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# Open Research at Edinburgh

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# Contents

# Overview

Open research practices, which seek to foster research collaboration, transparency, and accessibility, are an integral part of research culture change.

## *Problem statement*

Policies are being introduced, particularly at the level of research funding and publishing, to make open research the 'new normal'. However, the support currently available to help researchers adopt open research practices varies by:

- Institution
- College, school, or department
- Research discipline and methods

## *Aim*

Our primary aim was to identify the open research support available to University of Edinburgh research students and staff:

1. Centrally at university level
2. Locally at college or school level
3. As grassroots initiatives

As a secondary aim, we sought to understand post graduate researchers' experiences with open research, including:

1. PGRs own personal knowledge and adoption of open research
2. PGRs experiences accessing support
3. What kinds of support PGRs think would benefit them most

# Approach

## *Identifying support at the University of Edinburgh*

The scope of this review was restricted to open research support available between October 2023 and February 2024.

Central support services were identified through the Information Services Group (ISG) webpages. College- and school-level support, whether specific to that school or links to central or other support, was identified through college and school webpages. Grassroots initiatives were already known to the reviewer.

## *Understanding PGRs experiences with open research*

Between January and April 2024, the reviewer spoke to seven researchers across the University 's three colleges:

- Six PhD students
- One research assistant aiming to apply for PhD positions

Through semi-structured discussions, we explored their opinions of open research and how PGRs could be best supported to ensure they gain the open research skills necessary for careers in research.

# What is open research?

The terms ‘open research’ and ‘open science’ are used interchangeably, often with ‘open science’ being the more popular choice. However, The University of Edinburgh has chosen to adopt the term ‘open research’ as it is more inclusive as it covers all areas of research including the arts and humanities.

Collaboration underpinned by a culture of openness, enables researchers around the world to solve problems efficiently and effectively. A key principle of open research “open as possible, closed as necessary” facilitates openness while protecting personal information, intellectual property and public safety.

## *UNESCO recommendation on open science*

In 2021, UNESCO published their recommendations for open science, an internationally agreed set of shared values and guiding principles to help shape policy and practice within UN Member States (Figure 1).

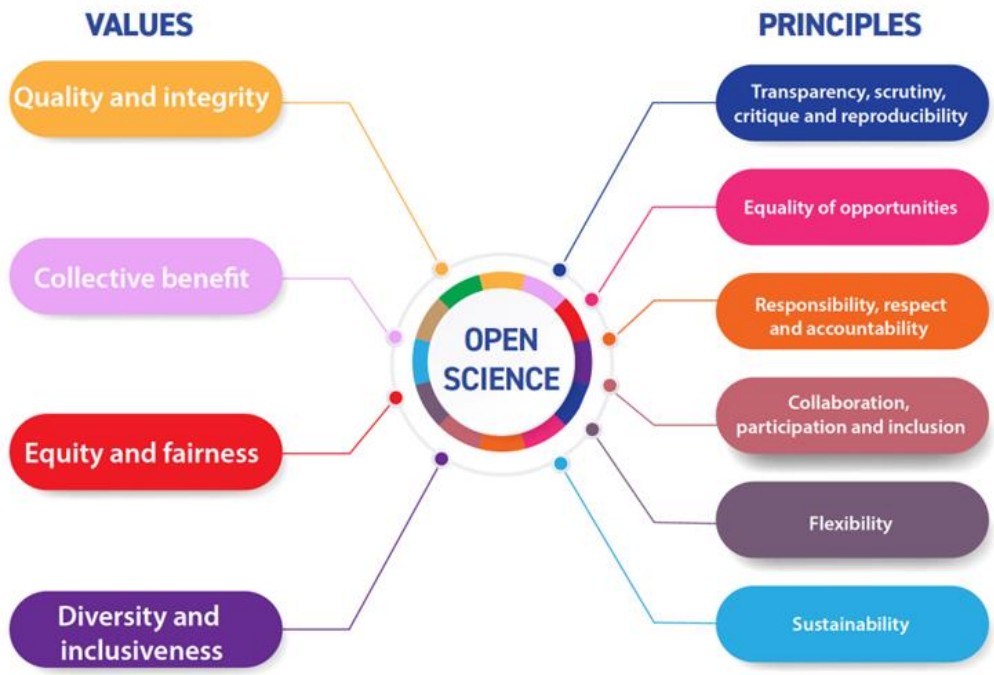


*Figure 1: UNESCO, 2021. https://www.unesco.org/en/open-science/about (CC-BY)*

## *Open research across disciplines*

While open research policies impact all areas of research, open research support and training is often siloed by research discipline and is concentrated on the sciences. This causes disparity in the availability of ready-made training materials and resources to support and promote open research across different research disciplines.

