

<b>Institution:</b> Oxford Brookes University		
<b>Unit of Assessment:</b> 23, Education		
<b>Title of case study:</b> Transforming research-based learning and mentoring in universities and schools		
<b>Period when the underpinning research was undertaken:</b> 2008 to present		
<b>Details of staff conducting the underpinning research from the submitting unit:</b>		
<b>Name(s):</b> Helen Walkington	<b>Role(s) (e.g. job title):</b> Professor of Higher Education / Geography	<b>Period(s) employed by submitting HEI:</b> [text removed for publication]
<b>Period when the claimed impact occurred:</b> 2013-2020		
<b>Is this case study continued from a case study submitted in 2014?</b> N		
<b>1. Summary of the impact</b>		
<p>Professor Walkington's research is based on a simple but powerful idea: that undergraduates, and even school students, can be researchers. Her work provides evidence of how engaging in research enhances student learning and has been pivotal in efforts to mainstream student research experiences, particularly in Higher Education, internationally. There is clear evidence of enhancement of learning and teaching across a range of institutions and amongst diverse practitioners. The 'ten salient practices of effective research mentors' have provided a global training framework for high-impact research mentoring in schools and universities. To help students complete the research process, Walkington developed conferences and journals through which students can present and publish their research. Students benefit from mentored research experiences and sharing their research publicly, reporting enhanced confidence, professionalism and employability. Teachers and technicians benefit from professional development and schools benefit from teacher retention. Walkington's research has been a driver for change in the institutional strategy of the Higher Education Academy (HEA, now Advance HE), the Institute for Research in Schools (IRIS), and numerous universities internationally. For example, new Teaching and Learning strategies focussed on research-based learning at Durban University of Technology, South Africa and Leiden University, Netherlands benefit 60,000 students annually.</p>		
<b>2. Underpinning research</b>		
<p>Two research projects have underpinned the impact outlined. Both projects set out to understand exactly how research-based learning translates into beneficial outcomes for students, particularly underrepresented groups. <b>Project 1 'Research-based learning in the disciplines'</b> started in 2008 to evaluate the impact of pedagogic innovations in student research dissemination and focussed on student experiences. <b>Project 2 'Ten salient practices of student research mentoring'</b> began in 2014 and focussed on teacher (mentor) practices. It set out to discover which practices are effective in securing student success in Higher Education and has since explored teacher practices in schools.</p> <p><b>Project 1: 'Research-based learning in the disciplines'</b>. Walkington's body of research since 2008 was the first to recognise a gap in the research cycle for students and to provide evidence of the capabilities developed by students in publishing their results from Research-Based Learning (RBL) in Higher Education. Her work shows the importance of research dissemination in closing this gap, in professionalising the student experience, raising aspirations and engaging students as part of the academic community. Walkington established the first national journal for undergraduate research in geography, GEOverse (HEA funded). The research [R1] found that undergraduate authors develop an ability to synthesise material, apply constructive criticism and critically evaluate their future work. Postgraduates develop a sense of wellbeing from belonging to a reviewer community. In 2008 Walkington established a public annual multidisciplinary undergraduate research conference at Oxford Brookes University (OBU), followed by the first dedicated public undergraduate research repository 'The <i>Get Published!</i> Student Research Collection' in 2015, housed at OBU. Recognition of Walkington's expertise led to an invitation to</p>		

create a steering group to establish a British Conference of Undergraduate Research (BCUR) and 'Posters in Parliament' event. Led by Walkington, in-depth interviews with 90 BCUR conference presenters in 2012, 2013 and 2014 revealed a previously unrecognised student-led pedagogy 'Reciprocal Elucidation' [R2], where students gain new perspectives on research through asking and answering interdisciplinary questions. Mapped against the Vitae Researcher Development Framework, her work revealed that preparation for and participation in the conference developed employability skills, interdisciplinary communication and networking.

Walkington's research uncovered the unique benefits of journal authorship (critical skills through reflection on writing and feedback) and conference participation (critical thinking via dialogue). Commissioned by the HEA, Walkington developed a conceptual framework for research dissemination, produced as a monograph on RBL in the disciplines [R3] with five online professional development training packs to share this research across the sector. This included transferable models, such as the 'ladder of participation' (demonstrating how to scaffold progression of student engagement with RBL).

