwin-Smith, 2019

02 Benefits of Engaging in Discovery and Co-creation of Learning for Students and Staff

Both students and staff benefit from engaging in discovery learning and co-creation of learning, albeit sometimes in different ways. Student-staff partnerships enhance the relationship or trust between students and staff, and this has been cited as one of the most common benefits highlighted in the literature (Mercer-Mapstone et al., 2017). This enhanced relationship of trust through partnership is based on the development of more human and engaged forms of learning and teaching, greater inclusivity, and increased understanding of the other's experience (e.g., staff understanding student experiences and vice versa) (Bovill, 2021; Mercer-Mapstone et al., 2017).

For students, engaging in discovery and co-creation may lead to the following benefits:

- Improved knowledge of pedagogic learning and/or academic subject learning, as well as insights into university structures and services.
- Better preparation to engage in a global world through exposure to different perspectives and through promoting critical thinking.
- Reward and recognition of learning through academic credit, certificates, remuneration, or institutional awards.
- Enriched relationships with staff and other students, and a stronger sense of belonging and mattering through more frequent and meaningful staff interactions.
- Raised awareness of graduate attributes, employability skills development, and/or career development (Bovill, 2021; Katz, 2021; Mercer-Mapstone et al., 2017).

For staff, engaging in discovery and co-creation with students may lead to the following benefits:

- Enhanced understanding of new or better teaching or curriculum materials.
- Re-conceptualised teaching practice and a greater understanding of collaborative processes to foster learning.
- Improved academic profile through dissemination activities, co-publishing, and ideas for future grant funding calls.
- Inspired and evidenced-based knowledge regarding enriching the student learning experience.
- Planned development and evidence to include in Advance HE Fellowship applications (Healey R. L., 2023; Healey and Healey, 2024a; Mercer-Mapstone et al., 2017).

These benefits have been recognised as both academically and personally rewarding (Healey et al., 2019), with the engagement of students and staff in discovery and co-creation having the potential to drive change (Riley and McCabe, 2021).

03 Different Forms of Discovery and Co-creation of Learning

Both discovery learning and co-creation of learning involve students working in partnership with each other and/or with staff (Healey et al., 2014; 2016; Healey & Healey, 2019). Figure 2 exemplifies these partnerships through four overlapping areas:

