

**Programmatic Registered Report 1: Open Scholarship and Feedback in Applied Research: A Qualitative Registered Report**

**Programmatic Registered Report 2: Understanding the Role of Climate Change in Applied Research: A Qualitative Registered Report**

Please note:

- This manuscript has been submitted to PCI:RR for consideration (28/03/2024).
- This manuscript is a programmatic Registered Report that is expected to be the basis of two final manuscripts, one of which explores the feedback mechanisms applied researchers adopt in their work and the role of open scholarship in applied research, and the second that focuses upon climate change. This work is submitted as a Programmatic RR such that the methodology can be consistent across the two, allowing for simultaneous data collection.
- Content highlighted in **Blue** is for the Open Scholarship paper ONLY.
- Content highlighted in **Green** is for the Climate Change paper ONLY.
- Content highlighted in **Yellow** is subject to change in the Stage 2 version of this Programmatic Registered Report.

## Programmatic Registered Report 1:

### Open Scholarship and Feedback in Applied Research: A Qualitative Registered Report

#### Abstract

Applied researchers have an important societal role in influencing real-world practice, bridging academic research, theory and practical experiences. Despite this, relatively little is known about the processes or mechanisms of feedback adopted by this community to promote contemporary scientific standards in transparency and rigour. The current study explores what feedback processes are readily adopted by applied researchers and whether they are aware of, and use, practices and feedback mechanisms established through the open scholarship movement (e.g. Registered Reports or pre-mortems). To achieve this, interviews with 50 applied researchers across various disciplines were conducted by student-led data collection teams. Content analyses suggest X. Recommendations are provided to identify opportunities where open scholarship practices can complement the workflow of applied researchers towards greater societal impact.

**Key words: Applied Research; Feedback; Impact; Qualitative; Open Scholarship**

#### Introduction

Basic research practices, and the wider research culture, are currently undergoing a significant period of reform following the 'open scholarship' movement. Open scholarship is "an umbrella term reflecting the idea that scientific knowledge of all kinds, where appropriate, should be openly accessible, transparent, rigorous, reproducible, replicable, accumulative, and inclusive" (Parsons et al., 2022, p. 314). A prominent publication that reported varying but alarmingly low levels of success in replicating previous research findings (Open Science Collaboration, 2015), and a collection of events surrounding research integrity and fraud (e.g., Levelt et al., 2012), fuelled an initial call for greater distrust of scientific practices (Ioannidis, 2005). Originally framed as a 'replication crisis', researchers have recognised the breadth and impact of these events, as well as the broader culture in which research exists, and reframed this more optimistically as a 'credibility revolution' (Vazire, 2018) to acknowledge the positive structural, procedural and community changes that have recently been made to scientific practices (Korbmacher et al., 2023).

This broad change in academic culture and thinking has driven a number of developments in research practices including new methods of study (e.g., replication markets, multi-lab studies), analyses (e.g., multiverse analysis), publication formats (e.g., Registered Reports), and ways of working (e.g., adversarial collaborations). However, such open scholarship practices have been nearly exclusively applied to basic and quantitative academic research, and there are many reasons why these practices may not be so common or considered so favourably in applied settings (e.g., wider and more transparent reporting of conclusions that are disliked by stakeholders). Despite the range of known barriers to open scholarship practices in fields of basic research where they are more established (e.g., insufficient education, effort and time, Spitzer & Mueller, 2023), the extent to which such practices are both suitable and helpful for applied research has thus far received little attention (Evans et al., 2023).

Applied research is undertaken by "academics, researchers, and practitioners working in applied settings to create practical knowledge, with the aim of evaluating or changing practices rather than

improving theory or understanding” (Evans et al., 2023, p. 89). Applied research can be conducted within an educational institution, government, private company or otherwise, and includes activities ranging from social science-based market research by consultants to inform market feedback, to multidisciplinary academic teams working with private organisations to enhance ecological modelling and weather forecasting. Applied research is a diverse yet vital component of the evidence landscape; it bridges the divide between academic research, theory and practice. For example, it can provide support for a theory, or challenge the practicality of applying principles driven by basic research within the real-world (Adams et al., 2017). Applied research provides especially influential evidence for practice given that it is often more accessible and ready for application than more basic academic research (Ijzerman et al., 2020; Mahood et al., 2014). As such, the quality of applied research is important because it represents an influential body of work to consult when considering the evidence behind any given practice.

In an exception to the lack of expansion of open scholarship practices beyond basic research, Evans et al. (2023) discuss how preregistration could be implemented within applied research. Preregistration is the “practice of publishing the plan for a study, including research questions/hypotheses, research design, and data analysis before the data has been collected or examined” (Parsons et al., 2022, p. 315). Preregistration can thus reduce the opportunistic use of flexibility in the research process aiming to achieve desired results, whilst also increasing the likelihood that elements of the research project will be accessible regardless of publication outcome (Ensinck & Lakens, 2023). Application of preregistration in applied research may also bring wider benefits, including the opportunity for wider recognition, possibilities for greater collaboration, allow for easier replication and reproduction of processes and/or results, and increase credibility. Whilst there are numerous practical, stakeholder- and methodology-based barriers to successful and impactful implementation, there are strategies available to mitigate them, with the potential for preregistration to represent a low-cost intervention for improving transparency and credibility for applied researchers.

