



## **Exploring equality and diversity using REF2014 environment statements**

**Report to HEFCE by the Careers Research & Advisory Centre (CRAC)**

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## 1. Executive summary

The Higher Education Funding Council for England (HEFCE) commissioned CRAC to undertake a retrospective analysis of information submitted by institutions to the 2014 Research Excellence Framework (REF2014) in relation to equality and diversity (E&D) in their research environment. The aim was to provide evidence of E&D activity contributing to the development of research cultures and environments at Unit of Assessment (UOA) level, in the period leading up to submission in late 2013.

More specific research objectives included identifying:

- The extent to which institutions were participating in known national E&D initiatives (such as award schemes including Athena SWAN and Stonewall) at the REF census date;
- How reported participation in such initiatives varied at main panel and UOA level, which could indicate the 'reach' of these initiatives within institutions and departments;
- Other initiatives or activities enhancing E&D in the research environment;
- Any trends in results and particularly linkages between institutions' reporting of specific E&D activities and their REF2014 outcomes.

The approach taken was to extract and analyse the 'People' sections of the 1,911 environment statements submitted to REF2014, containing sub-sections headed 'Staffing strategy and staff development' and 'Research students'. Guidance to institutions had asked them to report on how they were addressing E&D in their research environment. Collectively these texts comprised around 2.9 million words. This quantity of largely unstructured narrative text was beyond the scope of manual (human) analysis, so a hybrid approach was used to process, analyse and interpret the information, using computational methods to aid human investigation. This included both data-driven and hypothesis-driven methods of analysis. The project was experimental in nature and the use of processes very iterative in nature.

These text-mining approaches revealed the importance of contextual analysis in interpreting results, as many key terms (for example, relating to protected diversity characteristics) were more commonly used in other contexts (i.e. research topics) than to describe the research environment which was the theme of the study. Equally, one third of occurrences of an award name were aspirations to achieve that award rather than reporting that it had been received.

In relation to E&D in the research environment, the **main findings** from this project included (at the time of the REF2014 submissions):

- A focus by institutions predominantly on gender (and to a lesser extent pregnancy and maternity), much more than on other protected diversity characteristics;
- Of those other characteristics, age and disability were the next most commonly mentioned, more so than ethnicity, while other characteristics were rarely mentioned;
- A positive relationship between reporting of Athena SWAN awards (or the intention to obtain them) and attention to E&D within submissions;
- E&D issues overall (and gender in particular) were reported somewhat more commonly in submissions to Main Panels A and B (than to C and D). Several of the other protected characteristics were more commonly reported in Main Panels C and D rather than A and B;
- Submissions right across the UOA spectrum mentioned the Athena SWAN initiative, but the pattern reflected its original provenance in the sciences;
- Evidence of varying institutional strategies and approaches to supporting submissions, in relation to reporting of E&D initiatives, at UOA level – some institutions had provided common wording to be used in relation to particular awards or initiatives, but this was not the case in the majority of submissions;
- In some cases, not all the UOA submissions from an institution which had a particular institutional award reported it;
- Evidence suggesting a positive relationship between REF research environment sub-profiles (scores) and reference to key E&D terms within submissions, overall and at the level of the main panels;
- Evidence that research-intensive institutions reported more specific awards and initiatives than non-research-intensive.

Caution is necessary in interpreting these findings as this study was highly experimental and the sections of the environment statements analysed comprised only around one fifth of the narrative text provided within each environment statement submitted. Nonetheless,

in the context of the Stern Review of REF2014<sup>1</sup> and current consultation on REF2021,<sup>2</sup> the study suggests **the following recommendations:**

- Institutions and the sector should widen their efforts and activities in relation to enhancing E&D in the research environment to encompass protected characteristics in addition to their current welcome focus on gender;
- For REF2021, our evidence suggests that the best approach to providing information about the research environment would be to use a combination of quantitative and narrative approaches within submissions, and for assessment panels to review and assess submissions both quantitatively and qualitatively;
- If participation in currently widespread national initiatives, such as Athena SWAN or the European HR Excellence in Research award, is used to provide quantitative metrics in relation to E&D in the research environment in REF2021, a range of initiatives will be needed so as to avoid a narrow gender focus;
- The need for some contextual underpinning suggests that in future UOAs submitting information about their research environment will need to continue to have scope to describe the context for their activities in relation to E&D, through some element of narrative text;
- A revised and more structured UOA research environment template would be beneficial in REF2021, potentially including a specific E&D section, as has been proposed in the current REF consultation;
- More specific guidance should be given to institutions on the types of activities and measures relating to E&D that submitting units should cite in their submissions;
- As many E&D initiatives are currently at institutional level, these would be more systematically and robustly reported using an institutional research environment template, in addition to a UOA-level template to report more local activities and evidence for research culture including in relation to E&D.

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<sup>1</sup> Review of the Research Excellence Framework: Building on Success and Learning from Experience, Department for Business, Energy & Industrial Strategy, 2016

<https://www.gov.uk/government/publications/research-excellence-framework-review>

<sup>2</sup> Consultation on the second Research Excellence Framework, HEFCE, 2016,

<http://www.hefce.ac.uk/pubs/year/2016/201636/>

## 2. Introduction

### 2.1. Context – equality and diversity in UK higher education research

Equality and diversity (E&D) issues in higher education (HE) research, particularly the under-representation of women, have gained increased recognition nationally and internationally, as well as at the institutional level.<sup>3,4,5</sup> There are a number of underpinning rationales for achieving improved diversity in science and research:

- An increase in the diversity of research teams correlates positively with research quality, as more diverse teams are more creative and produce a greater diversity of ideas;
- Increased diversity can correlate positively with higher performance;
- Equality of opportunity: every current and potential researcher, at any level, should have the chance to fulfil their potential, free from discrimination;
- The ability to attract the best talent into the research workforce in future will be hindered if it is perceived not to be fair.

Over the last 10 years, a number of E&D initiatives specific to the academic research environment have been developed to improve its inclusiveness. Most prominent amongst these is the Athena SWAN Charter<sup>6</sup> which was established in 2005 by the Equality Challenge Unit (ECU) to recognise institutions' commitment to advancing the careers of women in Science, Technology, Engineering, Maths and Medicine (STEMM) in higher education. In 2015 it was extended to include the Arts, Humanities, Social Sciences, Business and Law (AHSSBL). The Charter was also extended to include those in professional and support roles within institutions, as well as researchers, and to address gender equality more broadly. There are three levels of the Award (Bronze, Silver and Gold) and it can be achieved at both institutional and departmental level. As at September 2016, 96 different UK research institutions between them held 574 Athena SWAN Awards. ECU has also recently piloted a Race Equality Charter<sup>7</sup> to improve the representation, progression and success of staff and students of ethnic minority background within HE.

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<sup>3</sup> Meta-analysis of gender and science, European Commission, 2012

<sup>4</sup> Gender Equality Policies in Public Research, Helsinki Group on Gender in Research and Innovation, 2013

<sup>5</sup> Equality and Status of Women in Research, Global Research Council, 2016

<http://www.globalresearchcouncil.org/documents>

<sup>6</sup> Athena SWAN Charter [www.ecu.ac.uk/equality-charters/athena-swan/](http://www.ecu.ac.uk/equality-charters/athena-swan/)

<sup>7</sup> Race Equality Charter [www.ecu.ac.uk/equality-charters/race-equality-charter/](http://www.ecu.ac.uk/equality-charters/race-equality-charter/)

Another example is Project Juno<sup>8</sup> which was established by the Institute of Physics in 2007 to recognise and reward physics departments that are addressing the under-representation of women in university physics and to encourage better practice for both women and men. It has complementary aims to Athena SWAN, and physics departments with Athena SWAN Awards can fast-track to a Juno Award at an equivalent level. In 2016, 44 UK physics departments had Juno Awards.

The Concordat to Support the Career Development of Researchers<sup>9</sup> was updated in 2008 as a set of principles for the support and management of research careers. One of the principles states that E&D must be promoted in all aspects of the recruitment and career management of researchers. It was signed by Universities UK and Guild HE on behalf of UK universities and the major UK research funders, including the Higher Education Funding Council for England (HEFCE). The Concordat is the primary mechanism for UK institutions to participate in the European HR Excellence in Research Award; 98 UK institutions hold the Award, as of summer 2016.<sup>10</sup>

As part of HEFCE's implementation strategy for the Concordat to Support the Career Development of Researchers it funded Vitae in 2011 to develop 'Every Researcher Counts',<sup>11</sup> a suite of resources to help universities understand, prioritise and make visible E&D among their researchers. HEFCE also funded the Premia<sup>12</sup> project based at Newcastle University from 2003 to 2005 in order to enhance the development of disabled doctoral researchers and also those who support them.

UK institutions also engage in more general E&D initiatives, such as Stonewall,<sup>13</sup> which supports employers to 'offer inclusive, equal and inspiring environments for lesbian, gay, bi and trans people' by embedding an inclusive and accepting culture. Other examples are the 23 UK institutions that are signatories to a charter for employers which are positive about mental health, developed by Mindful Employer<sup>14</sup> in 2004, and those signing up to the government's Disability Confident scheme (which has replaced the 'Two Ticks' scheme).

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<sup>8</sup> Institute of Physics, Project Juno [www.iop.org/policy/diversity/initiatives/juno/index.html](http://www.iop.org/policy/diversity/initiatives/juno/index.html)

<sup>9</sup> Vitae, Concordat to Support the Career Development of Researchers [www.vitae.ac.uk/concordat](http://www.vitae.ac.uk/concordat)

<sup>10</sup> HR Excellence in Research Award holders <https://euraxess.ec.europa.eu/jobs/hrs4r>

<sup>11</sup> Vitae, Every Researcher Counts [www.vitae.ac.uk/everyresearchercounts](http://www.vitae.ac.uk/everyresearchercounts)

<sup>12</sup> Vitae, Premia [www.vitae.ac.uk/premia](http://www.vitae.ac.uk/premia)

<sup>13</sup> Stonewall [www.stonewall.org.uk/](http://www.stonewall.org.uk/)

<sup>14</sup> Mindful Employer [www.mindfulemployer.net/](http://www.mindfulemployer.net/)



As a public sector body, HEFCE has a general duty to advance equality of opportunity through the Equality Act 2010, showing 'due regard' across all its functions. HEFCE has taken a proactive approach to E&D including mainstreaming E&D in policies and funding to encourage institutions to embed E&D in their research activities.<sup>15</sup> Practically, the 'Every Researcher Counts: equality and diversity in researcher careers' project that it has funded provides dedicated resources, case studies and briefings to improve the understanding of E&D issues amongst those who support and manage researchers in HE institutions.<sup>16</sup>

## **2.2. The Research Excellence Framework (REF)**

The Research Excellence Framework (REF) was introduced in 2014 as the new system for assessing the quality of research in UK HE institutions, replacing the Research Assessment Exercise (RAE), which had been implemented roughly every five years since 1986. The deadline for REF2014 reporting was 29 November 2013, so its submissions present a snapshot of HE research activity prior to that time, while the results and profiles were published on 18 December 2014.

The REF was undertaken by the four UK HE funding bodies<sup>17</sup>, managed by the REF team based at HEFCE and overseen by the REF Steering Group which consisted of representatives of the four funding bodies. The outcomes of the REF are principally used in these ways:

- HE funding bodies used the assessment outcomes to inform the selective allocation of their research funding to HE institutions;
- The assessment provides some accountability for public investment in research and produces evidence of the benefits of this investment;
- The assessment outcomes provide a certain amount of benchmarking information and establish reputational yardsticks.

A consultation is currently underway as part of the development of the next exercise, which is scheduled to take place in 2021.

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<sup>15</sup> HEFCE Equality and Diversity Statement and Objectives 2016-17, HEFCE, March 2016/05

[www.hefce.ac.uk/pubs/year/2016/201605/](http://www.hefce.ac.uk/pubs/year/2016/201605/)

<sup>16</sup> Every researcher counts [www.vitae.ac.uk/doing-research/every-researcher-counts-equality-and-diversity-in-researcher-careers](http://www.vitae.ac.uk/doing-research/every-researcher-counts-equality-and-diversity-in-researcher-careers)

<sup>17</sup> Higher Education Funding Council for England (HEFCE), Higher Education Funding Council for Wales (HEFCW), Department for Employment & Learning, Northern Ireland (DEL), Scottish Funding Council (SFC)

REF2014 was a process of expert review of the submissions made by HE institutions at the end of 2013. The 154 HE institutions participating in REF2014 made submissions to 36 Units of Assessment (UOAs), which were assessed by an expert sub-panel, working under the guidance of four over-arching main panels (A-D). The assessment was conducted according to the panel criteria for each main panel area.

Each submission to a UOA contained a common set of data and information comprising:

- Information on the staff in post on the census date (31 October 2013) selected by the institution to be included in the submission;
- Details of publications and other forms of assessable output that the selected staff had produced in the period 1 January 2008 to 31 December 2013;
- A completed template describing the submitted unit's approach to enabling impact from its research (an 'impact statement') and case studies describing specific examples of impacts achieved from its research during the period 1993 to 2013 inclusive;
- Data about research doctoral degrees awarded and research income relating to the period August 2008 to July 2013;
- A completed template describing the research environment during the period 1 January 2008 to 31 July 2013 (the 'environment statement').

Between them the 154 institutions making submissions to REF2014 provided information on 52,077 full-time equivalent staff and 191,232 research outputs for assessment, along with 6,975 impact case studies. A total of 1,911 environment statements were submitted.

### **2.3. Equality and diversity in REF2014**

Considerable work was done by the funding bodies to embed E&D considerations in REF2014. Following a review commissioned by the ECU of the processes through which E&D were promoted in the 2008 RAE, the equality measures for REF2014 were developed in consultation with an Equality & Diversity Advisory Group (EDAG) and, subsequently, overseen by an Equality & Diversity Advisory Panel (EDAP), in order to handle E&D considerations more sensitively, fairly and consistently than was thought to have been the case in previous assessment exercises.<sup>18 19</sup>

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<sup>18</sup> Equality and diversity in the 2014 Research Excellence Framework, EDAP, 2015

<http://www.ref.ac.uk/equality/edapreport/>

Institutions making a submission to REF2014 were required to develop, document and apply a Code of Practice on their selection of staff in the assessment. These were submitted in advance of REF submissions for review by EDAP and approval by the funding bodies, as a condition of making a submission to the REF. They were also required to conduct an equality impact assessment (EIA) on their policy and procedures for selecting staff for the REF. This led to an increase in the proportion of staff submitted in REF2014 compared with previous exercises,<sup>20</sup> with adjustments to take into account individual staff circumstances that could have impacted on their research productivity.

The 2014 REF process generated a significant quantity of information in relation to E&D, which provides a potential source for research into these aspects of the UK HE research sector and the HE research environment in the years leading up to it. Within this body of information, the 1,911 research environment statements submitted are the subject of the analysis in this project.

