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EXAMINING LEADERSHIP PRACTICES TO PROMOTE A POSITIVE CULTURE OF RESEARCH INTEGRITY IN HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

What is new?	While Higher Education Institutions (HEIs) have, in recent years, placed greater emphasis on promoting good research practices, it is yet relatively unknown what leadership approaches are best suited to cultivating a positive culture of research integrity (RI) in HEIs. This small-scale exploratory descriptive study therefore sought to uncover initial findings from within the European context on practices research leaders found to be most effective in leading positive change in this space.
What was the approach?	The design was constructed using semi-structured interviews with five senior research leaders. Countries that were members of the European Network of Research Integrity Offices (ENRIO), with HEIs that were members of the European Association of Research Management and Administration (EARMA) were used as part of the sample selection process. With the topic being under-researched and the examination

	being a small-scale exploratory study, opportunistic and purposive sampling were used to recruit participants.
What is the academic impact?	The overarching leadership style found to promote a positive culture of RI in HEIs was collective, with adaptive and competent boundary spanning characteristics, along with cognisance of the need for continuous professional development. There was agreement among all participants that change in research culture is occurring, and leaders need to adapt to these changes. RI and open research were seen as integral components to promoting good research practices in HEIs.
What is the wider impact?	There are multiple facets to promoting a culture of RI in HEIs, with excellent examples in the literature on both leadership and good research practices. However there is little evidence of which leadership styles create the best conditions for driving a positive culture of RI in HEIs.
Keywords	Collective Leadership; Adaptive Leadership; Boundary Spanning; Research Integrity; Open Research.

INTRODUCTION

In Higher Education Institutions (HEIs) there is growing emphasis on promoting good research practices in all aspects of research, from undergraduate to postgraduate studies and those within industry (All European Academies, 2023; Science Europe, 2022). However, there is little known about which leadership approaches are best suited to cultivating a positive culture of research integrity (RI) in HEIs.

RI underpins research activity and excellence and is considered a critical component of the basis for researchers to trust each other and the research record (Science Europe, 2015). In recent years, in parallel with the importance of RI, greater focus has been placed on open research (OR) (Science Europe, 2021). OR, Open Scholarship and Open Science are used interchangeably and relate to collaborative ways of generating, communicating and sharing research findings as early as possible in the research lifecycle (European Commission, 2019). For this study, the term OR is used to overarchingly incorporate openness of results, data, protocols and other aspects of the research process (European Commission et al., 2020). Although, RI and OR have overlapping themes, they are individually well-defined, with RI focussed on research conduct and OR on research dissemination, with both being attributes of embedding good research practice in research culture (Haven et al., 2022).

The definition for research culture is broader than the focus for this study in that "research culture encompasses the behaviours, values, expectations, attitudes and norms of our research communities. It influences researchers' career paths and determines the way that research is conducted and communicated" (The Royal Society, 2025). While this study's focus is on RI and grounding it within good practice and overall research culture.

Key challenges when embedding good research practices in HEIs include having the necessary infrastructure and resources (Wilkinson et al., 2016; Haven et al., 2022) and appropriate buy-in from management (Mejlgaard et al., 2020; Science Europe, 2022). Furthermore, the interpretation of good research practice is often dependent on research context and collaborators involved and may vary across disciplines (Mårtensson et al., 2016). With challenges there are opportunities; in RI this abides within research carried out with transparency and accountability, thus ensuring trust by the wider community (Science Europe, 2015; Robishaw et al., 2019). The research landscape is constantly shifting (Singh, 2001; World Economic Forum, 2019), with leadership as a mechanism to promote positive cultures of RI emerging as a field that has been minimally researched to date. This study seeks to provide a starting point for filling the gap in understanding the leadership conditions under which good research practice can thrive.

There are numerous examples of good research practice (Räsänen and Moore, 2016; Moher et al. 2020), along with guidance on expectations on leaders to promote these practices (Evans et al., 2022; Horbach et al., 2022). However, to align policies and procedures relating to good research practice a culture change is often required, where incentives and rewards for investing in change are not always recognised (European Commission et al., 2020). Mejlgaard et al. (2020) and Labib et al. (2023) state that to progress the RI agenda, actions and compliance are needed around support, organisation and communication for research, and for this to be achieved strong leadership is required.

There are examples in literature where leadership in RI is foregrounded, along with practical steps required to foster strong adherence to RI principles within HEIs (Forsberg et al., 2018; Casci and Adams, 2020), but little discussion of successful leadership models or approaches to enable this promotion exists. Casci and Adams' (2020) work considered learning from one HEI, with the sentiment echoing Forsberg et al.'s (2018) consensus statement on RI work in research-performing organisations. The latter outlined thirteen key issues, with the second relating to providing education, training and mentoring for researchers in RI. A key message from these two studies is that professional development is required to enable promotion of a positive culture of RI – aligned with international guidelines on RI and its impact on the research culture (All European Academies, 2023; Science Europe, 2022) – however, these do not go as far as suggesting leadership styles.

HEIs are analogous to systems (Singh, 2001) that may be separated by not only physical dispersion (e.g. multiple campuses), but within a campus there may be multiple units (faculties, schools, departments etc.), where each unit needs to maintain its own identity and distinctiveness (Weick, 1976). To ensure an institutional culture of RI, it is important that there is a consistent approach across the system. In leadership, Senge et al. (2014) state "the deep changes necessary to accelerate progress against society's most intractable problems require a unique type of leader – the system leader, a person who catalyses collective leadership" (p.1). However, there is little crossover between the

literature on research culture and leadership. This would be of value where the findings could contribute to establishing evidence-informed recommendations on leadership practices to promote a positive culture of RI in HEIs, thus establishing this is an issue and supporting initial steps to develop leadership in RI training and strategy.

If HEIs are considered as systems with a need for consistent approaches to RI across the institution, then a whole-institution approach could drive successful organisational change with RI throughout the research culture, system leadership may be an appropriate model. In parallel with this leadership model and given the ever-changing research landscape (Singh, 2001; World Economic Forum, 2019), the need to be forward thinking and prepared for change (Kotter, 1996) is also considered. Throughout this study, system leadership and agility to change are therefore related to the currently emerging RI agenda.