Beyond preregistration, the open scholarship movement has driven many other changes that could be considered suitable for the context of applied research. Registered Reports (Chambers & Tzavella, 2022) are an expansion of preregistration, whereby researchers submit a research protocol before data collection which undergoes peer-review to decide whether it should be awarded “in-principle acceptance” (IPA). This is an agreement that the journal will publish the work so long as the protocol is followed as planned (or any deviations are transparently reported and approved by the Editor), and the conclusions are evidence-based, no matter the results of the study. As such, Registered Reports encourage more timely and meaningful feedback before a study begins, maintaining an emphasis on quality processes rather than the desirability of research outcomes. This provides a plethora of benefits to the wider scientific community including increasing the methodological rigour and quality of dissemination (Soderberg et al., 2021) to help maximise impact, whilst minimising publication bias and avoiding the file-drawer problem (selective reporting of only positive or statistically significant results; Scheel et al., 2021).

There has been a wide range of practices created and championed by the open scholarship movement, including computational reproducibility audits (which evaluate data processing/analysis code for reproducibility), post-publication peer review (providing an ongoing evaluation of work), preprints (allowing researchers to secure feedback before publication), premortems (to try and anticipate probable concerns with a project before work is conducted), red teams (expert teams to critically evaluate the decision-making behind research), modular publishing (to publish steps of the research process subsequently), and code review (to evaluate the accessibility and efficiency of data

processing/analysis code). This wide range of practices has slowly been embraced by basic research stakeholders (Evans et al., 2022) and have been contributing to a wider shift in norms across the research cycle (Evans, 2022a). The extent to which the feedback mechanisms promoted through the open scholarship movement are known, relevant, desirable, useful, and embraced by applied researchers is yet unknown. As such, the current research first addresses the following question:

RQ<sup>1</sup>: To what extent are applied researchers aware of, and using, contemporary practices and feedback mechanisms established through the open scholarship movement?

Many of the open scholarship developments mentioned thus far (e.g., Registered Reports, preprints, pre-mortems, reviews and audits) represent new feedback mechanisms in the research ecosystem. Although the potential impact of these methods for applied research is considerable, little has been documented more generally about the feedback practices or quality assurance mechanisms employed by or for applied researchers (Evans et al., 2023). Feedback is vital not only in evaluating and improving research quality, and thus the subsequent impact of the work, but also in providing important functions for the researcher's emotions and self-perceptions, and broader culture of work (Evans & Dobrosielska, 2019). As such, there is considerable value in better understanding the feedback mechanisms adopted within applied research and whether the academic-practice gap, which is evident in so many fields of research (e.g., Banks et al., 2016), remains prevalent for the research practices and processes they adopt.

Peer-review during the publication of the work is the most widely adopted feedback mechanism in basic research internationally, but is highly variable in applied research domains. Peer-reviewed publication of applied research is commonly not possible (e.g., limited by disclosure agreements), not desirable (e.g., little perceived value for disseminating to an academic audience) and faces more barriers. For example, an applied research project may be considered less suitable for publication due to changes in design mid-study, operating in a complex context where findings cannot be explained without disclosing sensitive information, or due to a lower sample size limited by a finite population.

Due to the difficulties with academic publication, applied research is often disseminated as grey literature (i.e. in publication types not controlled/published by commercial publishers). Grey literature often systematically and markedly differs from the evidence published in academic spaces (due to the issues with securing publication highlighted above). Consequently this artificially creates a conflicting account of understanding referred to as the grey literature bias (Song et al., 2010). Diverse publication practices tell us little about the quality or feedback processes adopted during the process to ensure rigorous conclusions, and often makes it difficult to identify and establish a coherent body of evidence for informing practice.

Many of the common feedback mechanisms for academic work (e.g., peer-review or questions at conferences) also occur late in the research process (i.e., during dissemination of research) and as such, are unlikely to impact the process adopted and thus the quality of the work conducted. They provide feedback only after work has been completed and resources have been used, and often rely on privileged gatekeeping (Tennant & Ross-Hellauer, 2020). Indeed, these feedback mechanisms tend to be highly suboptimal because of well-established biases and inequalities (e.g., sexism; Nittrouer et al., 2018). For example, non-white researchers tend to appear on fewer editorial boards, experience longer times in review, and receive fewer citations (Liu et al., 2023). As such, academic feedback mechanisms tend to focus upon the quality of dissemination rather than the quality of processes adopted, and there are many structural and interpersonal barriers to overcome.

There are a number of alternative feedback mechanisms that may be suitable for applied research which may address known flaws with academic feedback processes. For example, direct work with stakeholders throughout the research process may provide more relevant and actionable feedback. Furthermore, there might be institutional policies, templates or supervision which may facilitate research decision-making and more established or explicit industry standards to dictate quality of practice. As such, there are many reasons to believe that researchers may have qualitatively different mechanisms of impactful feedback when conducting applied research compared to strictly academic work.

To date there has been little clearly disseminated understanding or evaluation of the feedback mechanisms available to applied researchers, despite the importance of their work. Yet, there is great potential for each community to learn from each others' practices and to build more rigorous quality assurance mechanisms in both domains. To facilitate this learning and better understand the choice and implementation of feedback mechanisms in applied research, the current study also addresses the following question:

RQ<sup>2</sup>: What feedback processes are available and adopted by applied researchers?