Currently, most generalised open research training produced globally still focuses on discrete areas within the sciences:

| Training | Focus |
|---|---|
| NASA's TOPS (Transform to Open Science) Mission | STEM |
| FORRT (Framework for Open Research and Reproducible Research Training) | Psychological sciences |
| Open Seeds | Life Sciences |

## *From the ground up*

Progress within open research has typically occurred at the individual, grassroots, and early career researcher (ECR) level. However, more coordination is required to prevent duplication of effort (multiple researchers coming up with the solution to the same problem) and to ensure that gaps in open research support are filled.

As time goes on, we are likely to see more open research policies from funders, publishers, and other stakeholders. Unless uneven access to training and support for ECRs and students is addressed this will likely mean that many will miss out on the chance to develop valuable skills. This may hamper the student experience and restrict access to career advancement.

# Support at the University of Edinburgh

## *Central support*

The University of Edinburgh Open Research Service, based within Library Research Services, acts as a central hub to advocate, promote, and coordinate open research within the university.

This includes the development of the Edinburgh Open Research Roadmap which aims to guide the University towards embedding open research practices as part of the normal research workflow.

Other support includes:

- An annual, free to attend open research conference, which has run since 2022
- Links to the Research Data Service
- Links to open access publishing resources
- Links to participatory research and citizen science support
- Information on research information management
- Links to the Institute for Academic Development Open Research Hub
- Links to grassroots initiatives, e.g. Edinburgh ReproducibiliTea and EORI
- Links to platforms supporting open research, either free to use or available via University of Edinburgh subscriptions

## *College- and school-level support*

As with the global situation, open research awareness and adoption, and the availability of existing online training materials, within the University is skewed towards the sciences and psychological sciences.

The College of Medicine and Veterinary Medicine (CMVM) site hosts dedicated open research support pages, and was the only college-level site to host any open research support.

In terms of school-level support, the School of Biology have their own dedicated data management support (BioRDM), and the School of Philosophy, Psychology and Language Sciences (PPLS) host an open research information hub and workshops. Most schools did not mention open research on externally- visible webpages and few had links to central University of Edinburgh open research support services.

In contrast, the Research Data Service team report receiving more engagement from researchers in the College of Arts, Humanities, and Social Sciences (CAHSS) than researchers in the College of Science and Engineering (CSE).

## *Grassroots initiatives*

Two grassroots initiatives within the University of Edinburgh emerged around 2019-2020: The Edinburgh Open Research Initiative (EORI) and Edinburgh ReproducibiliTea.

EORI was founded by a PhD student supervised by the University's UKRN (UK Reproducibility Network) Local Network Lead and LERU (League of European Research Universities) Ambassador within CMVM.

ReproducibiliTea was set up by two psychology PhD students. In 2022, the two initiatives combined when they were both run by Emma Wilson (author of this report), a PhD student in CMVM.

Since then, the report author (Emma) has attempted to broaden the range of open research support and discussion at the University of Edinburgh to encompass the whole university. Part of this has been collaborating with the University's Open Research Service.

# PGRs' experiences with open research practices and support

## *What (should open research support cover?)*

**General versus specialised**

Currently open research training is typically delivered on disciplines and/or open research skills. For instance, a training course or material might cover data management in genomics.

Most PGRs we spoke to said that general training was useful for understanding open research concepts but found specific, specialised training more beneficial as it clarified exactly how they could incorporate certain open research practices into their research workflow.

**Avoiding 'all of nothing'**

Open research covers a wide range of practices, including preregistration, data sharing, open access publishing, and participatory research. No one is an expert in all the topics, and from our conversations with PGRs we found that some lab groups and departments have expertise in one practice but not another.

***When encouraging researchers to embrace open research, small, cumulative steps are more important and feasible than expecting researchers to start working in a completely different way incorporating everything at once.***

**Uneven support**

However, this siloing of training also creates disparities, especially where the training offered is not equal, for instance where there is more training for scientific research and less for arts and humanities.

One PGR from the arts and humanities said that the data management and sharing training course they took assumed their data was in spreadsheet format and did not account for different types of data such as image files, videos, audio recordings, and use of historical collections. They thought

that training focused on different data types would help them better understand best practices around licensing and copyright.

**Expanding support**

Most open research training materials have emerged at the grassroots level from researchers based on their own experiences within their specific discipline. Sometimes, resources designed with a specific audience in mind are more broadly applicable with minor adaptions.