#### **2.4. REF2014 environment statements**

The environment statement template was structured to include four main components:

- Research strategy;
- People (staffing strategy and staff development; and research students);
- Income, infrastructure and facilities;
- Collaboration and contribution to the discipline or research base.

Although the guidance provided to institutions by Main Panels A-D differed in detail, all sub-panels assessed the research environment in terms of its 'vitality' and 'sustainability', with each main panel criteria statement providing further information about how these criteria would be understood.<sup>21</sup> The main panel criteria statements also outlined how sections of the environment template would be weighted in the assessment.

The 'People' component (or section) contained two sub-sections – 'Staffing strategy and staff development' and 'Research students'. Although guidance from the four main panels was not uniform, there were common elements in relation to how submissions should address the following issues in the 'Staffing strategy and staff development' sub-section:

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<sup>19</sup> The impact of the process to promote equality and diversity in the Research Assessment Exercise 2008, ECU, 2009 <http://www.ecu.ac.uk/publications/equality-and-diversity-in-the-rae2008/>

<sup>20</sup> EDAP, 2015

<sup>21</sup> REF2014 Guidance and criteria [www.ref.ac.uk/about/guidance/](http://www.ref.ac.uk/about/guidance/)

- How the staffing strategy related to the unit's research strategy and physical infrastructure;
- How there was career development support for all staff pursuing a career in research (including research assistants and postdoctoral researchers) and at all stages of their careers;
- Evidence of implementation of the Concordat to Support the Career Development of Researchers;
- Evidence of how the submitting unit supported E&D, particularly equality of opportunity in relation to recruitment, progression and support.

Guidance from Main Panel D also specifically mentioned evidence of support for equal opportunities in the recruitment and support of research students, within the 'Research students' sub-section.

Typically the People section or component of a completed environment statement template contained 1,500-2,000 words of text. Taken together, the 1,911 People sections of the submitted environment templates were the locus and primary information source for this project.

The environment statements were used by the sub-panels to develop an environment sub-profile for each submitted unit, which was published along with the statement itself, in parallel with the overall REF2014 profiles and results.

### **3. Project aims, themes and approach**

#### **3.1. Aims and objectives**

Two of the conditions sought by UK HE in its quest for excellence and sustainability are equality of opportunity and an environment that fosters diversity. HEFCE has embarked on a programme of work with UK HE institutions to facilitate the sector's progress in achieving these conditions, by seeking to understand how institutions are themselves making progress and identifying further opportunities to accelerate it. Within this programme of work it committed to two new projects. One, titled 'Sector-leading and innovative practice in advancing equality and diversity'<sup>22</sup>, aimed to identify innovative or sector-leading practice in E&D, through a qualitative analysis of institutions' self-evaluations of their E&D activity submitted in response to a call for evidence. This project was conducted by ECU, and the findings are the subject of a separate research report which will be published shortly.

The second of those projects is described in this report. Its principal aim was to provide additional understanding of the E&D initiatives, programmes and cultures implemented by HE institutions, and departments within them, during their research activity. The aim was to provide evidence of activity supported by and/or contributing to the development of institutions' (and/or their constituent departments') research environments and research cultures.

At HEFCE's suggestion, the research project was designed to achieve this by a retrospective analysis of information submitted by institutions to REF2014 in relation to their research environment.

It was hoped that such an approach could enable insights to be gained into practice within institutions, overall but also specifically at REF UOA level, which is a more granular level than sought through the 'whole-institution' approach taken in the parallel project by ECU. In doing so, it was hoped that it would be possible to investigate the 'reach' of certain known E&D initiatives within institutions, and the extent to which E&D activities and cultures are embedded within research environments and cultures at local level, i.e. at the 'coal face' of research activity.

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<sup>22</sup> Sector-leading and innovative practice in advancing equality and diversity, ECU, 2017  
<http://www.hefce.ac.uk/pubs/rereports/year/2017/edpractice/>

HEFCE also expressed the aspiration that the research might reveal some understanding about the elements of E&D initiatives that institutions find most useful when embedding E&D and inclusivity in their research activity, and also uncover other types of activity that are significant locally on the E&D agenda.

### **3.2. Research objectives and questions**

A range of more specific research objectives were developed:

- To identify the extent to which institutions were participating in known national E&D initiatives (such as award schemes including Athena SWAN, Project Juno and Stonewall) at the REF census date, based on the information they provided within their research environment submission at UOA level;
- To identify how reported participation in such known initiatives varied at REF main panel and UOA level, which might give an indication of the reach of different initiatives down to these levels within institutions and their departments;
- To identify other initiatives or activities, at national or more local level, dedicated to enhancing the E&D of the research environment, and a potential indication of their take-up within disciplines, institutional units or types of institution;
- To consider any observable relationships between institutions' reporting of specific E&D activities and their REF2014 outcomes;
- To place observations in the context of knowledge from other sources of information available in the sector, through any comparable analytical approaches available;
- To identify and develop a small range of case studies at UOA level that illustrate good or effective practice in embedding E&D and inclusivity within the research environment, in order to share and spread knowledge and practice across the sector (Appendix 2).

### **3.3. Research approach and method**

The only requirement placed on those preparing environment statements for REF2014 in relation to the 'People' section was that it should consist of two sub-sections; 'Staffing strategy and staff development', and 'Research students'. The vast majority of information in these sections was provided in textual narrative form (prose, rather than tabular or other format). Each environment statement was submitted as a PDF file.

Collectively the 1,911 People sections comprise around 2.9 million words. This quantity of largely unstructured text was beyond the scope of manual (human) analysis within the time constraints of this project. Accordingly, a hybrid approach was used to process,

analyse and interpret the information, using computational methods to aid human investigation. This included both data-driven and hypothesis-driven analysis methods. Given the exploratory nature of the research, an iterative approach was used throughout. A description of the methodologies used is given in Appendix 1.

### **3.4. Project challenges and limitations**

The size of the corpus of text extracted from the 1,911 submissions, although too large for manual analysis, is relatively small for some aspects of automated text analysis, limiting the range of analytical methods open to us. A further challenge was that there was some inconsistency, and/or inaccuracy, in the use of terminology by different submitting UOAs. While care was taken to alleviate this by searching a wide range of terms and amalgamating similar activities where possible, to account for different descriptions for them, this could limit the results emerging from the analysis.

Inherently, certain words which could be used in an E&D context could also be used in other ways. For example, words such as 'gender' and 'ethnicity', which are protected characteristics under the Equality Act 2010, could also be used in reference to a submitted researcher's specialism. Contextual analysis would be necessary to distinguish between these cases, but was not always possible given the scale of the corpus of submissions.

Some of the activities described, such as a mentoring or coaching scheme, could refer to general provision rather than being a specific E&D-focused activity, although the presence of such activities at UOA level could be indicative of a wider institutional commitment to create an inclusive research environment for all.

Furthermore, identification of a particular E&D activity or initiative, or a range of them, in a research environment template submitted to a UOA may not imply that E&D is embedded specifically in the submitting unit, but could relate to more general provision by the institution. REF2014 guidance specifically advised reference to institutional provision for E&D, so it was highly likely that this issue would arise. Some institutions took a 'strategic' approach to their submissions with research offices providing specific support to UOAs on drafting and editing submissions. We addressed this in our analysis by identifying where there was consistency in descriptions of particular E&D activities across units submitted by a single institution. This indicates an effective submission strategy, but may or may not indicate genuine embedding of the E&D activity at unit level across the institution.

Self-evidently, our analysis could not identify direct causal links between reported E&D activities in the research environment and the actual depth of engagement in those

activities or concern for E&D issues at UOA level. However, one of the aims of our analysis of reporting of activities was to shed any available light on just this issue.

## 4. E&D activities and initiatives

### 4.1. Word frequencies

#### 4.1.1. Raw frequencies

The 10 most commonly used words (having excluded stop words such as ‘and’ or ‘the’) in the entire corpus of the 1,911 People sections are shown in Table 4.1. Perhaps unsurprisingly, ‘research’ was by some way the most frequent occurrence, more than twice as frequent as either ‘staff’ or ‘student’. The words ‘development’, ‘training’, ‘support’ and ‘career’ were also in this top-10 list, as might be expected in material provided by submitting units to describe their research environment and the researchers that worked within it.

The ‘frequency’ column in Table 4.1 states the number of occurrences of the word, while the ‘proportion’ figure is the number of occurrences as a proportion of the total number of words (c.1.83 million) in the corpus of text, after removal of stop words.

**Table 4.1 Frequency of most commonly used and selected E&D-related words**

	Frequency	Proportion
<b>Top 10</b>		
Research	72350	3.95%
Staff	34794	1.90%
Student	28724	1.57%
University	18570	1.01%
Development	18232	0.99%
Training	14529	0.80%
Support	14398	0.79%
School	12365	0.67%
PhD	1103	0.62%
Career	9965	0.54%
<b>E&amp;D related</b>		
Equality	3332	0.18%
Diversity	2836	0.15%
Equal	1016	0.06%
Inclusi*	531	0.03%
Minority	131	0.01%



These figures give some context to the frequencies of a range of words selected which relate to E&D, also shown in Table 4.1. ‘Equality’ was used 3,332 times, and ‘diversity’ 2,836 times. They occurred together (in the form of ‘equality and diversity’) in around one third of these cases, or around 1,000 times, on the basis of n-gram analysis (which identifies sequences of words in the corpus). Very broadly, this suggests that the word ‘equality’ was used on average between once and twice within each environment statement.<sup>23</sup>

Analysis of how the frequency of usage for selected key words varied with REF main panel and UOA is given later in this chapter.

The Equality Act 2010 places legal requirements on employers for equality on the basis of nine protected personal characteristics: age, disability, sex (gender), gender identity, race (including nationality), religion or belief, sexual orientation, marriage and civil partnership, and pregnancy and maternity.

The terminology used in UK HE to describe these protected characteristics has tended to evolve from the forms of words used in the 2010 act. Table 4.2 shows the word frequencies, in the corpus of 1,911 submissions, of our interpretation of the most commonly used words for these characteristics. It shows that sex or gender was by far the most commonly referred to characteristic in the environment statements, much more so than any other protected characteristic. The word ‘women’ occurred 1,672 times and ‘female’ 1,243 times, while ‘gender’ itself was mentioned 977 times. Together these comprise nearly 3,900 occurrences, which is greater than the frequency of use of the term ‘equality’ itself.

**Table 4.2 Frequency of selected words associated with protected characteristics**

Characteristic	Frequency	Proportion
Women	1672	0.09%
Female	1243	0.07%
Gender	977	0.05%
Maternity	540	0.03%
Age	409	0.02%
Disability	384	0.02%
Ethnic*	323	0.02%

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<sup>23</sup> Different computerised methods of counting can deliver slightly different results, although these differences should be small and not affect any of the high-level interpretations reported.

Religious_Belief	189	0.01%
Pregnan*	41	<0.01%
Sexual [orientation]	11	<0.01%
Gender_Identity	6	<0.01%

In comparison, 'maternity' was mentioned 540 times (and 'pregnancy' or 'pregnant' a further 41 times), 'age' 409 times and 'disability' 384 times. Using a wildcard character during counting, ethnic\* was identified 323 times, and the characteristic describing freedom of religious belief 189 times. The characteristics of sexual orientation and gender identity were, in comparison, mentioned very rarely indeed.

It should be remembered, as set out in Section 3.4, that some of these terms could have been used in other contexts rather than in describing E&D in the research environment of the submitting unit. In some instances they occurred in relation to the research specialism itself, particularly in UOAs which included research on, for example, gender or women's studies or maternity. The extent to which this could have impact on the word-frequency results emerges more in our analysis by main panel and unit, later in this chapter.

One aspect of E&D which lent itself to word-frequency analysis was the presence of named initiatives or schemes, such as ECU's Athena SWAN Award. Analysis of these types of word had additional merit as these schemes and initiatives tend to have proper names which are readily identifiable and unlikely to be used in any other context.

Table 4.3 shows that the most commonly cited E&D initiative of this type was Athena SWAN (1,201 occurrences of the word 'Athena'), while the organisation Stonewall was mentioned 190 times, the TwoTicks scheme 60 times<sup>24</sup> and Project Juno 57 times.

**Table 4.3 Word frequencies for selected national E&D initiatives**

Scheme/initiative	Frequency	Proportion
Concordat	2304	0.13%
Athena	1201	0.07%
Stonewall	190	0.01%
Investors [in People]	140	0.01%
TwoTicks	60	<0.01%
Juno	57	<0.01%

<sup>24</sup> This government-backed scheme for employers was subsequently replaced by the Disability Confident scheme: <https://www.gov.uk/government/collections/disability-confident-campaign>

It was interesting to compare the relative frequencies of occurrence of named schemes or initiatives and the issues that they seek to address. The most frequently mentioned of these was the 'Concordat' which we interpret to mean the Concordat to Support the Career Development of Researchers.<sup>25</sup> In relation to gender, the Athena SWAN Award was mentioned just over 1,200 times, which is the same order of magnitude as the number of times that each of the words 'female', 'women' or 'gender' were used. On the other hand, Stonewall, an organisation that campaigns for acceptance of LGBT staff in the workplace, was mentioned 190 times (mostly in relation to its Diversity Champions programme for employers), whereas the issue of sexual orientation, which is the context in which Stonewall operates, was only mentioned 11 times.

The term 'disability' was mentioned 384 times, which was much more than the UK government's TwoTicks scheme (which accredited employers committed to employing disabled people), which was only cited on 60 occasions. The TwoTicks scheme was replaced by the Disability Confident designation in 2013, but the latter had had very little take-up at the point of REF2014 submissions in late 2013.

