Checklist for an Open Research Action Plan

Author: Robert Darby.

Contents

What is an Open Research Action Plan? 2
Why develop an Open Research Action Plan? 2
What do we mean by Open Research? 3
The Open Research environment 3
Cultural change 3
Defining the scope of an Open Research Action Plan 4
Developing and implementing the Open Research Action Plan 5
Checklist for an Open Research Action Plan 8
Appendix. Checklist for an Open Research Action Plan 16

What is an Open Research Action Plan?

In this guide, an **Open Research Action Plan** is a funded, medium-term programme of cultural change within a research organisation to promote and embed more accessible, transparent and reproducible ways of conducting and communicating research.

The **Checklist for an Open Research Action Plan** is a practical guide for stakeholders seeking to develop such a programme. It is based on the experience of creating and implementing an Open Research Action Plan at the University of Reading,[1] but it also draws on a range of resources and activities undertaken to promote the growth of Open Research culture in higher education institutions. While its main frame of reference is the UK university sector, the Checklist can be adapted to any local context.

The Checklist provides a structured framework within which to define the scope of a cultural change programme, identify key stakeholders, and develop, secure buy-in for, and implement a strategic plan. It can be used to create measurable objectives that are achievable within a medium-term timescale (i.e., three years).

The guide consists of:

- a discussion of Open Research and the rationale for undertaking a cultural change programme;
- a guide to developing and implementing the Action Plan;
- a checklist of actions to include in the Action Plan.

Why develop an Open Research Action Plan?

Many universities have begun to organise development, communication and engagement activities around the practice of Open Research/Open Science. Since 2019 growing numbers of UK universities have adopted statements of commitment to the principles and aims of Open Research.[2] As yet few institutions have developed and published detailed action plans. Two notable examples are TU Delft and Utrecht University in the Netherlands.[3]

The University of Reading has taken a planned and funded approach to developing Open Research culture. In this context an Open Research Action Plan is:

- a means to signify commitment to Open Research and build engagement with the research community;
- a vehicle for bringing numerous stakeholders and what may otherwise be disparate activities into strategic alignment within a programme of cultural change;
- a way to secure buy-in from leadership within the institution and obtain investment for a programme of activities.

This Checklist can serve as a practical guide for institutions seeking to develop and obtain funding for Open Research Action Plans of their own.

---

[1] University of Reading Open Research Action Plan 2021-23. Download from Useful links at https://www.reading.ac.uk/research/research-environment/open-research.aspx.
[2] Nick Sheppard (2020), 'Open access is not enough: reproducible science, research and scholarship'. Blog post. https://bit.ly/3BeD7PF.
[3] TU Delft Strategic Plan Open Science 2020-2024. https://doi.org/10.4233/uuid:f2faff07-408f-4cec-bd87-0919c9e4c26f; Utrecht University Open Science Programme 2018-2021. https://www.uu.nl/en/research/open-science.

What do we mean by Open Research?

Open Research[4] can be described in terms of key *concepts* and *practices*. Key concepts are those of *collaboration*, *accessibility*, *transparency* and *reproducibility*.[5] Key practices include:

- the Open Access publication of peer-reviewed research outputs;
- the preservation and sharing (under open licence wherever possible) of data, code and materials supporting research results;
- the use of digital tools to make research methods, protocols and equipment open and reproducible;
- the use of (Open Source) programming languages to implement reproducible research and analysis workflows;
- the pre-registration of study designs and use of results-blind reporting mechanisms to increase transparency and counter publication bias;
- the use of preprints and open peer review to accelerate dissemination and increase transparency in the certification process.

The Open Research environment

Around research itself, there is a range of practices and activities which develop the *environment* that enables Open Research. These activities might be undertaken by a variety of stakeholders in the academic system, including universities, funders, publishers and infrastructure service providers. Activities might include (but are not limited to):

- the development of open research software or hardware;
- the development of infrastructure and services for the management, preservation and publication of research materials and outputs;
- the development of open educational resources;
- the promotion of Open Research in professional networks, within institutions (e.g., UK Reproducibility Network (UKRN) Open Research Working Groups,[6] ReproducibiliTea journal clubs)[7] and across broader sectoral bases (e.g., through organisations such as the UKRN and the Research Data Alliance);
- the adoption of responsible research assessment policies.

An Open Research Action Plan will include activities to promote the adoption by members of its research community of some or all of the key open practices. As a programme of *cultural change* it will also seek to develop the *institutional environment* that enables Open Research. This may include developing policies, infrastructure, services and processes, and making connections with other initiatives and activities, in the institution and beyond.