With educational leadership in RI being an emerging area, this study examines leadership strategies implemented to establish effective approaches to promoting a positive culture of RI in HEIs. Comprising semi-structured interviews with a purposive sample of senior research leaders in European HEIs, the study collates examples of leadership practices in underpinning a positive culture of RI, but with the caveat of potential biases that result from self-reporting of these practices. As a small-scale study, this enquiry was intentionally designed as exploratory and descriptive; not seeking to be definitive or representative, it instead aimed to uncover initial insights on this hereto under-researched area to inform future research, with a focus on addressing the following research questions (RQs):

> RQ1: With there being little evidence of which leadership styles create the best conditions for driving a positive culture of RI in HEIs, which leadership models do senior research leaders find most effective?
>
> RQ2: Which practices have senior research leaders found most effective in leading change and promoting a positive culture of RI in their HEI, in line with changing internal and external requirements?

Through these two RQs, the study provides insights that may contribute to establishing evidence-informed recommendations on research leadership practices to promote a positive culture of RI in HEIs. As an exploratory descriptive study, the aim is that the findings should provide initial insights to inform future research, with a longer-term goal being to contribute to HEIs' development of training and strategy surrounding leadership in RI.

Background and Context

This section takes a proportion of the literature available on leadership practices that may be mapped to a setting where creating a culture of RI is a priority, while examining the current research policy and practitioner contexts (All European Academies, 2023; Science Europe, 2022). With the changing research landscape (Singh, 2001; World Economic Forum, 2019), literature across leadership theory that promotes and

encourages adaption and learning (Heifetz et al., 2004; Stoll et al., 2012) within a system is discussed. There are instances of where findings from scholars on research culture are also included (Casci and Adams, 2020; Mejlgaard et al., 2020). Although the definition for research culture is broader than the focus for this study, the literature on research culture remains pertinent to the exploration of leadership's role in promoting a positive culture of RI in HEIs.

The overall examination and presentation of literature is grouped under the headings relating to system leadership in higher education, professional development, and pressures and challenges in leadership to promote a positive culture of RI.

System Leadership in Higher Education

HEIs are large, complex organisations that often have challenges around physical and digital connectedness (Mowles et al., 2018; Kilpert et al., 2022). It can therefore be argued that to promote a consistent positive culture of RI within HEIs, multiple leadership styles are likely to be required (House and Mitchell, 1974; Muczyk and Reimann, 1987). This section explores system leadership approaches, relating them to the currently emerging RI agenda.

For clear instruction and direction to motivate a system, Leithwood (1994), Hallinger and Heck (1997) and Hallinger (2005) advocate for an instructional and directive leadership model to consolidate the performance of effectiveness and output. While these scholars are focussed on pre-tertiary education there are broad generalisations across all education systems. They posit the wider community are motivated by the leader to change, with clear instruction underpinned by a mission, which impacts the overall system's culture. Although directive leadership may seem fitting when promoting a positive culture of RI within a HEI, this leadership style appears to oppose the definition of leadership by Murphy et al. (2006), which leverages interactions and relationships, working together and being collective. Muczyk and Reimann (1987) state that directive leadership has its place, but a leader's positionality can adapt and change over time, while Kania and Kramer (2011) advocate for collaborative working on a common agenda as key to the success and sustainability of a system over time. To maintain responsible conduct of research (RCR), Hanover Research (2014) advocate for an assertive, participative leadership style when building a culture of research, which engages across functions to ensure consistency in RI approach.

Expectations on HEIs have changed immensely in recent years, particularly surrounding research on societal change, engagement with industry and related areas (Singh, 2001; Mowles et al., 2018; World Economic Forum, 2019). In a study of research culture at the University of Glasgow, Casci and Adams (2020) state inconsistency in approach to embedding RI across units has a negative impact on research culture. Elken and Vukasovic (2019) found within HEIs multiple couplings do co-exist, often with a complex co-existence within the system; coupling being a situation where one entity is responsive yet retains levels of separateness and identity (Weick, 1976). Hence, for the purposes of promoting a culture of RI within complex HEI systems, leadership that is

aware of potential coupling and methods to overcome challenges is important and evidence of cohesiveness is needed (Weick, 1976; Orton and Weick, 1990).

To maintain appropriate levels of responsiveness, distinctness and coupling, the importance of competent boundary spanners and boundary spanning leadership should be to the fore (Williams, 2002). Although Williams' (2002) work was framed within the UK public policy context, there are learnings from the findings in that when working across boundaries, boundary spanner leaders encourage collaboration, facilitate meetings of stakeholders and provide the catalyst for action.

Leithwood et al. (2008), Kania and Kramer (2011) and Senge et al. (2014) note a major characteristic in leadership is adaptability, which is particularly critical in the ever-changing higher education environment. Based on over forty interviews with UK HEI leaders, Mowles et al. (2018) found changes are wide and varied, with influences from external agencies, national and international policies to organisational structures and stakeholder engagement. In considering research culture, pressures around high research standards may originate from internal HEI policy and procedures, alongside expectations from external funding agencies. In overcoming these issues, a leader with adaptive traits would appear essential within a system (Heifetz et al., 2004).

Professional Development to Promote a Positive Culture of RI

Casci and Adams (2020) state that developing policy is not enough, researchers should be shown how to implement and make practical changes to their research practices. This aligns with guidelines on RI and its impact on research culture (All European Academies, 2023; Science Europe, 2022).

Professional learning and professional development are used interchangeably within literature, but within this study distinctions are drawn. Guskey (2002) and Porritt et al. (2017) explain professional learning as being wide and varied, incorporating learning from new technology, attending seminars and completing qualifications. Earley and Porritt (2009) alternatively outline that professional development is where professional learning is put into practice and becomes embedded in culture, leading to change. Hargreaves (2011) phrases this succinctly in that professional development is where "the object is to improve what teachers do, not merely what they know" (p.10). This echoes Casci and Adams' (2020) assertion that RI learnings need to be implemented to drive practical change.