## Programmatic Registered Report 2:

### Understanding the Role of Climate Change in Applied Research: A Qualitative Registered Report

#### Abstract

As the escalation of climate change continues, applied researchers have a pivotal role in encouraging more sustainable practices in individuals, organisations and governments. Despite this, relatively little is known about how their work considers or impacts climate change, how climate change impacts their current practice, how these practices are expected to change, and the range of barriers and opportunities climate change may provide for impactful applied research. The current study explores these through interviews with 50 applied researchers across various disciplines, collected by trainee-led data collection teams. Content analyses suggest X. Recommendations are provided to guide applied researchers, and their employers, to realign priorities with the imminence of action required.

**Key words: Applied Research; Impact; Climate Change; Climate Action; Qualitative**

Climate change is one of the greatest contemporary threats to our societal fabric, with the effects of human activity escalating in their irreversible, complex, and hazardous consequences for our ecosystem. The latest report by the Intergovernmental Panel on Climate Change (IPCC, 2023) has made it clear that there is “a rapidly closing window of opportunity to secure a liveable and sustainable future for all” (p. 88). The effects of climate change tend to disproportionately impact the global communities who pollute the least (Eckstein et al., 2021). This escalates pre-existing inequalities whilst the most common actions taken to minimise temperature rises and more unpredictable climate are disparate, modest, and incremental. As such, there is an immediate need to reconsider and co-ordinate a diverse range of practices and actions to mitigate and adapt to the intensifying societal impacts of climate change.

Although all members of society have a responsibility for climate action, and this need for change is generally acknowledged and supported (Andre et al., 2024), changes are most impactful in regions where pollution is high, and from groups with higher power, privilege, or influence (Moorcroft et al., 2024, Nielsen et al., 2021). One community with a particularly influential societal role is that of applied researchers (Weiss, 2021) – these are individuals “working in applied settings to create practical knowledge, with the aim of evaluating or changing practices rather than improving theory or understanding” (Evans et al., 2023, p. 89).

Research is an important activity conducted within, adjacent and external to universities, and applied researchers have a unique role in bridging the gap between theoretical and academic research and real-world practice (Adams et al., 2017). Applied research involves negotiating across a wide range of societal stakeholders, and is especially important for driving individual, organisational and societal practices and policies (Ijzerman et al., 2020; Mahood et al., 2014). Applied researchers have the skills and understanding required to work across disciplinary boundaries and stakeholder groups and therefore represent an important community that are often consulted with to translate academic understanding of climate change into practice. As such, consideration of, and action on, climate change is likely to be especially impactful within the work of applied researchers.

There is some evidence on how applied researchers have influenced climate change practice, such as how interventions within psychology and the social sciences can be designed to maximise climate-friendly actions within a household (e.g., clean energy use) or organisation (e.g., climate-friendly investing) (Nielsen et al., 2021; Stern, 2011). However, the learning and action established is infrequently synthesised across disciplinary boundaries, and often comes in the context of complex histories. For example, there has been increased attention from Occupational Psychology communities, demonstrating how applied researchers can influence climate change through all core domains of their expertise, including leadership, training, wellbeing, psychological assessment, and organisational change and design (Maskell, 2023). As Occupational Psychologists have contributed to the exacerbation of climate issues through support of capitalist growth ambitions (Olenick & Bradburn, 2019), many believe that it is time to “claim [their] spot at the table in coming up with solutions and sharing the insights [they] have to address this great threat” (p. 452). Despite this, there has been a notable lack of co-ordinated action in promoting climate change as a central priority within this field of research and practice. Occupational Psychologists are just one specific group of applied researchers from which, given the extent of action required to minimise irreversible consequences, more substantive and immediate action is required.

Given the diversity of roles applied researchers assume, the scope of potential action they take (and could take) towards mitigation of extreme climate change is very broad and has not yet been established. The nature of applied research is diverse based upon industry and field, but there are many dimensions of practice which can influence climate outcomes. These range from more minor personal choices to more substantive action embedded into their practice (e.g., explicitly considering climate implications in the decision-making or evaluation of their practice). Dablander et al. (2023) conducted the most comprehensive analysis of scientists to date (N = 9,220), reporting that whilst levels of climate concern tends to be relatively high, and individual lifestyle changes have been made by most scientists, there is less engagement in advocacy or activism that could drive larger impact. A number of factors drive this difference, including limited (perceived) autonomy to act and concerns surrounding reputational damage from activism.

Applied researchers could have a substantive impact upon climate change through their research foci and practices. For example, they may establish policies to not work with (or take funding from) groups or stakeholders having disproportionate negative climate impacts, as is becoming common in basic research (Campos, 2023). Many basic researchers are also pivoting their research expertise to see how they can contribute to positive climate action (e.g., the 1in5project: <https://www.1in5project.info/>) or contributing to collaborative projects on these themes (e.g., Vlasceanu et al., 2024). Indeed, 49.8% of Dablander and colleagues’ (2023) sample reported shifting some of their research to include topics relating to climate change, with 27.7% prepared to and only 22.2% unprepared to do so. Although the current manuscript is such an example of this, such a pivot has foreseeable complications that require management. For example, this increase in coverage may increase the ‘noise’ in climate change research, making it harder to filter and evaluate relevant and high-quality sources, demonstrating the importance of accurate and effective dissemination. Given the importance of climate change, there is also greater transparency and rigour expected from consumers of that knowledge, which may impact researchers’ engagement with a variety of practices including data sharing and open dissemination strategies (Tai & Robinson, 2018).