Cultural change

> *Bringing about change at universities requires: 1) leadership, vision, strategy and adequate resources for implementation, 2) a mix of targeted measures to achieve cultural change, 3) transparency, accountability and monitoring, and 4) trust and confidence in a shared vision.*[8]

---

[4] Open Research is considered to be synonymous with Open Science and Open Scholarship.
[5] Open Science is 'scholarly research that is collaborative, transparent and reproducible and whose outputs are publicly available' ('Integrated advice of the Open Science Policy Platform Recommendations', 2018. https://bit.ly/3uAYGq7).
[6] https://osf.io/vgt3x/.
[7] https://reproducibilitea.org/.
[8] League of European Research Universities (2018), 'Open Science and its role in universities: A roadmap for cultural change', p. 7. https://bit.ly/3A9Uhgg.

An Open Research Action Plan describes strategic, co-ordinated institutional action to *transform research culture*. Implementing the plan requires a multidimensional and integrated approach, and involves developing institutional leadership, policies, services and infrastructure. Change can be enabled in various ways: knowledge, skills and norms of good practice can be transmitted through communications, training, allies in the research community, and business processes; services and infrastructure can be developed to reduce barriers to adoption of new practices; incentive structures can motivate behaviour; and policies can enforce compliance.[9]

A programme of change must be developed in partnership with the research community, built on a basis of shared values and incentives, and driven by strong leadership. Some universities have adopted institutional statements on Open Research.[10] The process of developing a statement can give currency within the institution to the language of Open Research, and secure the commitment of institutional leaders to its principles and aims. This in turn may help to create the institutional will to change – and to invest in the activities that promote change.

Open Research will already be a focus of activity and service provision within an institution. Professional services will provide Open Access and Research Data Management (RDM) support; research software engineering services are becoming more widespread; and there will be loci of researcher-led activity in the research community, such as a ReproducibiliTea journal club. But there may be little interaction or strategic co-ordination between activities. An Open Research Action Plan can help to bring multiple activities and stakeholders into alignment and productive interaction, to redefine service remits and to develop the business case for additional resource.

It is important that the Action Plan is costed and funded, and reports progress against defined measures to its sponsoring committee. Effecting cultural change costs time, effort and resource. Institutional investment in the Action Plan will secure senior management interest in its outcomes, and signal to the rest of the institution that Open Research is important, valued, and merits resource commitments. The level of funding need not be great: the University of Reading's Action Plan is funded at £42,000 over three years.[11]

Defining the scope of an Open Research Action Plan

The scope of an Open Research Action Plan will depend on institutional context, and will be determined by various factors, including: the disciplines in which the institution is research-active; the existence and maturity of institutional policies, infrastructure, services and processes; and the levels and distribution of open practices among the research community.

It will take account of the fact that different disciplines are at different stages in their orientation to Open Research, with differing levels of understanding and motivation and differing needs. Understanding what already exists, and the desired end-point within a defined timeframe, will help to specify the scope of the Action Plan.

The shape of the Action Plan will also be influenced by the wider context of institutional change, in so far as this may serve to develop an enabling institutional environment. Activities that may have aligned or convergent objectives will need to be identified, such as those relating to research integrity and responsible research assessment, or initiatives to develop capability in specific areas, for example, digital humanities. These may have an independent

[9] Brian Nosek (2019), 'Strategy for culture change'. Blog post. https://www.cos.io/blog/strategy-for-culture-change.
[10] See https://bit.ly/3BeD7PF. The UKRN also provides a common statement on research transparency for use by institutions: https://www.ukrn.org/common-statements/.
[11] University of Reading Open Research Action Plan 2021-23, p. 7.

existence and not need bringing within scope of the Open Research Action Plan; but it may be important to identify that such activities are planned or taking place, and to establish dialogue with stakeholders so that there can be mutual understanding and support, and conscious alignment of objectives and activities where this is merited.

Not all items in the Checklist will be included in any one Action Plan. Some items may not require action, for example, if they are out of scope or if the institution has already arrived an accepted maturity level; others may be the subject of ongoing activity outside of the Plan; others yet may be deemed of minor importance or lesser urgency. The Plan will ultimately be defined by the priorities for action and the available resource.

The scope can be considered in terms of *strategic* and *functional objectives*. Strategic objectives express the high-level aims. Functional objectives specify the practical actions that will be undertaken to achieve those aims.

Three strategic objectives are identified:

- To *engage* stakeholders about Open Research, expectations, and services, by means of policy, communications and training;
- To *incentivise* the adoption of open practices, through communications, engagement, training and business processes;
- To *enable* the adoption of open practices, by providing services, infrastructure, and training.

Functional objectives define activities in terms of institutional functions, and the activities that will be taken to develop those functions in order to achieve the strategic objectives. Functional objectives are considered under the following headings:

- Strategy and policy;
- Communication and engagement;
- Competencies;
- Services;
- Business processes;
- Infrastructure;
- External engagement.

