

**Institution:** University of Edinburgh (UoE)

**Unit of Assessment:** 23 Education

## 1. Unit context and structure, research and impact strategy

Based at the University of Edinburgh, the Education unit (68.8 FTE) at the Moray House School of Education and Sport is committed to research and impact that addresses questions focused on creating socially just and inclusive educational futures. We work within a national policy context that is distinctive in its aspirations to provide for all learners and which has research-informed teaching and professional learning at its core. We are proud to serve Scottish education by supporting these ambitions while, at the same time, building partnerships that enable us to extend the international reach of our values-led research and enhance our global presence.

### 1.1 Research, knowledge exchange and impact strategy

Our strategy is designed to position Education at the forefront of innovative research that anticipates, influences and responds to educational challenges. We focus on tackling real-world problems through interdisciplinary, data-informed approaches that shape policy and practice. A key indicator of the success of this strategy is an increase of 30% in our external research income, from £7.5m in REF2014 to £9.8m in REF2021, including a growing portfolio of GCRF-funded projects (total award value of £2.32m).

We have brought this strategy to fruition by promoting the cross-cutting priorities of innovation, interdisciplinarity, internationalisation and impact. First articulated in our 2015 strategy, these four priority areas have enabled us to envision and conduct research that resonates with the growth in funding for challenge-led initiatives. Examples follow of the ways in which these priorities and their intersections are manifested in our strategic focus areas of social justice and inclusion, advanced data-led research and digital education. These achievements result from our demonstrable strengths in collaborations across national and disciplinary boundaries and engagement with users in governments and civil society. Figures below refer to the allocation of funds to Education, unless the total sum awarded is explicitly mentioned.

#### **Innovation**

Our vision of education is underpinned by our commitment to data-informed, methodological and substantive innovation. We have positioned ourselves to address the growing importance of data in understanding education, social change and public services by exploiting the University of Edinburgh's award from the UK and Scottish governments (£237m, leveraged to £661m) for Data-Driven Innovation (DDI). Part of the Edinburgh and SE Scotland City Region Deal, this investment aims to promote economic prosperity, increase digital skills in the workforce and provide support for researchers to collaborate with the public, private and third sectors.

- DDI funds the *Data Education for Schools* project (Robertson, £2.4m, from 2018) which creates engaging teaching materials and a research-informed data science curriculum for Scotland to develop data literacy and data citizenship. Serving all 528 schools in Edinburgh and five other local authorities, an extensive series of workshops supports teachers to be confident in educating children from preschool upwards to thrive in a digital world.
- The *Data for Children Collaborative* extends the DDI funding by a further £3m in partnership with UNICEF and the Scottish Government (McCluskey, then Smith, from 2019). It employs novel data science techniques to improve children's outcomes in both Scotland and overseas by tackling existing problems in new ways.

Our links with the Edinburgh Futures Institute support our priority of developing futures-oriented research. Located in an iconic, category-A listed building (£140m), and opening fully in 2022, EFI is being transformed into a space for multidisciplinary collaboration and partnership. It will

host the major DDI projects mentioned above, but we have also maximised use of its £5k seedcorn scheme to fund innovative pilot projects on young children's understanding of personal data (Manches), community cafés as sites of social justice (Konstantoni, followed up by a £43k award from the Froebel Trust) and the development of software to support teachers' professional learning, which contributed to the international NordForsk-funded project mentioned below.

### **Interdisciplinarity**

We cultivate interdisciplinarity by encouraging synergies within and across the research hubs described in 1.2. Robertson's joint professorial appointment with Informatics has made possible the research in children's data education cited above; further examples of major interdisciplinary research projects that exploit advanced data-informed research methods to create significant impact include:

- *Understanding Inequalities*, an interdisciplinary and international project led by the School of Law, investigates inequalities in education, crime, employment and housing with partners from the UK, Europe and the USA (Co-I Iannelli, ESRC, £538k, from a total grant to Edinburgh of £3.2m). It has informed the work of the UK Commission on Widening Access and prompted the Scottish Government to address the ways in which young people's subject choice in secondary schools contributes to social inequalities in post-school destinations.
- the *End Violence Lab* (Fry and Tisdall, United Nations, two grants totalling £230k) works with national and local leaders to accelerate action towards ending violence against children in Cambodia, Colombia, the Philippines and Uganda. Taking account of social, economic and political causes, data-driven methods map the prevalence of violence and develop indicators of the changes being introduced. This work aligns closely with that undertaken by the *Data for Children Collaborative*.
- a £20m partnership of 12 countries and 54 organisations addresses risk management for multi-hazard urban disasters such as floods and earthquakes in the four cities of Istanbul, Kathmandu, Nairobi and Quito. As Co-I, Bayne (NERC, £50k) leads the education strand for the project, developed in conjunction with Edinburgh's School of Geosciences.

### **Internationalisation**

As these three examples demonstrate, many research challenges transcend disciplinary boundaries while highlighting global interconnections. Florian, Fry and Tisdall's extensive networks with overseas non-governmental organisations along with visiting researchers, such as Maternowska from UNICEF, ensure that internationalisation is central to our vision of values-led research. We have also made three strategic appointments (Horner, Lee, Smith) to accelerate expansion of research in international development and comparative education. Outcomes of our internationalisation priority include:

- the award of eight Global Challenges Research Fund (GCRF) projects to a total value of £2.32m: three funded by AHRC, two each by ESRC and NERC, and one by the British Academy. These include a project on improving early years education, partnered with the University of Cape Town and based in Brazil, Eswatini, Palestine and South Africa (PI Tisdall, ESRC, £1.8m).
- *Teaching that Matters for Migrant Students* (PI Pantić, NordForsk, £1.1m) investigates the ways in which schools in Scotland, Sweden and Finland respond to migration, with a focus on social integration and mobility.
- building on our strengths in social justice and data-led methods to advance international child protection research, Fry has led a team of 57 academics to secure preferred consultant status with UNICEF, one of only two long-term agreements granted to any university worldwide (six contracts with UNICEF and implementing partners in 14 countries, £485k).

**Impact**

Our goal of conducting research, knowledge exchange and public engagement with demonstrable impact is illustrated by investment in two additional staff to provide specialist support for knowledge exchange and impact. A full-time senior colleague and a further part-time post in the professional learning team ensure that we exploit synergies across these areas. Impact activities have also been boosted by:

- 13 awards totalling £168k through the ESRC Impact Acceleration Account and a Scottish Funding Council GCRF Impact Acceleration Award of £23k.
- 24 internally-funded small knowledge exchange grants totalling £64k to support the creation of early and continuing interaction with stakeholders.

These awards underpin a broad portfolio of impact activities, including the successes captured in the six impact case studies and the strategy indicated in 1.3. Combined with the examples above, they illustrate how the principles of interdisciplinarity, internationalisation and innovation weave through the spread of our research and how, in turn, our attention to impact helps us to advance the reach and significance of our research.