Stoll et al. (2012) and Kilpert et al. (2022) posit if academics wish to develop professionally, doing so collaboratively appears the most effective way, with professional learning communities (PLCs) or communities of practice being appropriate modes of delivery. Collaboration is integral to research and thus intertwined with research culture (Science Europe, 2022). Bubb and Earley (2013), in their study across six hundred schools in England, found that training should be discipline-specific, rather than all encompassing. Earley and Porritt (2009) further found that for professional development and interest in the topic to be sustainable there needs to be evidence of its benefit and overall impact.

Earley and Porritt's (2009) study measuring effective practices in professional development, which included HEIs, found a key message underpinning their findings was the importance of being strategic in leadership of professional development. This aligns with RI, when considering planning and adapting to both internal and external demands and trying to overcome pressures and challenges in leadership around promoting a positive culture of RI.

Pressures and Challenges in Leadership to Promote a Positive Culture of RI

While there is minimal existing literature on leadership practices commonly attributed to promoting positive cultures of RI in HEIs, some work has been done on practical methods to support a positive research culture (Evans et al., 2022; Haven et al., 2022; Labib et al., 2023). Although, leadership is not to the forefront of this literature, some pressures and challenges in culture leadership are noticeable.

Following exploration of different forms of governance to foster RI, Labib et al. (2023) recommended that conversations around governance of good research practices and research quality should occur at the start of research collaborations and involve the researchers in establishing RI rules. Involving researchers in the conversations is analogous to successful collective leadership posited by Senge et al. (2014). While Labib et al.'s (2023) findings are limited by being based on a single case study, given the under-researched topic of leadership and RI, their recommendations are useful.

In Science Europe's (2022) framework for the organisation of research, drafted by a working group on research culture, OR practices with openness and transparency for all aspects are seen as key to the organisation of research. For HEIs to be eligible for European funding they must show they are aligning with these expectations as much as possible (Horizon Europe, 2021). A challenge HEIs face in meeting the criteria to be eligible for European funding and leadership in OR is ensuring they have the necessary infrastructure to curate and store research outputs in accordance with principles that ensure they are Findable, Accessible, Interoperable and Reusable (FAIR) (Wilkinson et al., 2016). Haven et al. (2022) collates opinions of practitioners on the relationship between RI and OR and what is required of the researcher and HEI to implement both in the research culture, noting that for research to be undertaken in as open a manner as possible, the correct supports need to be in place. Similarly, qualitative findings on stakeholder experiences of RI support in HE across three European countries, found stakeholders believe it is the HEI's responsibility, rather than just the researcher's, to promote positive research cultures with integrity (Evans et al., 2022).

In European Commission et al.'s (2020) scoping report on reproducibility of research results, the funder's responsibility is also highlighted in recognising good research practices. The need for funders to recognise and ensure implementation of new research assessment forms is the next step (Horbach et al., 2022). Science Europe et al.'s (2022) published vision for reforming research assessment, leading towards the Coalition for Advancing Research Assessment (CoARA), moves towards recognising diversity of research contributions, assessment of research based on qualitative

evaluation rather than purely quantitative indicators, and abandonment of inappropriate uses of journal impact factor and the use of rankings for research organisations.

What is evident from the pressures and challenges experienced by leadership when seeking to promote a positive culture of RI is that change is required to overcome these (Casci and Adams, 2020; Mejlgaard et al., 2020). There are many change management theories within literature, with those of Lewin (1947), Kotter (1996) and Fullan (2007) being particularly prevalent. A clear synergy existing between these scholars is communication pre-, during- and post-change, however a common error mentioned by Kotter (1996) in leading change is neglecting to anchor changes firmly in a culture underpinned by trust. This reflects Casci and Adams' (2020) work on the need for implementation and practical change, along with Science Europe's (2015) assertion that RI is the basis for researchers to trust each other and the research record.

Summary

The leadership literature discussed covers practices spanning directive to collective mapping to a research setting, while being cognisant of the research policy and practitioner contexts (All European Academies, 2023; Science Europe, 2022). With the ever-changing research landscape, literature across leadership theory promotes and encourages adaption and learning within a system (Heifetz et al., 2004; Stoll et al., 2012). The research literature highlights challenges impacting a positive culture of RI, including the need to professionally develop, the need for appropriate infrastructures and resources, under the ever changing HE landscape in terms of internal and external agency demands (Horizon Europe, 2021; Science Europe et al., 2022). However, the synergy between the leadership literature and the research literature is minimal, hence the rationale for this study, uncovering initial insights to inform future scholarship.

Methodology

As an under-researched topic, a phenomenological paradigm with a primary qualitative data collection method was deemed appropriate (Connolly, 2016). This paradigm enabled the building of rapport with participants and thus potentially validating why certain data was collected, while being cognisant that the research data collected may not be representative of the population or be generalisable (Thomas, 2017). Primary qualitative data was gathered to gain initial insights and function as a starting point when exploring this under-researched topic. To ensure certain questions were covered within the interview timeframe, but with flexibility to build a rapport and ask follow-up questions to potentially interesting responses, semi-structured interviews were used (Adams, 2015). Within the constraints of this research method, the sample size was small, however in future an alternative or mixed methodology could be employed to expand access.

To gain insight into the intersection between leadership and research, interviews were framed around four overarching themes, derived from the literature, alongside research

policy and practitioner contexts (All European Academies, 2023; European Commission, 2019):

1. Compliance and enhancement issues in HE research;
2. Leadership obstacles to promoting good research practices;
3. Procedures around research misconduct;
4. Leading change to embed good research practices in research culture.

The flow and order of questions varied between interviews, based on learnings from previous interviews, forming an iterative approach (Male, 2016). Questions posed in the interviews are outlined in Appendix A.

Ethical approval to conduct the research was granted by University College London on 28 March 2022.

Sampling and Data Collection

In 2008, the European Network of Research Integrity Offices (ENRIO) was founded as a European Network to enhance RI within Europe with an emphasis on growing international cooperation. Finland, the Netherlands and the United Kingdom (UK) were founding members. ENRIO was used for initial sampling given one of its aims is to support and advise countries relating to policies, procedures and training in RI. Following country selection, determination of HEIs to include in the study was guided by HEI membership of the European Association of Research Management and Administration (EARMA), which represents research managers and administrators working in Europe.