Developing and implementing the Open Research Action Plan

The stages described below can be followed by stakeholders within an institution to develop and implement an Open Research Action Plan. The sequence follows a logical order, but this will not necessarily be the actual order in which the stages occur: each institution will have its own starting point and may have already begun or completed some of the stages described. Many stages will also be concurrent and mutually interactive.

Identify the individual who will own the Plan and lead implementation

The Plan should be owned by a senior academic champion, preferably with a remit for Open Research or research improvement and reporting to the PVC for Research (or equivalent in non-HEIs).

Establish the working group

The working group should be sponsored by a relevant institutional committee. It must have the support of the PVC for Research (or equivalent in non-HEIs), and will be led by the senior academic champion. The group should include representation from key professional services

and the research community. The process of its formation will involve the formal description of its scope and objectives, which may be subject to discussion and negotiation.[12]

Define the scope of the plan and identify strategic objectives

An initial definition of the scope and strategic objectives should be part of constituting the working group. These will provide the framework for the Plan at itself. Objectives are likely to be high-level at this stage, although some specific activities or outcomes may already be identified. Detailed functional objectives will be elaborated and defined in the course of developing the Plan.

Identify stakeholders

A stakeholder analysis exercise can be used to identify existing and prospective roles or involvement.[13] The focus for purposes of developing and delivering the Action Plan should be on internal stakeholders, but the exercise can also identify external stakeholders that may have a role in delivering elements of the Plan or shaping the environment in which the Plan is delivered. These may include funders, publishers, infrastructure providers such as data centres, and capacity-building organisations such as the Digital Curation Centre and the UKRN.

The planning process will be driven by a small number of stakeholders. They will need to identify others within the organisation whose support and involvement is required. Stakeholders will include:

- Existing professional services with an actual or prospective Open Research remit, e.g., the team with responsibility for Open Access and RDM support, the function that provides, or may be capable of providing, research software engineering support, the Research Office, a University publisher, an open educational resources team;
- Members of staff involved in the management of research. These will include the PVC for Research and members of the central research committee, as well as those responsible for management of research activity at a local level;
- Groups working to develop the institutional infrastructure or environment in ways that have a relationship to Open Research capability, for example, in areas of research culture, research integrity, early career researcher development, infrastructure review and implementation, etc.;[14]
- Researchers involved in groups with relevant remits or known champions of Open Research, for example, members of a local ReproducibiliTea journal club, or any researchers who advocate for Open Research causes.

One or more members of these groups will be the nucleus that is driving the development of the Action Plan. If any of the groups is not represented in that nucleus, they may need to be represented in the working group that will develop and implement the plan.

---

[12] The UKRN co-ordinates a network of Open Research Working Groups and provides guidance on how to set one up. See https://osf.io/vgt3x/.

[13] For a guide to stakeholder mapping see ODI, 'Planning tools: stakeholder analysis'. https://odi.org/en/publications/planning-tools-stakeholder-analysis/.

[14] The 'Concordat to support research integrity' (https://bit.ly/3Dgadzd) and the 'Concordat to support the career development of researchers' (https://www.vitae.ac.uk/policy/concordat) were both updated in 2019 and place greater emphasis on the responsibilities of institutions to give them effect. The 'Concordat to support research integrity' requires signatories to publish an annual statement setting out how they are meeting its requirements. These updates may have instigated reviews of institutional support and compliance.

Survey the landscape

A realistic plan with achievable objectives needs to describe the position from which it starts. Much of this knowledge will be held by members of the working group, but some systematic mapping of the landscape could be part of the developing the plan. This might involve undertaking surveys to understand current practices, knowledge, motivations and support requirements. A number of universities have carried out Open Research surveys and shared their questionnaires and results.[15] There are also models for more focused audit exercises, for example the Digital Asset Framework (DAF) and Research Infrastructure Self Evaluation Framework tools provided by the Digital Curation Centre,[16] and surveys into research programming practices and needs.[17]

Any institutional landscape assessment can map the current existence and maturity level of:

- Open Research practice (Open Access publishing, data sharing, etc.) across the organisation and in organisational sub-units;
- services and infrastructure for Open Access, RDM and research software engineering;
- researcher-led groups (e.g., ReproducibiliTea journal clubs, coding clubs);
- training (for both staff and students);
- governance (e.g., the committee with oversight of Open Access and RDM);
- activities and services that may have aligned or convergent objectives (e.g., relating to research integrity and responsible research assessment);
- key external relationships (e.g., with UKRN).

Much of this information may be collected and held by professional services or may have been gathered during the stakeholder analysis stage. An important part of this process is identifying the gaps in the existing landscape or areas where further development is required to meet the strategic objectives.

Define project objectives

The working group must envision a destination and establish how the desired end-point will be attained. This will enable the group to develop its project objectives and start defining the Action Plan.