**1.2 Research hubs**

Six research hubs create a focus for shared enquiry and capacity building. Each is facilitated by a professorial lead, with a dedicated postdoctoral researcher associated with four of the hubs and the others sharing access to support from three research assistants. Providing an internal structure for managing research activity, as well as a coherent approach to presenting our research externally, the hubs are inclusive of all academic staff and doctoral students. Hubs host constituent research groups and networks ranging from those that are short-term, fluid and dynamic to others that are more established, as well as providing a base for mentoring, peer review, writing retreats and seminars. Our strategy to accelerate development of the three strategic focus areas mentioned in 1.1 is reflected by hubs in existing areas of strength: advanced quantitative research in education, digital education, and social justice and inclusion. Three further hubs advance emerging areas of strength, energised by investment in key professorial appointments in this REF cycle (Biesta – curriculum and pedagogy, Coyle – language education, Tisdall – children and young people).

The size and configuration of the hubs vary as staff and doctoral students indicate their primary affiliation to one hub, but have optional membership of others. This ensures that the boundaries between the hubs are permeable and that the priorities of innovation, interdisciplinarity, internationalisation and impact cut across them, creating a shared vision that enables us to identify and respond rapidly to new opportunities.

**Advanced quantitative research in education.** Coordinated by Iannelli, this hub builds interdisciplinary connections and creates cross-fertilisation among researchers using advanced quantitative methods within Education, across the University and beyond. Research focuses on policy-relevant topics such as inequalities in education and uses comparative, longitudinal and large-scale data. Iannelli led the education and social stratification strand of the international *Applied Quantitative Methods Network* (ESRC, full award £3.2m, of which £651k to Education), was Co-I for the Administrative Data Research Centre for Scotland (ESRC, full award £6.8m, of which £50k to Education) and the Edinburgh Q-Step Centre funded by Nuffield, ESRC and HEFCE (£1.46m). The hub hosts *Understanding Inequalities* (see 1.1) and contributes to the *Data for Childhood Collaborative*. New investment (Abaci, Duta, Smith) and five postdoctoral researchers over this REF period have expanded capacity in advanced quantitative research, enabling us to prioritise research that requires data-informed methods. Impact case study 3 describes work in this hub on widening access to higher education and promoting social mobility.

**Children and young people.** Coordinated by Tisdall, this new hub builds on an impressive portfolio of projects, many with a focus on children's rights or the ways in which children's

participation can strengthen policy. The involvement of major international stakeholders has enabled the hub to pioneer research on monitoring violence prevention, including a long-term agreement with UNICEF for child protection research and the *End Violence Lab* (Fry, see 1.1 and impact case study 4). Further research in this area includes work by Tisdall with children affected by domestic violence (European Commission, £167k and Co-I, ESRC, £250k). Two major projects focus on improving early childhood education: the ESRC GCRF project with the University of Cape Town mentioned above (PI Tisdall, £1.8m) and a Froebel hub and spoke grant (PI McNair, £450k from 2021) which will develop practitioner enquiry in early years education. The constituent developmental psychology research group has secured funding from the Nuffield Foundation for a project on motivating child readers (McGeown, £135k from 2021) that extends research reported in impact case study 5 on improving reading.

**Digital education.** Coordinated by Bayne, this hub has expanded by nine new appointments in the REF period, consolidating digital education research as a world leader in its field. Much of the research demonstrates a commitment to the four cross-cutting priorities: Gallagher strengthens our profile in data-driven innovation in international development contexts and four appointments (Davies, Lamb, Miltner, Williamson) are linked to the Edinburgh Futures Institute. Innovative, high impact projects include ways in which mobile methods can support new approaches to arts evaluation (Ross and Knox, AHRC, £143k), the *Move2Learn* study on embodied learning for preschoolers (Manches, US National Science Foundation and the Wellcome Trust, £701k) and the major *Data Education for Schools* project mentioned earlier. Impact case study 1 draws on work in this hub on the future of digital education in universities; impact case study 6 describes work on developing and implementing a new computing science curriculum in Scottish schools.

**Language education.** Coordinated by Coyle, this new hub includes experts in bilingual education and pluriliteracies, language policy, intercultural understanding, British Sign Language and poetics and contemporary rhetoric. O'Hanlon was Co-I on a project on Gaelic language, identity and civic participation (ESRC, £154k) and Coyle and O'Hanlon lead research underpinning the development of the National Languages Framework for Initial Teacher Education (Scottish Government, £152k). This has led to all of our primary school student teachers having elements of their course taught in French and/or British Sign Language. The hub attracts high numbers of doctoral students, leading to the creation of a new Institute for Language Education from 2021.

**Social justice and inclusion.** Coordinated by Florian, this hub addresses questions of equity, access and participation, including research on school exclusion in the UK (McCluskey, ESRC, £306k) and the rights of children with additional support needs (Riddell and MacAllister, ESRC, £356k). Reflecting a cross-hub engagement with issues of social justice, Florian facilitates research on inclusive pedagogy and the hub builds on synergies with projects such as the *End Violence Lab* and *Understanding Inequalities*. Examining issues of equality, wellbeing and social justice in the context of race equality and anti-racist practice, Arshad has led research on religious identities and Islamophobia (AHRC, £452k) and Horner has secured funding to support peace educators in conflict-affected settings (AHRC GCRF, £199k, from 2021). Impact case study 2 profiles Arshad and Foley's work on enhancing racial and linguistic equality in Scotland's schools.

**The teacher, curriculum and pedagogy.** Coordinated by Biesta, this new hub focuses on close-to-practice research on teachers and teaching, with strong commitments to retheorising and reclaiming the importance of teaching and supporting educators throughout their careers. Its Scottish focus is broadened by linking with Continental and Asian discourses on curriculum and pedagogy such as *Bildung*, *Didaktik* and *Manabi*. The hub includes a network on research-led teacher education and a research group on philosophy of education which has expanded as a result of new appointments (Biesta, English, MacAllister). The hub has hosted an ESRC seminar series on teacher education for the changing demographics of schools (Florian and Pantić,



£30k), while policy-oriented projects funded by the Scottish Government include measuring quality in teacher education (Kennedy, £107k) and shared learning spaces and outdoor learning (Colucci-Gray and Coyle, £50k).

Shaped by the four priorities set out in 1.1, the hubs nurture forward-looking research which addresses educational questions arising from living through a period of great change. This applied research is informed by articulating the unique contribution of educational research to interdisciplinary approaches and a powerful engagement with theory. Biesta has an influential role in this: his work on educational theory and a comparative approach to different configurations of educational research worldwide make a significant contribution through *Educational research: An unorthodox introduction* (2020) and his book series on *Theorising Education*.

### 1.3 Achieving impact and public engagement

As educators, we have a longstanding focus on impact as an integral part of research. Nevertheless, our engagement with the impact agenda has increased considerably since REF2014 and the areas covered by the six hubs indicate the many ways in which our research can impact on knowledge, understanding and decision-making for policymakers, practitioners and the public. Our strategy is based on the premise that research benefits from thinking about impact and public engagement from its inception, and so we focus on creating the conditions to maximise this and to increase the visibility of our work.

We have created two posts of deputy director of research and knowledge exchange to bring impetus to working in international contexts (Fry) and with industry (Manches) in addition to the two additional staff who provide specialist support highlighted in 1.1. In conjunction with a superb University knowledge exchange team, they provide advice and training at all stages of planning and delivery. This investment has enabled us to be proactive in supporting staff to identify and achieve the impact most appropriate to their research by i) coordinating institutional support; ii) providing advice and training to acquire the skills necessary for achieving impact; iii) offering financial support to facilitate impact activities; and iv) identifying and supporting opportunities to foster user engagement. Examples of engagement with, and impact on, government, third sector and diverse publics are provided in 4.3.