Working from an EARMA database, in March 2022, there were 13, 18 and 6 HEIs in Finland, the Netherlands and the UK respectively, that were members of EARMA. Else (2021) reported that in its first year of existence, the Swedish research misconduct agency was inundated with alleged cases; with the potential learning from leadership practices of RI in this network, Sweden (ENRIO member since 2009) was therefore also included in the population, accounting for an additional 13 EARMA member HEIs. EARMA members from Finland, the Netherlands, UK and Sweden yielded a total research population of 50 HEIs. Applying the Malterud et al. (2016) model of requiring a sample size in qualitative studies to be guided by the aim of the study, sample specificity, use of established theory, quality of dialogue, and analysis strategy, the interview schedule included a 10% sample (five HEIs) for the study.

To obtain the opportunistic sample, senior research leaders from five HEIs within the authors' professional networks were identified and invited to participate via email. After attempts to contact senior research leaders from HEIs in Finland without success, a further participant from the UK was included following a recommendation by another institution. In total there were two, two and one participant included in the study drawn from the Netherlands, the UK and Sweden, respectively. Recorded interviews took place online between May and June 2022 using Microsoft Teams or Zoom and ranged in duration from 50 to 55 minutes. While the study did not seek to be definitive or

representative, and there may have been value from more leaders in one jurisdiction, this study's focus was to gain insights across a European sample initially that future studies could explore further.

With the enquiry focusing on RI and its position in good practice and overall research culture, the first substantive question to participants was, "What do you consider to be good research practice?". The response then guided the remainder of the interview, mitigating the researcher's potential insider positionality (Thomas, 2017). Following the interviews, the recordings were transcribed by the lead author, following which data verification took place by sharing interview transcripts with participants and before data analysis, to ensure accuracy in researcher interpretation (Male, 2016).

Data Analysis

A qualitative analysis approach was applied to the data, using NVivo (release 1.6.1), which enabled a quantitative descriptive to some of the question responses and subsequent codes created. There was a two-fold approach to analysis involving a priori codes (Male, 2016) and emergent codes (Braun and Clarke, 2006). Five codes were identified prior to data collection: "Culture change"; "External agencies"; "Good research practice"; "Research misconduct" and "Shared learning environment". Further data-driven codes were founded through open axial coding based on elements associated with the grounded theory approach and based on the theoretical and deductive thinking of the authors (Sang and Sitko, 2015; Male, 2016). The number of references (text extracts) per code was tallied by NVivo and presented descriptively using frequency tables. Charts were created using the ggplot2 package (Wickham, 2016) from the statistical programming language, R (R Core Team, 2022).

The number of codes increased from the five a priori codes to a total of 27 codes supported by 266 unique references from participants that could be used to address the research questions. In total, participants' contributions to codes ranged from 25 to 30 per participant, along with 48 to 84 references (inclusive of text extracts, memos and annotations) per participant. The R script and tally of references are presented in Appendices B and C.

Given the limited scale of this study and its novel nature, overarching themes were developed and summarised using a thematic table (Braun and Clarke, 2006). Codes were collated based on the principles of grounded theory and review of the references associated with each code. Adopting back and forward analysis described by Braun and Clarke (2006) led to the final themes.

Findings

A minimal volume of demographic information was obtained from participants to maintain anonymity. The five participants were located across three European countries and affiliated with HEIs that had both education and research foci. Three of the HEIs were multi-disciplinary in nature, with one HEI focussed only on the sciences area, and another focussed on medical science only. Participant HEIs' student and staff

numbers ranged from 8,000 to 40,000 students and 1,200 to 7,000 staff. Two participants were directors (or equivalent) and three were programme leaders (or equivalent) in RI, with all five participants experienced in PhD supervision. Three participants were research active at the time of the study and all had been working in promoting RI from three to ten years. While this is a small and non-representative sample, it is suggested the findings remain of significant value due to minimal existing evidence in the literature of what leadership styles create the best conditions for driving a positive culture of RI in HEIs.

Codes and Themes

Responses to the first question "What do you consider to be good research practice?" included research results being valid, reliable, open and transparent, along with practices being informed by policy and guidelines (Figure 1). An unexpected finding was how each participant first explicitly stated that good research practice is discipline-specific. This echoes literature on the importance of a RI leader possessing awareness of competent boundary spanning (Williams, 2002), where to maintain the appropriate levels of responsiveness, distinctness and coupling, competent boundary spanning leadership should be to the fore. Participants were consistent in revealing the areas that boundary spanning is required, suggesting differences when discussing leadership approaches specifically for developing a positive culture of RI rather than general educational purposes.

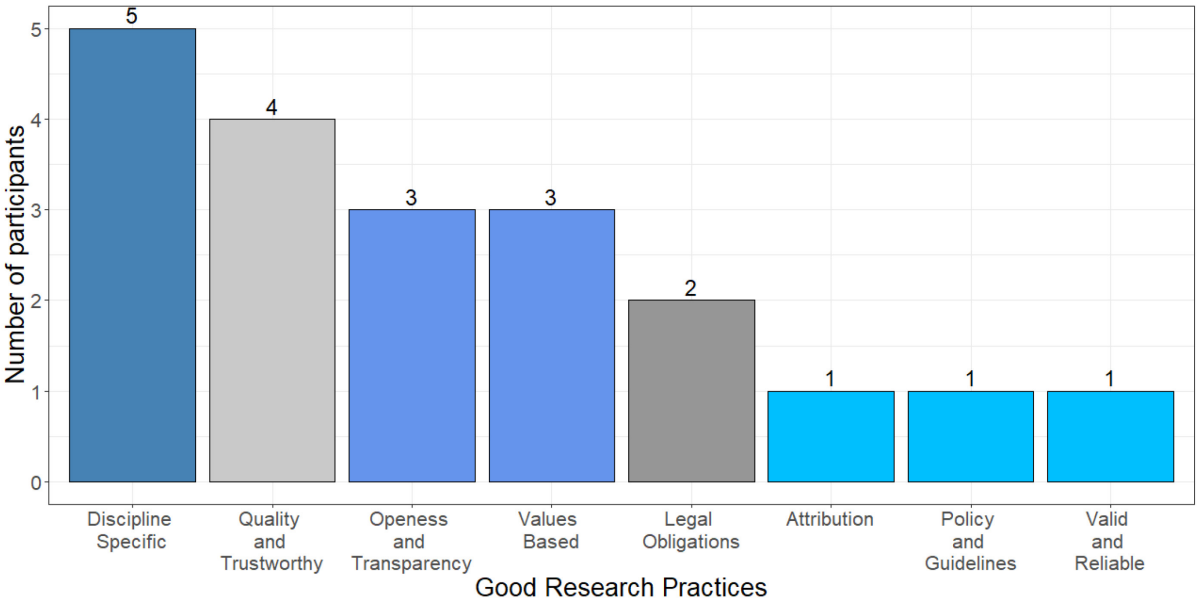

Figure 1. Summary of initial input from participants when asked the question "What do you consider to be good research practice?"