It is advisable to involve a wider group of stakeholders at this stage, to develop a broader collaborative ownership of the problem and the solutions that are generated. A workshop or series of workshops might be organised to discuss the challenge, 'How might we develop the culture of Open Research in the university?' The focus of such workshops should be to generate and agree achievable mid-term objectives.

Workshops should include representation from the research community (at all levels from research student to senior academic), professional services (e.g., the Library, the Research Office, IT/research software engineering support), and senior management. Stakeholder analysis and survey activities should have enabled the working group to identify prospective participants. Consultation should not include only the converted: members of the neutral

---

[15] The University of Cardiff (2017, https://osf.io/dmfke/); Royal Holloway, University of London (2019, https://osf.io/chqaj/); the University of Surrey (2020, https://www.surrey.ac.uk/library/open-research/resources); the University of York (2020, https://osf.io/ryzxe/). The University of Glasgow included some consideration of Open Research within a broader research culture survey (2019, https://www.gla.ac.uk/myglasgow/ris/researchculture/researchculturesurvey/).

[16] https://www.dcc.ac.uk/tools.

[17] The University of St Andrews (2016, https://library.wp.st-andrews.ac.uk/2017/01/25/research-software-survey-results/); the Software Sustainability Institute (2016, http://bit.ly/2cBYpQc); the University of Reading (2017, https://doi.org/10.5281/zenodo.1166019).

majority and the unpersuaded minority should be included if at all possible. Any attempt at cultural change, if it is to be realistic, must take account of the inertias in the prevailing culture.

Develop the Action Plan

With outputs from the ideation stage, the working group should be in a position to develop the full Action Plan. Objectives should be SMART and relevant progress measures defined. Staff and resource requirements should be specified in the project business case. This will be a suitable moment to revisit the strategic objectives, and ensure these and the Plan are in alignment.

Secure project approval and funding

With the Action Plan developed and costed, the working group will be in a position to seek approval and funding from the relevant committee, with the advocacy of the senior academic lead. There may be further negotiation over the scope of the Plan, its objectives, the funding allocation, and composition of the working group, which will entail some revision before the definitive Plan is agreed and funded.

Implement and monitor the Plan

Once the Plan is approved and funded, implementation can commence. A project manager should be designated from within the working group. Progress should be monitored on an ongoing basis and reported periodically to the sponsoring committee.

The Plan should be published and communicated to the research community. This is an opportunity to advertise the university's commitment to cultural change and to open dialogue with researchers. Members of the working group could visit School/Department meetings to introduce the Plan and invite engagement. Periodic updates should also be published, e.g., on an annual basis, to maintain awareness of the Plan and of progress that has been made.

Checklist for an Open Research Action Plan

A tabular Checklist is provided in the Appendix. It is organised into seven sections corresponding to functional objective groups: Strategy and policy; Communication and engagement; Competencies; Services; Business processes; Infrastructure; External engagement. Below, we describe each of the items in the Checklist in more detail and provide examples that can be points of departure for those developing their own Action Plan.

1 Strategy and policy

1.1 Align Open Research strategic objectives with Research Strategy

Open Research strategic objectives should be aligned to themes or objectives identified in the institution's Research Strategy. It is preferable that the Research Strategy include one or more explicit Open Research objectives,[18] but it may not be until the Research Strategy is next revised that these can be included or further articulated. The strategic objectives can also be articulated in an institutional Statement on Open Research (see 2.2 below) and will provide the framework for the Open Research Action Plan itself.[19]

---

[18] For example: the University of Reading Research and Innovation Strategy (2019) commits to '[b]uild a culture of open research, encouraging researchers and research students to be as open as they can, as early as they can, in their work' (https://bit.ly/3Dgrfx8); the University of Sheffield Vision (2020) undertakes to '[c]reate an open research culture' and 'adhere to the FAIR principles to the benefit of society' (https://www.sheffield.ac.uk/vision); the UCL Research Strategy (2019) includes the objective to '[foster] open and engaged research' and to 'share our knowledge as openly and widely as possible' (https://www.ucl.ac.uk/research/strategy-and-policy).

[19] This is the case, for example, with the TU Delft Strategic Plan Open Science 2020-2024 (https://doi.org/10.4233/uuid:f2faff07-408f-4cec-bd87-0919c9e4c26f).

1.2 Review Open Access and RDM policies

Open Access and RDM policies will be subject to periodic review to ensure their continued relevance in an evolving policy landscape, and their next review can be included in the Open Research Action Plan.

Open Access policy will need to take account of Plan S, the UKRI Open Access policy, and the policy for the next Research Excellence Framework (REF) cycle. Policies and supporting provisions can anticipate changes. The University of Reading has since 2017 provided a dedicated fund for the publication of Open Access monographs and book chapters:[20] Open Access requirements for these outputs are now included in the UKRI Open Access policy and expected in the next REF.