For instance, while targeted at ecologists, the paper "Not just for programmers: How GitHub can accelerate collaborative and reproducible research in ecology and evolution" by Pereira Braga et al., (2023) offers broadly applicable and accessible ways to use GitHub, including archiving data, hosting websites, and project continuity. The framing of this resource as specifically for ecologists may alienate researchers from others disciplines or prevent them from finding it entirely.

However, most open research training materials are not applicable to other research areas without major adaptions. Differing research methods, and the reasons behind making research open will have to be considered. For instance, it may be appropriate for a biomedical researcher to share their lab notebook to improve the transparency of their work, but it may not be appropriate for an ethnographer to share their field notes. In other cases, language may have to be adapted. With reference to publishing, journal articles are more common in the sciences, while monographs may be more common in the arts and humanities. Additionally, one PGR said that arts-based researchers may not consider their work 'data' in the same way a scientist does.

To ensure that open research training covers all research disciplines appropriately, we need specialists to (1) adapt existing materials where possible, and (2) develop new training where necessary. The development of new, high-quality resources will require dedicated time, funding, and specialist knowledge of best practices in specific research disciplines and in open research.

**Key points**

- General training helps introduce researchers to key concepts

- Specialised training is necessary to help PGRs incorporate open research practices into their workflows
- Small, incremental changes to research workflows are more feasible than 'all of nothing' changes
- Current support is uneven across research disciplines
- Some existing resources could be adapted for use by other research disciplines but most will require development from scratch to ensure relevancy
- Paid roles must be created to employ specialists to develop open research training across different research disciplines to ensure more even support

## *Who should open research training be targeting towards?*

**A focus on early career researchers**

Most currently available open research training is pitched towards ECRs, including PGRs, as the people doing most of the hands-on work within research projects.

Most of the PGRs we spoke to thought that training aimed at ECRs was helpful as it allowed them to gain essential research skills at the start of their career, meaning they wouldn't have to re-learn skills later. However, supervisors and principal investigators are often the ones in control of the intellectual property from research projects, meaning ECRs and PGRs need permission before they can adopt various open research practices like data sharing.

**Changing supervisors and unlearning**

Gaining a diversity of experiences, both through working in different work environments and with different supervisors, is considered an essential part of developing as a researcher.

However, three PGRs said that although they had developed open research skills with previous supervisors, new supervisors were not always as supportive of or knowledgeable about open research practices. They found

that they began to prioritise open research less, unlearning the skills they had developed.

Additionally, one PGR said that although their current supervisor was broadly supportive of open research their lack of knowledge relating to processes such as preregistration meant that they could not offer the practical support the PGR needed.

**A focus on established researchers**

Many PGRs felt that they didn't have the authority or influence to change practices within their immediate working environment and all felt that training aimed at established researchers and supervisors would be beneficial, as they can then embed these practices from a more "top down" approach.

***Training should be adapted for its target audience; for instance, ECRs would require practical 'hands-on' training while established researchers would likely get greater benefit from overviews of the benefits of open research, especially from a policy perspective.***

**A focus on professional services staff**

Although the experiences of professional services staff are not the focus of this report, it is useful to note the benefits of training targeted towards those in professional services, especially where it allows them to further assist PGRs on open research practice and policy. Initially targeting professional services staff for training may more feasibly allow for more equitable support to PGRs than targeting all PGR supervisors.

**The gap before the PhD**

Within the University of Edinburgh, research training is typically offered to PGR only, staff only, or to both audiences, depending on the topic of the training and it's assumed suitability.

One PGR highlighted that, while working as a Research Assistant prior to PhD study, they felt locked out of training offered only to PhD students which may be applicable to them. Likewise, most of the staff training that was available to them was not applicable to them an as ECR without a PhD.

An awareness of pre-PhD Research Assistant roles when deciding training suitability would help junior staff members gain the skills they need to enter PhD study with confidence.

**Key points**

- Everyone should have access to open research training suitable for their career stage
- Reliance on ECRs to lead the way in open research puts unacceptable pressure on them, and skills may be lost when they change working environments
- ECRs deserve to be supported in open research as part of their development as Principal Investigators of the future
- Training opportunities for research staff members without a PhD should be considered

## *When should open research training take place?*

**Fitting open research training into already overstretched workloads**

Researchers, both early in their career and those more established, struggle with heavy workloads, juggling multiple projects and responsibilities, and keeping up to date with the work in their field.

Therefore, despite continual learning being an integral part of being a researcher, finding time to attend open research training is difficult for all researchers.

**Optional or mandatory**

Currently, most open research training is delivered as optional sessions throughout the academic year. There is typically low turnout for this type of training, reasons for which may include a lack of time, suitability of the training time or location, or simply the benefit not being clear to potential attendees.