### 1.4 Open research environment

Sharing the outputs of our research for cultural, economic and societal benefit is central to our aspirations for accountability and accessibility: we therefore actively engage with the University's policy on research data management and the requirement that data should be FAIR (findable, accessible, interoperable and re-usable). To supplement this guidance, Gallagher developed an open research strategy specifically for Education, adopted in 2019, to address the opportunities and challenges of open access and data sharing. As well as promoting data management and open research data (see 3.2), the strategy recognises the importance of open archives and repositories for hosting research outputs, the provision of a long-term archiving function and the potential of such sites for disseminating our research to new audiences.

Our goal of promoting social justice in international contexts underlies the desire to make our research and data widely available, particularly for those countries, organisations or individuals that cannot access paywalled sites. The strategy of encouraging researchers to identify alternatives to standard routes to publication is already yielding results as they are increasingly choosing to publish on an open access basis: Knox and McGregor's book on data justice, for instance, has been funded by a grant from Edinburgh Futures Institute. In support of the strategy, we have appointed a full-time research data coordinator who provides feedback on individual data management plans and advises on the collection and storage of personal data. These actions have led to Education attaining 98% open access compliance since 2016, going beyond requirements by including book chapters. This puts us in the vanguard of good practice, ready to comply with the implementation of Plan S and evolving guidance on open research.

**1.5 Research ethics and integrity**

As educators, our research engages with a broad range of participants, stakeholders and funders, making research ethics and integrity core considerations at all stages of our work. The University of Edinburgh has adopted the UK Research Integrity Office's code of practice for research and the Universities UK Concordat to support research integrity. We are committed to ensuring the wellbeing of researchers, of participants, and of the environments in which our activities take place and so welcome this guidance and the imperative to adopt the highest levels of integrity in our own research and in our interactions with others.

Unprecedented ethical dilemmas can arise from increases in the volume of research conducted in low- and middle-income countries, the aggregation of data across large datasets and the increase in online methods for capturing data as a response to pandemic-related constraints on fieldwork and lab-based research. In conjunction with the research office, the long-established research ethics committee alerts us to these challenges and provides training to meet these needs. It also provides extensive support for staff by making considered responses to enquiries available without delay, recognising that projects may progress in unexpected ways and frequent iterations of the approval process may be necessary. The committee has participated in the redesign of an online form which streamlines processes, takes account of these unfolding challenges and responds to the need to comply with new legislation.

All student research projects require ethical approval. However, we go beyond this to develop students' understanding of the need to be accountable for research, to share its outcomes widely for cultural, economic and societal benefit and to acknowledge fully the contributions of others. Training delivered by the University's Institute for Academic Development extends to students and supervisors as well as being integrated into postgraduate teaching.

We are an acknowledged source of expertise for researchers across the university on responsible research with children. Fry coordinated a seminar series on this topic and has drawn on her experience with international partners to provide guidance on the ethical challenges of overseas research. Plowman was an invited member of EPSRC's strategic advisory group on responsible research and innovation (2019-20) and this has expanded our understanding of the ways in which researchers, citizens, policymakers and business can work together during the entire research and innovation process in order to take account of societal values and expectations.

**1.6 Future strategic aims and goals for research and impact**

Our vision over the next few years is to reconceptualise education in a changing world. The rapid disruption of conventional modes of education necessitated by pandemic-related school and university closures demands research in two key areas.

- The hurried introduction of digital teaching and learning across all phases of education has highlighted the ways in which technology appears to be developing faster than our capacity to fully understand its implications. We will examine the complex ethical challenges and opportunities that digital education, the 'datafication' of education and artificial intelligence pose for new models of education, from examining the potential for access to education for under-served populations to curricular and pedagogical innovation.
- Schools and other education settings provide structure and safety for vulnerable children and young people but initial indicators suggest that changes in provision may exacerbate inequalities. We will extend our current research using data-informed methods to address matters of social justice and inclusion by using data on health and educational achievement outcomes and COVID-19 prevalence to inform policy and interventions.

While we have longstanding relationships with policymakers, practitioners and publics, we are at an earlier stage of collaboration with industry. An additional goal is to build on the links to

industry and business put in place by Manches (see 3.1) to identify the educational and societal challenges that impact on the development of breakthrough technologies.

We will create the conditions for pioneering research by:

- continuing to invest in research-led appointments to build expertise and capacity in areas of strategic focus, including further appointments in international development and comparative education
- developing our overseas profile beyond existing networks by building on these new appointments and releasing funds to enable researchers to forge further international partnerships
- making progress towards a fully open research environment by acting as early adopters and pioneers in open data and methods.

## 2. People

### 2.1 Staffing strategy and staff development

The increase in staffing from 39.97 FTE in REF2014 to 68.8 FTE (headcount 72) for this submission is the result of a strategy to promote a research environment which aligns with our principled commitment to inclusion and diversity. We have made this progress by providing intensive support and mentoring, as described below, for staff across career stages to develop their research activities. The opportunities presented by retirements and departures have also been exploited to make new professorial appointments in educational theory (Biesta), digital education (Gašević and Robertson), language education (Andrews, Coyle) and childhood and youth studies (Tisdall).

We are committed to supporting the next generation of researchers to build the skills and profile they need to establish successful careers within or beyond the academy. Five tenure-track Chancellor's Fellows were appointed in the REF period to 2014. Designed to lead to permanent lectureships, all five (Boeren, English, Sabeti, Manches, Pantić) have been promoted to Senior Lecturer or Reader, generating combined research income totalling over £1.06m from funders including the EU, Spencer Foundation, AHRC and ESRC. The success of this investment has underpinned the appointment in this REF cycle of a further three Chancellor's Fellows (Lavoie, O'Hanlon and Williamson) to align with research hubs on children and young people, language education and digital education. Early career research is also supported by hosting two joint industry-academic postdoctoral fellows in the prestigious train@ed scheme funded by the Horizon 2020 Marie Skłodowska-Curie Actions. Funded at £167k each over three years, they augment our work in social inclusion and family support (Galey-Horn) and in evaluating initiatives designed to increase employability through the acquisition of digital skills (Miltner).

In addition to the professorial appointments, **research leadership** has been strengthened by four new personal chairs (Arshad, McCluskey, McCune and Ravenscroft, all promoted internally) adding to the complement of three personal chairs (Bayne, Iannelli, Riddell) and three established chairs (Coyle, Florian and Plowman). We have also recognised the contributions of ten lecturers with internal promotion to Senior Lecturer, supplementing the promotions for Chancellor's Fellows mentioned above.