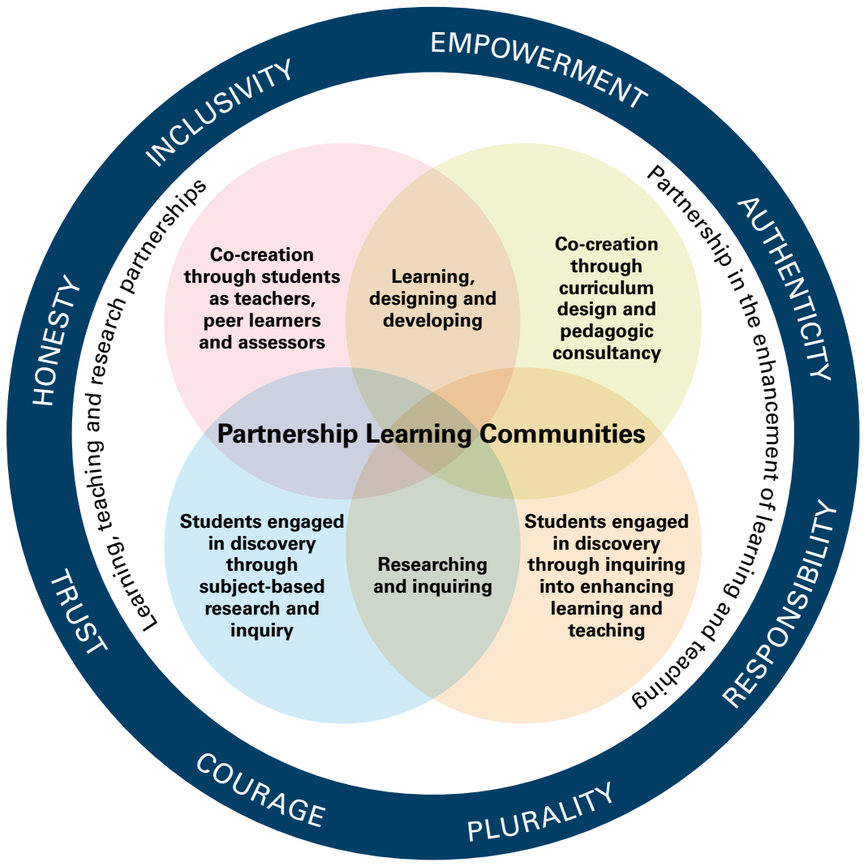
Discovery-led learning

1. Students engage in discovery through subject-based research and inquiry
2. Students engage in discovery through inquiry into enhancing learning and teaching
3. Co-creation of learning
4. Co-creation through students as teachers, peer learners, and assessors
5. Co-creation through curriculum design and pedagogic consultancy

The Framework also illustrates the values underpinning effective student engagement through partnership. Understanding these values is important in supporting the formation and advancement of partnerships (Healey & Healey, 2019).

The short case studies in the next section are structured around the four overlapping types of discovery and co-creation of learning shown in Figure 2.

Figure 2: Students engaged as partners in discovery and co-creation of learning



Source: Based on a modification of Healey, Flint, & Harrington (2014) and Higher Education Academy (2015).

04 Case Studies: Discovery-led Learning

1. Students engage in discovery through subject-based research and inquiry

Students may engage with research and inquiry by being research-led, research-oriented, research-based, or research-tutored (Healey M., 2005). **Case studies 4.1.1 and 4.1.2**, respectively from the University of Lincoln, UK and Zayed University, United Arab Emirates, highlight how discovery-led subject-based learning can be mainstreamed and established over time across diverse institutional contexts, broadening to a larger-scale project. In contrast, **Case Study 4.1.3** from Taylor's University in Malaysia exemplifies how discovery-led learning can also be subject-specific in the academic discipline of engineering.

Case Study 4.1.1: Organising curricula around the concept of 'Student as Producer' at the University of Lincoln, UK

The 'Student as Producer' is a long-standing initiative that is central to the learning and teaching philosophy at the University of Lincoln. It was introduced as an institutional strategy in 2010 and is now embedded as an underlying principle within teaching and learning across the University. In this approach, the emphasis is on students producing knowledge rather than just consuming it. The focus of Student as Producer is the student, who works in collaboration with other students and academic staff on real research projects, or projects that replicate the process of research either in or outside of their discipline. Students work alongside staff in the design and delivery of their learning, and in the production of work of academic content and value. Staff and students can apply for development funds from the Undergraduate Research Opportunities Scheme (UROS). Successful projects are awarded a student bursary of up to £1000, enabling students to work collaboratively on their research during term time and/or over the summer vacation period.

Further information: **https://lalt.lincoln.ac.uk/student-as-producer/**

Case Study 4.1.2: The Undergraduate Research Scholars Programme (URSP) at Zayed University, UAE

Zayed University has taken a lead in promoting a research culture among its students by establishing the Undergraduate Research Scholars Programme (URSP) to meet the United Arab Emirates' goal of building national research capacity. Each URSP cohort begins with a summer research institute followed by four additional research-focused semester-long modules.
These modules provide students with the knowledge and skills required to conduct a literature review, develop a research proposal, obtain ethical clearance if required, and collect and analyse data. This ultimately enables students to prepare oral and visual communications of their research findings. Opportunities to present at international academic conferences are also a feature in this programme. All modules are delivered by experienced academic staff members with the support of a staff mentor in the student's field of study, who assists with content-specific feedback and field-specific approaches to research design and implementation.

Further information: Matthews et al. (2022); **https://www.zu.ac.ae/main/en/research/for_students/zu_ursp**

Case Study 4.1.3: Organising research project-based learning around Grand Challenges in Engineering at Taylor's University, Malaysia

The curriculum in the School of Engineering adopted a project-based learning approach, where the students are required to take a Design module each semester for the first three years of their four-year study, and then a final-year capstone project. This project enables students to apply their knowledge and skills from across their entire degree programme to address real-world issues. All the projects require students to conduct a variety of inquiry-based, design, and team building activities. Engagement in the (US) National Academy of Engineering Grand Challenge Scholars Program is mandatory for all fourth-year students. Each undergraduate student is required to undertake a major research project and write a conference paper as a requirement for graduation. Their research findings are presented

at the School's annual Engineering Undergraduate Research Catalyst Conference. Students are given the opportunity to participate in various national and international competitions, which challenge them to apply their knowledge, obtain feedback from experts, demonstrate teamwork, boost their confidence, and sharpen their practical research skills.