Most of the PGRs thought that open research training for supervisors should be added as part of mandatory supervisor training.

**PhD inductions**

Some universities have begun delivering open research training as part of regular PhD training and induction. This is thought to help improve awareness early on.

Some of the PGRs we spoke to thought this would be beneficial, however others thought that inductions were already overwhelming and they may struggle to take more information in.

Similarly, some PGRs thought that early training would allow them to have open research at the back of their mind when they needed it later, while others thought open research concepts were too abstract at this early stage and would make more sense later on once they started to have data.

From speaking with PGRs from all three colleges, it became clear that processes for inducting PhD students varied significantly across different schools and departments, with some (particularly those joining dedicated PhD programmes) receiving formal inductions and others not.

**Key points**

- All researchers struggle with workloads and finding the time for training
- Researchers should be encouraged to take time for personal development, including learning best research practices
- Current open research training is optional
- PGRs could benefit from having their supervisors receive mandatory open research training as part of their wider supervisor training
- There was disagreement between PGRs about the best time to deliver open research training
- There needs to be more consistency surrounding PhD inductions across departments, schools, and colleges

## *Where should open research training by delivered?*

**In-person versus online**

Many researchers find in-person training more engaging and interactive. However, online training is more accessible for researchers who are limited by time or are not based on campus.

As the University of Edinburgh is split across different campuses, training providers must make decisions on where best to hold in-person events. For instance, a researcher based at King's Buildings may not be able to attend a lunchtime training course held on Central campus.

More researchers can attend online sessions, however they may not be able to receive the same personalised experience as they would at an in-person event.

**Central versus local**

Some PGRs said they would find local training targeted to their specific research approaches more beneficial than general training provided centrally. One PGR suggested that training and support should be offered at the school-level by professional service staff with strong knowledge of their particular research area.

***However, to avoid the disparities between schools that we are already seeing, there should be a central body within the university, potentially within Library Research Services, to ensure that the support offered at each school is equal.***

**Key points**

- In-person training can often be seen as more engaging and personalised, however, is less accessible which may contribute to low attendance rates
- Online training may avoid barriers relating to travelling around campus, but attendees should feel well supported
- Open research training offered at the school-level may allow researchers to receive more targeted support, but a central governing body is required to ensure disparities between schools and student experience do not remain

## *How should open research training be offered?*

**Group sessions versus one-to-one support**

Some PGRs found that, although the current training offered by the University was helpful, it was also fairly generic. The training was useful for

introducing topics, but there was not time or space to ask questions more specific to their individual needs.

One PGR reported that the one-to-one support they had received from the Research Data Management Service was highly beneficial as it was both in-depth and personalised.

PGRs said they would like to see more one-to-one support. However, this relies on dedicated staff time.

**Key points**

- Training offered to groups works well for introducing topics but does not allow researchers to ask individual questions
- PGRs find one-to-one support beneficial and would like to see more of it
- More funding and resource should go into hiring professional services staff to provide one-to-one support where required by researchers

## *Why should PGRs prioritise open research skills?*

**Motivators**

Many researchers do not prioritise open research skills development as they do not see the benefits to themselves and their work or have misconceptions about what open research means.

***Open research training should be clearly beneficial to researchers.***

The PGRs we spoke to suggested multiple motivations for embracing open research, including benefits to their career progression, building community with other researchers, and giving back to the communities impacted by their research.

In biomedicine and psychology, open research practices are often conflated with reproducibility and research integrity. Many research findings in these areas do not replicate across experiments and in order to solve this problem and improve research quality we need to understand exactly what was done — therefore, open research is necessary. Open research for research integrity is therefore a strong motivator in this area.

However, materials developed around field-specific key motivators may alienate researchers from other fields.

**Policy changes**

Ultimately, a key driver of the need for open research is policy changes which will require researchers to work collaboratively, share materials and data, and publish openly.

As open research becomes the norm, the University of Edinburgh risks its reputation as a world-leader in high-quality research if its researchers do not have the support to embrace open research into their own work.

**Key points**

- It should be clear how open research training will benefit researchers
- Benefits of adopting open research to researchers' career, wider research communities, and communities impacted by research should be highlighted
- The University of Edinburgh urgently needs to support open research to retain its reputation as a world-leader in research

# What's next?

Ensuring PGRs receive appropriate open research training and support is essential to ensuring that they will adopt these practices. Identifying the most beneficial modes of training and support will require research improvement projects to test the efficiency of different supports, as recommended by the University of Edinburgh Research Strategy Group.

Research improvement projects can assess the impact, benefits, and costs of various modes of open research training.