Recognising the complex relationships between society and climate, it is also important to recognise the impact of climate change upon the work of those in applied research. Whilst the potential impact of applied researchers upon climate has been discussed, there is great value in securing a clearer understanding of the unique pressures and opportunities climate change brings to these

influential researchers. As has been seen across domains (e.g., McHugh et al., 2021), discourse surrounding climate change can be presented as a threat to modern standards of life and a barrier to decision-making. Equally, climate change could be considered an opportunity to re-evaluate practices and values to better meet the demands of stakeholders and societies, thereby maximising impact. As such, we expect both positive and negative consequences of climate change upon applied researchers. For example, climate change may simultaneously encourage innovation (Tian et al., 2024), evoke more discussions on inclusivity (Narain et al., 2022), disrupt or challenge feasibility of projects or working practices (Wright & Nyberg, 2017), and require greater moral/values positioning and leadership (Sancino et al., 2022). An appreciation of the scope of such impacts could facilitate others to recognise the benefits of escalating climate action, and provide recommendations and support in negotiating the potential challenges associated with this.

As it stands, there is little shared understanding of how climate change is responded to within applied research, whether this is individual, organisational or societally-driven, and what further opportunities are available to realign priorities with the imminence of action required. It is also unclear how those working in applied research consider and position climate change e.g., as a potential opportunity for promoting less problematic (and more inclusive and innovative) practices, and as a barrier or threat to current practice. As such, the current study aims to address the following research questions:

RQ<sup>1</sup>: How does the work of applied researchers contribute to positive climate change action, and what is the perceived scope of potential for further action?

RQ<sup>2</sup>: How is climate change perceived to influence applied researchers, and how is this expected to change over their career?



## Method

### Study Design

Through interviews conducted by a distributed network of trainee-led data collection teams, the current study aims to provide a qualitative understanding of how applied researchers negotiate feedback and the recent developments made through the open scholarship movement/ influence and are influenced by climate change, and how this is likely to change. This work was conducted as a Programmatic Registered Report, such that the methodology could be consistent for data collection teams to conduct one interview on both themes (feedback and open scholarship/climate change) or to cover one whilst including other themes depending upon their own interests and career aspirations.

### Pedagogical Setup and Recruitment of Data Collection Teams

This study was designed to facilitate data collection through student/early career researcher (ECR)-led research teams (hereby referred to as trainee-led). To recruit such teams from the project team's networks, all UK Reproducibility Network (UKRN) Institutional Leads and Course Directors of Applied Psychology courses (e.g., Occupational Psychology) in the UK were emailed to encourage staff-trainee/student dyads to participate (see [osf.io/XXXXX](https://osf.io/XXXXX)). Social media and collaborative networks (FORRT: Framework for Open and Reproducible Research Training, ReproducibiliTea, ABRIR: Advancing Big-team Reproducible science through Increased Representation) were also contacted to maximise the reach of the project. In line with the inclusive approach of the current study, recruitment of trainee-led data collection teams was not limited by country but use of English was mandatory for data collection and project management. Data collection teams were required to be trainee-led, with appropriate training provided such that students could be at any level (undergraduate to doctoral level). To be eligible to participate, teams were asked to obtain and evidence ethical approval from their Institutional Review Board (unless it was not required or could be covered by pre-existing approval). X trainee-led data collection teams contributed to this project, several/many/most completed this project as part of their BSc (%) or MSc (%) dissertation.

Analogous to CREP (Wagge et al., 2019), and similar to previous quantitative projects co-ordinated by this team (e.g., Evans, 2022b), the proposed work was aimed at providing an opportunity for students (within and external to the lead author's institution) to obtain research experience, develop academic skills, and engage with open scholarship practices whilst studying themes of personal and societal interest. To support these pedagogical outcomes of the project, a number of videos and curated resources were produced to support the trainee-led teams through the project. For example, this included recorded discussions with experts in interviewing, recordings on the purpose and complexities of data sharing, and advice on conducting qualitative analyses. All such resources are available on the corresponding project's Open Science Framework (OSF) page ([osf.io/XXXXX](https://osf.io/XXXXX)). Students were also encouraged to have frequent and direct contact with lead authors in order for them to receive timely feedback and support.

## Procedure

Interested trainees reviewed a public Open Science Framework ([osf.io/XXXXX](https://osf.io/XXXXX)) page of the project where an overview of the project, and all relevant resources to participate, were shared. An interactive spreadsheet allowed each team to register for the project, update their details, and log or check their progress at each stage. The guide supporting trainees through the process, and signposted support and resources (e.g., example IRB documentation) was available through the OSF page ([osf.io/XXXX](https://osf.io/XXXX)).

Trainees were first asked to provide details of their team, and to request access to the project OSF page to create a private “fork”. They then uploaded evidence of ethical approval or exemption. All data collection teams were expected to attempt to secure ethical approval to publicly share the anonymised transcripts, but approval for public data sharing was not mandatory as long as data could still be shared within the research team to facilitate analysis.