We offer our own tailored **induction and staff development programme** to complement that provided by the university. In addition to the allocation of 40% of workload hours for research, all staff have a research mentor and an annual personal development meeting to review achievements against identified milestones, including update and review of individual research plans. Staff development funding of £50k is available annually, in addition to support for conference attendance (148 awards totalling £91k allocated in this period). We have made 38 awards of £1.5k seedcorn funding, with Sabeti's British Academy grant of £152k a consequence

of preliminary work funded in this way. Since 2020, this has been increased to awards of £5k in recognition of the need for greater support for developing complex collaborative and international proposals. Five staff have received financial support to complete doctorates in this REF cycle. Study leave, ranging from one semester to a full academic year, has been granted to 29 staff.

We strongly endorse the principles of the 2019 concordat to support the **career development of researchers** and recognise that a proactive approach is required to create an environment in which all researchers can flourish and achieve their full potential. As a result of identifying a need to support mid-career staff to apply for research funding, we nominated Cebula for an internally funded mid-career fellowship that led to a successful application to the Bailey Thomas Charitable Fund (£90k). Enrolment on courses to develop research leadership at mid-career stage also led to Sabeti's success with two GCRF awards and Ross's AHRC award (£146k) for a project using new methods of arts evaluation. Experienced investigators and research leaders with a clear trajectory towards managing a major grant or centre within the next few years are encouraged to participate in the *Strategic Leadership in Research Programme*. Running over six full days, it culminates in an ideas summit at which participants pitch their research idea to potential collaborators, funders and senior leaders. The six-session *Research Leader Programme* is suitable for new and aspiring PIs at an earlier stage of their career.

As described in 1.2, the hubs have an important role in providing a supportive environment for career development. In addition to mentoring and peer review, sharing intellectual enquiry and participating in writing retreats, there are opportunities to take on different roles, such as overseeing social media, internal communications or external links and coordinating provision for doctoral students. Each of the six research hubs has a professorial lead who works in conjunction with a colleague who is at an earlier career stage, providing the opportunity to gain experience of research leadership.

## 2.2 Research students

Moray House is home to a lively and increasingly multinational postgraduate research community with an intake of around 30 students each year. The number of overseas students continues to grow, with 61 countries of domicile represented in the current REF period. We make offers to a quarter of applicants, enabling us to select students based on academic potential as matched with our expertise and alignment with the research hubs. A total of 41 studentships has been awarded since 2014, including thirteen from ESRC. We have consolidated links with external partners through four collaborative studentships funded by ESRC: two with the Scottish Government and one each with a children's hospital charity and the Scottish Book Trust. A further collaboration with the National Galleries of Scotland was funded by AHRC and we have also been successful in securing awards associated with funded research projects, such as *Move2Learn*. The total number of doctoral degrees awarded each year are as shown in the table below (fractions indicating joint supervision across Schools).

	Academic year						
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
PhD	13.55	12.5	13.9	26.58	14.65	11.3	13.1
EdD	2	1	1	1.5	1.5	1.5	4.9
<b>Total</b>	<b>15.55</b>	<b>13.5</b>	<b>14.9</b>	<b>28.08</b>	<b>16.15</b>	<b>12.8</b>	<b>18.0</b>

Successful doctoral completions have increased from 76 to 119 over this REF cycle, with 60% of staff providing doctoral supervision. Each student has two supervisors, with progress linked to an initial review at four months, a formal progression review at the end of the first year and annual reviews thereafter. Training on appointment and at five-year intervals is mandatory for all supervisors and we have achieved an increase of more than 50%, from 25 to 41, in the number



of staff providing supervision. We have encouraged interdisciplinary supervision teams and currently have arrangements in place with staff in areas such as Design, Linguistics, Geosciences, Medicine and Politics, as well as an interdisciplinary ESRC studentship with Informatics. We have also seen increases in international co-supervision, with arrangements in place including Monash, Oslo and Queensland University of Technology. Part-time research students are typically mid-career or senior professionals working as head teachers or in government agencies, local authorities and advisory roles. This diversity of career stage, professional experience and nationality brings wide-ranging contributions to the intellectual life of Education and reinforces our links with policy and practice.

### ***The postgraduate research environment***

All doctoral students have access to training offered by the Scottish Graduate School of Social Science, of which Plowman is Associate Director. Funded by the ESRC and the Scottish Funding Council, the SGSSS provides more than 700 hours of training each year on a wide range of advanced methods for all social science research students across 16 Scottish universities. It also offers internships, a summer school, a high-profile impact competition and business booster activities. A further 25+ training events are held each year within Education on research methods, preparing for the viva and applying for postdoctoral awards and academic posts. Students are also encouraged to participate in the Edinburgh Award for volunteering and community work and to take on tutoring as appropriate. The University's Institute for Academic Development offers courses as preparation for the Edinburgh Teaching Award, a recognised route for applying to Advance HE, and provides a comprehensive programme on transferable skills and careers resources. This provision is complemented by advice offered by the careers service for students during their studies and for up to two years after graduation.

All research students are also integrated members of one or more of the research hubs, through which they are encouraged to participate in regular seminars and workshops as well as to publish in peer-reviewed journals, with more than 50 papers published since 2014, either as sole author or co-authored with staff. A doctoral work-in-progress seminar series and an annual student-led conference enable students to share their research with peers and staff. Students also organise social events, including picnics, walks, potluck suppers and quizzes, with a monthly student-led newsletter promoting events and training opportunities, updates on funding and academic vacancies.

Students have been research partners or on student exchanges in Australia, Canada, Colombia, Korea, New Zealand and the USA. International collaborations have been facilitated by our membership of Universitas 21 (U21), with three doctoral students (Andries, Fakunle, Savadova) successful in obtaining funding to develop research across its network. Fakunle has been a member of the U21 Forum for International Networking in Education, now succeeded by Kwiatkowski. We provided financial support for students to attend a U21 event at the American Educational Research Association conference and the European Conference on Educational Research and Guan was funded to work with fellow doctoral students for ten days prior to the Global Education Deans' Forum in China. Cebula was awarded an internship with the Scottish Government and Fakunle was awarded the Estelle Brisard Memorial Prize for excellence in 2018 by the Scottish Educational Research Association. Hunter Blackburn has contributed to BBC Radio 4's *More or Less* and was awarded Wonk of the Year 2017 by WONKHE for her blog, *Adventures in Evidence*, cited as essential reading for a critical commentary on the funding of Scottish higher education.

## **2.3 Equality and diversity**

As Head of School for much of this REF cycle, Arshad's leadership has been a key factor in putting equality and diversity at the centre of who we are and how we work, ensuring that our steps forwards are driven by a genuine desire to practise what we teach and research. She convened a University-wide committee to document the experiences of Black and Minority Ethnic students which has resulted in moves to recognise and counter forms of everyday racism.

Two doctoral students (Becnel and Xu) and a Council for At-Risk Academics postdoctoral fellow (Ramadan) have been invited to join an Advance HE steering group on racial harassment, while Becnel and Ramadan are members of a Scottish Government group providing guidance on decolonising the curriculum of universities and colleges throughout Scotland. Arshad is also investigating the University of Edinburgh's historical relationship to slavery and is contributing to its efforts to work towards the Race Equality Charter Mark. Her contributions have been recognised by an award of the CBE in the 2019 New Year's Honours list, by being conferred a Fellow (2019) of Scotland's largest teaching union and being invited to join BBC Scotland's education advisory board for her expertise in race equality.