The research approach taken for this study limits the extent to which we know whether variations of this type reflect differential participation by institutions, or whether they result from what units have chosen to describe in their submissions (i.e. a specific award, or the underlying issue it seeks to address). More robust understanding would require comparative analysis of the actual participation in these awards or initiatives by HE employers (i.e. institutions and/or departments) with UOA-level descriptions

## **4.2. Trends in word frequency results**

### *4.2.1. Trends by REF main panel*

The frequencies of occurrence of selected key words highlighted in Section 4.1 were analysed by the REF2014 main panel within which the UOA was located. Table 4.4 is a reminder of the disciplinary coverage of the four main panels (A-D), with the titles of the 36 UOAs. These provide a potential basis from which to analyse word frequencies against different research disciplines, although it should immediately be noted that the UOAs do not map directly to either institutional structures (such as university departments) or to standard subject classifications such as the Joint Academic Classification System (JACS). Although the four main panels were not specifically named

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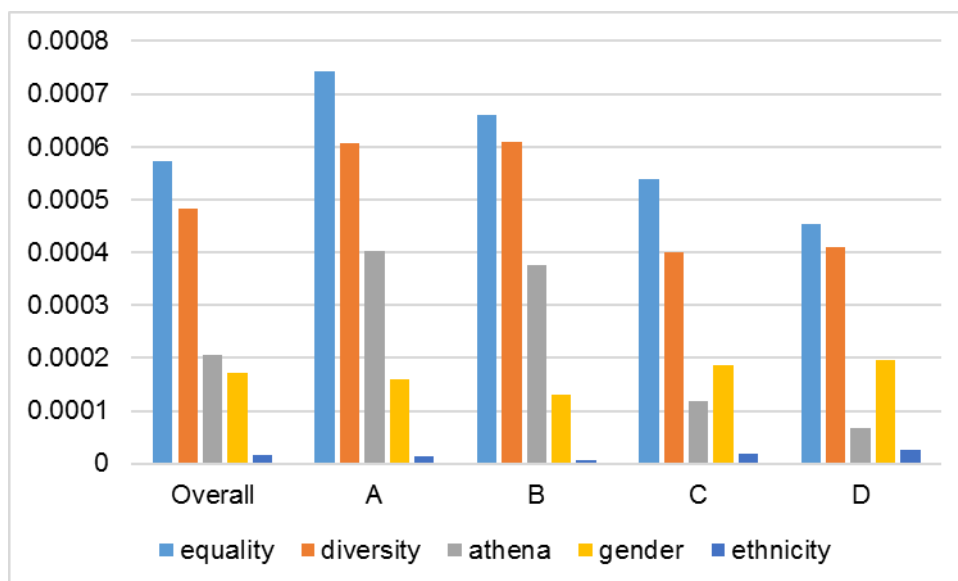
<sup>25</sup> <http://www.vitae.ac.uk/concordat>

in the REF exercise, they tend colloquially to be considered as: A – Health and Life Sciences; B – Physical Sciences and Engineering; C – Social Sciences; D – Arts and Humanities.

Combining UOA submissions in the four main panels allows for a first, high-level analysis of selected word frequencies by very broad disciplinary area. Figure 4.1 depicts this comparison for a selection of E&D-related keywords, including ‘equality’ and ‘diversity’ as well as ‘Athena’. The chart shows the relative frequencies of occurrence of these five words across the total corpus of People sections (‘Overall’), and also for submissions within each of the four main panels. The vertical scale indicates the relative frequency of the occurrences, i.e. the number of occurrences of the word within (the People sections in) UOA submissions to a main panel divided by the total number of words in those sections.

This analysis indicates that the relative frequencies of the five words are in some cases similar across the main panels, with ‘equality’ and ‘diversity’ the most commonly used in all panels (although n-gram analysis revealed that the majority of the instances were not of these two words together) and the former always more commonly than the latter. The chart also emphasises that in all four main panels the term ‘ethnicity’ was far less commonly used than ‘gender’.

**Figure 4.1 Relative frequencies of selected keywords, by main panel**



**Table 4.4 REF2014 Units of Assessment and main panels**

<b>Main panel</b>	<b>UOA number</b>	<b>Unit of Assessment</b>
A	1	Clinical Medicine
	2	Public Health, Health Services and Primary Care
	3	Allied Health Professions, Dentistry, Nursing and Pharmacy
	4	Psychology, Psychiatry and Neuroscience
	5	Biological Sciences
	6	Agriculture, Veterinary and Food Science
B	7	Earth Systems and Environmental Sciences
	8	Chemistry
	9	Physics
	10	Mathematical Sciences
	11	Computer Science and Informatics
	12	Aeronautical, Mechanical, Chemical and Manufacturing Engineering
	13	Electrical and Electronic Engineering, Metallurgy and Materials
	14	Civil and Construction Engineering
	15	General Engineering
C	16	Architecture, Built Environment and Planning
	17	Geography, Environmental Studies and Archaeology
	18	Economics and Econometrics
	19	Business and Management Studies
	20	Law
	21	Politics and International Studies
	22	Social Work and Social Policy
	23	Sociology
	24	Anthropology and Development Studies
	25	Education
	26	Sport and Exercise Sciences, Leisure and Tourism
D	27	Area Studies
	28	Modern Languages and Linguistics
	29	English Language and Literature
	30	History
	31	Classics
	32	Philosophy
	33	Theology and Religious Studies
	34	Art and Design: History, Practice and Theory
	35	Music, Drama, Dance and Performing Arts
	36	Communication, Cultural & Media Studies, Library & Information Management

However, the relative use of the terms 'Athena' and 'gender' does differ between the main panels. Overall, 'Athena' was used slightly more often than 'gender' but in submissions within Panels A and B this difference was much more marked, with more than twice as many occurrences of 'Athena' than 'gender'. In contrast, within Panel C submissions, the term 'gender' was used more commonly than 'Athena', and in Panel D much more commonly. These relative differences are mostly driven by variations in the frequency of use of 'Athena', rather than the frequency of 'gender' which was relatively similarly used across the main panels.

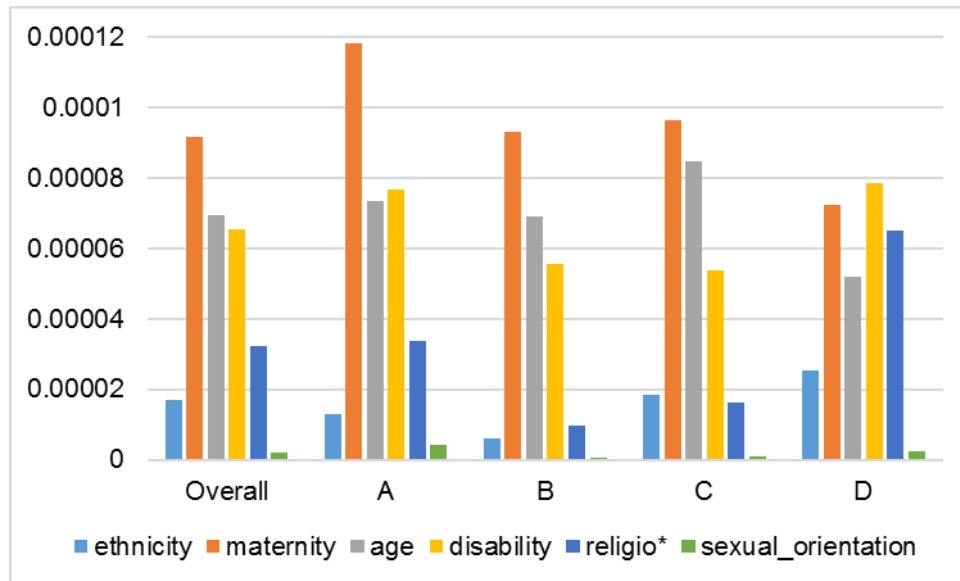
This trend reflects the provenance of the Athena SWAN initiative, which originated as a scheme to promote gender equality in STEM subjects, with chemistry departments prominent amongst early adopters. In May 2015, the scope of the Athena SWAN Charter was expanded to cover gender equality in AHSSBL disciplines, although this was later than the period covered by the REF2014 submissions. In Section 4.3 more specific analysis of the reporting of Athena SWAN initiatives is presented, in comparison with records of award holders at institutional and departmental level.

In Figure 4.2 a similar approach is used to show analysis of selected words relating to other protected characteristics. The distribution of frequencies in the 'Overall' segment of the chart in Figure 4.2 demonstrates that there is relative similarity in the frequencies of use of maternity, age and disability, while ethnicity (in this analysis, rather than the stemmed version ethnic\*) is cited less frequently, along with religious belief, while sexual orientation was mentioned only very rarely.

Analysing these frequencies by main panel, it can be seen that the distribution of relative frequencies is broadly maintained for each panel, although maternity and disability were cited significantly more frequently in Panel A submissions than others. It should also be noted that Panel A contains UOAs including clinical medicine and nursing, so this may have had an impact on the higher frequencies.

On the other hand, submissions to Panel C UOAs cited age more frequently than other Panels, while Panel D UOAs mentioned maternity and age less frequently than overall, but cited disability and, especially, religious belief relatively more. The frequency with which sexual orientation was mentioned was so low as not to be significant on this chart. Gender identity is not shown as these words were only used in a very small number of submissions exclusively to Panel D.

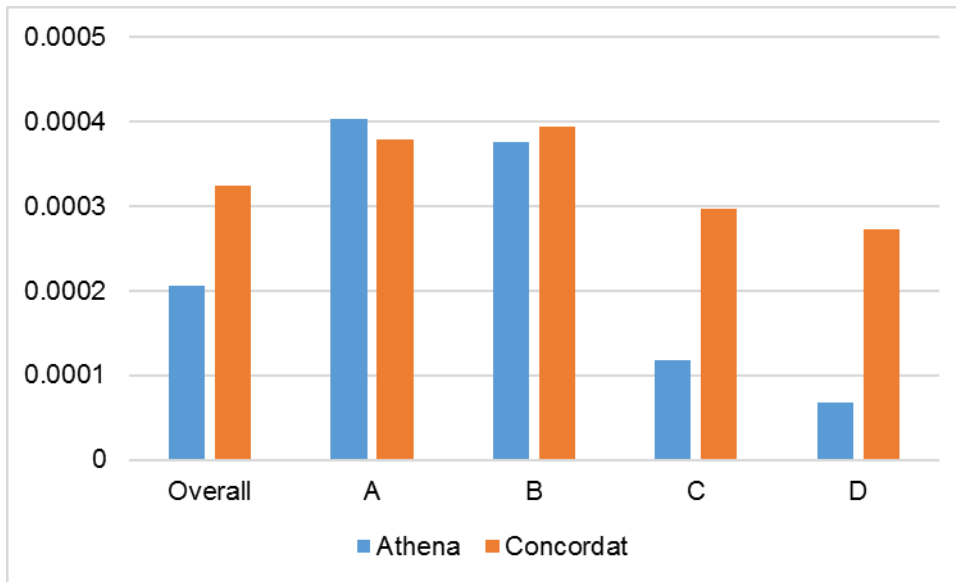
**Figure 4.2 Relative frequencies of selected keywords relating to protected characteristics, by main panel**



Note: Vertical scale is different from Figure 4.1 as these words are less frequent

Comparisons of the relative frequencies of words identifying specific E&D-related schemes or initiatives are shown by main panel in Figures 4.3 and 4.4. Figure 4.3 compares the distributions of occurrences of ‘Athena’ and ‘Concordat’, both of which were much more frequent than the initiatives depicted in Figure 4.4. As described previously, this shows the frequency rate of Athena to be much higher in submissions to Panels A and B than in Panel C and D submissions, whereas mentions of the Concordat follow a broadly similar pattern but with less variance between the panels.

**Figure 4.3 Relative frequencies of Athena and Concordat, by main panel**



**Figure 4.4 Relative frequencies of keywords relating to selected national E&D initiatives**

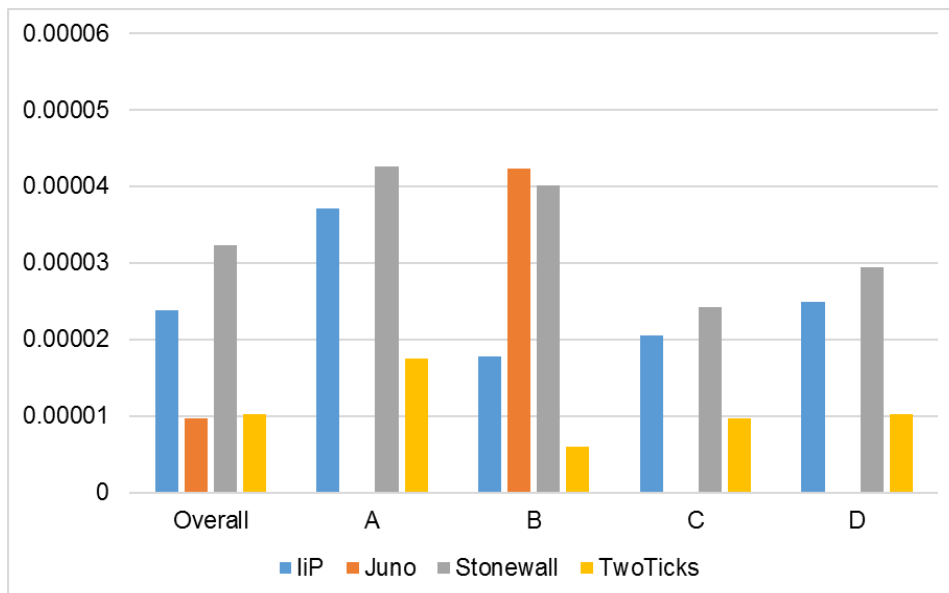


Figure 4.4 compares the frequency of occurrence of the words ‘Investors’ [in People], shown on the chart as liP, of Project ‘Juno’, ‘Stonewall’ and the ‘TwoTicks’ initiative, by main panel. This shows that Project Juno was only mentioned in Panel B submissions, which is to be expected as this initiative was focused on Physics, whereas occurrences of Investors in People, Stonewall and the TwoTicks initiative were seen in submissions to all the main panels, and most commonly in Panel A submissions. These are all initiatives at



the employer, or institutional, level, so these differences by main panel could reflect different levels of knowledge about or commitment to these institutional schemes.