**Project 2 'Ten salient practices for excellence in research mentoring'** was funded from 2014 by the Center for Engaged Learning at Elon University, USA. In collaboration with American colleagues [R4], Walkington identified Ten Salient Practices (10SP) for effective mentoring linked to positive student outcomes across disciplines, institutions, national contexts and demographics, e.g. students under-represented in Higher Education. Mentored undergraduate research is a high-impact pedagogy but, until this systematic research, no one understood why. The research explained how specific mentoring practices leverage successful outcomes (student retention, learning gains). For example, Practice 5: 'Build a sense of community among members of the research team' instils trust and perseverance. Practice 8: 'Supporting students' professional development through networking' allows students to engage with the wider academic community and transforms career aspirations, particularly for minority students. The multi-institutional research team created an international database of award-winning research mentors (national and institutional awards). Walkington led data collection via interviews about mentoring practice. The research revealed that international award-winning practice across different contexts focuses on: recruiting diverse students; sustaining engagement through appropriate challenge; and celebrating achievement via publishing outputs [R5]. Findings also record the positive impact that research mentoring has on academic careers, academic staff retention and strengthening of academic identity. The findings have been used to provide training for Higher Education staff globally and have been shared internationally since 2015: 13 published outputs (e.g. R5); 11 international and 4 national invited presentations; 10 international workshops; and a project website (1,406 unique views in 2019).

Walkington, in collaboration with the Institute for Research in Schools (IRIS), conducted surveys with school teachers mentoring school-student research projects (in the UK 60,000 students do extended project qualifications or CREST awards, internationally 150,000 do research through the International Baccalaureate), and identified 10SP for school teacher-mentors [R6]. The research indicates that retention of school-teachers is emerging as an impact of engaging in high quality mentoring practice.

### 3. References to the research

- R1.** Walkington, H. (2012). Developing dialogic learning space: the case of online undergraduate research journals. *Journal of Geography in Higher Education*, 36 (4), 547-562. DOI: 10.1080/03098265.2012.692072 (*REF 2021 paper, specifies the outcomes of students engaging with a national undergraduate research journal for the first time. Impact factor 1.533*).
- R2.** Walkington, H. Hill, J. L. and Kneale, P.E. (2016). Reciprocal Elucidation: a student led pedagogy in multidisciplinary undergraduate research conferences. *Higher Education Research and Development*, 36 (2), 416-429. DOI: 10.1080/07294360.2016.1208155 (*REF 2021 paper, the first to report learning outcomes from multidisciplinary research conferences. Impact factor 2.129*).
- R3.** Walkington, H. (2015). *Students as researchers: Supporting undergraduate research in the disciplines in higher education*. York: Higher Education Academy ISBN 9781907207860 (*Widely cited open access monograph commissioned by the HEA*). Available [here](#).
- R4.** Shanahan, J., Ackley-Holbrook, E., Hall, E., Stewart, K., and Walkington, H. (2015). *Salient*

Practices of Undergraduate Research Mentors: A Review of the Literature. *Mentoring and Tutoring* 23 (5), 359-376. DOI: 10.1080/13611267.2015.1126162 (*Highly cited paper reviewing 20 years of literature on effective research mentoring, the basis for mentor training materials*).

**R5.** Walkington, H., Stewart, K., Hall, E., Ackley, E and Shanahan, J.O. (2020). Salient practices of award-winning undergraduate research mentors: balancing freedom and control to achieve excellence. *Studies in Higher Education*. 45, 1519-1532. DOI: 10.1080/03075079.2019.1637838 (*REF 2021 paper, Impact factor 3.00*)

**R6.** Walkington, H. and Rushton, E.A.C. (2019). Ten Salient Practices for mentoring student research in schools: new opportunities for teacher professional development. *Higher Education Studies*, 9 (4), 133-147. DOI: 10.5539/hes.v9n4p133 (*Google-based Impact Factor (2018): 9.98*).

#### 4. Details of the impact

Professor Walkington's research has demonstrable impact across a range of beneficiaries in Higher Education and secondary schooling, including: strategy at Advance HE; Higher Education institution-wide strategies and practices; lecturer and schoolteacher professional development in research mentoring; and student and pupil opportunities to engage in real-world research.

**Impact on Advance HE strategy development:** In 2015 Walkington's monograph [R3] commissioned by the HEA (now Advance HE) was used in their 'Change Academy' consultancy work with over 20 UK Higher Education providers working on strategic institutional change, engaging c.500 academic staff from across the sector in development activities. Director of Academic Practice (HEA) noted that the monograph was '*Commissioned to inform the development of our work with the sector relating to research-led teaching. The findings were fed into our operational planning process and helped shape our planned activities relating to our innovative pedagogies workstream. The findings are informing the delivery of enhancement services in the current year and will further contribute to the shaping of our CPD offer*' [S1]. In 2016 Walkington undertook further consultancy to create five online open access training packs for the HEA which allowed more institutions to adopt the frameworks themselves (304 unique academic users).