Moray House was awarded the Athena SWAN bronze award by the Equality Challenge Unit in 2017 at the first attempt, one of only five departments of education in the UK who had achieved the award at that time. Efforts to address equality and diversity have been progressed by Arshad's successor as Head of School (Andrews) and we are now working towards a silver award: progress is a standing item on the monthly agenda for the executive team and Athena SWAN is an integral part of the school plan. As part of our commitment to all staff, a representative of the Equality, Diversity and Inclusion committee sits on all core School committees in line with our revised governance framework from 2020. The committee has made arrangements for staff to learn British Sign Language and hosted 'where to draw the line' workshops to combat bullying and harassment as well as awareness-raising events for staff, students and the public on disability, racial and gender discrimination. While we could still do more in terms of supporting researchers disadvantaged by career interruptions or with protected characteristics, including the LGBTQ+ community and those with disabilities, we are committed to identifying and addressing structural barriers.

We recognise the complex issues associated with the feminised nature of applicant pools in departments of education and how this can lead to a combination of insecure employment, part-time work and fewer prospects of career progression. Informed by Robertson's open access book, *EqualBITE*, which shares practical and effective strategies for creating more gender-balanced working environments, we take account of all fixed-term staff and the precarity of career pathways for contract researchers through staff induction, workload allocation and career development. All staff involved in job interviews and postgraduate research admissions are required to complete unconscious bias training. Our website has been redesigned to project greater awareness of issues relating to equality and diversity; recruitment packs embed a statement welcoming under-represented groups to apply and emphasise our commitment to flexible working and equality and diversity principles in action. We aim to help staff to balance the demands of research, teaching, academic leadership and administration and have increased the transparency of workload plans by making them available on the intranet. We ensure parity of access for all staff in terms of personal development reviews, access to research mentors, conference travel funds and promotion advice.

The University is a signatory to the San Francisco Declaration on Research Assessment (DORA) and we recognise the need to assess research on its own merits rather than rely on external indicators such as journal impact factors. In line with the UoE REF2021 Code of Practice, we have adopted an inclusive approach to defining 'independent researcher' and have welcomed the decision to return 100% of eligible academic staff. Following unconscious bias and equality and diversity training, we adopted a rigorous and transparent approach to the selection of outputs, fully accounting for special circumstances which have affected individuals' research activity. We established an independent group to review the distribution of outputs across staff by gender and career stage, although we were unable to access data on other protected characteristics given the voluntary nature of the information. The review demonstrated a balanced spread of outputs across gender and career stage: 69% of outputs submitted are authored by female staff (who comprise 69% of our staff) and, overall, more than half (51%) of staff contributed 2 or more outputs. Along with more than a quarter (28%) of all staff being

named as PI or Co-I on successful applications for research funding, this is testament to how our inclusive approach has enabled staff to flourish.

We benefit enormously from the geographic diversity of our staff from 12 countries, seven of which are beyond the EU, in terms of international collaborations and broader perspectives and we believe strongly that staff and student quality of life is important if we are to foster an inclusive culture of research and learning. Initiatives to ensure the health and wellbeing of our community include weekly mindfulness sessions and a Twitter-led encouragement to 'walk and work'. Place2Be provides professional counselling for our student teachers and staff. It is funded by Baillie Gifford, a local company, and is a fully staffed, self-referral service which supports mental health and emotional resilience.

Further issues of equality and diversity have surfaced as the consequences of the COVID-19 pandemic became apparent. Although it has created research opportunities, as indicated in section 4, it also generated inequities for those whose activities were severely curtailed during the period of lockdown and whose research ambitions have been impaired as a result. As an initial response, we have circulated text that staff can use in applications for promotion or sabbaticals to ensure that there is no detriment to their case as a result of changes to work patterns. We are rethinking the criteria for the allocation of study leave, we have rebadged the research innovation fund to facilitate catch-up, and we are developing a mitigation fund to enable staff to buy out some of their teaching in order to recover lost research time. These responses have been supplemented by a range of funding opportunities targeted at research adaptation funded by the University.

### 3. Income, infrastructure and facilities

#### 3.1 Research Income

Our research strategy has led to investment in expanding the research office from four to seven staff, leading to a higher level of professional support and improved visibility, communication and take-up. Combined with stimulus from the research hubs, this has led to a notable growth in activity to generate research income in the current REF cycle, which has increased by 30% compared with the REF2014 period. The strategy has also yielded results in terms of staff activity and recruitment, with more than a third of staff appointed during this REF period named on successful grants as PI or Co-I.

While the mean value of research awards has risen by 42% to £117k from £82k over the two REF cycles, we continue to emphasise our strategy of encouraging and supporting greater ambition. This is evidenced by a total of 83 applications for grants to the value of more than £200k each, an increase of 66% over the previous REF cycle, with the success rate for these awards rising from 14% to 24%. The strategy of being more selective in identifying which applications to ESRC should be supported to go forward and subjecting them to meticulous internal peer review has been effective: our 32% success rate is well in excess of the average sector-wide success rate of 17% for 2014/15 to 2017/18 (the most recent data available for proposals in the Education discipline for ESRC awards). The total ESRC research funding of £3.4m in this cycle is an increase of 64% over ESRC awards to the value of £2.1m in REF2014.

Our investment in supporting staff to apply for projects across institutional, international and disciplinary boundaries has been successful, with eight GCRF projects awarded £2.32m (see 1.1), along with others such as the US-UK collaboration *Move2Learn* study led by Manches. Our goal of developing international research has led to growth in income from overseas sources, with £2.07m awarded from the European Commission, Spencer Foundation, UNICEF and United Nations. Further awards include the current international and interdisciplinary *Understanding Inequalities* project (ESRC, £538k, co-led by Iannelli) and Pantic's *Teaching that Matters for Migrant Students* (NordForsk, £1.1m). Our income-generating strategy has adapted

vigorously in line with changes in the funding environment towards larger bids, but we recognise that smaller projects offer development opportunities and that such funding can be used to pilot new techniques, open up new areas of investigation, lead to significant impact or develop a relationship with a new funder. Smith, for instance, has created a network on access to secondary education in six countries in the Asia-Pacific region (Scottish Funding Council, £7.5k) to underpin further ambitious international research.

We have also been successful in obtaining core income from the Scottish Government for knowledge exchange centres. The Scottish Sensory Centre (Ravenscroft, £67k), CALL Scotland for communicative and assistive technologies (Nisbet, £1.8m) and STEP, supporting mobile families including Gypsies and Travellers (core funding of £170k per year), generated a combined value in excess of £2.5m from 2013-14 to 2019-20, including research-related income.

### **Consultancy**

As well as an additional income stream, we see consultancy as creating opportunities to engage in leading-edge early-stage research and routes to impact. We are making progress with our goal of developing a strong consultancy portfolio, with income in the current REF period of £1.3m but aspirations to increase this. In addition to consultancy work with the third sector (such as McGeown's evaluation of a literacy app for Save the Children and Florian's with the British Council and Open Society Foundation), we have also emphasised our commitment to socially responsible innovation and growth by promoting research-industry links across different business models. These include social enterprises (Konstantoni's play café initiative with the Froebel Trust), small- and medium-sized business (Galloway and Nosebleed Interactive funded by an Innovate UK Knowledge Transfer Partnership on language learning), large corporations (Tisdall's consultancy for Ipsos-MORI on the effects on young people of advertisements that promote gambling), public services and industry (Manches with several projects for the BBC; Plowman as Co-I on an ESRC grant with the BBC and Dubit, a global marketing company; Sheail with the National Library of Scotland) and unions (Williamson on the use of new data systems in HE for the University and College Union).