The LEARN project Model RDM Policy[21] and associated guidance provide a framework within which to review and update the current RDM policy.

1.3 Implement or review policy on responsible research assessment

The San Francisco Declaration on Research Assessment (DORA) and the Leiden Manifesto have both obtained wide currency in recent years and many institutions have adopted policies on the responsible use of research assessment.[22] But policies may not yet be fully implemented in systems and processes.

Assessment frameworks that encompass a broader range of activities and types of contribution, and that reward collaboration, accessibility, transparency and reproducibility, incentivise the activities and behaviours that are definitive of Open Research.[23] Updating of recruitment and promotion frameworks to incorporate Open Research criteria (see 5.1 below) may be usefully co-ordinated with implementation of responsible research assessment policies in recruitment and promotion processes.[24]

1.4 Review Intellectual Property policy

A review of the University's intellectual property (IP) policy should ensure that it is aligned with Open Research principles, and enables the open licensing of research-related intellectual property wherever this does not conflict with commercial objectives. IP policy will deal with databases, software, and other primary outputs of research or research-related activities that may be made open, for instance design files for open hardware. Dialogue with the institution's IP protection/commercialisation function can be used to establish common ground, for example around an understanding that open licensing is not incompatible with commercial exploitation and may have advantages over exclusive licensing. Review of the IP policy may tie in with review of research contracts (see 5.3 below).

---

[20] https://bit.ly/2Y4s4dj.

[21] http://learn-rdm.eu/en/about/.

[22] DORA: https://sfdora.org/; the Leiden Manifesto: http://www.leidenmanifesto.org/. The UKRN provides a model policy statement on responsible research evaluation: https://www.ukrn.org/common-statements/.

[23] The UNESCO Recommendation on Open Science (in draft), highlights 'Fostering a culture of Open Science and aligning incentives for Open Science' as one of the seven areas where action is needed by members states. This entails '[r]eviewing research assessment and career evaluation systems in order to align them with the principles of Open Science' and '[e]nsuring that the practice of Open Science is a known, well-understood and standardized element in academic recruitment and promotion criteria' (https://en.unesco.org/science-sustainable-future/open-science/recommendation).

[24] The DORA toolkit provides materials to facilitate the development of responsible research assessment policies and practices, including: 'Rethinking research assessment: ideas for action', and 'SPACE to evolve academic assessment: A rubric for analyzing institutional conditions and progress indicators' (https://sfdora.org/resource-library/?_resource_type=tools&_dora_produced=1).

Some institutions, including the Montreal Neurological Institute (MNI) and Aarhus University, have taken a bolder approach by adopting a 'no patenting' policy to permit the free re-use and distribution of their research.[25] These polices recognise that for most universities acquiring patents and selling licences is loss-making, and, more importantly, that protective practices inhibit innovation: predefined models of commercial viability may constrain exploratory basic research, and potential collaborators and beneficiaries who might develop and apply research are locked out. A 'no patenting' policy may work better in some fields than others and will be a hard sell for institution-wide adoption, but both MNI and Aarhus have shown that it can be productively applied in defined areas.

2 Communication and engagement

2.1 Communication plan

The Open Research communication plan should integrate with existing communication plans for Open Access and RDM, and will cover ongoing communications and events as described in the rest of this section.

2.2 Develop and publish an Open Research statement

Increasing numbers of UK universities are adopting institutional statements of commitment to the principles and aims of Open Research.[26] These articulate strategic objectives for the institution as a whole and expectations placed on researchers, and usually provide a definition of Open Research and reference existing policies, e.g., on Open Access, data sharing, research integrity and responsible research assessment. The statement should be in alignment with (and preferably reference) the University's research strategy.

The process of developing a statement affords an opportunity to engage the wider research community through consultation and to secure buy-in from key stakeholders. Early stakeholder analyses and surveys should have identified a consultation group. Publication of the statement can be attended by communications to the wider research community.

2.3 Publish Open Research web pages

Public Open Research web pages will provide a point of reference and a gateway for both members of the research community and those from outside the institution. Web pages should be centred around the institutional Open Research Statement where one has been developed, link to existing policies and web pages for Open Access and RDM, and provide information about open practices. It should be assumed that those coming to the web pages may arrive with the questions, 'What is Open Research?', 'Why should I care?' and 'What does it mean for me *in practice*?'

The University of Reading Open Research Statement links to a web page '12 things you can do to be open'),[27] a selection of Open Research case studies (see 2.4 below), and an Open Research Handbook,[28] providing a more detailed practical primer.