Further information: **https://university.taylors.edu.my/en/study/undergraduate/engineering.html; https://university.taylors.edu.my/en/study/undergraduate/engineering/nae-grand-challenges-for-engineering.html**

2. **Students engage in discovery through inquiry into enhancing learning and teaching**

There has been rapid growth in students undertaking research and inquiry designed to improve the university learning experience for themselves and their peers. Many are inspired by the 'Students as Change Agents' programme at the University of Exeter, UK (see **Case Study 4.2.1**), where projects have transformed student learning experiences across the University. In contrast, the Student Associates in Learning and Teaching (SALT) Scheme at the University of Sheffield involved discovery-led learning, where SALTs worked in partnership with staff in academic departments on projects that aimed to develop and improve the learning and teaching experience for students (**Case Study 4.2.2**). **Case Study 4.2.3**, at the University of Queensland, Australia depicts how this pedagogical inquiry is carried out at scale and is linked to the University's Employability Award.

Case Study 4.2.1: Engaging students as partners in shaping and leading their own educational experiences through the 'Students as Change Agents' initiative at the University of Exeter, UK

Students as Change Agents and Partners is the University of Exeter's route for "empowering students to actively improve the University experience for themselves and their peers through a project-based approach". To become involved in a project, students can either apply for an internship or establish a project. A fundamental element of the initiative is that students "must take a leading role in the direction and management of a project". Students can work in partnership with staff, or they can propose and lead a project by themselves. "Students working on Change Agents projects are supported to deliver effective and measurable change, and become part of a community of sharing practice in student-led enhancement". Involvement in a Change Agents project includes support and training. This approach provides a breadth of experiences, to enable students to hone their skills and attributes. Key aspects of the initiative include supporting students to recognise and evidence a range of valuable professional skills such as leadership, teamwork, and project management, as well as providing a strong foundation for learning through student-led exploration and discovery.

Further information: **https://www.exeter.ac.uk/students/changeagents/**

Case Study 4.2.2: Student Associates in Learning and Teaching (SALT) at the University of Sheffield, UK

The SALT scheme ran from 2011-2018, with approximately 50 students employed as part of the scheme each academic year. SALTs worked in partnership with staff on projects that aimed to develop and improve the learning and teaching experience for students. SALTs worked on projects relevant to their department or the University, in a flexible way that aligned with their timetable and other academic commitments. Each SALT team was allocated a project brief and worked collaboratively in partnership with staff to shape and deliver their project. Each team had a Lead SALT who was tasked with overseeing the team's progress and achievements throughout the year. The students were paid for 50 hrs project work during the academic year, averaging at 2-3 hours a week during term-time. SALTs were different from Academic Representatives and Student Union Councillors, as they were not expected to represent students nor sit on committees. Some SALTs also carried out research or consultation with students as part of their projects.

Further information: Healey and Healey (2024b, 42)

Case Study 4.2.3: Engaging students and staff in partnership through a grant scheme to enhance student employability at the University of Queensland, Australia

The University of Queensland's Student-Staff Partnership (SSP) program supports (i) student representation in decision-making bodies, (ii) student feedback via focus groups, and (iii) semester-long student-staff partnership projects to enhance educational and extra-curricular activities. Piloted in 2017 with a dozen projects, the SSP Projects scheme now enables over 100 projects annually, including scholarships for student participation. To date, there have been over 500 projects involving 1000+ students collaborating with hundreds of academic and professional service staff. The idea that students should be partners has reached across the institution and is evident in strategic plans (e.g., Disability Action Plan). Eligible University of Queensland students who successfully complete their project can count their participation in the initiative towards the attainment of the institutional Employability Award. This accolade recognises and rewards student learning beyond the formal academic curriculum.