Our aim of building a culture of innovation and entrepreneurship has been led by Manches, our lead for industry engagement. He has built on his experience of developing research-informed spin-outs, including *Numbuko*, an app for maths learning in the early years, and the *Magic Cloud*, an internet-connected toy to encourage song and early learning that was supported by ESRC business booster funding. Links to support industry networking have been developed with NESTA, the UK foundation to promote innovation, and Edinburgh Innovations, the University's specialist consultancy and commercialisation service. Opportunities have been created for staff to engage with expert advisers, gain access to start-up workshops and attend sessions tailored to the interests of the research hubs as well as an education-focused entrepreneurship bootcamp for doctoral students and early career researchers.

### **3.2 Infrastructure and facilities**

Following an internal review, we have reconfigured the research and knowledge exchange directorate with, most recently, two co-Directors and two deputies supported by investment in the professional services research team. A re-grading of the manager's post at a higher level has enabled us to realise a more enterprising vision for the research office and brings the total staff complement to seven (5.5 FTE), with additional support from the communications team and a digital services manager. A new appointment of data coordinator and the use of data visualisation software such as Power BI enables us to maintain oversight of research applications and awards, along with other indicators of research activity, which we can now scrutinise more easily in terms of source and scale of funding and applicants' gender and career stage.

These changes have enabled us to strengthen and expand initiatives to support staff throughout the research life cycle, from developing partnerships to post-award management. Examples



include a weekly digest of updates on funding schemes, targeted communication of opportunities, access to a dossier of successful proposals, visits from funders, one-to-one tailored support, holding weekly drop-in sessions in different locations and a rigorous system of internal peer review. Refreshing the infrastructure has enabled us to increase visibility, improve information flows and actively promote funding opportunities. The research office also supports and manages activities such as awaydays, writing retreats and seminars on behalf of the research hubs. Regular workshops address topics including research ethics, data management, creating and tracking impact, writing successful grant proposals and engagement with external partners. The research information system, PURE, ensures that the research profile, outputs, awards, projects, activities and impacts are captured in a single system for every member of academic staff.

### ***Digital services and the library***

As indicated in 1.4, the open research strategy requires us to make research data available where a sustainable and accessible platform is available and while ensuring rigorous adherence to all ethical processes and data protection standards. Our dedicated full-time data coordinator and the research office provide local support for uploading data and monitoring open access compliance, with all staff offered individual one-to-one training and refresher sessions as needed. The eight-person digital services team in Education provides learning technology support, including one-to-one training, a video production and subtitling service and website maintenance. They support the open research strategy by providing technical guidance to facilitate the sharing of outputs, data and methods. Through Miltner and Ross, we have a strong relationship with the College's Centre for Data, Culture and Society which enables us to source and fund training and skills development for researchers interested in exploring novel digital techniques.

A dedicated library on the Moray House campus offers 141 spaces and two group study rooms for silent study and houses a comprehensive collection of books and journals on education along with an extensive range of specialist databases, print sources and special collections. The historical record of Scottish education materials is a unique resource that includes publications on the history of individual schools, educational policy and education reports from 1841 to 1978. The exceptional main university library gives desktop access to over 1.4m e-books and 185k e-journals but is within walking distance when hands-on access to the resource of 2m print books is required, as is the National Library of Scotland, one of six legal deposit libraries in the UK.

Access to a comprehensive infrastructure that includes file storage for active research data (DataStore), archive storage (DataVault), a Data Safe Haven for the management of sensitive datasets and a version control service to allow users to store code is provided centrally. We also use DMP Online from the University of Edinburgh's Digital Curation Centre to help our researchers develop data management plans. The university's computing provision is amongst the most advanced in Europe, providing first class facilities for collaboration, high performance computing and design services. The Edinburgh International Data Facility serves the Data-Driven Innovation programme, hosting and curating regional, national and international datasets for a wide range of stakeholders. Payments for article processing charges to support publication in open access journals are also managed centrally on our behalf.

### ***Estate***

The University has invested more than £1.5m in Education's facilities and estates since 2014, including the creation of three dedicated PhD suites with individual allocated workspaces and a room fully refurbished to host six visiting scholars. We have also completed improvements to open access computer labs and opened a large new café, Levels, with three different lounge areas. Provision for staff and students with impaired mobility has been upgraded with specific student-led changes made within the Moray House library along with accessible study rooms, offices and teaching space as well as parking spaces for drivers. Other initiatives include providing access to free sanitary products and installing hearing induction loops.

Research centres have designated space so that they are able to maximise interaction between colleagues. Education has excellent audio-visual and videoconferencing facilities to facilitate sustainable distributed research activities including the shared learning space. Following investment of £60k, this has capacity for more than 50 learners, providing a large screen for video and data links between the Moray House site and schools.

We are proud to have been awarded a Silver Sustainability Award by the university in 2018-19 and will continue to create a culture where sustainability is part of our decision-making framework. For instance, live information screens with details of public transport options have been installed on campus and a car park has been converted to create a car-free garden space with tables and benches for use by students, staff and the public.

#### **4. Collaboration and contribution to the research base, economy and society**

Agile responses to the pandemic provide an illustration of some of the ways in which we have made contributions across the research base, economy and society. Already a global leader in digital education, there has been increasing demand for our expertise in pedagogically-informed course design that has shaped effective online education for students worldwide. For example, Gallagher (GCRF theme development fund, £23k) has co-developed remote teaching strategies within Nigeria, Tanzania, and Uganda. Williamson is mapping the organisations and networks promoting education technologies during the pandemic, examining the commercialisation of public education and its consequences (Education International, 3k euros). McCluskey is exploring vulnerable children's experiences of COVID-19 and the effects on mental health and education (Chief Scientist Office, £25k), while Robertson and colleagues established weekly webinars to support teachers, parents and learners while children are being educated at home.

As a leading provider of initial teacher education and professional learning, we have a longstanding reputation for making the most of opportunities for user engagement and knowledge exchange, supported by access to resources within the University (such as media training) and beyond (the Beltane public engagement network, the many festivals hosted by the City of Edinburgh). Our activities aim to anticipate and respond to a rapidly changing external environment and to challenge existing orthodoxies, so providing government and other stakeholders with broader perspectives that enable them to think differently about their decisions. These goals underpin the leadership programme for government ministers and policymakers in low- and middle-income countries provided by the *End Violence Lab*.

The professional learning team, now expanded from two to five, maximises this important element of research-informed engagement with educators and policymakers. It has led to substantial growth, increasing from 838 course participants in 2017-18 to over 3,000 in 2019-20 with a 292% increase in income in the same period. Research-led professional learning has included visits of educators from countries including China, Croatia, Georgia, Germany, the Netherlands, Sweden and the USA. Other provision includes a three-month course on teachers as agents of change (Pantić), eleven cohorts of Froebel and Childhood Practice courses that enrol over 400 practitioners each year, and many bespoke courses run for local authorities across Scotland. Indicative short courses from a wide portfolio include 'coding and cake' events using robots and coding toys (Robertson), encouraging adolescents' motivation to read (McGeown) and promoting STEAM (science, technology, engineering, arts, maths) education (Colucci-Gray).