2.4 Publish Open Research case studies

Sourcing and publishing Open Research case studies can be an effective way of giving recognition to researchers in the university who are using open practices to effect in their work, and of providing concrete examples that colleagues can be inspired by and learn from. Authors

---

[25] Brian Owens (2016), 'Montreal institute going "open" to accelerate science', in *Science.* https://dx.doi.org/10.1126/science.aae0265; Aarhus University, 'Open innovation in science'. https://nat.au.dk/en/collaboration/research-and-innovation-collaboration/open-science/.
[26] A list of UK universities that have adopted Open Research statements is provided at https://bit.ly/3BeD7PF.
[27] https://bit.ly/3AaZIvs.
[28] https://libguides.reading.ac.uk/open-research.

of the case studies can be identified as allies within the university's engagement network. The University of Reading publishes an Open Research Case Studies series[29] and the UKRN maintains a case study compendium.[30]

2.5 Run an Open Research Award competition

An Open Research Award competition can incentivise researchers to identify and value their own open practices. It can be combined with an event that showcases entries in the competition, and used to source case studies that can be subsequently published and promoted. A number of UK universities have organised such competitions, and the UKRN has published a primer on running an Open Research Award competition.[31]

2.6 Organise Open Research events

Open Research-themed events can be useful vehicles for building knowledge and engagement. The universities of Reading and York have organised Open Research-themed conferences;[32] the University of Lancaster has a Data Conversations seminar series,[33] and the University of Reading now holds regular Open Research Forum meetings as part of its Open Research Champions programme (see 2.7 below). Events may integrate with existing calendar fixtures, such as International Open Access Week.[34]

2.7 Recruit Open Research Champions

A network of Open Research Champions can cultivate allies in the research community who can model good practice, amplify communications, and propagate knowledge and skills within local networks. The University of Cambridge established a Data Champions programme in 2016; more recently the University of Reading launched an Open Research Champions programme and the University of York an Open Research Advocates Network.[35] In the Netherlands, an Open Science Communities network has evolved and is spreading internationally.[36] Champions can be supported by members of professional services and may be able to access funding to support activities, such as holding workshops, organising training sessions, attending conferences and training outside the University, and participating in external projects.

2.8 Provide Open Research funding

The university might make available small amounts of funding to support researcher-led Open Research-related activities or projects, for example to develop and deliver training sessions, to buy in training from external sources, and to participate in projects with an Open Research focus, such as the development of tools to facilitate Open Research.

External Open Research funding opportunities can also be highlighted, such as the Wellcome Trust Open Research Fund and Software Sustainability Institute Fellowships.[37]

---

[29] https://bit.ly/3DfUIro.
[30] 'Open Research: examples of good practice, and resources across disciplines'. https://osf.io/3r8hb/.
[31] 'Open Research awards: a primer from UKRN'. https://www.ukrn.org/primers/.
[32] Open in Practice conferences at the University of Reading 2017 (https://wp.me/P7JqIr-bj) and 2019 (https://wp.me/P7JqIr-nr); University of York Open Research launch event 2020 (https://wiki.york.ac.uk/pages/viewpage.action?pageId=231936012).
[33] https://www.lancaster.ac.uk/library/research-data-management/data-conversations/.
[34] http://www.openaccessweek.org/.
[35] University of Cambridge Data Champions: https://www.data.cam.ac.uk/intro-data-champions; University of Reading Open Research Champions: https://research.reading.ac.uk/open-research-champions/; University of York Open Research Advocates Network: https://bit.ly/3BeXA6W.
[36] K. Armeni et al. (2021), 'Towards wide-scale adoption of open science practices: The role of open science communities', in *Science and Public Policy*. https://doi.org/10.1093/scipol/scab039.
[37] Wellcome Trust Open Research Fund: https://wellcome.org/grant-funding/schemes/open-research-fund; SSI Fellowship Programme: https://bit.ly/2YjUfF4.

3 Competencies

3.1 Review and develop training

A key part of the project will be to review the existing training offer for staff and students, identify gaps and develop training. There will be existing training on Open Access and RDM. New training might cover:

- an Open Research 101 course providing an overview of concepts and practices;
- specific practices treated in-depth, e.g., pre-registration, open peer review;
- general skills, e.g., research software engineering and code management, statistical skills and tools for reproducible research;
- research integrity and good research practice;
- responsible research assessment for those involved in recruitment and promotion.

The scope of the training must also be considered: the focus at least initially is likely to be on staff and research students, but extension of some training to taught postgraduates and undergraduates may be a longer-term aim.