Each trainee was asked to conduct a dry-run interview with an individual named by their supervisor (e.g., a receptive colleague), and to upload all resources including the interview guide used, transcription, and supervisor feedback, for review. All team resources were then reviewed by one of the core project team for adherence to the protocol and for quality of implementation. Feedback was offered in iterative reviews until the trainee was given approval to progress. Interviews conducted in accordance with the protocol were included in the final sample where the reviewer, trainee and supervisor all agreed it was appropriate. Interviews which did not meet the standard of implementation expected were not made publicly available and were not used in the final analysis.

Following approval, trainees were expected to conduct a minimum of two interviews. Recruitment strategies varied from use of professional contacts to use of open social media requests. Interviews followed the interview schedule noted in Appendix A. Interviews were expected to cover no more than one additional theme beyond **climate change** **feedback and open scholarship** to allow trainees to tailor their research experiences to their interests and career ambitions. If covering both themes, they could be covered in either order but this had to be reported explicitly in the meta-data. To avoid influencing responses to the current project, any secondary topics had to take place after this projects’ core themes. This tailored content is beyond the scope of this study and therefore not reported here, but all materials including interview schedules and anonymised data are available on the OSF project page. Interviews were expected to take a minimum of 30 minutes, although an hour was considered reasonable if covering two themes. Interviews were transcribed verbatim. In line with other qualitative projects (e.g., Simblett et al., 2021), use of Microsoft Teams (or other such software) to automate an initial transcription was considered permissible so long as data was retained according to their university's data use strategy/policy and not shared with untrusted external partners. A second version of transcripts with extra-linguistic features was encouraged but not mandated to allow for further in-depth analyses.

A protocol for ensuring data is pseudo-anonymised and suitable for sharing was developed in line with guidance (Campbell et al., 2023). Firstly, all names of specific individuals, projects, labs, or institutions were redacted. Secondly, all highly specific pieces of information able to identify individuals or projects were revised into broader remarks. Revised language is indicated using square brackets. For example, “My colleague Taylor Swift”, was revised to “My colleague [name redacted]” and “Our project looking at the role of emotional intelligence as a second-stratum factor of intelligence” was revised to “Our project looking at [individual differences and intelligence]”. Our general principle was that participants should not be identifiable from a review of openly available information (e.g., Google search). For example, the name of a specific organisational policy should

be amended to use more broad language such that the scope of it would be understood but would not make the institution identifiable. Finally, the transcribed interviews were independently reviewed by at least two members of the project team for combinations of data that may identify individuals. In consultation with a document outlining this expected anonymisation protocol, trainees were expected to make amendments or redactions of the raw data using a 'track changes' function. This version of the data was reviewed by the supervisor (for BSc/MSc students) who would check, make suggestions, and finally sign off the data as anonymised. The lead authors of this project (or project contributors with expertise in qualitative data/data anonymisation) were signposted as a source of support for discussions on cases of ambiguity or concern. Data collection teams were strongly encouraged to consider other protocols to ensure anonymisation (e.g., sharing data to be made publicly available with participants to sign off before making publicly available, or using the 'text anonymisation helper tool' developed by the UK Data Archive: <https://www.data-archive.ac.uk/managing-data/digital-curation-and-data-publishing/tools-we-use/>), although due to practicality these processes were not mandated. The resulting version of the data was then shared privately on their OSF fork for final review by the project lead for consistency and quality of protocol implementation as an additional safety measure. All amendments and redactions are clearly distinguished as such in the final version of the data, which have been made publicly available.

To maximise pedagogical benefit and support qualitative skill development, trainees were asked to provide reflexive statements for each interview, considering how their viewpoint influenced the discussion and reflecting upon how they could improve their practice further. In recognition that such reflections may be personal and sensitive, and that contributions to this Registered Report need to be publicly acknowledged, two protocols were established to protect interviewers. Firstly, trainees and supervisors were encouraged to edit/anonymise these statements as they see fit, differentiating between any need for deeper reflexivity statements in their studies, and the needs of this research project. Secondly, the interviews of each data collection group were not associated with their group, such that it is not possible to identify which group conducted which interview (and thus produced each reflexive statement). This measure was also considered to contribute to protecting participant anonymity as interviewed researchers may have been from the same institution or geographical location.

Trainees completed a brief meta-data proforma to provide useful context to the data (Appendix B). This includes details about how they conducted the interviews (e.g., online or face-to-face), provides summaries of the themes beyond climate change feedback and open scholarship discussed, and any other relevant information (e.g., use of any incentives). As such, each fully transcribed, verbatim, anonymised interview transcript is accompanied with a reflexive statement and meta-data.

Upon completion of data collection, each trainee also completed a brief post-project questionnaire (see Appendix C) to gauge the pedagogical value, complexity/difficulty, and quality of support provided through the project. Trainees then received a certificate to confirm engagement and acknowledge contributions and completion. All trainee contributions to data collection and curation, and supervisor contributions through supervision and anonymisation, are recognised by the CRediT taxonomy statement and authorship of the Stage 2 Registered Report. In sum, X data collection teams were involved in this project, and all contributions can be found fully listed in the appendices.