##### **4.1 Collaboration and contribution to the research base**

Our explorations of the ways in which data are used to understand, predict, modify and influence learning and behaviour in educational contexts make recognised contributions to the research base and are globally influential. We are mindful of society's need to ensure that data-driven

technologies are being deployed responsibly and ethically without creating new forms of exclusion and inequality.

*Data Education for Schools* and the *Data for Childhood Collaborative* have given a huge impetus to this work, enabling us to scrutinise these changes and to pioneer research with the potential of positively transforming people's lives. For instance, Robertson is empowering school students to be confident users of digital technologies and Duta, Iannelli, McCluskey and Smith work with large-scale data to understand more about children's outcomes and learning trajectories. Further examples include Manches' research on very young children's safety and privacy when playing with internet-connected toys, while Knox and Williamson have gained worldwide attention for problematising the use of data to track performance through predictive learning analytics and scrutinising how this is used to draw conclusions about students' psychological states, behaviours and neural activity. A new Leverhulme Trust project (PI Williamson, £135k, from 2021) will take a radically interdisciplinary approach to 'precision education' by integrating biological and data sciences to investigate the use of genetic, neural and biometric data for targeted teaching and learning.

The *Applied Quantitative Methods Network* (2013-2017) has provided a service to the broader academic community as well as a platform for in-house training in skills that are perceived to be in decline in educational research elsewhere in the UK. Iannelli and O'Hanlon have also contributed to the Q-Step programme (Nuffield Foundation, ESRC and HEFCE, 2013-19) to promote quantitative social science training and Iannelli was Co-I on the ESRC-funded *Administrative Data Research Centre* (Big Data Network) based at the University of Edinburgh from 2013-18, one of only four such centres in the UK. These initiatives have fulfilled a vital part of ESRC's mission to develop capacity in advanced quantitative methods across the social sciences and addressed the shortage of quantitative skills in Scotland. Our work on social justice has grown as a result, informed by the capacity for new data linkages and ways of interrogating large-scale data. Continuing a proud tradition of commitment to research that informs policy analysis and development, it aims to understand the ways in which education systems interact with their socio-economic contexts to study inclusion and equalities in education, training and employment, often within comparative, cross-national or international contexts.

### **Academic service and recognition**

Recognition of our intellectual contributions to education research are indicated by the award of Fellow of the Academy of Social Sciences to four professors (Andrews, Florian, Plowman, Riddell). Andrews and Toye are Fellows of the Royal Society of Arts and Manches is a member of the Royal Society of Edinburgh's Education Committee and the Young Academy of Scotland, which honours emerging leaders from the professions, entrepreneurs and academics. Prizes have been awarded for publications, including the AERA outstanding book award in 2014 to Biesta for *The Beautiful Risk of Education*, Iannelli's inclusion in BERA's 40@40, which highlights 40 years of educational research through 40 studies, and Macleod and McCluskey's award for the best article in *Educational Review* (2016).

Contributions to the research base through service to the research councils and other funders include Iannelli's membership of ESRC's Strategic Advisory Network (from 2019) and Plowman's roles as member and subsequently vice chair of the ESRC's grants assessment panel (2010-15), and membership of the EPSRC's Strategic Advisory Network (2013-2019), the Norwegian Research Council education panel (2013-15, 2019) and the Carnegie collaborative research grants panel (2016-18). Florian, Manches and Tisdall are members of ESRC's peer review college, while peer review for overseas research councils includes Iannelli (Israel, the Netherlands and Switzerland), Plowman (Australia, Canada and Ireland), Choi (Korea), Smith (Israel) and Coyle, Kennedy and Manches (Hong Kong).

Further examples of academic service and recognition that contribute to shaping the research base include editorial roles. These include s Biesta for *Educational Theory* and, with Colucci-

Gray, for *British Educational Research Journal*, Florian's editorship of Springer's book series on inclusive learning and Ravenscroft's for the *British Journal of Visual Impairment*. Other editorships include Bayne for *Teaching in Higher Education*, Williamson for *Learning, Media and Technology* and English for *Dewey Studies*. Andrews is co-editor and chair of the advisory board for the *Cambridge School Shakespeare* (Cambridge University Press) and oversees the 2020 Chinese edition. Contributions to editorial boards include Arshad, Policy Press book series on social justice; Bovill, *Teaching in Higher Education*; Dasli, *Pedagogy, Culture & Society*; Florian, *Cambridge Journal of Education*; Hamilton, *Scottish Educational Review*; MacAllister, *British Journal of Educational Studies*; Macleod, *International Journal of School Disaffection*; McGeown, *Journal of Research in Reading*; O'Neill, *Deafness & Education International*; Sabeti, *Ethnography & Education*; Riddell, *Disability and Society*; and Tisdall, *Children & Society*.

#### 4.2 Collaboration across the University

We have made major contributions to research leadership across the University of Edinburgh through Plowman's role as Dean of Research for the College of Arts, Humanities and Social Sciences (2015-17) and membership of the management group of the Institute of Advanced Studies in the Humanities, Ross's membership of the ESRC Impact Acceleration Accounts management board and Sabeti's membership of the university-wide Researcher Experience Committee. As Assistant Principal (Digital Education), Bayne advised on the expansion of online learning, building digital archives and developing digital publishing across the university and, as Director of Education for Edinburgh's Futures Institute, she works with Williamson and EFI fellows (Knox, MacGregor, Ross) to address the social implications of technological change. Gallagher has been awarded the Principal's medal for his research-informed work supporting the rapid expansion of digitisation and hybrid delivery of teaching as a result of the pandemic.

#### 4.3 Collaboration with government, third sector and diverse communities

As attested in the impact case studies, we have made the most of our location in Edinburgh by forging links with government agencies and decision-makers and exploiting opportunities to shape the Scottish policy-making process. Our research has directly influenced the Scottish Government's educational agendas, with researchers contributing at senior strategic levels to inform public policy in areas such as diversifying the teaching profession, sustainability education, the computing curriculum, Gaelic education and widening participation in higher education. The impact case studies confirm the benefits of longstanding relationships with key users and decision-makers, the diversity of communities and organisations that have been reached, and the institutional support that has enabled academic staff to maximise impact by influencing or informing policies, practices and perspectives. Data produced by Florian, Fry and McCluskey has provided the leading evidence on the links between violence in childhood and the impact on learning outcomes that informs the global advocacy initiative Safe to Learn, led by UNICEF, the Department for International Development and UNESCO.