Further information: **https://employability.uq.edu.au/ssp**

3. Co-creation through students as teachers, peer learners, and assessors

Students engaging as teachers, peer learners, and assessors are increasingly common forms of co-creation. For example, peer learning is central to statistics teaching at the University of Stirling, UK (**Case Study 5.3.1**). Educators may also democratise their classrooms in a variety of ways, including students writing their own essay titles in collaboration with academics, co-designing module marking criteria, co-designing the module evaluation, or negotiating what topics will be taught as portrayed as in **Case Study 5.3.2** from the University of Edinburgh, UK. At this University, Student-Led, Individually-Created Courses (SLICCs) enable students to take ownership of their learning for academic credit. In **Case Study 5.3.3,** students are the course coordinators at Uppsala University, Sweden and the Swedish University of Agricultural Sciences, where they lead transdisciplinary topics.

Case Study 5.3.1: Final-year students teach statistics in psychology to second-year students at the University of Stirling, UK

Psychology students tend to come from non-scientific backgrounds and can on occasions find the statistical elements of Psychology challenging to learn. To address this, the University of Stirling employs fourth-year undergraduate students to teach statistics to second-year undergraduate students.

Two members of staff oversee the student tutors, and they meet weekly or twice weekly for a few weeks before and during the term. The student tutors receive training in oral presentations and delivery and are supported as needed in their role. A key feature of this process is that each cohort of student tutors is invited to plan and deliver the module for themselves. They design all aspects of the teaching with the only requirement being that all learner students will have successfully completed several examples of basic statistical tests. The experience reveals that second-year learner students become adept at statistics more quickly and proficiently than under the more traditional lecturer-led delivery model.

Further information: Healey & Healey (2024b, 95)

Case Study 5.3.2: Student-Led Individually-Created Courses (SLICCs) are available at the University of Edinburgh, UK

At the University of Edinburgh, Student-Led Individually Created Courses (SLICCs) are a flexible and scalable experiential learning and assessment framework. They use a reflective e-portfolio that enables students to take ownership of their learning for academic credit. The University's Institute for Academic Development and the Careers Service work in partnership to oversee and support the SLICCs framework. As part of the SLICC process, first- and second-year students have the autonomy to propose and define their own learning aspirations during a self-sourced internship, work placement, or volunteering activity in the summer vacation period. Throughout their self-defined learning experience, students develop a portfolio to illustrate and evidence their learning journey and tailored goal setting. From an institutional and academic perspective, the SLICCs initiative is regarded as inclusive, scalable, and transformative. Student feedback is extremely positive as students clearly recognise the learning opportunities, incentives, and motivation around co-creation. SLICCs are also offered at taught master's level, again with strong student engagement. The underpinning philosophy of SLICCs is that the students are positioned at the centre, undertaking independent, co-created, and co-owned student-led learning.

Further information: **https://www.ed.ac.uk/sliccs/**; Riley & McCabe (2021)

Case Study 5.3.3: Igniting a Learning Revolution - Student-led higher education for sustainability and students as a force for renewal at Uppsala University and the Swedish University of Agricultural Sciences, Sweden

The Centre for Environment and Development Studies (CEMUS) is a student-initiated and primarily student-led university centre, straddling the two universities in Uppsala. Since its inception in the early 1990s, the Centre has initiated and greatly expanded the space for transdisciplinary student-led higher education, as well as research and collaboration that transcends traditional academic disciplines and boundaries between academia and society at large. Around 700 students enrol annually in one or more of the 20 current undergraduate, graduate, and PhD courses offered at CEMUS. The courses are organised and led by students as course coordinators on a nine-month project-basis. Often working in pairs, the student course coordinators lead the process of planning, running, and evaluating each course, and do so in close partnership with a selected multidisciplinary group of researchers and teachers as well as practitioners and educational developers, who contribute to the course as guest lecturers, examiners, and advisors. Over the years, several hundreds of students have worked as course coordinators, while thousands of researchers, teachers, and guest lecturers have been engaged in the process, and well over 10,000 students have taken one or more of the many courses offered by CEMUS.