#### *4.2.2. Trends at Unit of Assessment level*

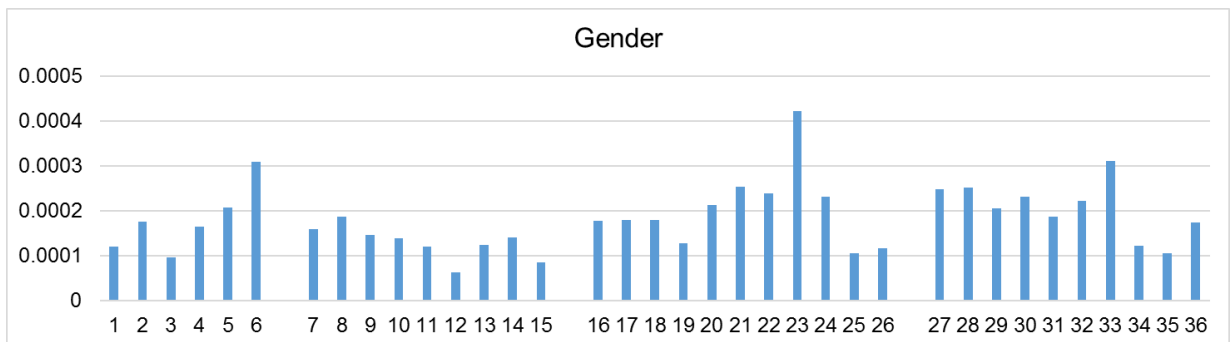
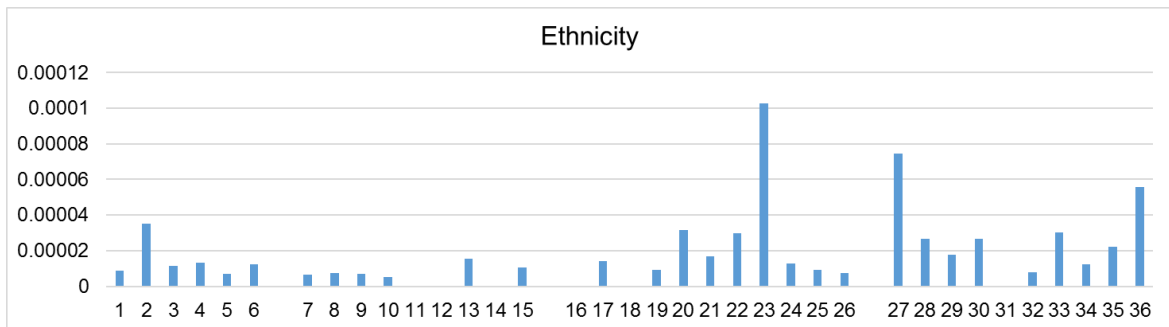
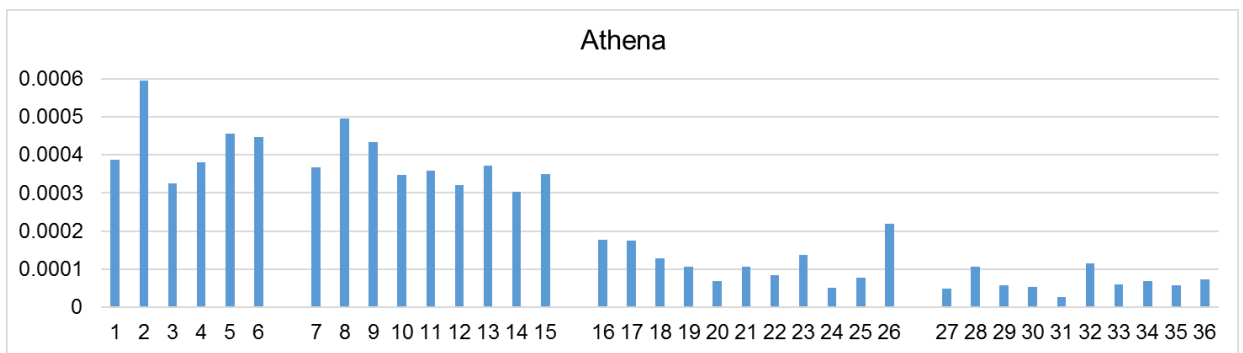
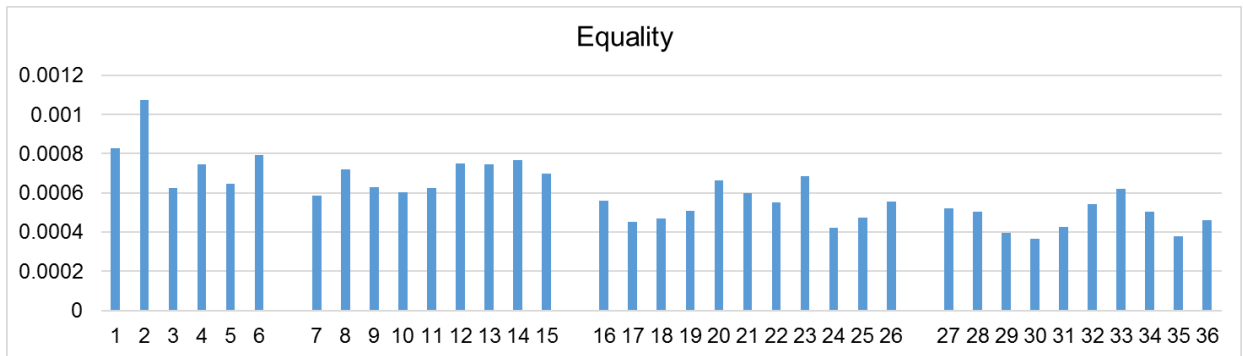
Figure 4.5 illustrates the relative frequencies of selected key words in submissions to each UOA, expressed as proportions of the total number of words in the People sections of those submissions. The vertical axis scale for each chart should be noted, as these differ from chart to chart.

The word 'equality' occurred in submissions to all UOAs, with its relative frequency varying in magnitude by a factor of up to three between the lowest and highest occurrences. By comparison, there was more variation in the relative frequency of occurrences of the word 'Athena', overall and within each main panel. This more detailed analysis shows that the higher frequency of this term in submissions to units in Panels A and B (compared with C and D) was common across all the constituent UOAs.

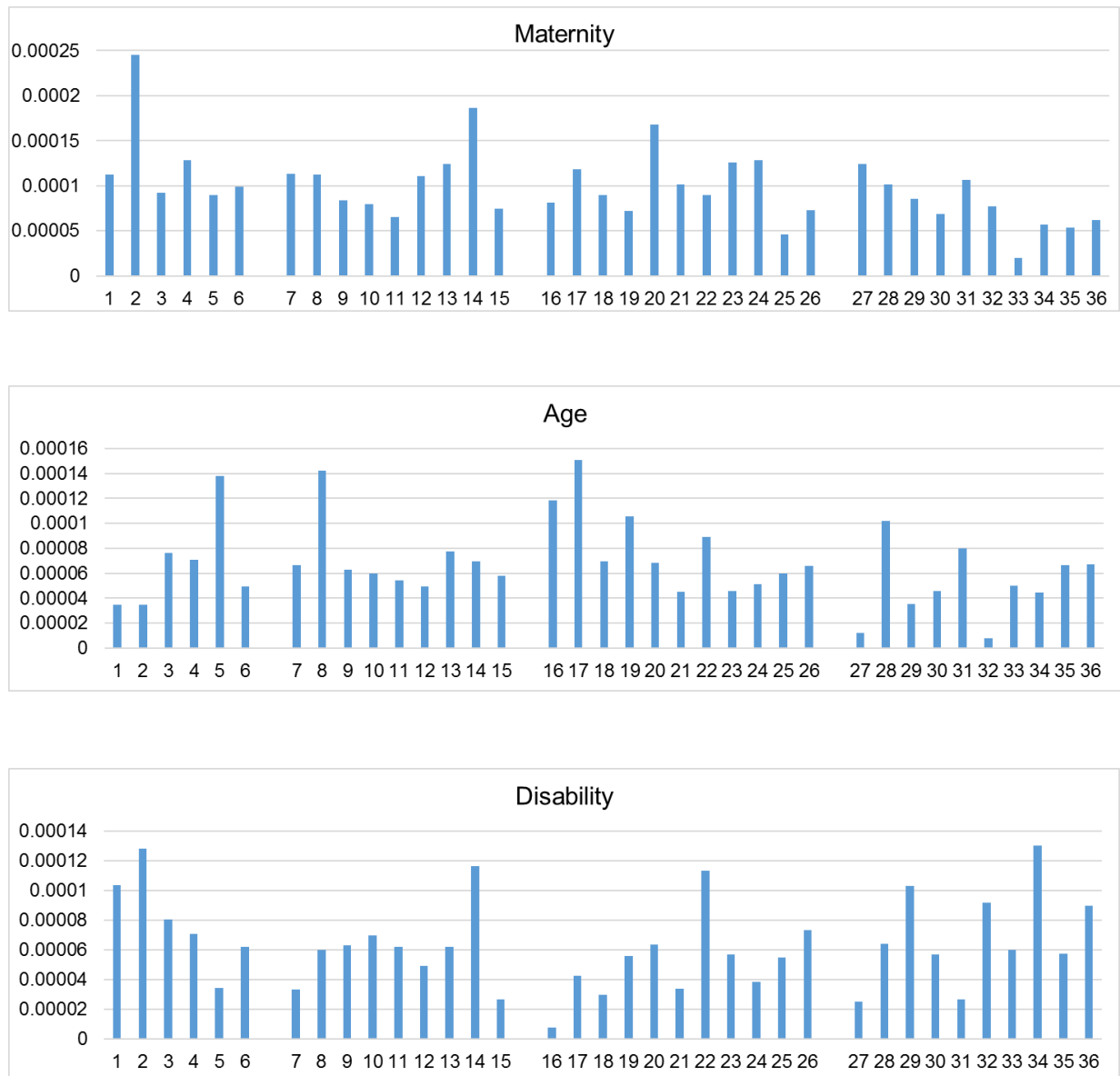
The frequency of use of the word 'gender', on the other hand, was somewhat more even across the main panels and their constituent UOAs, but with significant 'spikes' of high frequency of usage in certain UOAs, notably highest in C23 (Sociology) where it is likely to be a research topic.

Frequency data for 'ethnicity' was also relatively variable at this level, bearing in mind that overall its use was much rarer (a different scale on the vertical axis is used for this term) than for the other words analysed in Figure 4.5. For certain UOAs, 'ethnicity' was not used at all in any submissions, while there were distinct spikes of relatively high usage in C23 (Sociology) and also in D27 (Area Studies) and D36 (which includes Cultural Studies). The more frequent use of this particular term may reflect disciplinary descriptions – in relation to a research specialism – rather than reflecting ethnicity-based issues in relation to E&D concerns for staff or students.

**Figure 4.5 Relative frequency of selected keywords, by Unit of Assessment**



**Figure 4.6 Relative frequency of selected keywords relating to protected characteristics, by Unit of Assessment**



In a similar depiction, Figure 4.6 demonstrates the relative frequencies of occurrence for the terms ‘maternity’, ‘age’ and ‘disability’ at UOA level. It should again be noted that the vertical axis scale is different for each term. For these three words, there had been relatively modest variations in the frequency of occurrence at main panel level (Figure 4.2), but this more detailed analysis shows that the panel-level analysis masked greater variations at UOA level. In most cases there was as much or more variation in the relative frequencies between UOAs within a single main panel as there was across the entire spectrum, particularly for ‘age’ and ‘disability’.

For the words analysed in relation to gender identity, analysis at UOA level showed that the terms were only used in submissions to two UOAs, D33 (Theology and Religious Studies) and D35 (Music, Drama, Dance and Performing Arts). Similarly, for sexual orientation, there were no occurrences in the submissions to the majority of UOAs, and the total number of occurrences was extremely small.

The position for religious belief, however, was different again, in that the words analysed were used sparingly in a minority of submissions but these submissions were located in almost every UOA (see Figure 4.7). This suggests that mentions of the topic were relatively uncommon but quite widely spread. The frequency of use in submissions to D33 (Theology and Religious Studies) was far higher than for submissions to other UOAs, by around an order of magnitude. This, of course, is likely to result from the words being used in describing research topics or specialisms rather than in relation to religious belief as a protected characteristic within E&D considerations.

**Figure 4.7 Relative frequency of 'religio\*' words, by Unit of Assessment**

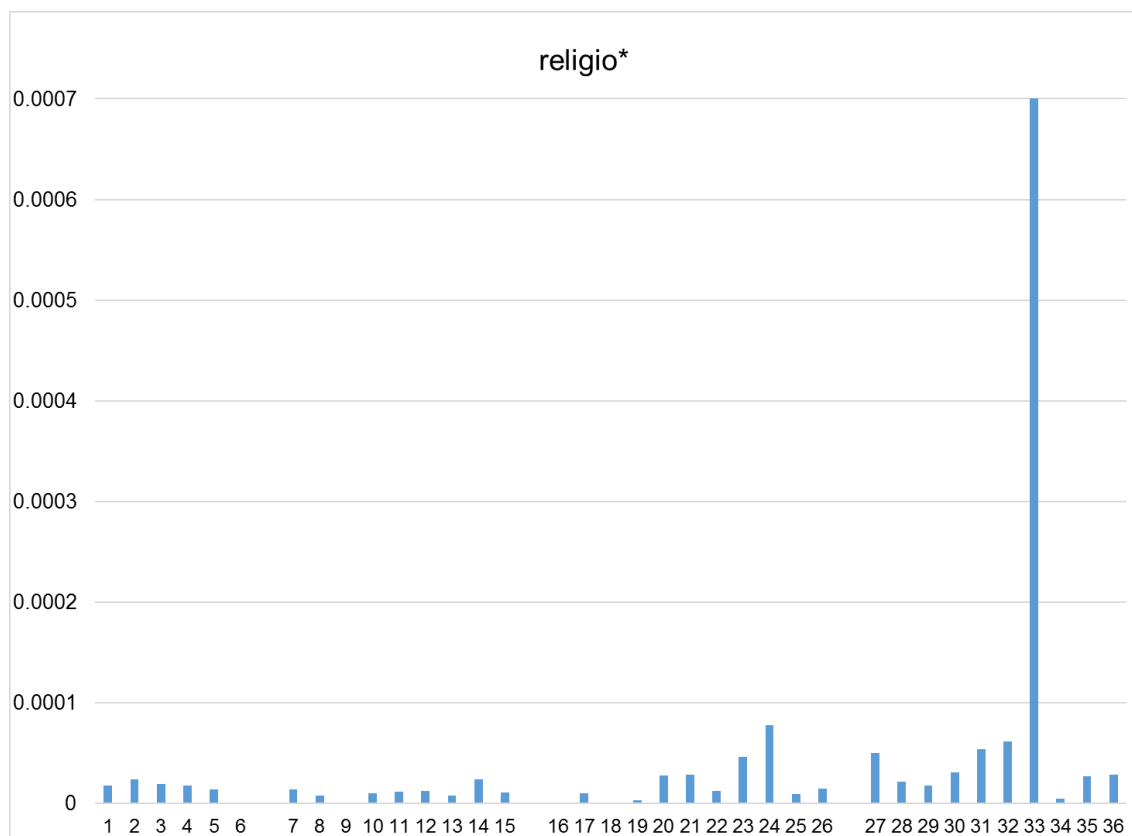
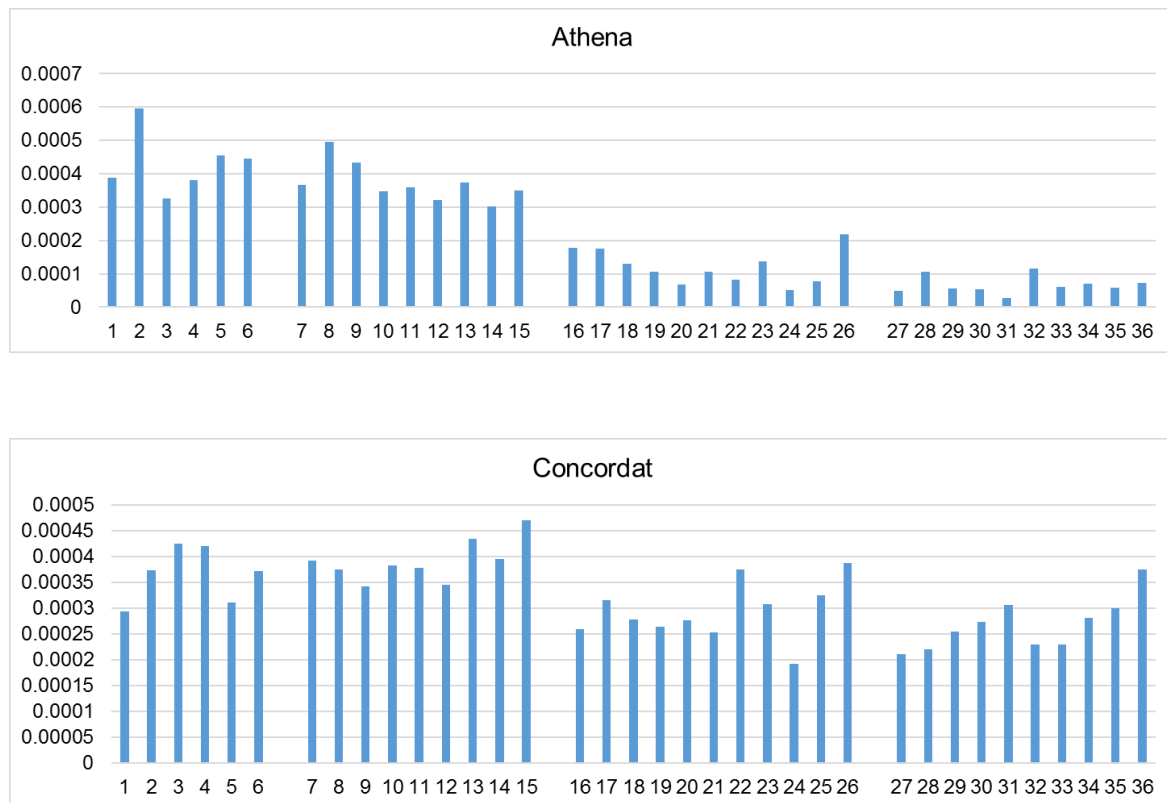


Figure 4.8 compares the relative frequencies of occurrence at UOA level of the names of two of the most prominent national initiatives relating to E&D, 'Athena' (as shown in Figure 4.5) and 'Concordat'.<sup>26</sup> These initiatives were both named in submissions to all UOAs. The comparative distributions of the frequencies at UOA level were broadly similar to the pattern seen at main panel level, with the Concordat mentioned relatively consistently across all UOAs but Athena mentioned much more commonly in UOAs under Panels A or B than those under Panels C or D.