#### **Collaboration with government**

In line with the Scottish Government's *Research Strategy for Scottish Education* (2017), we see it as imperative that our research contributes to supporting social equity, diversity and positive learning experiences as much as it contributes to raising attainment. Iannelli is a member of the group convened to offer advice and guidance on the future direction of this strategy. Arshad's work on the Race Equality Action Plan has ensured that issues of race are referenced in the new national professional standards for teachers. At the request of the Deputy First Minister, she chairs a group to take forward its recommendations to monitor applications by, and progression of, black and minority ethnic applicants to Scottish teacher providers and she has provided evidence to the Scottish Parliament's equalities and human rights committee (Impact case study 2). Membership of ministerial advisory groups and committees also includes Coyle on modern languages, Florian on autism and dyslexia, Iannelli on widening access and school subject choice, McCluskey on behaviour in school and chairing the review of guidance on school attendance, and Nisbet on augmentative and alternative communication.



**Collaboration with Scottish education**

Our research in teacher education reflects our role as a leading provider of initial teacher education and the only provider of teachers for children with sensory impairments in Scotland. The Scottish Government has provided funding of £1m for research-informed masters-level provision through the Teacher Education Partnership, including *Into Headship* programmes. Our research is enriched by the differences we can make to professional practice by involving practitioners as agents of change from early years settings to schools and tertiary education. This, in turn, enriches our teaching at all levels, enabling teaching professionals and educational researchers to work together productively. Macleod has contributed to the *Read, Write, Count* campaign since 2016 by coordinating students to support the work of the Scottish Book Trust and family learning workers. McGeown is a member of a steering group on improving gender balance and equalities for Education Scotland and led a national conversation on literacy standards in schools (Impact case study 5). Coyle chairs the Scottish Council of Deans of Education language group and Robertson's work with Education Scotland has led to teachers in more than 2000 Scottish primary schools receiving a copy of *Teach Computing Science: A Guide for Early Years and Primary Practitioners*.

As mentioned in 3.1, we host three knowledge exchange centres fully funded by the Scottish Government: the Scottish Sensory Centre for the education of children and young people who are visually impaired, deaf and deafblind, CALL Scotland, which provides world-leading expertise in communicative and assistive technology, and STEP, which creates resources promoting innovative approaches to learning for mobile families including Gypsies and Travellers. In addition to providing mechanisms by which we can contribute to developing participation and justice in sectors of education that are often neglected, these knowledge exchange centres also provide professional support for educators and unique pathways for engagement with schools, local authorities, families and communities. CALL was awarded the Design for Diversity prize for developing a Scottish computer voice for narrating text as well as an outstanding community inclusion prize for its accessible digital versions of the books which are gifted to every five-year-old child in Scotland for National Book Week.

**Collaboration with the third sector and engagement with diverse communities and publics**

Collaborations with the public sphere permeate much of our work, with major examples including Fry's membership of the World Health Organisation committee on preventing youth violence and her wide-ranging consultancy roles for UNICEF and Save the Children. McCluskey was a member of the UNESCO platform on school violence and bullying and Florian has advisory roles with the Council of Europe, British Council, UNICEF, UNESCO and the Open Society Foundation.

The Scottish Universities Insight Institute is funded by seven Scottish universities to promote engagement between researchers and wider society. We have been successful in securing six programmes of seminars and workshops, each funded for a maximum of £20k, including topics such as British Sign Language (O'Neill, with National Deaf Children's Society), the intersections of poverty, attainment and mental wellbeing in adolescents (Macleod, with Children in Scotland, the Poverty Alliance, Mental Health Foundation) and developing a game to inform schools about the sustainable development goals (Pantić, with UNESCO). Further examples highlighting the range of ways in which we engage with the public include *Help! My Teacher is a Robot!*, organised by the digital education team in a shopping mall (ESRC Festival of Social Science) and an eight-week online course on digital play for childminders and parents developed in conjunction with NHS Lothian (Plowman, ESRC Impact Acceleration Award, £20k). We have been creative in developing innovative methods of communicating our research: Iannelli has collaborated with the Traverse Theatre and O'Neill has been involved in expanding the British Sign Language glossary into new areas of the school curriculum. Manches has been awarded the Tam Dalyell prize (2020) for excellence in engaging the public with science, has been funded by a Wellcome engagement award (£60k) to co-create an exhibit with the Glasgow Science

Centre and has developed animations and board games to convey scientific concepts. Partnerships with cultural organisations have included the learning strand of Artists' Rooms, in conjunction with the Tate and National Galleries of Scotland (Bayne and Ross).

#### 4.4 National and international research networks and collaborations

As indicated earlier, international research and collaborations have been a cross-cutting priority and have led to growing income from international sources (3.1). Further examples of collaboration include Gallagher and Ross leading a three-day workshop supported by the Council of At-Risk Academics on online teaching for a group of academics displaced to Turkey by the Syria crisis and Riddell organising a seminar series with the University of Burgos on autonomy and rights for children with additional support needs. Arshad is a founding member of the deans' group of Universitas 21 (U21), a worldwide network of 27 research-intensive universities which supports exchanges and research partnerships; Andrews attended the first Global Education Deans' Forum in Shanghai in 2019.

Within the UK, McCluskey's collaboration with the *Excluded Lives* network based at the University of Oxford has led to success in securing an ESRC large grant to investigate the political economies of school exclusion across the four UK nations (total grant £2.7m). All eleven providers of initial teacher education in Scotland have collaborated on a six-year project to measure quality in initial teacher education (Kennedy, Scottish Government) and McGeown co-founded a network on children's language and literacy in Scotland with over one hundred members, including speech and language therapists, researchers and teachers.

#### 4.5 Seminar series, keynotes and conferences

Focusing mainly on the latter part of the REF cycle, given the volume of activity, highlights include invited keynotes by Andrews, New York University (2016) and Chinese University of Hong Kong (2019); Bayne, Universitas 21 educational innovation symposium in Johannesburg (2019); Biesta, the World Educational Research Association in Tokyo (2019); Bonacina-Pugh, University of Strasbourg (2019); Florian, UNESCO forum on inclusion and equity in education (2019), the BERA annual conference (2020); Plowman, La Trobe University, Australia (2018) and Erikson Institute, Chicago (2018); Riddell, University of Innsbruck (2019) and Ross, University of Sydney (2018).

We have hosted a range of leading speakers in lectures open to staff, students and the public, including Rt Hon Lord Jack McConnell on 'What happened to excellence?', David Gillborn (Birmingham) on critical race theory, Nancy Fraser (New York) on capitalism and racial oppression, Gloria Ladson-Billings (Wisconsin-Madison) on teaching for a diverse and digital world and Kirsten Sandberg (Oslo) on making children's rights real. Visiting scholars include Prof Martin Mills (Queensland and UCL), Prof Emer Smyth (Economic and Social Research Institute, Dublin), Prof Robert Fisher (Connecticut), Prof Jo Salmon (Deakin) and Prof. Irene Rizzini (Rio de Janeiro). We have hosted four Fulbright Scholars since 2017.

We are proud of our research at the forefront of educational thought and practice and recognise that active and engaged researchers are our main resource. We acknowledge their research needs and aspirations and are committed to enabling all staff to contribute to a culture that is participatory, reflective and based on a clearly articulated research strategy. The vitality of our research environment is demonstrated by our strides forward in developing research capacity and our discernible influence in education policy and practice. Investment in our staff and students and in innovation, interdisciplinarity, internationalisation and impact ensures an environment that supports our goal of continuing to conduct outstanding research as well as the sustainability and future of our discipline.