Further information: **http://www.cemus.uu.se/about/**

4.Co-creation through curriculum design and pedagogic consultancy

Engaging students in curriculum design and pedagogic consultancy is perhaps the least developed of the four areas, though there are plenty of examples of students producing pedagogic resources as illustrated in **Case Study 5.4.1,** where students, staff, and workplace partners co-create curricula at Macquarie University, Australia. In **Case Study 5.4.2**, a decolonising reading list campaign at the University of the West of England, UK also showcases partnerships working to create resources. In contrast, **Case Study 5.4.3** depicts students as pedagogical consultants at Bryn Mawr and Haverford Colleges, Pennsylvania, USA to enhance jointly the curriculum through reviewing curriculum and assessment practices and innovating to develop modules and staff members' teaching practices.

Case Study 5.4.1: Students, staff, and workplace partners co-create curricula at Macquarie University, Australia

All Macquarie bachelor degrees include at least one Professional and Community Engagement (PACE) program unit involving international work-integrated and community-based service-learning placements. As a pedagogic approach, service learning involves students engaging with the local community on structured projects that also incorporate reflective learning. These projects have included student and workplace partner involvement in co-creating curricula. The first activity involved 11 community-based organisations from seven countries. Students were involved in this project, working with workplace partners at a co-creation workshop. The students collaborated on trial activities and contributed to a series of videos focused on providing advice to students. The second activity was the on-going co-creation of a unit that supports third-year undergraduate students undertaking international work-integrated learning placements. The student cohort came from multiple disciplinary backgrounds, ranging from business to health sciences.

Further information: **https://students.mq.edu.au/careers/pace**; Bilhous et al. (2018); Ruskin & Bilhous (2019)

Case Study 5.4.2: The Library and Students' Union lead a 'decolonising my reading list' campaign at the University of the West of England, UK

The 'Decolonising my reading list' campaign began in 2020, with the aim to ensure that the library collection and reading lists speak to all voices, particularly those that are traditionally underrepresented in curricula and on reading lists. This is a collaborative project between students, teaching staff, and the library team to create decolonised and inclusive reading lists to represent better the identities and experiences of the student body. It is open to all to suggest diverse authors that can be added to the library collection and reading lists. Students are asked to critique reading lists and research additional items for inclusion, so the reading list is co-created. The aim is to ensure all students can see themselves reflected in the curricula they are being taught. This approach is designed to portray the identities of the student body regardless of their background and experiences. Students who contribute are entered into a monthly cash voucher prize draw.

Further information: **https://www.uwe.ac.uk/study/library/our-libraries/library-activities-and-groups/decolonising-your-library#section-3**

Case Study 5.4.3: Students act as pedagogical consultants at Bryn Mawr and Haverford Colleges, Pennsylvania, USA

In pedagogical partnerships between students and academic staff, the former work as consultants and partners with the latter. Students apply for the role and are remunerated for their contributions, working up to seven hours each week. In the role, students become a consultant and they meet with their allocated academic on a weekly basis before the scheduled teaching session. The student consultant then attends the taught session and provides written feedback to the staff member to support the enhancement of classroom practice. A follow-up meeting occurs where they discuss and creatively think to solve any teaching or classroom issues. The aim of the partnership is to maximise engagement and learning for all involved. As a result of the classroom observation, a range of collaborative review approaches are often taken forward, and these often include a focus on teaching methods, assessment practices, and other aspects of pedagogy and practice.

Further information: **https://tli-resources.digital.brynmawr.edu/programs-and-opportunities/salt-program/student-consultants/**; Cook-Sather et al. (2019)

06 Key Takeaways about Discovery and Co-creation of Learning

1. Discovery learning and co-creation of learning both involve active learning and student engagement and are characterised by students working in partnership with each other and/or with staff.
2. Discovery and co-creation of learning can result in many benefits for students and staff including increased student engagement/ownership/motivation for learning; increased student confidence/self-efficacy; development of new or better teaching or curriculum materials; and enhanced relationships and trust between students and staff, as illustrated through the varied case studies in this Guide.
3. Undertaking discovery and co-creation of learning in the curriculum helps create person-centred and collaborative approaches for mutual learning that are more equitable and inclusive.
4. Aim to build your confidence with student partnership working, keep it small and manageable initially. Remember large projects are not a pre-requisite for implementing discovery learning and co-creation of learning.
5. There is scope to adapt the case study practices presented in this Guide to other settings, despite each of the case studies being contextually dependent.

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