What training can be developed and offered will depend on available capacity, but identification of additional training needs may support a business case for increasing staff resource. Some training may be integrated into course programmes, or delivered by researchers to their peers. A 'train the trainer' model, enabling individuals to qualify as course instructors, can have a powerful multiplying effect. This is the model employed by the Carpentries initiative,[38] which teaches coding and data science skills, and the VIRT2UE research integrity training programme.[39] UKRN has recently received funding from Research England for the development and delivery of a substantial Open Research training programme to the UK higher education sector.[40]

4 Services

4.1 Review and develop support services

A review of existing support services can identify gaps and plan to address these. As with a review of training needs, this presents an opportunity to develop the case for investment in additional resource. A services review may entail modification of the remit and configuration of existing services, for example to extend support beyond Open Access and RDM across a broader spectrum of open practices. Recent years have also seen a number of universities developing research software engineering support services in response to identified need.[41]

There may be other areas where there is potential for services to be established or to evolve, for example:

- a university press might establish or develop Open Access publishing models;
- the university might support the development and publication of open educational resources, including e-textbooks;[42]
- the university might provide laboratory/workshop facilities for the development of open hardware.[43]

---

[38] https://carpentries.org/.
[39] VIRT2UE Training Guide. https://www.embassy.science/wiki/Guide:Bbe860a3-56a9-45f7-b787-031689729e52.
[40] https://www.ukrn.org/2021/09/15/major-funding-boost-for-uks-open-research-agenda/.
[41] See https://society-rse.org/community/rse-groups/.
[42] Jisc provides an e-textbook publishing toolkit for universities: https://www.jisc.ac.uk/guides/institution-as-e-textbook-publisher-toolkit.
[43] See for example Biomakespace, an independent not-for-profit laboratory facility based in Cambridge: https://biomake.space/home.

5 Business processes

5.1 Introduce Open Research criteria into recruitment and promotion processes

Introduction of Open Research criteria into institutional systems and processes for recruitment and promotion will be a substantive project. It will affect HR policies and procedures and may require consultation with staff representative bodies.

There have been a number of initiatives in recent years to develop Open Research criteria that can be evidenced and assessed.

The UKRN Hiring Policies Certification Scheme provides a set of Open Research criteria that can be specified in recruitment (open data, open materials/code, public pre-registration, Open Access, preprints, and open peer review) and a framework for their progressive implementation in institutional recruitment policy and practice.[44] The Scheme proposes levels of implementation, recognising that the introduction of such criteria into recruitment is likely to be selective and optional at first, and will only gradually be more fully adopted.

In 2017 the EU's Working Group on Rewards under Open Science published an Open Science Career Assessment Matrix (OS-CAM).[45] It includes 23 criteria grouped under the headings Research output, Research process, Service and leadership, Research impact, Teaching and supervision, and Professional experience. The Matrix can be applied in various contexts: at individual level for the purpose of recruitment and promotion, at individual or group level in the evaluation of grant and fellowship applications, to develop institutional funding allocation models, and to establish incentives focused on building Open Science capacity. A modified version of the (NOR-CAM) has recently been proposed as a common assessment framework for adoption by universities, funders and national authorities in Norway.[46]

These assessment frameworks enable researchers to demonstrate a more diverse range of competencies and achievements, including those that fall under an Open Research heading. The emergence of a 'narrative CV' model can be seen in a similar light. This format has recently been adopted by the Royal Society and is being introduced by UKRI.[47] It is designed to replace a CV more narrowly focused on enumeration of outputs and performance indicators.[48] Institutions could explore the possibility of using narrative CVs within their own recruitment and promotion processes.

5.2 Introduce Open Research criteria into research planning and review

Research planning and review should take account of Open Research, and the criteria discussed in section 5.1 might be applied. Institutions were obliged to consider Open Research as part of preparing the 2021 REF submission. This required Units of Assessment to evidence how they were 'progressing towards an open research environment', including specifically how they have engaged in 'wider activity to encourage the effective sharing and management of research data' and, where relevant, to support the reproducibility of research.[49] Open Research requirements in the next REF cycle are likely to be strengthened.

---

[44] https://osf.io/qb7zm/.

[45] Working Group on Rewards under Open Science (2017), 'Evaluation of research careers fully acknowledging Open Science practices: rewards, incentives and/or recognition for researchers practicing Open Science'. https://bit.ly/3oy4H77.

[46] Universities Norway (2021), 'NOR-CAM – a toolbox for recognition and rewards in academic careers'. https://bit.ly/3iuHcb5.

[47] Royal Society Résumé for Researchers: https://bit.ly/3a9LqRc. UKRI (2021), 'Introducing a better way for you to evidence your contributions'. https://bit.ly/3oGIJyG.

[48] A University of Glasgow project reviewed the effectiveness of the narrative format and developed an online course providing guidance on writing a narrative CV. See https://bit.ly/3BhLlGT.

[49] REF 2021 (2019), 'Panel criteria and working methods', para. 346, p. 62. https://bit.ly/2Yp1ZWI.

Institutions should put in place the processes to ensure that Open Research criteria are applied in research planning and review, at both institutional and research unit level.