**Figure 4.8 Relative frequencies of Athena and Concordat, by Unit of Assessment**

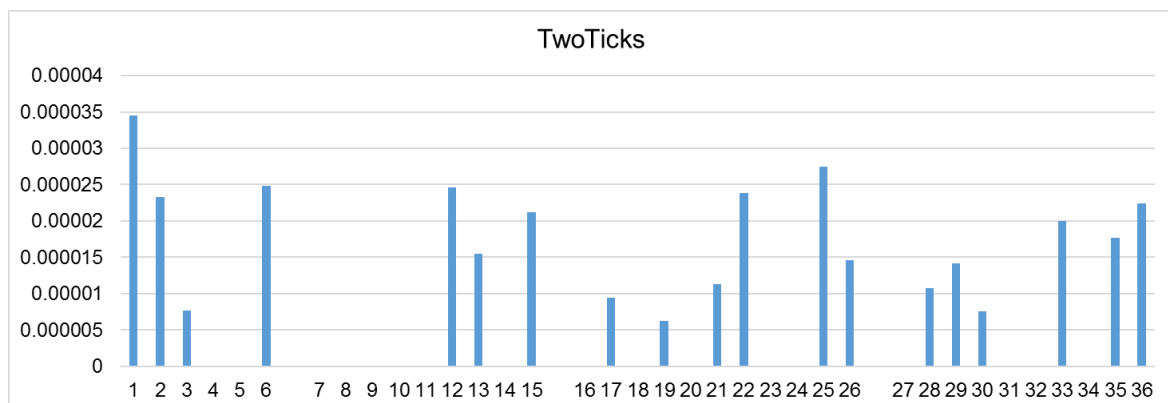
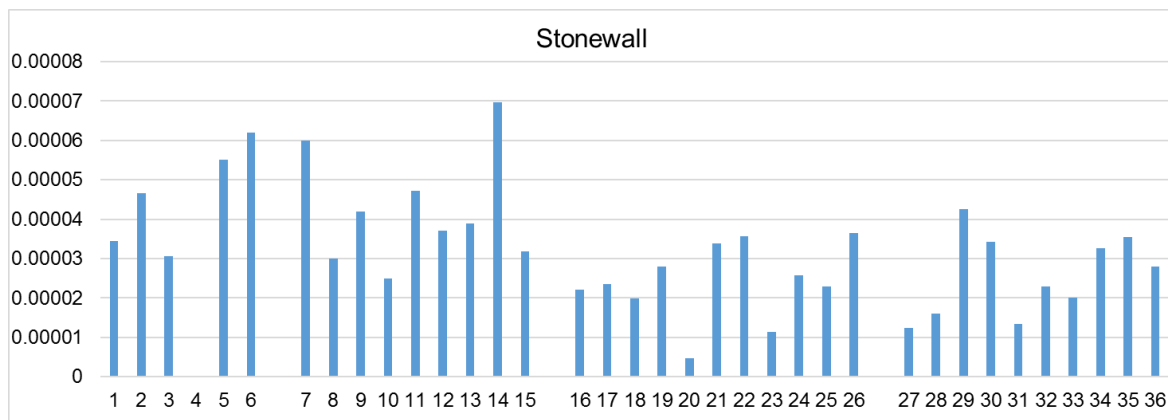
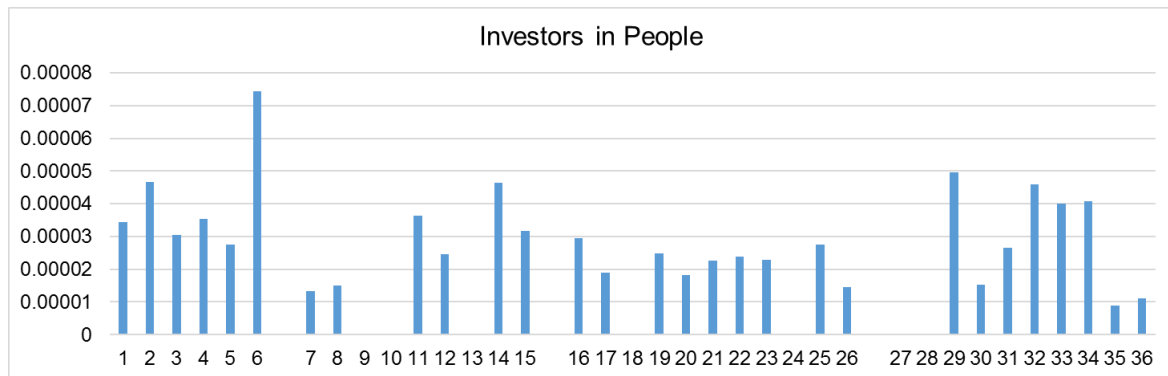


In Figure 4.9, the distributions of word frequencies for terms identifying the Investors in People (IiP) scheme, Stonewall and TwoTicks initiatives are shown at UOA level. This shows that although the number of occurrences of Stonewall in certain UOAs were relatively similar to those of IiP, Stonewall was cited in a wider range of UOAs than was the case for IiP. In comparison, the 'TwoTicks' initiative was mentioned less uniformly and also less commonly (noting that the scale on the vertical axis is smaller for this than for

<sup>26</sup> Detail on the Concordat can be found in section 4.3.

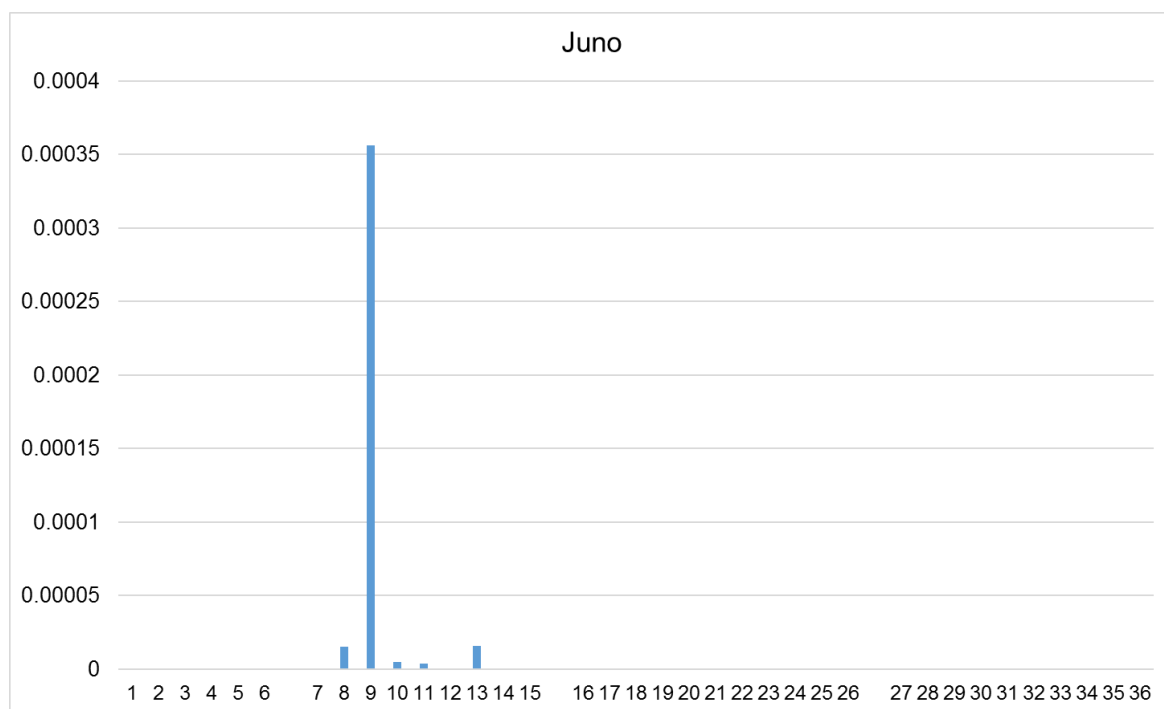
the other two terms). TwoTicks was present in submissions to only around half of all UOAs. As mentioned previously, the Stonewall Diversity Champions scheme, which is the context for use of the term, and these other two initiatives are for employers and will have been taken up at university level, not at individual department level.

**Figure 4.9 Relative frequencies of selected keywords relating to national E&D initiatives, by Unit of Assessment**



In Figure 4.10, the word 'Juno' is seen to have been used mostly in submissions to the Physics UOA (B9) and to a much lesser extent in submissions to other Panel B submissions, but in no others. This reflects the scope of the Project Juno initiative, which is to recognise and reward Physics departments that can demonstrate that they have taken action to address the under-representation of women (and to encourage better practice for both women and men). The fact that there were occurrences outside the Physics UOA presumably reflects that some submissions to those units had overlaps with Physics departments.

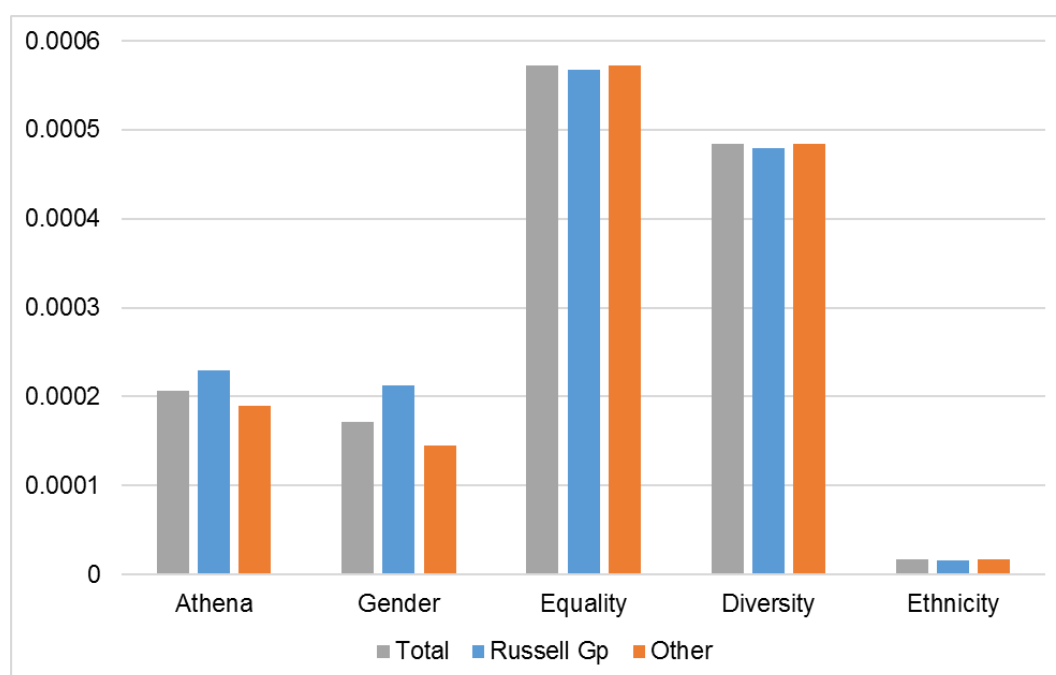
**Figure 4.10 Relative frequency of 'Juno' by Unit of Assessment**



#### 4.2.3. Variation by university type

Figure 4.11 illustrates a very simple analysis of key word relative frequencies by broad university type, grouping institutions on the simple basis of Russell Group membership or not, as a broad proxy for research intensiveness. For the words 'equality' and 'diversity', and for that matter 'ethnicity', there was very little difference between these word frequencies between submissions from all Russell Group member institutions combined, and all submissions from other institutions.

**Figure 4.11 Relative frequencies of selected keywords, by type of institution**



#### 4.2.4. Holders of Athena SWAN awards

The words 'Athena' and 'gender', on the other hand, were more frequently used in submissions made by Russell Group member institutions than other institutions. As will be shown in Section 5.1, this seems to relate quite closely to the relative take-up of the Athena SWAN initiative by institutions at the time of REF2014 submissions.

The ECU (which manages the Athena SWAN award scheme) kindly provided us with the dates on which institutions and departments obtained Athena SWAN awards. Institutions which had obtained an Athena SWAN award at institutional level prior to their REF submissions were grouped into those with a silver award, those with bronze and those with none.