#### **Mainstreaming Research Based Learning (RBL) in Higher Education strategy:**

Walkington's work has provided the evidence to support a shift towards RBL as a core pedagogy for traditional and technical universities. For example, in 2016 Walkington delivered a keynote based on her body of work (including R1, R2, R3) at the prestigious 'Innovation Room', a collaboration between Dutch Universities (Leiden, Delft, Erasmus, Rotterdam). Her work influenced a policy paper for the European University Association in Brussels [S2]. The Vice-rector Magnificus, Leiden University, Netherlands said: '*The Innovation Room of the Leiden-Delft-Erasmus (LDE) university alliance was an immense success. You presented the theory, as well as a large set of examples of how you implemented this at Oxford Brookes University. You truly inspired the audience, as well as me. Your work influenced a policy paper for the European University Association in Brussels. In addition, your work inspired a new teaching strategy which has activating research-based learning as its main ambition*'. This strategy has transformed the student experience by providing opportunities for students across the university to engage in authentic research and has increased the motivation of students and lecturers. Walkington helped to launch the revised university teaching and learning strategy at Leiden University's inaugural education festival in 2018. RBL is now the university's core aim.

Technical universities and professional colleges without a research tradition now recognise the need to develop students' research capabilities for future employment. To rapidly embed RBL Walkington has provided evidence-based frameworks for curriculum design and effective pedagogy to ensure student retention and success; two examples follow. In 2017 the Danish Evaluation Institute (EVA) invited Walkington to present her research and training to all the 'university colleges' in Denmark in order to support the creation of research opportunities for students. In 2019 Walkington was invited to Durban University of Technology (DUT) to deliver six staff training days and advise senior management on integrating RBL. The visit precipitated a revised DUT teaching and learning strategy committed to embedding research-based learning, benefitting 30,000 students; a 60 minute TV programme on research enhanced teaching for the national teaching fellows' network which was shared via the Higher Education Learning and Teaching Association of Southern Africa (HELTASA) [S3]. Deputy Vice-Chancellor (Research,

Innovation & Engagement, DUT) highlighted: *'Prof. Walkington has had institution-wide impact at DUT in establishing research-based learning [...] She delivered multiple training sessions based on her research to academics and support staff across the university (as well as at the University of KwaZulu Natal). DUT has been able to transform teaching experiences for our students. The Teaching and Learning strategy of the University was changed in 2019 to incorporate research-based learning and research mentoring best practice. I resourced a new 'Supporting Undergraduate Research Excellence' initiative across the university in summer 2020' [S3].*

**Impact on mentor training:** Since 2015 the Ten Salient Practices (10SP) framework [R4, R5] forms the basis of mentor training in institutions in 12 countries in North America, Europe and Africa, and is very widely adopted across the USA. The 10SP have been adopted as a framework by the Council for Undergraduate Research (CUR) in their publication 'Excellence in mentoring undergraduate Research'. CUR has 580 institutional members in the USA. CUR past President (2017–18) observed that *'the framework formed the basis of state-wide mentor training in Nevada and has been adopted by CUR's division for undergraduate research programme managers'*. Each programme manager administers a university-wide undergraduate research programme.

In 2018 Walkington was invited to address an Inside Government conference in the UK [S4], to share RBL and mentor training frameworks [R1-4] that enhance the efficacy of developing undergraduates as researchers for the UKRI researcher pipeline. The audience included Deputy Vice Chancellors for Research, charities (e.g. Wellcome Trust, Cancer Research) and policy makers.

**Transforming practice in Higher Education Institutions:** Walkington's work through GEOverse, the national undergraduate journal, multidisciplinary student conferences and associated RBL training materials, has inspired other Higher Education institutions to provide student publication opportunities. For example, at Glasgow University the journal *Press-Start* has changed the practice of staff and students since 2014. *Press-Start* Editor wrote [unsolicited email] *'Thanks for the great paper and keynote on student journals at the HEA conference 2014. Thanks to you, I decided to press ahead with a similar venture here at Glasgow (in game studies)'*. The Editor surveyed the journal's 392 member facebook group. 70% of respondents valued 'learning from peer feedback'. *'From my perspective it's an opportunity to fine tune research skills that could be applied in further study and in a professional environment'* (Postgraduate Student). The journal has created 'videogame scholarship' with student research being cited by academics. In Ireland, Galway University adopted Walkington's RBL training materials in the Postgraduate Certificate in Higher Education course, resulting in an institution-wide conference and a new student journal called NOVOverse [S5].