Analysis from the remainder of the questions yielded seven overarching themes, summarised in Figure 2, with mapping of codes to themes included in Appendix C.

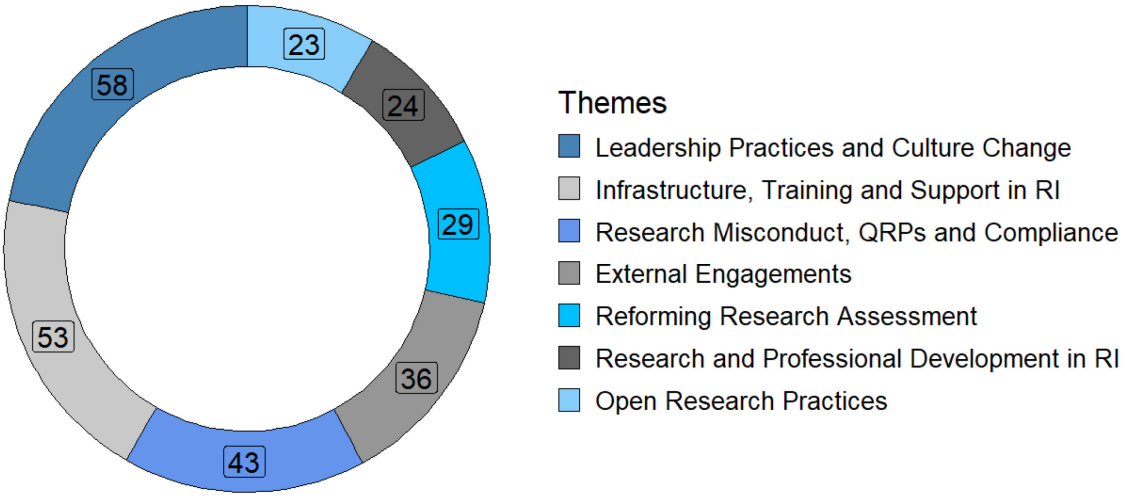

Figure 2. Overarching themes from the semi-structured interviews complemented with the number of references to each theme.

DISCUSSION

LEADERSHIP PRACTICES AND CULTURE CHANGE

While seven themes are discussed, due to order of questioning, the first gained the most attention during the interviews. All participants were explicit that cognisance is required of the relationship between RI and how it varies across disciplines, foregrounding the importance of boundary spanning leadership and being able to engage people across boundaries (Senge et al., 2014; Weick, 1976; Prysor and Henley, 2018). However, in the context of research, one participant stated they often experience incoherence and inconsistencies with HEI system leadership:

> *Several departments are organising similar things and no one on the periphery understands who is responsible for what … [a colleague and I] discovered that there are five handbooks and six websites basically providing the same content, but none of them completely complete.*

Mårtensson et al. (2016) found the interpretation of good research practice is often dependent on research context and collaborators involved. The above quote supports this argument, speaking to the inconsistencies across boundaries and the waste in resources on RI, with duplication of work yet none complete.

Time spent engaging peers and colleagues was discussed by all participants, where one participant stated "the more granular you can do that and the more local to where they are you can do it, the better. Harder work, but it is better". The same participant mentioned that if they were to start over, they "would spend even more time talking to people. Investing and listening to them". This speaks not only to a leadership approach with awareness of competent boundary spanning (Williams, 2002), but also openness

and communication (Kania and Kramer, 2011; Senge et al., 2014). In the research leadership context, the output of communicative action adds to the outputs of Labib et al.'s (2023) single case study, this current exploratory study provides a broader perspective from participants across jurisdictions in Europe.

One participant mentioned while it is the researcher's responsibility to follow good practices, the HEI leader's responsibility is to support them. While this aligns with findings from Evans et al. (2022), input from another participant goes further, adding that leadership of policy and training needs to be supported by a values-based framework, arguing if HEI leaders can first agree a set of values to follow in RI and overall good research practice, positive impact on the research culture follows. However, they noted the biggest issue with deciding values is "each institution does not have the luxury to make up its own rules…they need to be linked in with funders, prize givers and other institutions".

While all participants agreed that change in research culture is occurring, one participant added a challenge in adapting to culture change is that some researchers have a closed mindset, not realising despite "the way that the game used to be played…it doesn't mean that's the way that the game is going to be played in future". Aligning with change theory findings (Kotter, 1996; Lewin, 1947; Fullan, 2007) all participants regularly mentioned the importance of communicating expectations, including rigour, supporting careers and openness, while "behind that aligning our policies, our communications, our training, our evaluation". The leadership challenge with change, called out variously by all participants, is "embedding [change] in the day-to-day practices and structures so it is embedded in what they do, as opposed to something else to add to what they are doing already".

Infrastructure, Training and Support in RI

All participants agreed that for RI to become embedded in an HEI's research culture, there needs to be appropriate infrastructure, training and support, which was reflective of leadership literature in other fields (Muczyk and Reimann, 1987; Kania and Kramer, 2011; Stoll et al., 2012). Analogous to Evans et al.'s (2022) findings, one participant spoke to distributed leadership and the responsibility placed on HEIs to enable this:

> *There is no point in having a policy on research integrity and open research, if the library has not provided a platform, if the resources are not there, if the expertise is not there, if conversations are being had in parallel committees. So, it requires having a more joined up distributed leadership and less ownership of individual programmes.*

While this is not a unique finding, it was interesting to note two participants explicitly mentioned that often for people within HE, expertise to facilitate training on RI is lacking. One added that when it comes training it should be practical and framed around:

> *How do you get a good publication? How do you get it noticed? How do you go from a research idea to identifying collaborators? How do you identify what the best outlet is for your research? Who do you go to, to ensure it has the highest degree of visibility? Where do you go for discussions on authorship and so on?*

In the leadership paradigm, this adds to claims that to promote trust in research and researchers, not only do the correct supports need to be in place but the training needs to be practically driven (Haven et al., 2022).