## Participants

Participants were required to self-identify as an applied researcher, defined as “academics, researchers, and practitioners working in applied settings to create practical knowledge, with the aim of evaluating or changing practices rather than improving theory or understanding” (Evans et al., 2023, p. 89). Individuals completing research primarily for qualification purposes (e.g., research conducted for the purpose of a PhD) were excluded. The feedback strategies and open scholarship adoption of research students has been better established (e.g., Calle-Arango & Ávila Reyes, 2023) and was considered to be different from the focus of the work proposed. Participants were not required or expected to be working in the field of climate change have any experience with open scholarship, although this was welcomed where available. Whilst we did not wish to formally compare between those working within/outside of climate change with or without experience of open practices, we encouraged data collection from both to gain a clearer sense of the scope of beliefs and action. To minimise the potential of selection bias distorting conclusions (e.g., by recruiting researchers especially interested in open scholarship), the presentation of the study focused upon the broader themes (i.e., feedback), and highlighted the importance of applied researcher perspectives compared to that of basic science.

Participants were recruited from across the globe to emphasise the diversity of practices. Whilst there are well-established cultural differences in funding, incentives, approaches to working, and systems, the research cycle and as such many research processes are likely to be similar for researchers in Europe and America (where strongest representation was expected). We anticipated more substantive institutional- and specialism-based differences, and there was insufficient cross-cultural work examining the prevalence of open scholarship practices in applied domains to justify limiting participation by geography. Cultural individualism has been associated with more problematic beliefs surrounding climate action, however no meaningful effect upon climate action has been reported (Goldwert et al., 2024). As the current work focused upon actions rather than beliefs, and our research questions aim to represent diversity in experiences, rather than consensus in practice, we found insufficient evidence to justify limiting participation by geography.

Each trainee-led data collection team recruited a minimum of two participants each, to account for the varying levels of interview time and to be achievable to all student levels of study. To achieve the scope and diversity of insights required, yet represent a realistic and achievable plan, 50 participants was set as the minimum target for each component of this programmatic Registered Report. No maximum sample was declared given the inclusive ethos of the project, potential for reuse of a substantive and diverse qualitative dataset, and pedagogical value of trainees completing the project. To increase feasibility, a list of 100 applied researchers was generated by the research team before data collection. To maximise the diversity of sample, these were purposefully selected to represent a wide range of career stages, demographics, geographical regions, career specialisms and contract types, with representation from all major disciplines of study as outlined by the Frascati Manual (OECD, 2015). Each team was allocated up to five individuals from this list to contact to expand their network, where possible including a range of local individuals that could be suitable for climate-friendly face-to-face interviews, and international contacts within an appropriate time-zone. Recruitment through this method was an attempt to provide support to groups with more modest networks, and all trainees were able to contact researchers on their own initiative.

To ensure the project was inclusive to all trainees interested in contributing, a central incentive was offered. Participation was compensated by the planting of trees, in line with the climate values of the project. The project lead planted a tree for each participant in the final sample, and to motivate

target completion, planted an additional 50 trees when more than 50 participants were recruited in each dimension of the wider programmatic Registered Report. Planting is seasonal and thus progress was documented through a dedicated resource on the OSF project page where participants could find ongoing targets and photographic evidence of their individual contribution. Some (X%) data collection teams also offered their own additional participation compensation, and this was logged as part of the meta-data for the interview.

Collectively we met/exceeded the target of 50 and recruited X participants, representing academia (n = X), government (n = X), charity (n = X) and industry (n = X). Each participant was engaged in an interview ranging from 20 to 60 minutes and most were (not) compensated further for their time through X. Participants were commonly/mostly UK-based (X%), from Y (X%) and Z (X%) disciplines, identified as male/female (X%) and had a mean background of X years (SD = X) experience working in applied research.

### **Open Science Statement**

The preregistration, materials, resources, ethics documentation, data, meta-data and analysis documentation were published on the OSF project page ([osf.io/XXXX](https://osf.io/XXXX)). Data will also be submitted for depositing separately with the UK Data Service to maximise likelihood of adherence to FAIR Principles and to increase visibility.

### **Ethics and Timeframes**

Ethical approval has been granted from the University Research Ethics Board at the University of Greenwich (ID: 23.2.5.7). Confirmation of ethical approval or exemption was required from each data collection group before they were permitted to collect data. Data collection was completed between X/X/X and the 31<sup>st</sup> of August 2026.

We hope to secure IPA prior to UK MSc students starting their dissertation project in September 2024, with data collection ongoing until 31<sup>st</sup> of August 2026. Should the project not be within 10% of the minimum expected sample size (i.e., 45 participants), data collection will be extended for a further year to allow the subsequent cohort of trainees to collect data. This timeframe will be revisited for feasibility in accordance with the changes required of review at every round of revision and any changes post-IPA will be subject to agreement from the Recommender handling the manuscript.

### **Analysis Plan**

Due to the use of a distributed network of data collection teams, more reflexive approaches (e.g., Braun & Clarke, 2019) were considered suboptimal for recognising the multiple levels of reflexivity and as such a broader content analysis approach was adopted. Theoretically, content analysis carries the advantage of being a fairly systematic and replicable technique that allows for condensing large volumes of text (such as from interviews) into fewer content categories, logically organised around explicit rules for coding (Stemler, 2000). Notably, as others have suggested, content analysis allows sufficient flexibility that it can appropriately capture the experiences of individuals, groups, institutions or societies (Weber, 1990).