5.3 Review IP procedures and terms in research contracts

Further to review of IP policy (see 1.4 above), there may be a need to review processes by which decisions are made whether or not to apply protective measures to research outputs.

A first step may be to develop a set of guidelines that can help researchers and professional services identify, in respect of any given project or research output, where open licensing is appropriate, and where a protective approach should be applied.

Standard research contracts can be reviewed to ensure they maximise options for researchers to make the intellectual property generated by research openly available, where no reasons for restriction exist. Provisions might apply to data, software and other materials (e.g., hardware designs). Contracts in scope would include research and collaboration agreements, studentships, and data sharing agreements.

5.4 Review research ethics processes

Review by a Research Ethics Committee (REC) is a gateway through which all proposals for research involving the collection of data from participants must pass. RECs will be primarily focused on protection of participant confidentiality and may not consider the sharing of data collected from participants in support of research findings. Institutions can ensure that participant-based research proceeds on an ethical and legal basis which facilitates retention and sharing of research data by requiring the submission of a data management plan with the application for ethical review. This will help to maximise possibilities of future data sharing at the research planning stage, and ensure that information provided to participants about data sharing intentions is clear and transparent.

5.5 General

Consideration should be given to opportunities for implementing Open Research-friendly expectations or requirements in systems and processes. For example:

- publication-related processes, e.g., deposit in an institutional repository, applying for Open Access funding, can include prompts to deposit/reference supporting data;
- in some systems (e.g., repositories, Current Research Information Systems or CRIS) or for some purposes (e.g., preparation of annual review submissions), use of ORCIDs and the CRediT Contributor Roles Taxonomy[50] can be encouraged or mandated;
- ethical review submission processes can encourage pre-registration of study designs.

6 Infrastructure

6.1 Review research outputs infrastructure

Research outputs infrastructure will be subject to periodic review. This provides an opportunity to ensure implementation is strategic and coherent, that publications, data, theses and other outputs are managed effectively, that preservation infrastructure is appropriate, and that integration with other systems (e.g., CRIS) is effective.

6.2 Map Open Research tools

Mapping existing use of Open Research tools can identify gaps and opportunities. Tools might include:

[50] https://casrai.org/credit/.

- code repository platforms, e.g., GitHub;
- research environments, e.g., Open Science Framework;
- pre-registration platforms, e.g., Open Science Framework;
- electronic lab notebooks and protocol documentation tools;
- citizen science platforms, e.g., Zooniverse.

7 External engagement

7.1 Develop external engagement

Active engagement of relevant professionals within the institution with organisations that work to develop the Open Research environment and infrastructure will be a given. Two key organisations with which there will be value in developing active engagement are:

- The UK Reproducibility Network (and allied national Reproducibility Networks).[51] The primary criterion for membership of the UKRN is that the institution appoints a senior academic to the role of Institutional Lead, with responsibility for research improvement and research integrity, reporting to the PVC for Research (or equivalent).[52] The role is expected to make a minimum commitment of one day per week. Joining UKRN has transformative potential for an institution, because it requires significant commitment at a senior management level.

- The Society of Research Software Engineering.[53] The Society works to increase software skills in research, to promote collaboration between researchers and software experts, and to support the creation of an academic career path for Research Software Engineers. If there is not yet dedicated research software engineering support within the institution, it will be useful to identify relevant professionals who can become members of the Society.

This work is licensed under a
Creative Commons Attribution-ShareAlike 4.0 International License.

[51] https://www.ukrn.org/international-networks/.
[52] 'UK Reproducibility Network Terms of Reference': https://www.ukrn.org/terms-of-reference/.
[53] https://society-rse.org/.

Appendix. Checklist for an Open Research Action Plan

Item	Assessment	RAG status
1 Strategy and policy		
1.1 Align Open Research strategic objectives with Research Strategy		
1.2 Review Open Access and RDM policies		
1.3 Implement or review policy on responsible research assessment		
1.4 Review Intellectual Property policy		
2 Communication and engagement		
2.1 Communication plan		
2.2 Develop and publish an Open Research Statement		
2.3 Publish Open Research web pages		
2.4 Publish Open Research case studies		
2.5 Run an Open Research Award competition		
2.6 Organise Open Research events		
2.7 Recruit Open Research champions		
2.8 Provide Open Research funding		
3 Competencies		
3.1 Review and develop training		
4 Services		
4.1 Review and develop support services		
5 Business processes		
5.1 Introduce Open Research criteria into recruitment and promotion		
5.2 Introduce Open Research criteria into research planning and review		
5.3 Review IP procedures and terms in research contracts		
5.4 Review research ethics processes		
5.5 General		
6 Infrastructure		
6.1 Review research outputs infrastructure		
6.2 Map Open Research tools		
7 External engagement		
7.1 Develop external engagement		