Research and Professional Development in RI

Prysor and Henley (2018), Mejlgaard et al. (2020) and Science Europe (2022) state that to adapt to changes in an educational and research culture setting, there needs to be buy-in from management. One participant captured the research management landscape succinctly in terms of an unintended consequence of the current research culture, stating it has "taken [researchers] in a path where self-interest pays". While this is not necessarily comfortable to consider, when supported by another participant's comment it is hard to ignore:

> *A very strong barrier is that we seem to have many inappropriate and even wrong and perverse incentives along the way. No one is giving you career points for doing the right thing, normally, and you get your career points mainly still for publishing a lot and being cited a lot and all the rest is a waste of time from that perspective, so getting the incentive right is really important.*

In this space, the responsible use of research metrics forms an important part of RI, however two participants noted there is "minimal evidence of what works" in RI leadership and "when it comes to obtaining support from management there is a need to develop evidence-based practice". This point was echoed by all participants, who discussed the need for research and scholarship into what works in RI leadership.

One participant, when asked what they would do differently if starting over, stated they "would spend more time trying to get data", while another said if they were in management and asked to change a process or procedure, they "wouldn't do that unless someone could show [evidence] that it works" (Earley and Porritt, 2009). However, going further than Earley and Porritt (2009), when carrying out research to form the evidence base for new initiatives that may provide mechanisms for professional learning (Porritt et al., 2017) or professional development (Hargreaves, 2011), one participant noted initiatives often failed when "not co-created with users, that are not well tested, and prioritises administration over user friendliness". An interesting insight here is how leveraging a PLC (Stoll et al., 2012) could be an avenue to pilot research-related initiatives informally as "you only discover user friendliness and also comprehensibility when you test".

Open Research Practices

All participants mentioned the importance of OR practices in promoting a culture of RI, with one participant noting were they to start over in their RI work, they would have "from the very beginning framed a lot of our work as open and responsible research". Three participants felt that in principle no researcher is against OR, but whether there are appropriate resources to support good practice is the real issue, which depends on the HEI size, funds and appropriate expertise to show what good OR practices are.

Although OR is seen as a key component to good research practice, two participants highlighted a point not mentioned in the literature, that not all OR is good research:

> *…there is a danger there, of course, in that not all research that is open, is done with integrity. There is a hierarchy. Transparency makes it easier to evaluate integrity. A badly executed plan of work that is transparent isn't any better fundamentally.*

This speaks to the interrelationship between OR and RI, in that if a researcher shares poor research openly, then the openness of the methods and outputs enables the RI to be determined, and any shortcomings highlighted.

External Engagements

Two main facets emerged relating to external engagements: external collaborations on research studies and communities of practice; and engaging with external agencies' demands and expectations around good research practice. Considering external collaborations, four participants engaged in some type of external learning community and the overarching impression was this is "a really good way of keeping up to date and [having] an awareness of what's happening".

While all participants were advocates of external collaborations, three highlighted the need for research leaders to be involved in decision making of external agencies to enable "direct insight into what is happening, as opposed to just being at the receiving end of what comes out of these bodies". All participants cited the power of funding agencies, with one noting: "Funders say open access and that's what we do. Funders say open data, and that's what we do. Funders are much more powerful than the management of research institutions". Being involved in meetings with external agencies was considered critical so issues around infrastructure, resources and training could not be ignored when potential targets were being altered by these agencies.

Two participants discussed the importance of conversations occurring in external meetings to be filtered down locally, expanding on the findings of Labib et al. (2023) that conversations around governance of good research practices and research quality should occur at the start of research collaborations and involve the researchers in establishing RI rules. This may also be where PLCs (Stoll et al., 2012) could support as a forum for external communication to be shared.

Research Misconduct, QRPs and Compliance

Nature (Ed.) (2019) states that RI is much more than research misconduct and questionable research practices (QRPs), which was evident in the interviews where references to *Research Misconduct, QRPs and Compliance* was not the most prevalent theme. One participant remarked "people's minds default to misconduct because to some extent that's all there was. That is where it all started", while in reality:

> *…no researcher goes to work on a Monday morning and sets out to do bad research. It is just that they end up doing research that is bad because of a variety of competing pressures. Sometimes it's that they don't have the training to do good research…Sometimes it is because of the expectation placed on them because of their institution, either directly in terms of this is what your annual target is, or what the institution requires of them for promotion or continuation of contract.*

All participants agreed research misconduct does happen but is not as widespread as some may perceive, while the wider issue is around QRPs:

> *…[RI] has a lot more to it than just avoiding FFP [Falsification, Fabrication, Plagiarism]. Trying to make people aware that the practices that have the biggest impact on the trustworthiness of science are not stealing and cheating and lying practices, it's the poor analysis practices. It's not keeping records of what you're doing, it's stuff that is every day. It is the everyday mistakes and nobody is morally deficient because they do them. But maybe we are quite not aware of the impact of these as researchers.*

All participants agreed the essential nature of communicating research misconduct procedures within HEIs, with transparency around procedures. One participant noted that while changing "may not be costly financially, it is expensive in resource terms because we are asking people to change what they do" and so time is needed. There could be learnings here from creating a mechanism to "generate short term wins" (Kotter, 1996, p.23) to recognise success with change. This also speaks to recognising researchers for carrying out good research practices in terms of RI and OR and other related areas, which forms an integral component of discussions internationally on reforming research assessment.