The University of Edinburgh Research Strategy Group designed a rubric to assess the impact of proposed research improvement projects across 3-dimensions: benefit, certainty, and cost (Figure 2).

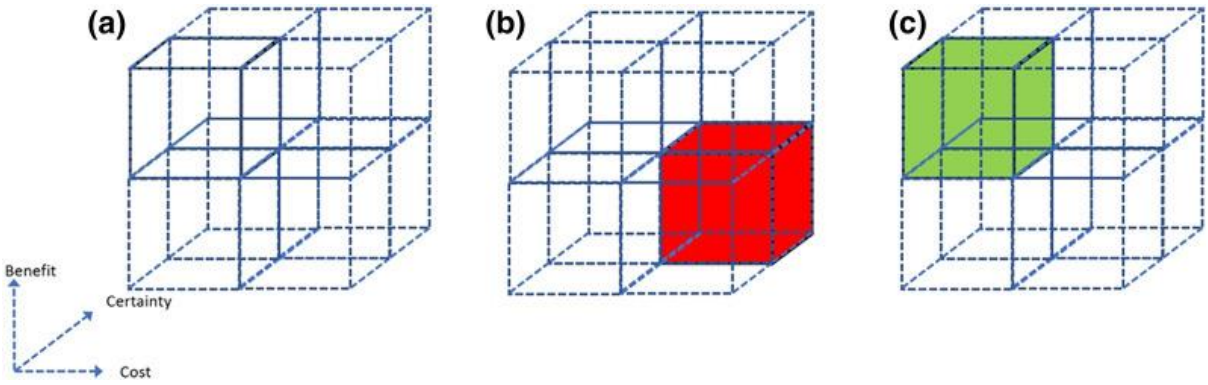


*Figure 2: The research improvement cube. a The costs (x axis), potential benefits (y axis) and our certainty in these estimates (z axis) can be portrayed in three dimensional space. b An intervention which is known, with confidence, to have high cost and low benefit is unlikely to be implemented. c An intervention for which there is low certainty in costs of benefits, but a suggestion of low cost and high benefit, might be suitable for implementation with audit to establish if the expected changes occur. From Macleod and the University of Edinburgh Research Strategy Group, 2022. https://doi.org/10.1186/s13104-022-06030-2 (CC-BY)*

# Conclusions

## *Summary*

Developing strong open research skills is imperative for researchers in the modern age. As a world-leading research institution, the University of Edinburgh has a duty to ensure its staff and students are trained in the best practices of open research.

Our report focused on the experiences of post graduate researchers (PGRs), such as PhD students. We spoke to seven PGRs across the University of Edinburgh's three colleges to understand how they feel they can be best supported to conduct high quality open research.

There are currently gaps in the open research materials available and open research training offered that create disparities in awareness and adoption of open research practices.

## *Key recommendations*

- All research staff and students, and research-adjacent staff, should have access to training that allows them to feel comfortable with open research practices. However, we should remain aware of the already overstretched workloads of research staff and students expected to attend, and the research-adjacent staff expected to support or deliver training.
- The University of Edinburgh should offer both general and discipline specific open research training that is targeted towards different career stages and roles (from ECR to established researchers).
- The University of Edinburgh should heavily invest in the infrastructure required to enable equal access to knowledge and support surrounding open research. This would involve:
    - Paid professional services roles should be created at the school level to develop and deliver local training and support, and
    - University-wide and local-level research improvement projects to assess the efficacy and impact of different training and support interventions.

# Notes from the author

Emma Wilson is a final-year PhD student at the Centre for Clinical Brain Sciences within the College of Medicine and Veterinary Medicine (CMVM). She completed her undergraduate degree in Neuroscience in 2015, and worked as a Research Assistant before starting her PhD in 2019.

She developed an interest in open research practices through several of her supervisors: Professor Emily Sena, Professor of Meta-science and Translational Medicine, and Professor Malcolm Macleod, Professor of Neurology and Translational Neuroscience, Academic Lead for Research Improvement and Research Integrity, Director of Edinburgh Neuroscience.

Her research focuses on curating and building upon evidence from published neuroscience research literature, and so she recognises the importance of research transparency, rigour, and collaboration.

However, she realises that her experiences, and the opportunities she has had to learn about and adopt open research practices, do not match that of her peers. As open research practice quickly becomes policy, she is keen to ensure that all researchers receive adequate and equitable support to do good quality research and thrive in a research career.

Alongside her PhD, Emma leads the Edinburgh Open Research Initiative (EORI) and organises Edinburgh ReproducibiliTea seminars.

Edinburgh Open Research