We took a directed content analysis approach to answer each of the research questions, similar to the codebook thematic analysis approach discussed by Braun and Clarke (2022). Our practice is best categorised as a directed or deductive approach, having used our research questions and existing understanding to drive initial coding categories (Hsieh et al., 2005) from which analyses were framed. The coding categories were purposefully broad and flexible to allow for change during the analysis process (see Table 1).

Table 1: Initial Coding Categories

Category	Feedback and Open Scholarship	Climate Change
1	Feedback mechanisms available	(Anticipated) Impacts of applied research upon climate change
2	Feedback culture and barriers	(Anticipated) Impacts of climate change upon applied research
3	Observations on feedback quality	Climate-based decision-making
4	Understanding and relevance of open scholarship	The framing of climate change
5	Engaging with new (open scholarship-inspired) practices	Stakeholders and responsibilities for action

Analyses were conducted by a core team of researchers with qualitative experience (as detailed in the CRediT statement in the Appendix). Analysis work was facilitated through various shared document systems (e.g., Google Docs and Sheets), instead of established qualitative analysis software, for practicality of simultaneous use across the analysis team. The full process is detailed in Table 2.

Table 2: Analysis Process

Activity	Implementation
Familiarisation with the Data and Maximising Use of Expertise	TRE created a summary of the interview features, with core details including the participants' domain of work experience or geographical region. TRE collated all data (and meta-data) centrally. The core analysis team read through the summary and allocated themselves a minimum of 15 interviews each for which they noted down their initial thoughts on how the data related to the research questions and any observations they wished to share at an early stage. The broader observations were collated and distributed across the analysis team. Each interview was reviewed by a minimum of two researchers.
Refinement of the Coding Categories	The analysis team familiarised themselves with the initial coding categories, as driven by the research questions, and systematically coded data (line by line) to determine their relevance to the categories. After coding five interviews each, the analysis team met to discuss and amend the coding categories to ensure all data relevant to the research questions was included. Following a further five

	interviews, the analysis team met again to discuss further changes, and the final structure of categories was agreed and disseminated. All meeting notes and category changes have been made available via the OSF (OSF.io/XXXXX).
Detailed Analysis and Formation of Structure	The analysis team completed coding of data from their allocated interviews according to the coding categories. Separate sub-groups formed to examine all data relevant to specific categories. Here they worked through all relevant data to provide additional coding and establish commonalities and hierarchies within their coding. All codes, hierarchies and reflexive notes were made available via the OSF (OSF.io/XXXXX).
Refinement of Final Structure	The full analysis team met to review the coding, themes and hierarchies proposed by all sub-groups. As overlap between research question responses was expected, this meeting was designed to manage cross-fertilisation of themes and ideas, such that the final structure could provide a holistic view of how the data was summarised. This structure is visually presented in Figure 1.
Dissemination and Review	Each subgroup was responsible for defining their themes, identifying the most relevant supporting quotations, and writing up this section for dissemination. Following an initial draft of each section, the analysis team collaborated through a live document to review, refine and provide feedback on the analysis as a whole. Members of the wider research team, including the trainee-led data collection teams, were then encouraged to provide feedback on the full manuscript draft before submission of the Stage 2 manuscript(s).

Data from the post-project questionnaire completed by trainees suggests many/most/all considered the experience of contributing to this project to be valuable/enjoyable/well-supported/positive. As can be seen in Figure 2... [Results will be presented in a descriptive manner with accompanying violin plot visualisation for each item, and a brief description of any pertinent themes from the open question].

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## Appendix A

### Interview Questions by Theme

Theme	Proposed Questions
Rapport Building and Context	<p>Completion Checklist</p> <ol style="list-style-type: none"> <li>1. Offer thanks</li> <li>2. Provide overview of project aims</li> <li>3. Check they are happy with the definition of applied research* and can define themselves as an applied researcher</li> <li>4. Provide overview of withdrawal process</li> <li>5. Provide opportunity to ask further questions</li> <li>6. Check consent form has been signed</li> <li>7. Check participant is happy to proceed and confirm they are happy to start being recorded</li> <li>8. Start recording and confirm to participant this has started</li> </ol> <ul style="list-style-type: none"> <li>● So we can make sure your involvement is confidential, shall we agree a preferred pseudonym* and a few-word phrase presenting your area of practice that you would be happy to be associated with quotations of your data? (E.g., “Billy – Occupational Psychologist working for Test Publisher”)</li> <li>● Tell me a little more about the organisation you work for (academic, government, charity, industry or other), the field/industry you work within, and what your applied research* entails?</li> <li>● What is the work you are most proud of?</li> </ul>
Feedback and Open Scholarship	<p>RQ<sup>1</sup>: What feedback processes are available and readily adopted by applied researchers?</p> <ul style="list-style-type: none"> <li>● How would you define feedback? What does the word ‘feedback’ mean to you?</li> <li>● Thinking about the last project you completed, could you walk me through the project and at what points you asked for, or received, feedback? Where/ when/ how did you get this feedback? Did you incorporate this feedback? Why or why not?</li> <li>● In addition to those you noted, what are the main ways you tend to get feedback during your applied research? Where does this tend to be in the research lifecycle? (e.g., conception, design, conduct,</li> </ul>