Reforming Research Assessment

All participants agreed that reforming research assessment will impact the current research culture, with one participant specifically referencing PhD students as "almost exclusively do[ing] their PhDs by publication" as opposed to acknowledgement of other research contributions, e.g. data management plans, sharing data openly, conference presenting, open access journal publications. They stated, "there's publication pressure for everyone, but I do think our PhD students are particularly under an awful lot of pressure". While the existing literature (Ayres, 2022; Woolston, 2019) supports these

findings, it is interesting to note the prevalence, even for staff, of good research practices "not reach[ing] a level of acknowledgement in terms of assessment for promotion or tenure", where "we all know that people are valued more on the article that they produce, rather than other tasks such as teaching or supervision". Although this is only a small-scale study and therefore cannot be deemed representative, it is worth noting how this finding recognises the need to implement new research assessment forms (Horbach et al., 2022) with Science Europe et al.'s (2022) CoARA vision for reforming research assessment extremely timely and needed.

Summary

From the five interviews, all participants spoke of engaging across boundaries consistently and had similar mindsets relating to good research practices with RI and OR impacting the research culture. The findings showed that in the crossover between research and leadership, embedding change in day-to-day practices and structures was considered both the main leadership challenge and of high importance. Adding to this is the support of Casci and Adams (2020) in that the changes should be values-based with practical training around implementing them, not simply information sessions on the importance of good research practices, but more with a focus on how to align with HEI values. However, all five participants highlighted the need for research and scholarship into what works in RI leadership.

Participants added that when it comes to implementing new practices, these should be tested. Establishing PLCs that are informed by external engagements could be an avenue for this testing, with a focus not only on RI, but also OR in parallel. Unsurprisingly all participants mentioned time as a major challenge in implementing good research practices, however more prevalent was the lack of formal recognition for work in this space. This speaks to recognising researchers for carrying out good research practices in terms of RI and OR and other related areas, which forms an integral component of discussions internationally on reforming research assessment.

The aim is that findings from this small-scale exploratory study join the leadership and research literature within the European context which can provide unique initial insights to inform future research.

Limitations

A key limitation was the small sample size and with five participants across HEIs in three European countries there is the potential for biases through self-reporting. To maintain participant anonymity minimal demographic information could be utilised. If the study were larger additional demographic information would be analysed to allow greater synergy between qualitative and quantitative analysis, with attention to participant roles, experiences, gender along with having a geographic balance. For a broader study on the synthesis between leadership and RI, a mixed-methods approach could be advantageous while an increase in sample size would seek to include several practitioners in each region to allow for comparison within and across regions.

Furthermore, a broader study could benefit in including research leaders from different disciplines and different backgrounds, including but not limited to, PhD supervisors, research group leads, heads of department, institutional leads for research, and professional services. Due to the minimal evidence or discussion on successful leadership models in RI in the literature however, there was no secondary data available that could be used to explore hypotheses. This, combined with the exploratory goals of the study, meant the selected methods were deemed appropriate for initial insights to inform future research (Connolly, 2016).

Researcher positionality is a justifiable concern around a potential power-play in relation to expected answers in the semi-structured interviews based on the authors' own potential ontological and epistemological beliefs (Holmes, 2020). While efforts to mitigate against this were implemented by the authors through sharing interview transcripts and summary fundings with participants, the authors also adopted reflexivity in tandem with positionality. The authors have an awareness that their positionality may change over time and is not fixed and thus are open to other opinions and positions and did not knowingly lead, influence or bias any aspect of the research design and overall conduct of research.

It is also noted while this study focuses on leadership approaches which create a positive culture of RI, there are impacts on the broader research culture including equality, diversity and inclusion, engaged research and human resources which could be considered if expanding the current area of enquiry.

CONCLUSIONS

The key findings from this exploratory piece of research centred around the need for competent boundary spanning in leadership approaches, the challenges and criticality of embedding change in systems and structures, and the need for more information, in the form of research and training, to support leadership development.

In response to RQ1 (leadership styles), findings from the study showed the overarching leadership style to promote a positive culture of Research Integrity (RI) within HEIs was collective with adaptive and competent boundary spanning characteristics within a system, along with cognisance of the need for continuous professional development. With the latter, there was compelling evidence of the positive impact of external engagement, both in working with external agencies and communities of practice, with the need for learning from these external engagements to be filtered through HEIs, perhaps through professional learning communities (PLCs). There was agreement among all participants that change in research culture is occurring and leaders need to adapt, with the need for research and scholarship into what works in RI leadership. Findings also outlined that for HEIs to be proactive to change, with support from management in resourcing the appropriate infrastructure and training, evidence-based research in collaboration with the future users is essential for the sustainability of change in research culture.

In answering RQ2 (effective practices), participants found collaboration and engagement with the research community (both internal and external) to be effective in leading change, along with regularly gathering research evidence to inform decisions. Findings showed outlining core values and principles around expectations of good research practices at institutional level is the initial step in promoting a positive culture of RI, but these need to be subsequently supported by policy and practical training at various levels within HEIs. It was expected that RI would be seen as an integral component of a positive culture of RI, but what was surprising was how RI and OR were often mentioned together, although the study participants were clear that the two practices are distinct.

Overall, this study uncovered strong perceptions that promoting a positive culture of RI in day-to-day practices and structures was considered both a leadership challenge and of high importance, which highlighted the need for further research and training support. The aim is that findings from this study will encourage further scholarship in this area that should contribute to HEIs' development of training and strategy surrounding leadership in RI.

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APPENDIX

A. INITIAL INTERVIEW SCHEDULE

Introduction

- Confirm receipt of consent form.
- Reiterating information on anonymity and data storage.
- Explain why this topic has been chosen.
- Details on interview: length, notes, request permission to record.
- Reiterate questions can be skipped if needed, along with the right to withdraw at any point.
- Confirm that it is okay to commence?

Control questions

1. Can you please confirm your role title?
2. How long have you been in the current role? Or working in areas relating to current role?
3. In your current role, do you have time to carry out research of your own?

Theme 1 – Compliance and enhancement issues in Higher Education research

4. What do you consider to be good research practice?
5. What do you see as compliance and enhancement issues in Higher Education research in your HEI?
6. How do you stay up to date with compliance and enhancement issues in Higher Education research?
7. Where are the pressures for these issues coming from?
8. What are the repercussions if these issues are not addressed?
9. How do you approach addressing these issues internally?