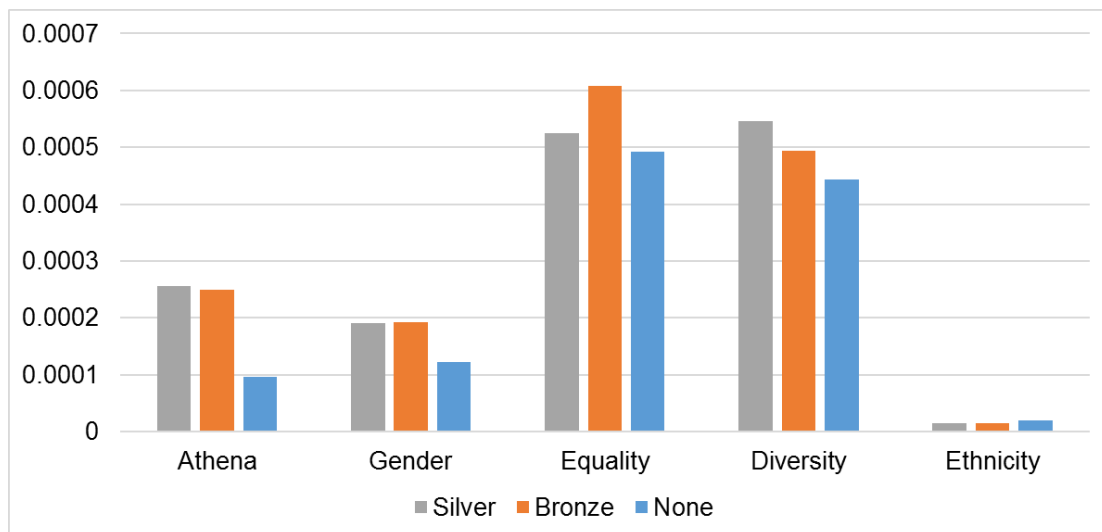
The group with silver awards at institutional level was very small (comprising only four institutions, which between them made 94 UOA submissions) compared with those with a bronze award at institutional level (60 institutions, which submitted 1,166 statements in total) or those with none (a still larger number of institutions, many of which were small and therefore between them made a smaller total of 640 submissions).

Figure 4.12 illustrates relative frequencies of selected key words for these three groups. Within this analysis, unsurprisingly, submissions from institutions with a bronze or silver award had cited the word 'Athena' more than twice as frequently than those without an award. However, what is important to note is that this difference in relation to 'Athena'



was not perhaps as great as expected. More detailed analysis showed that 163 of the c.1,200 instances of this word were made by submitting units where no award was held by the institution. Section 4.3 presents a further investigation of the usage of this term in the submissions, offering a view of how important contextual analysis may be in relation to word-frequency studies.

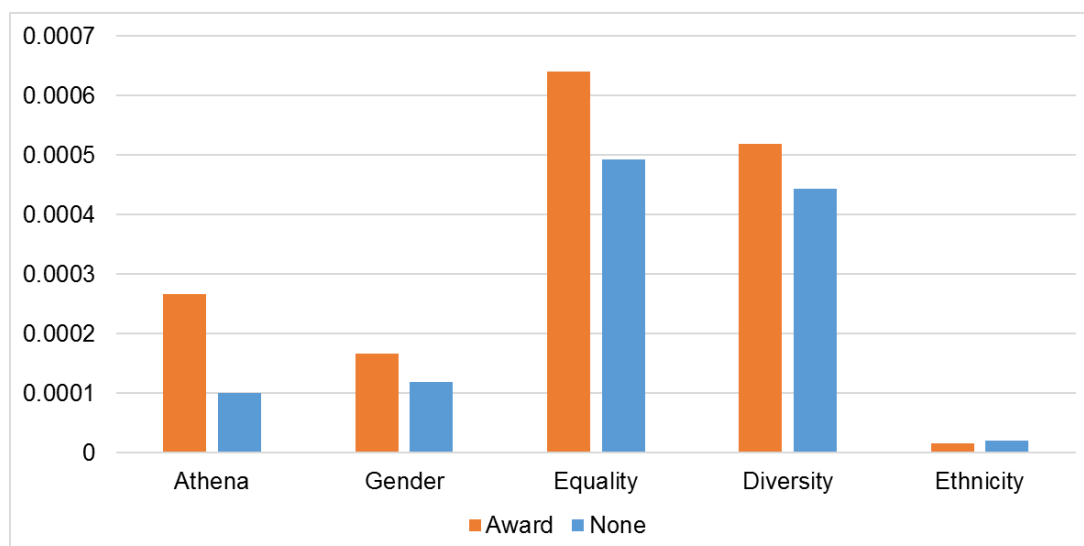
**Figure 4.12 Relative frequencies of selected keywords, by whether or not the submitting institution held an Athena SWAN award**



Award holders also used the word 'gender' somewhat more frequently than those without an award. For the words 'equality' and 'diversity', submissions from UOAs within institutions holding an Athena SWAN award again used these words slightly more than those without, but for the (far less commonly used) word 'ethnicity' the trend was the other way around.

The situation is potentially complicated further by the fact that Athena SWAN awards can be held at departmental level as well as institutional. In theory this would offer the opportunity to analyse relevant word frequencies at a more granular level, but in reality in most cases UOAs do not map directly to university departments. To isolate the impact of the departmental award from that of the institutional award, therefore, may require an approach that is able to understand more about the context of the individual submission. At the time when the REF 2014 submissions were made, the proportion of institutions holding departmental-level awards was relatively low compared with the position now.

**Figure 4.13 Relative frequencies of selected keywords used in non-Russell Group institution submissions, by Athena SWAN award holder or not**



It was evident during this analysis that only one Russell Group member institution did not have an institutional Athena SWAN award at the time of REF2014 submissions, while many of the ‘other’ institutions did not hold an award. This means that a correlation in the trends of results for Athena SWAN award holders and Russell Group institutions is inevitable. It was more useful therefore to compare results for the ‘other’ institutions with and without Athena SWAN awards. This analysis is shown in Figure 4.13, illustrating that for institutions outside the Russell Group, there was a correlation between holding an award and higher frequency of occurrence of ‘Athena’, ‘gender’ and also ‘equality’ and ‘diversity’. The greatest difference was seen in relation to ‘Athena’, unsurprisingly. Although the number of occurrences of ‘ethnicity’ was small, there was again the suggestion that slightly more submissions from those without an Athena SWAN award mentioned this word than those from award holders.

### **4.3. Describing equality and diversity activities**

Keyword-in-context (KWIC) analysis was used as a mechanism to identify broad trends in the way in which certain keywords were used in the People sections. Studying the words immediately surrounding such keywords provided insights into the context in which these topics or issues were being reported. One such analysis was of occurrences of ‘Athena’ as this was a reasonably widespread keyword which was unambiguous in that it was highly unlikely to have been used in any context other than with reference to Athena SWAN awards.

For the KWIC analyses, a number of iterations of potential outputs were developed, using extractions of text in order to observe ‘windows’ of 10 or 20 words on either side of the term ‘Athena’. This approach was adjusted to take account of the structure of the sentence in which the term appeared (i.e. removing words within the window that were in the previous sentence, or the following sentence, where this occurred) in order to de-clutter the output. The most valuable approach was found to be a window of 10 words either side of the keyword, and adjusting this to be shorter where the sentence started or finished.

Table 4.5 demonstrates how such an analysis can reveal the importance of context in word frequency investigations. There were just over 1,200 occurrences of the word ‘Athena’ in total. Of these, at least 417 were seen to be related to achievement of the award, where the submissions had used terms such as ‘awarded’, ‘achieved’, ‘received’, ‘gained’ etc. (including these words in stemmed form). However, over 300 other occurrences of ‘Athena’ related to aspirations to obtain an award, reporting applications or future submissions using words such as, for example, ‘application’/‘apply’, ‘prepare’, ‘pursue’.

Further caution had to be applied, however, as in some cases a submitting unit referred to an existing bronze award but an application for silver in future, and in a few cases combined these words. Instances of the word ‘submit’ (or submission) also included some examples of ‘submitting unit’ which referred to the submission to the REF rather than for an Athena SWAN award.

This reinforces the point that caution is needed when undertaking quantitative analysis of narrative text using keyword frequencies, and rather that supporting contextual analysis is needed.

**Table 4.5 Total frequency of occurrences of selected words within text extracts including the word ‘Athena’**

<b>Achievement-related word</b>	<b>No of occurrences</b>	<b>Aspiration-related word</b>	<b>No of occurrences</b>
Awarded	116	Appli*	106
Achiev*	87	Apply*	58
Hold/held	79	Plan*	44
Receiv*	65	Submit*	44
Gain*	54	Prepar*	33
Won	6	Pursu*	16

Earn*	6	Aspir*	1
Conform*	4		
Sub-total	417	Sub-total	302

Qualitative analysis of context for the word ‘ethnicity’, using KWIC analysis, revealed other aspects of the complexity of word usage. The KWIC analysis of ‘ethnicity’ revealed that a considerable proportion of the occurrences of the word were in relation to ethnicity as a research specialism (within, for example, Sociology) or within the title of a research group, and not in any way related to E&D considerations of the research environment. This suggests that proportionally its usage (compared with references to gender equality, although gender too will have been used in multiple contexts) in the context of E&D in research environments was lower than observed.

This issue was observed to varying extents for all the terms investigated. A very prominent example was observed in relation to religious belief, which was analysed as a protected diversity characteristic but was used commonly in other contexts within submissions to the Theology-focused UOA, as seen in Figure 4.7.

KWIC analysis was also useful in identifying local activities or schemes reported by institutions or departments/schools, as opposed to those they reported which were national-level schemes or initiatives. It was this manual analysis of a variety of KWIC outputs from a selection of E&D-related terms that led to identification of the activities that are described in the vignettes of practice in Appendix 2.

Detailed manual analysis, and sorting of results, within certain KWIC outputs revealed a variety of strategies to have been used by different institutions in the way in which their submitting units reported particular E&D-related activities. These were most readily identified in relation to national schemes such as Athena SWAN, the Concordat or the European HR Excellence in Research Award. It was noticeable that identical patterns of words existed in certain text extracts from submissions to different UOAs by some institutions. This presumably reflected institutional support for development of its UOA submissions, with units adopting shared text to describe particular activities at institutional level.

On the basis of the analysis undertaken, there were only one or two cases where all an institution’s submissions used the same words in this way. In contrast, in the vast majority of cases submitting units appeared to maintain full autonomy in their reporting. It was perhaps surprising how little commonality there was between submissions from each institution, given the strategic importance of the REF, although this research did only consider the People sections of the environment statements.

However, this observation also begs two questions:

- Did this apparent widespread autonomy of submitting units result in submissions that did not report E&D-related activities that were present at institutional level?
- To what extent did any 'central' institutional control of, or influence on, submissions by individual units impact on the potential value of analysis of unit-level submissions to identify local-level activities?

For the latter, our observations broadly suggest that most submissions (at least on the basis of extracts from the section analysed) appeared to be almost entirely bespoke, with only a minority of cases in which forms of words were identical in different submissions, and these appeared to focus around particular awards attained at institutional level. One of the analytical methods explored was to search for common longer strings of words across the corpus of texts, and this appeared not to reveal widespread presence of identical forms of words aside from the minority of cases reported above.

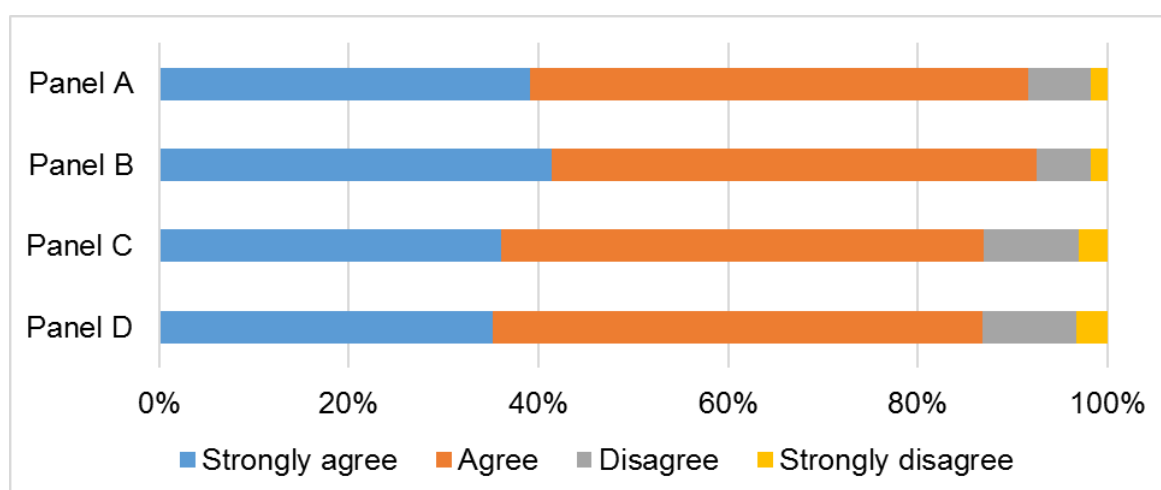
In relation to the former question, we analysed a small sample of institutions' submissions in relation specifically to their reporting of the Athena SWAN award, and compared this with the known award-holders from ECU records. Although this was carried out for only a handful of institutions, it was clear that not all the submissions from some larger institutions mentioned that it held an institution-level Athena SWAN award, while others mentioned it in all their submissions. This suggests that UOA-level submissions are not an entirely robust way to record some institutional-level E&D activities.

## 5. Comparative analysis

The Careers Research Online Survey (CROS) since 2009 has provided a view every two years from institutions of the perceptions and experiences of research staff in relation to their employment and professional and career development. The aggregated results to the surveys conducted in institutions provide several measures of progress in implementation of the Concordat to Support the Career Development of Researchers, while institutions use their results in evidence towards achievement of the European HR Excellence Award. CROS includes several questions which specifically relate to perceptions of E&D. The following results are from CROS 2015, aggregated to the UK level. Results at institutional level are not published openly.

Around 90% of research staff, of those who expressed an opinion (which was 8,189 respondents) strongly agreed or agreed that their institution was committed to E&D, and a low proportion disagreed. When analysed by main panel (Figure 5.1), the proportions only differed by panel to a modest extent, although the proportion perceiving there was not commitment to E&D was higher amongst those in Panels C and D, at around 14%, than in A or B (well under 10%).

**Figure 5.1 Extent of agreement by research staff that their institution is committed to equality and diversity (excluding those who did not know)**



This slight broad trend of difference in perceptions is roughly in parallel to the trend seen in our research in terms of word frequencies for key words (in Paragraph 4.2.1) at main

panel level; 'equality' and 'diversity' were both more commonly used in submissions to UOAs in Panels A and B, than in those to UOAs in Panels C and D.

CROS results also offer an indication of whether research staff think that all staff in their institution are treated fairly, irrespective of their personal characteristics. Overall, 84% of respondents (who expressed an opinion) believed that there was fair treatment in relation to gender and 16% did not. The respective proportions were 94% (and 6%) in relation to ethnicity, 95% (and 5%) in relation to disability, 90% (and 10%) in relation to age and 85% (and 15%) in relation to pregnancy or maternity. When these results were analysed by main panel, slightly higher proportions of Panel C and D respondents disagreed that there is fair treatment in relation to several characteristics, particularly gender and pregnancy/maternity but also ethnicity and disability, than amongst Panel A and B respondents, of whom slightly larger proportions agreed that there is fair treatment for all. It should be stressed, however, that these were not large differences. In relation to gender and pregnancy/maternity, just under 78% of Panel C and D respondents perceived that there was fair treatment, while this was around 82% for Panel A respondents (and higher amongst Panel B respondents), while for ethnicity and disability the proportion perceiving fair treatment was around 90% for Panels C and D and higher for Panels A and B. A persistent trend was also that higher proportions of those in Panels C and D stated that they did not know.