	<p>analysis, dissemination, etc.)</p> <ul style="list-style-type: none"> <li>● What is the feedback culture like where you work?</li> <li>● How do you feel about the quantity and quality of feedback you receive to support your work? Does it differ between feedback providers? Is delivery important?</li> <li>● If you wanted to get feedback on a project, how easy/ structured would this be? Who would you approach or where would you go?</li> <li>● Do you experience any barriers when asking for and receiving feedback on your applied research? If so, what are they?</li> <li>● What recommendations would you share for those in similar applied research roles, to improve the use of feedback for their applied research?</li> </ul> <p>RQ<sup>2</sup>: Are applied researchers aware of, and using, contemporary practices and feedback mechanisms established through the open scholarship movement?</p> <ul style="list-style-type: none"> <li>● Have your feedback practices changed in the last few years? If so, how and why? If not, are you aware of any new feedback practices and why do you think things haven't changed?</li> <li>● What are the core ways in which you disseminate your work for impact? Have any of these practices changed recently?</li> <li>● What does the term 'open science/research/scholarship'* mean to you?</li> <li>● Has any of your applied research work been preregistered*? If so, why? What was the experience and impact of this? If not, do you have any thoughts on this approach? What are the potential benefits/issues/barriers?</li> <li>● Does your applied research tend to change from conception to delivery and how is that thought of and managed? Does your field differentiate between confirmatory or exploratory analyses?</li> <li>● Open scholarship has driven a number of new feedback mechanisms like premortems*, research audits*, preprints*, red teams*, etc. Have you heard of these, any experience of these, or have any views of whether they would be helpful for your applied research?</li> </ul>
Climate Change	<p>RQ<sup>1</sup>: How does the work of applied researchers contribute to climate change action, and what is the scope of potential for further action?</p> <ul style="list-style-type: none"> <li>● What direct or indirect impact does your role have upon mitigating and/or adapting to climate change?</li> <li>● What role and how prominent is climate change in decision-making in</li> </ul>

	<p>your research work?</p> <ul style="list-style-type: none"> <li>● Are there any examples of when tackling climate change has taken a particularly clear role in a research decision or action you have made?</li> <li>● Are the research decisions and actions you take towards climate change driven by your own values, by institutional/employer expectations, and/or broader societal policies/procedures? How autonomous are you to act?</li> <li>● What further actions do you believe you, or those in similar applied research roles, could take in your role to promote greater climate action? e.g., activism</li> </ul> <p>RQ<sup>2</sup>: How is climate change perceived to influence applied research, now and in the future?</p> <ul style="list-style-type: none"> <li>● Does climate change impact your work? If so, how?</li> <li>● How do you expect this impact to change over time/over the course of your career?</li> <li>● Is climate change a barrier or an opportunity to what you do?</li> <li>● How does this positioning of barrier/opportunity differ across all the different stakeholders you engage with?</li> <li>● What are the greatest barriers/opportunities climate change provides you in your applied research?</li> </ul>
Study Completion	<ul style="list-style-type: none"> <li>● Is there anything we haven't spoken about on these themes that you would like to share, or anything you would like to elaborate upon, or discuss before I stop recording?</li> </ul> <p>Completion Checklist</p> <ol style="list-style-type: none"> <li>1. Confirm recording has stopped</li> <li>2. Offer thanks</li> <li>3. Provide overview of project aims and dissemination plan</li> <li>4. Provide reminder of withdrawal process</li> <li>5. Provide overview of anonymisation process</li> <li>6. [optional] Ask participants whether they'd like to sign off the anonymised transcript at a later date</li> <li>7. Signpost support mechanisms available, if needed</li> </ol>

	8. Provide opportunity to ask further questions
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Note: Where \* is included, definitions will be offered to participants unfamiliar with these terms.

## **Appendix B**

### **Meta-Data Proforma**

**Interview conducted as pilot?:** No or Yes

**If yes, reviewer, trainee and supervisor all agree it was appropriate for inclusion?** Yes or No

**Approval to share transcript publicly?:** Yes or No

**Interview length:** \_\_\_ minutes

**Interview format:** Face to face or Online

**Geographical region (country) of participant:**

**Pseudonym:**

**Description of area of practice:**

**Interview themes covered, in order:**

**Any additional incentives provided:**

**Anonymisation protocol followed?:** Yes or No

**Reflexive statement included?:** Yes or No

**Any other notes (e.g., disruptions):**



## Appendix C

### Post-Project Questionnaire for Trainees

We would like to get a greater sense of your experience throughout this project. Please complete the following items, responding honestly to provide us with useful feedback on how to evaluate and improve this type of group project in future. The data you provide will be anonymous, not associated with the data you have provided for the project (interview transcripts, reflections, etc.), and will not be accessible by supervisors. On a scale of 1 (strongly disagree) to 10 (strongly agree), to what extent do you think...

1. I enjoyed contributing to this project
2. I learned a lot from contributing to this project
3. I developed my research skills by contributing to this project
4. I would encourage others to contribute to collaborative projects like this
5. I found the tasks required for this project easy/manageable
6. I was well-supported by my supervisor to contribute to this project
7. I was well-equipped to contribute to this project through the training and support provided by the central project team
8. I consider myself more employable having contributed to this project
9. Generally, my experience of contributing to this project was positive

Is there anything else you'd like to share with us? Feel free to elaborate on any of the questions above, or share anything you think might be helpful for us to learn about your experience of this style of collaborative project...

[Open Text Box]