Theme 2 – Leadership obstacles to promoting good research practices

10. How would you describe your approach to leading your area to promote good research practices?
11. What are the obstacles, if any, you encountered in your leadership in promoting good research practices?
12. Are there initiatives that were particularly successful in promoting good research practices? Why do you think these initiatives worked?
13. Are there initiatives that were not successful in promoting good research practices? Why do you think these initiatives did not work?
14. Do you incentivise good research practices at your institution? If yes, how do you? If no, are there reasons for not?

Theme 3 – Procedures around research misconduct

15. How do you handle alleged cases of research misconduct?
16. Do you have different procedures for addressing research misconduct for students and for staff?
17. In relation to disciplinary procedures for staff research misconduct, who did you engage with to develop the procedures in addressing alleged cases of research misconduct?
18. What impact do you think research misconduct procedures have on the culture and perceptions of research integrity at your institution?

Theme 4 – Leading change to embed good research practices in the research culture

19. How did you approach embedding good research practices in the research culture in your HEI?
20. How have you distributed responsibility for championing research integrity throughout the institution?
21. If you were to start over in designing and leading interventions around research integrity at your institution, is there anything different that you might do?

Closing

- Explain timeline for forwarding interview transcription for data validation.
- Confirm that a copy of final results will be shared after submission of the dissertation.

B. RSTUDIO SCRIPT FOR FIGURES

Script for Figure 1

```
Cat<-c("A","B","C","D","E","F","G","H")
```

```
Value<-c(5,4,3,3,2,1,1,1)

df<-data.frame(Cat,Value)

fill <-
c("steelblue", "gray79", "cornflowerblue", "cornflowerblue", "gray59", "deepskyblue", "deepskyblue", "deepskyblue")


library(ggplot2)

windows(20,10)

ggplot(df,aes(x=Cat,y=Value))+geom_bar(stat="identity",fill=fill,color="black")+theme_bw()+

  geom_text(aes(label=..Value..),vjust=-0.3,size=6.5)+

  theme(text = element_text(size=20))+labs(y="Number of participants", x="Good Research Practices") + scale_x_discrete(labels=c("A"="Discipline \nSpecific", "B"="Quality \nand \nTrustworthy", "C"="Openess \nand \nTransparency", "D"="Values \nBased", "E"="Legal \nObligations", "F"="Attribution", "G"="Policy \nand \nGuidelines", "H"="Valid \nand \nReliable"))
```

Script for Figure 2

```
library(ggplot2)

df <- data.frame(count=c(58, 53, 43, 36, 29, 24, 23),

                 Themes=c("Leadership Practices and Culture Change", "Infrastructure, Training and Support in RI", "Research Misconduct, QRPs and Compliance", "External Engagements", "Reforming Research Assessment", "Research and Professional Development in RI", "Open Research Practices"))


df$Themes<-ordered(df$Themes,

                   levels=c("Leadership Practices and Culture Change", "Infrastructure, Training and Support in RI", "Research Misconduct, QRPs and Compliance", "External Engagements", "Reforming Research Assessment", "Research and Professional Development in RI", "Open Research Practices"))


# Compute percentages

df$fraction = df$count / sum(df$count)

df = df[order(df$fraction), ]

# Compute the cumulative percentages (top of each rectangle)

df$ymax = cumsum(df$fraction)
```

```
# Compute the bottom of each rectangle
df$ymin = c(0, head(df$ymax, n=-1))

# select colours
fill <-
c("steelblue", "gray79", "cornflowerblue", "gray59", "deepskyblue", "gray39", "lightskyblue")

windows(20,10)
(ggplot(df, aes(fill=Themes, ymax=ymax, ymin=ymin, xmax=4, xmin=3)) +
   scale_fill_manual(values=fill)+ geom_rect(colour="black") +
 coord_polar(theta="y") +  xlim(c(0, 4)) +  theme_void() +
   geom_label(aes(label = count,x = 3.5,y = (ymin + ymax) / 2),inherit.aes = TRUE,
     show.legend = FALSE,size=8)+
 theme(text = element_text(size=25))+
   theme(legend.spacing.y = unit(0.5, 'cm'))  +
      guides(fill = guide_legend(byrow = TRUE)))
```

C. Mapping of Codes to Themes

Table 2. Mapping of collated codes, using axial coding, to overarching themes.

THEMES		COLLATED CODES	
LABEL	NO. OF REFERENCES	LABEL	NO. OF REFERENCES
Leadership and Change Management	58	Attributes to Good Leadership	22
		Culture Change	22
		Consistency across Disciplines	14
Infrastructure, Training and Support in RI	53	Good Research Practice	20
		Training	12
		Capacity and Resources	9
		Awareness	6
		Supportive Environment	6
Research Misconduct, QRPs and Compliance	43	Policy and Procedures	14
		Internal Review	11

THEMES		COLLATED CODES	
LABEL	NO. OF REFERENCES	LABEL	NO. OF REFERENCES
		Oversight and Supervision	10
		QRPs	5
		National Authority	3
External Engagements	36	External Agencies	19
		External Collaborations	17
Reforming Research Assessment	29	Research Assessment	17
		Incentive to Publish	6
		Research Metrics	4
		Incentive for Good Research Practices	2
Research and Professional Development in RI	24	Evidence-based and Co-created with Users	14
		Professional Learning	6
		Scholarship	4
Open Research Practices	23	Shared Learning Environment	9
		Open Communication	7
		Open Research Methods	5
		Disseminating	1
		Intellectual Property	1

BIOGRAPHIES

Seán Lacey, BSc, PhD, MBA is the Research Integrity & Compliance Officer in Munster Technological University (MTU). Previous to this role, Seán was a Senior Lecturer in the Department of Mathematics (MTU, Cork Campuses). Research interests include the role of statistical analysis in real-world data analysis matters with a special interest in leadership and promoting good practice in research ethics, research integrity and open research.

Jennifer J. Wilkinson, BA, MBA is Pro Vice-Chancellor at Liverpool Hope University and Academic Associate at UCL. Jenny has worked in several UK HEIs and has particular expertise in international development initiatives. Her research interests include gender and wellbeing in higher education, alongside ongoing work exploring the intersection between internationalisation and climate action in higher education.

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Seán Lacey 0000-0003-3005-6294: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing

Jennifer J. Wilkinson 0000-0001-5441-4282: Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing

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