Recognition of the student-led pedagogy 'Reciprocal Elucidation' [R2], based on data from the British Conference on Undergraduate Research (BCUR) of 2012, 2013 and 2014, changed the design of student conferences within institutions, nationally and internationally. These events became multidisciplinary in format because of Walkington's research influence. Nationally, since 2011, 350 undergraduate students participate annually in BCUR and 25 institutions in the prestigious Posters in Parliament event. BCUR provided a model for a national conference in Australia (2012) and the first World Congress on Undergraduate Research in Qatar (2016). Walkington also recognised that creating multidisciplinary conferences within institutions increases the number of opportunities for students to gain benefits linked to research dissemination, e.g. to enhance employability. Walkington established the 'Get Published!' initiative for 17,000 students across Oxford Brookes University and partner colleges in 2015: *'I still talk about my experience at the undergraduate conferences and being able to publish my research! The experience earned me recognition and gave a sense of how rewarding a career in research could be and encouraged me to continue in higher education'* (Undergraduate, now a doctoral student at University of Wisconsin). Many institutions have since adopted the *Get published!* Model. For example, Walkington advised the University of the West of England (UWE, Bristol) in developing their first conference in 2017. It now has 300 students presenting annually. An impact report for the senior management team at UWE [S6] said: *'Presenting students have secured competitive PhD places and jobs. The event is well attended by BAME and international student presenters as challenging learning experiences enhance their learning and self-development. It enhances the student learning journey by offering an authentic learning experience, develops multi-disciplinary skills and enhances self-efficacy'. 'This is one of the best, most useful, engaging and important parts of my*



*degree so far* (Graduating Student). *'Having seen the high quality and competence of the students, I would welcome your graduates applying for posts in my organisation'* (Employer). In June 2018 Walkington's work was recognised by the International Taylor & Francis Award for sustained contributions to teaching and learning in Higher Education. The Royal Geographical Society president announced *'Professor Walkington has transformed the ability of undergraduates to disseminate their research and is enhancing the experiences of thousands of students, educators and researchers. She inspires others by demonstrating the clear link between pedagogic research, learning, and teaching quality enhancement'*.

#### **Impact on school students, teachers, technicians and an educational charity:**

Walkington's research in geography formed an inaugural research project for school students (Langton Grammar) to work with an academic collaborator. This project helped to launch the Institute for Research in Schools (IRIS) in 2016, a charity supporting 500 schools with cutting edge research projects in STEM. This has impacted positively on teachers and technicians' working practice and identity as researchers. It has provided school students with authentic research experiences: *'I like telling them that I don't know what we are expecting and I don't know how we are going to do it. For them that is very new. They see us as people that say, "this is how you do the experiment, we know what we are expecting". You see the kids develop from the experience of real science'* (High-school Physics Technician). IRIS adopted the *Get Published!* model that Walkington established at Oxford Brookes University for their research dissemination events and evaluation strategy. Walkington's research led to a change in IRIS strategic priorities for 2019-2021, committing IRIS to *'develop our conference provision beyond the annual single-disciplinary symposia to a programme of multi-disciplinary regional conferences'* [S7]. IRIS now runs six multidisciplinary national conferences for 300 schools annually. The Director of Evaluation observed: *'As a result of your published research we have significantly changed our approach to school student research conferences. This will enable more students from over 200 schools (5% of UK state secondary schools) to share their research at conference and enhance their development'* [S8]. In 2019 alone IRIS ran six conferences for 560 students and 85 teachers from over 60 primary and secondary schools in UK who shared their research across a range of disciplines.

Walkington led collaborative research with IRIS to define best practice for teacher-mentors based on the ten salient practices framework [R6], delivering CPD via training workshops across the UK, Belgium, Norway, Channel Islands. One Norwegian teacher pledged to: *'Bring pupils to summer conference; Look at publishing pupils' work on-line; Make contact with other schools to share project ideas.'* IRIS's CEO wrote: *'sharing your research in such an accessible way has directly benefited teachers' professional development and practice as research mentors, creating a valuable resource for over 200 teachers'* [S9]. Training materials are housed on the [IRIS website](#). In the evaluation, a Scottish teacher commented *'As a mentor, I am more likely to stay in teaching as I feel a connection and a real-world effect of my work.'* The Geography PGCE (teacher training) course at Kings College London has adopted 10SP in the curriculum to prepare teachers for supporting student research projects [S10].

#### **5. Sources to corroborate the impact**

- S1.** Letter from Director of Academic Practice, HEA (now Advance HE)
- S2.** European Universities report 'Re-inventing Research-Based Teaching and Learning' by Dekker, H. and Wolff, S.W., Centre for Education and Learning, 2016
- S3.** Letter from Deputy Vice Chancellor, Durban University of Technology, South Africa, October 2020
- S4.** Inside Government, 9<sup>th</sup> Annual Research, Development and Innovation conference programme, 22 November 2018
- S5.** Unsolicited letter from an academic about setting up a journal at NUI, Galway, May 2017
- S6.** Internal conference impact report to senior management team at UWE, Bristol, 2019
- S7.** IRIS impact report 2017-18 (page 5)
- S8.** Letter from Director of Evaluation, IRIS, November 2018
- S9.** Letter from CEO of IRIS reporting teacher workshop impact, March 2019
- S10.** Email from PGCE course leader at Kings College London, October 2020