For gender and pregnancy/maternity, these CROS results were themselves somewhat gendered, with more female respondents perceiving unfairness than males, and this is likely to account for some of the apparent difference between main panels (particularly between Panel B and others, as the gender composition of respondents in Panel B is male-dominated).

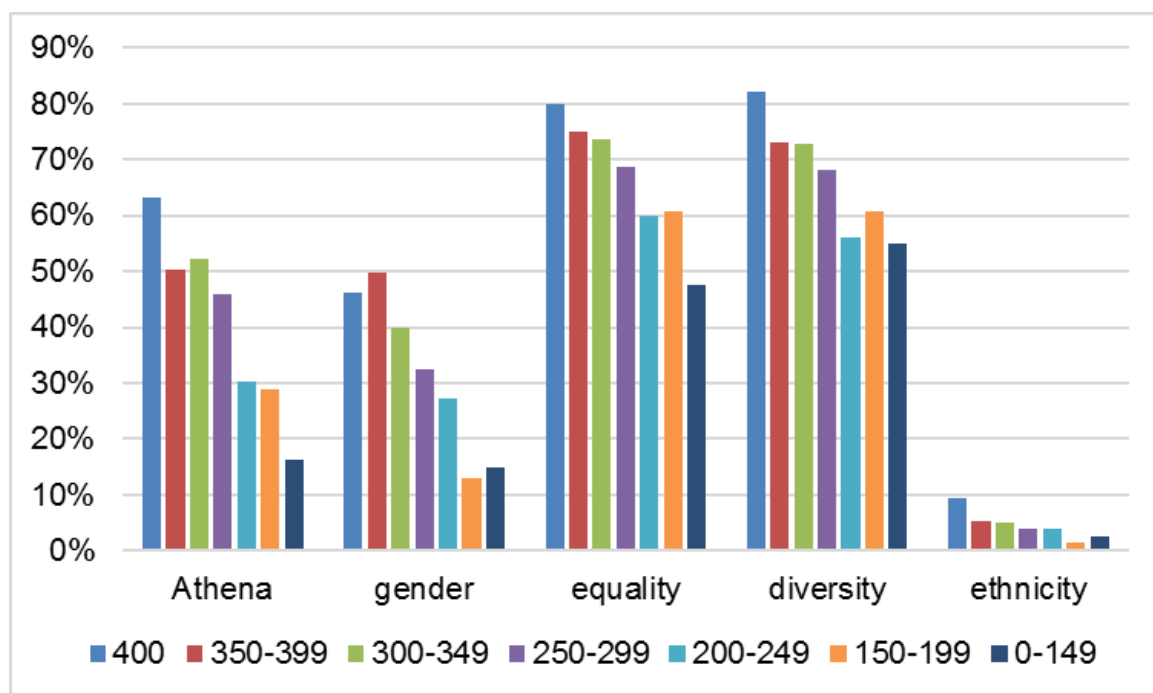
Further research would be needed to explore whether these differences in perceptions of research staff result from variations in the research culture in which they work in relation to E&D between different broad disciplinary areas (i.e. different main panels), or whether there are other factors driving these results, such as gender balance or whether researchers in different areas have different levels of understanding or recognition of some of these issues. Therefore, it is not appropriate to correlate trends in CROS results with apparent differences in word frequency results at main panel level. Nonetheless, these comparisons appear to support the conclusion that, broadly, perceptions of commitment to E&D appear to be stronger in the research domains in which REF environment statements are talking more commonly about these issues.

## 6. Relating results to REF profiles

Due to the large number of submissions, all of which were allocated individual environment sub-profiles (i.e. scores), it is not feasible to try to correlate individual profiles with their key word frequencies. Instead, for simplicity, we combined submissions into bands based on their environment profiles. A numerical 'score' for each submission was derived by multiplying the proportion of the UOA obtaining 4\* by four, 3\* by three and so on, and summing these to a numerical total. Thus a submission with 100% at 4\* was allocated  $4 \times 100 = 400$ , while one with 75% at 4\* and 25% at 3\* was allocated  $(75 \times 4) + (25 \times 3) = 375$ , and so on. Once submissions were banded in this way, the proportion of submissions within each band that used a key word at least once was calculated (i.e. as a proportion of all the submissions in that band).

Figure 6.1 shows the results for the entire corpus of submissions, for a selection of key words. This suggests a broad positive relationship between the proportion of submissions using a selected key word and the scoring of the environment profile. This ranged from 80% of the submissions which had scored most highly including the word 'equality', to under 50% of the lowest scoring submissions.

**Figure 6.1 Proportion of submissions using selected keywords at least once, by banded environment profile**

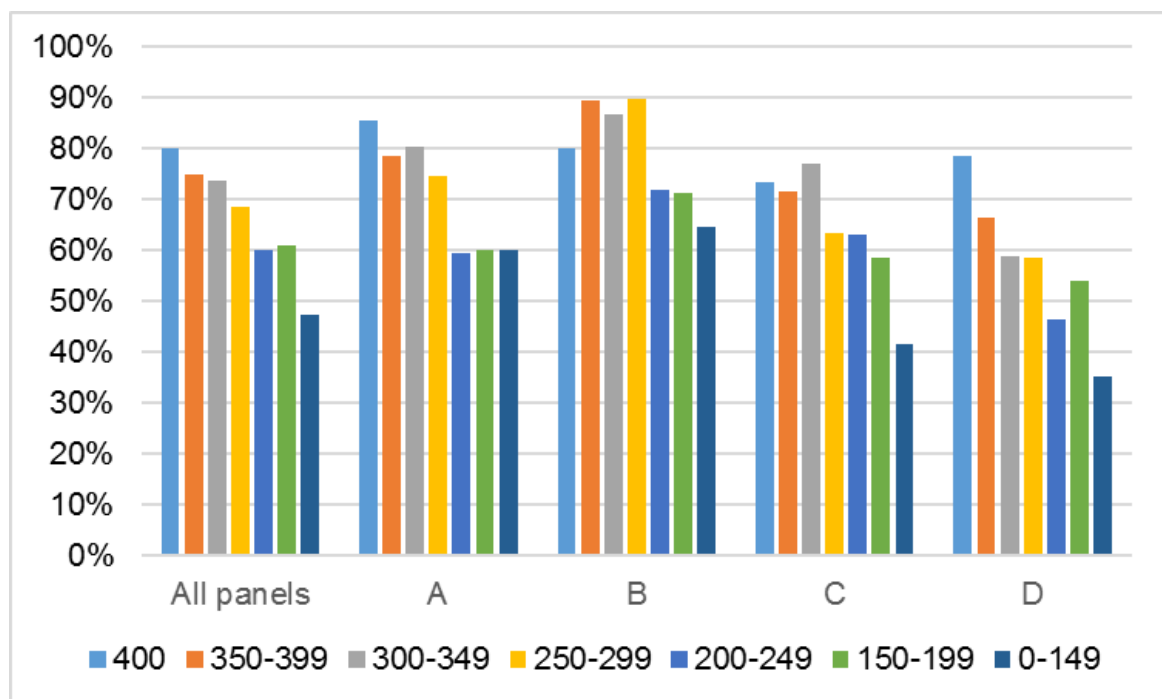




This trend persisted across all the key words investigated, including ‘ethnicity’ which, as we have seen previously, is a term used far less commonly in the submissions than ‘equality’ itself, ‘gender’ or ‘Athena’.

This analysis was also carried out at main panel level, which resulted in the trends shown in Figures 6.2 and 6.3, for ‘equality’ and ‘Athena’ respectively. Broadly, the same trends resulted within each main panel. For the term ‘equality’ (for example), higher proportions of submissions which scored highly for their environment contained this word at least once when compared with lower scoring submissions. In detail, there were some minor variances within certain main panels; in the case of ‘equality’, the highest proportional occurrences were found in submissions that scored relatively highly rather than in the highest scoring group, but the broad pattern of correlation was roughly maintained.

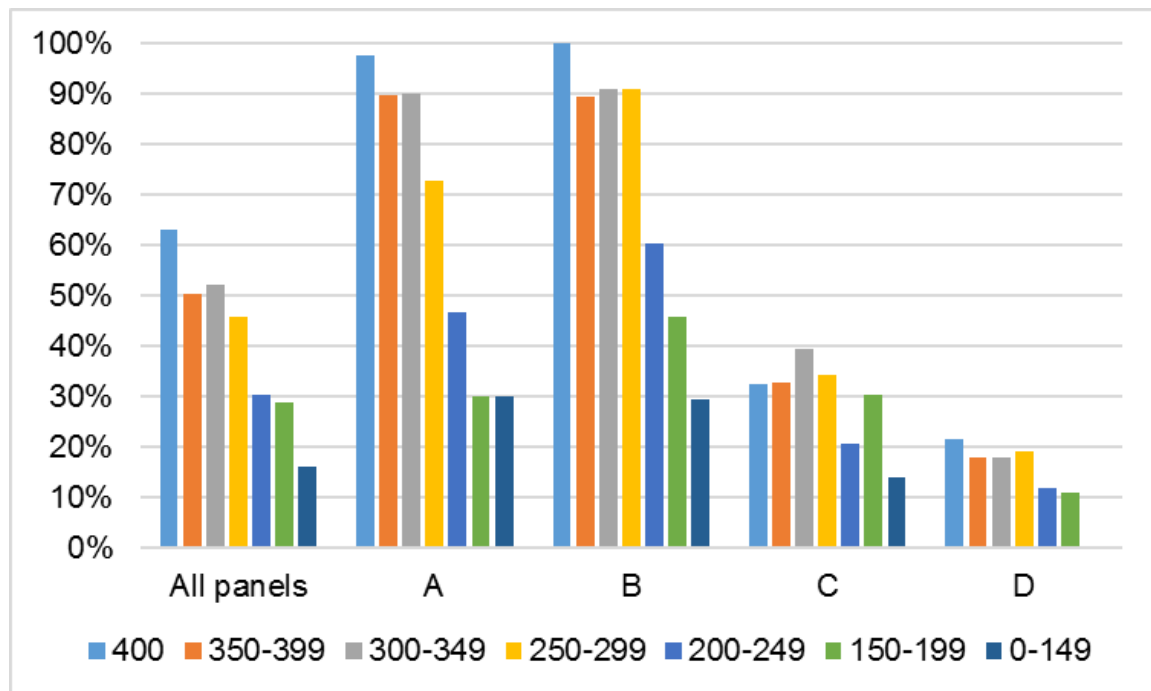
**Figure 6.2 Proportion of submissions using the word ‘equality’ at least once, by banded environment profile and main panel**



The same can be seen for ‘Athena’ in Figure 6.3 where the relatively lower citation of the word generally in Panels C and D can be seen, as has been noted before, but a broad trend of correlation between higher scores and use of the term in submissions was maintained.

It should be remembered that this particular analysis did not record if a term was used more than once in a submission, only that it was used at least once. It is also important to note that the analysis looked at the score derived from the environment sub-profile of a submission, not any assessment of purely the People section within it. No attempt was made to correlate word frequencies with overall REF profiles.

**Figure 6.3 Proportion of submissions using the word ‘Athena’ at least once, by banded environment profile and main panel**



## 7. Emerging overall findings and recommendations

The following findings are derived from this research which comprised a series of approaches to analysis of the text provided in the People sections of the environment statement templates submitted by UOA to REF2014. These relate to the period leading up to submissions in late 2013. In relation to E&D:

- A focus by institutions predominantly on gender (and to a lesser extent pregnancy and maternity), much more than on other protected diversity characteristics;
- Of those other characteristics, age and disability were the next most commonly mentioned, more so than ethnicity, while other characteristics were rarely mentioned;
- A positive relationship between reporting of Athena SWAN awards (or the intention to obtain them) and attention to E&D within submissions;
- E&D issues overall (and gender in particular) were reported somewhat more commonly in submissions to Main Panels A and B (than to C and D). Several of the other protected characteristics were more commonly reported in Main Panels C and D rather than A and B;
- Submissions right across the UOA spectrum mentioned the Athena SWAN initiative, but the pattern reflected its original provenance in the sciences;
- Evidence of varying institutional strategies and approaches to supporting submissions, in relation to reporting of E&D initiatives, at UOA level – some institutions had provided common wording to be used in relation to particular awards or initiatives, but this was not the case in the majority of submissions;
- In some cases, not all the UOA submissions from an institution which had a particular institutional award reported it;
- Evidence suggesting a positive relationship between REF research environment sub-profiles (scores) and reference to key E&D terms within submissions, overall and at the level of the main panels;
- Evidence that research-intensive institutions reported more specific awards and initiatives than non-research-intensive.

In relation to analysis of texts using text-mining approaches:

- A number of the key terms (relating to protected diversity characteristics, in this case) were more commonly used in other contexts (i.e. research topics), indicating the importance of contextual understanding;
- The total size of the corpus of texts (and especially number of submissions, in this case) limited the range of text-processing approaches that could be used.

When considering the implications of this research, and potential recommendations, it should be remembered that these findings were derived purely from analysis of the text of the People sections of the 1,911 environment statement templates submitted to REF2014. The environment statement (along with certain other information submitted) contributed 15% of the total REF profile, while the People section comprised roughly one fifth of the narrative text within each environment statement.

The Stern Review has suggested that the use of narrative text submissions in relation to the research environment raised certain issues in relation to the amount of effort required to produce and review these submissions and also concerns about how closely they related to the staff submitted.<sup>27</sup> HEFCE's consultation on REF2021 (underway at the time of writing) suggests that there is some desire for evolution of the manner in which submissions cover the research environment, potentially introducing the use of certain metrics in addition to narrative text, rather than relying on text narrative submissions.<sup>28</sup>

The REF2014 research environment template was not structured systematically enough to provide a consistent level of information on E&D activities at a UOA level. Reading of individual submissions provides a limited insight, but there was too much variation in the type and quality of information provided by UOAs to use an automated analysis approach. This suggests that in a future exercise there may need to be distinctive metrics to provide any quantitative data, but also a narrative approach to assess the extent to which E&D measures are embedded and whether there is an inclusive research culture at UOA level. The template and associated guidance would need to be revised to encourage UOAs to provide more information on their approach and activities, in a more systematic way.

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<sup>27</sup> Building on Success and Learning from Experience: An Independent Review of the Research Excellence Framework, Department for Business, Energy & Industrial Strategy, 2016

<https://www.gov.uk/government/publications/research-excellence-framework-review>

<sup>28</sup> Consultation on the second Research Excellence Framework, HEFCE, 2016

<http://www.hefce.ac.uk/pubs/year/2016/201636/>

Our finding that not all UOA submissions reported on existing institutional awards suggests that the additional provision of an institutional-level research environment statement (proposed in the current REF2021 consultation) would be valuable to make the recording of institutional-level activities more systematic. In addition, more guidance to submitting units from institutions could also be of benefit. While the variety of text we encountered suggests there was a strong degree of autonomy on the part of submitting units, this would be sub-optimal if it omits key information – and such omission is not necessarily indicative that an initiative is not embedded at that level.

Our broad recommendations are therefore as follows:

- Institutions and the sector should widen their efforts and activities in relation to enhancing E&D in the research environment to encompass protected characteristics in addition to their current welcome focus on gender;
- For REF2021, our evidence suggests that the best approach to providing information about the research environment would be to use a combination of quantitative and narrative approaches within submissions, and for assessment panels to review and assess submissions both quantitatively and qualitatively;
- If participation in currently widespread national initiatives, such as Athena SWAN or the European HR Excellence in Research award, is used to provide quantitative metrics in relation to E&D in the research environment in REF2021, a range of initiatives will be needed so as to avoid a narrow gender focus;
- The need for some contextual underpinning suggests that in future UOAs submitting information about their research environment will need to continue to have scope to describe the context for their activities in relation to E&D, through some element of narrative text;
- A revised and more structured UOA research environment template would be beneficial in REF2021, potentially including a specific E&D section, as has been proposed in the current REF consultation;
- More specific guidance should be given to institutions on the types of activities and measures relating to E&D that submitting units should cite in their submissions;
- As many E&D initiatives are currently at institutional level, these would be more systematically and robustly reported using an institutional research environment template, in addition to a UOA-level template to report more local activities and evidence for research culture including in relation to E&D.

## **Appendix 1: Methodologies**

### **1.1 Approaches to text handling and analysis**

The People sections of the environment statements were submitted by units within institutions with no prescribed structure other than the requirement for there to be two sub-sections (Staffing strategy and staff development, and Research students). The vast majority of information was submitted in the form of prose (textual narrative) rather than containing any tabular or graphical material within a PDF document that comprised the environment statement.

Collectively the People sections of the 1,911 environment statements comprise around 2.9 million words. This extent and quantity of largely unstructured text is beyond the scope of manual human analysis, at least within the time constraints of a modest research project. On the other hand, it is relatively small for automated text-processing. Accordingly, a variety of approaches were used to process, analyse and interpret the information that had been submitted. Our study was largely exploratory, but contained some specific questions regarding E&D policy and practice that it aimed to answer using the textual data. This is reflected in our choice of a hybrid approach, using computational approaches to aid human investigation. Within the former, we used both data-driven and hypothesis-driven methods. Given the exploratory nature of this research, an iterative approach was used throughout.

#### *i. Text processing and extraction*

The 1,911 environment statements were accessible as separate PDF format files and so required processing prior to analysis. This consisted of two steps – conversion of the documents into plain text and then extraction of the People sections which form the focus of study in this report. Plain text was generated using the Unix command line utility ‘pdftotext’ (specifying the ‘layout’ command option in order to capture possible text structures and line breaks). Once plain text files were available, a Python script using a series of regular expressions was used to extract the text of the People sections. Separate scripts were used to map the numerical file identifiers within file names to institution names and UOAs.

#### *ii. Pre-processing*

Two main forms of pre-processing were performed on the texts: the first was the removal of stop words (e.g. ‘and’, ‘but’ etc.) to leave words representing more of the content of the

texts, as well as 'stemming' in order to modify words to their base form and increase consistency within the texts. The latter process (for example, transforming all occurrences of 'runs', 'running' and 'ran' to 'run') used the Porter Stemming Algorithm.<sup>29</sup> Both of these approaches aim to help in generating more meaningful output which can be more easily interpreted by the researcher. However, neither approach is perfect, and so the benefits need to be balanced against the potential loss of fine-grained information. In addition, some of the analyses we carried out also automatically pre-processed input texts for their function; for example, in the word-frequency analysis, punctuation was removed and all letters converted to lower case.

### *iii. Data-driven analysis methods*

To get a better sense and understanding of the textual data, some initial exploration was conducted to examine word frequencies in the documents as a whole (i.e. as a single corpus). This was performed using the raw texts, as well as those which were pre-processed for stop words and stemmed.

In order to understand better the word patterns and usage within the texts, n-grams were generated using Python scripts, incorporating functions from the Natural Language Toolkit (nlk.org). Although these were generated for the whole corpus and panel sub-corpora as an exploratory step, the n-grams were more informative when they were incorporated into the hypothesis-driven analysis (see below).

An additional data-driven method which was available for exploration of the data was topic modelling. A limited amount of topic modelling was undertaken on an experimental basis in the exploratory phase, but this did not provide valuable insights and so the method was not continued. More details of the topic-modelling process can be found in Gill et al. (in press).<sup>30</sup>

### *iv. Hypothesis-driven methods*

Given the iterative nature of this project, the data-driven and hypothesis-driven approaches should not be viewed as isolated steps, but rather ones which fed into each other. Indeed, often hypotheses were supplemented and enriched using findings from the data-driven methods, and then studied in more detail using the hypothesis-driven methods.

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<sup>29</sup> <https://tartarus.org/martin/PorterStemmer/index.html>

<sup>30</sup> Gill et al. (in press). Insight workflow: Systematically combining human and computational methods to explore textual data. *Journal of the Association for Information Science and Technology*.

For example, although the corpus-comparison methods are described in the data-driven methods section, as well as highlighting new findings they were also used to test and refine hypotheses relating to differences of E&D focus across the REF main panels. In addition, these techniques were also used to develop 'key words' seen to embody particular issues of interest, which could then be tested and explored in more detail using keyword-in-context analysis as well as analysis of frequencies across the texts.

KWIC is a technique from corpus linguistics which enables the researcher better to understand how words are being used (e.g. particular senses or combinations with other words). It does this by generating all occurrences of the key word and displaying them within a window of (for example) 10 words on either side of that key word. Since some of the key words examined in this process frequently occurred in clusters, the KWIC analysis presented each sentence on a separate line to increase intelligibility (using a custom Python analysis script). KWIC output was displayed to include the institution name, REF main panel and UOA of the submission, enabling the researcher to explore hypothesised differences in usage of the key words at these fine-grained levels. Frequencies of key words (expressed as a proportion of their constituent text) were also generated at a document level, which enabled multivariate analysis of word usage across these different levels. Note that across our analyses, key words may contain 'wildcard' matching characters, for example 'ethnic\*' which would capture 'ethnic', 'ethnicity', etc., which provides a more targeted alternative to stemming the texts, as well as key words containing the space character to enable phrases such as 'religious belief'.

Focused study of the KWIC output with the human eye was necessary to distinguish between reported bespoke activities and references to initiatives at national level.

In addition to n-grams used for exploratory analysis, a revised version was generated in order to provide a variant of 'longest common substrings' at the word level for particular key words of interest. This enabled us to focus on characteristic phrases and co-locations containing particular key words, rather than potentially irrelevant or meaningless phrases or patterns. In addition, this analysis could also be performed on submissions in each REF main panel in turn to give a finer-grained analysis. The analysis was performed in two steps: the first was to extract sentences containing the key word; the second step was to iteratively generate n-grams based on the optimal combination of length and frequency. In practice this second step was performed under researcher supervision in order to generate two n-gram lists: the first containing the 10 longest n-grams with a frequency greater than around five (in some cases giving n-grams of length in excess of 30 words), and the second containing the most frequent n-grams of length 10 words (in some cases giving frequencies of around 10 instances).



## **1.2 Case studies**

To complement the textual analysis undertaken in this project, a small number of particular equality or diversity activities by institutions thought to be interesting practice were identified during the KWIC investigations and written up as short case studies or vignettes. These appear in Appendix 2 and provide some 'real life' context to supplement the data-driven focus of this report, as well as providing some examples of interesting or innovative practice in promoting E&D in the research environment.

For these examples, the appropriate department or unit within the institution was contacted and a short interview undertaken. This enabled us to validate that the aspect of E&D activity that we had identified had been interpreted correctly although in practice activity at the time of REF2014 submissions had evolved or been superseded, so the case studies deliberately reflect more current practice. Once a case study (vignette) had been drafted, it was approved by the institution concerned prior to inclusion in Appendix 2.

## Appendix 2: Case studies of practice

A small number of potential case studies were identified during the KWIC analysis stage of the research, which was used to investigate local initiatives. The case studies that follow were selected in that way but have been updated with more recent information in order to bring them up to date at the time of publication of this report.

### **Case study: Brunel University London - Instilling 'disability know-how' in staff**

Brunel University London's organisational culture promotes continual awareness-raising of disability across the institution. Staff and students are encouraged to disclose their disability, enabling the institution to support them.

A range of support mechanisms aim to embed the positive value placed on difference throughout the Brunel community. Considerable effort is placed on building awareness of diversity issues, acceptable behaviours and best practice. It runs a number of initiatives to inform and engage staff in its commitment to disabled people's issues which include:

- Mandatory E&D course for all new staff ('Equally different'), with a focus on disability issues;
- Bespoke training from Brunel's innovative disability and dyslexia service;
- Advice and guidance, via intranet and leaflets, raising awareness and on how to support disabled staff and students;
- An annual celebration of disability history month;
- An active and informative disabled staff network group.

In order to demonstrate commitment to these agendas, the institution has changed the name of one of its departments to Health and Wellbeing. In the last two years Brunel has seen a 5% increase in student disclosure and a 1.5% increase in staff disclosure.

In 2014 it gained the Disability-smart Award from the Business Disability Forum, a recognition for organisations that demonstrate an outstanding commitment to employing, working with and doing business with disabled people.

### **Case study: Canterbury Christ Church University – Staff diversity networks**

Canterbury Christ Church University (CCCU) is a Stonewall Diversity Champion, has accredited iIP status and is operating at Level 2 standard of the Disability Confident scheme. It became an Athena SWAN charter member in November 2015.

CCCU has a clear web presence in relation to E&D, defining protected characteristics and detailing its commitment to equality and support and resources linked to each characteristic. Prominent amongst these is its range of staff networks, supported by its E&D team. At the time of REF2014 submissions these comprised:

- Inter Faith Council
- LGBTIQ network (called CCCq)
- Staff Disability Network

Subsequently CCCU has added:

- BME Network
- Cancer Support Network
- Single Parents' Network
- Women's Network

The networks have developed over time and the way in which each operates and its membership differs, from a small group with a social focus to larger memberships with mailing lists of over 70. Activity in the staff networks varies and includes:

- Supporting and providing information for members via email, blogs and meetings;
- Running activities for members, e.g. lunchtime meals and activities;
- Arranging and publicising university and public events for awareness days or months, e.g. lectures, film screenings;
- Jointly running events and supporting other networks development;
- Working across the university to promote staff networks, e.g. attending corporate induction events and the annual Staff Wellbeing Fair.

The networks are independent of but work closely with the E&D team, and staff network chairs are members of the university's E&D Committee so that they can directly influence E&D policy and practice.

### **Case study: Glasgow School of Art – mainstreaming equality**

As a small specialist institution, in 2012 Glasgow School of Art (GSA) set out a process to mainstream E&D across the institution. Governors, senior staff and a cross-section of other staff and students identified successes and challenges for GSA around E&D. More than 60% of GSA's staff and a range of student representatives took part in a second stage which investigated the issues, developed proposals and tested responses, in order to have a transformative effect on GSA's work, student and staff experiences. These culminated in identification of a range of Equality Outcomes as targets to be achieved in the period 2013-2017.

Amongst these objectives for staff were greater inclusion of those employed part-time, reduction of a gender pay gap and development of a transparent and supported career structure for all staff. As part of the latter, GSA committed to achieving an Athena SWAN Bronze award and became the 100<sup>th</sup> UK institution to gain the European HR Excellence in Research award in September 2016. A further objective was to increase the proportion of staff (including external examiners and visiting lecturers) from diverse ethnic and cultural backgrounds in order to diversify the range of contributions to learning, teaching and research.

GSA publishes its strategic plans and intended Equality Outcomes and in 2015 published an update of its progress against these including data on its narrowing gender pay gap.

### **Case study: King's College, London – Mentoring for Black and Minority Ethnic staff**

King's, in partnership with University College London and Queen Mary University, London, set up a cross-institutional mentoring scheme called B-Mentor. This enabled senior academics (senior lecturer or above) of any ethnic background to mentor more junior Black and Minority Ethnic (BME) academics/researchers (at post-doctoral or lecturer level) from one of the other institutions.

The aim was to exchange experiences, ideas and feedback between the two parties to promote understanding of formal and informal structures, enhance opportunities for staff development and build skills and knowledge, enabling continuing professional development and personal growth.

King's has subsequently set up its own separate Diversity Mentoring Scheme (although the other partners continue to support B-Mentor). This builds on and extends its experience with previous schemes. The new scheme is broader in that it is open to academic, research and professional services staff at any grade who are female, trans, non-binary or another gender variant identity or from a BME background.

These groups were prioritised by King's on the basis of known under-representation at particular grades and because they face greater institutional barriers to progression. It is intended to expand the scheme to other priority groups after the pilot year. The new scheme provides mentees with an opportunity to meet with a more experienced and trained mentor and to identify, define and progress towards professional goals that will enhance their career progression and retention at King's. Training is provided to all participants and the scheme has been endorsed by a number of senior sponsors who attended the launch event, where they shared their personal stories of mentoring.

In its first year, the scheme received over 180 applications from mentors and mentees and it was hoped to make 80 successful matches. Mentoring pairs are expected to meet for at least one hour on a monthly basis for six months. The scheme will be closely evaluated for impact and participants will be offered the opportunity to attend a mid-term review and celebratory event at the end of the period.

King's holds the ECU Race Equality Charter Mark Award and this scheme forms a key action in its associated action plan. Other current initiatives to support BME post-doctoral staff include a planned pan-London conference in 2017 to provide key information/support on strategies for a career in academia, and a diversity-focused post-doctoral fellowship.

## List of abbreviations

AHSSBL	Arts, Humanities, Social Sciences, Business and Law
BME	Black and Minority Ethnic
CRAC	Careers Research & Advisory Centre
CROS	Careers in Research Online Survey
E & D	Equality and diversity
ECU	Equality Challenge Unit
EDAG	Equality & Diversity Advisory Group
EDAP	Equality & Diversity Advisory Panel
EIA	Equality impact assessment
HE	Higher education
HEFCE	Higher Education Funding Council for England
liP	Investors in People
JACS	Joint Academic Classification System
KWIC	Key word in context
LGBT	Lesbian, Gay, Bisexual and Transgender
LGBTIQ	Lesbian, Gay, Bisexual, Transgender, Intersex and Questioning
RAE	Research Assessment Exercise
REF	Research Excellence Framework
STEMM	Science, Technology, Engineering, Mathematics and Medicine
UOA	Unit of Assessment