Communicating knowledge: How and why researchers publish and disseminate their findings

Supporting paper 2: Report of focus groups findings

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September 2009

Research & consultancy for performance management
Information, cultural & academic services

Table of Contents

Acknowledgements

The research on which this report is based was undertaken by a team from Loughborough University and Manchester Metropolitan University.

The research team would like to thank:

- Aaron Griffiths and Michael Jubb from the Research Information Network
- The RIN Expert Panel - Michael Anderson; Bob Campbell; Hannah Chaplin; Alison Holt; Neil Jacobs
- All those researchers who gave their time to attend and contribute to the focus groups, and who completed the survey
- Mary Ashworth & Sharon Fletcher from LISU, who provided invaluable administrative support
- The bibliometric data collectors – Karen Davies; Tracy Forskitt; Vicki Jackson; Amy Beeston
- The focus group contacts collectors – Evgenia Vassilakaki, Magda Vassiliou and Ioanna Zorba

Executive summary

This study was commissioned by the Research Information Network, in collaboration with the JISC, in December 2008, to gather and analyse evidence about the motivations, incentives and constraints that lead researchers in the UK in different subjects and disciplines to publish, disseminate and cite their work in different ways.

The following key issues were investigated, covering three broad areas:

1. Publication and dissemination behaviour:
2. Citation behaviour:
3. The perceived influence of research assessment (past and anticipated):

Methodology

Four complementary methodologies were used: literature review, bibliometric analysis, focus groups, and a survey. This mixed method approach has been used to help ensure a holistic view is provided of the publication, dissemination and citation behaviour of researchers across subject disciplines.

This report provides findings of data collected from the focus groups and interviews. Having sampled at the coarse-grained level of broad disciplinary groupings (that is, the HESA and RAE 2001 categories), as a way of coordinating sampling across the three methods, we have used Whitley's (2000) organizational theory of disciplines to sample within these broad disciplinary groupings. Thus, the coarse grain disciplinary groups investigated were Physical Science, Medical Science, Engineering, Humanities, Social Sciences and the Arts.

Key findings

The following were identified as key issues emerging from the focus group and interview participants:

- The motivations, incentives and constraints that lead researchers in the UK in different subjects and disciplines to publish and disseminate their work in different ways
    - Predominance of journal articles:
        - There was an almost universal view that there is an expectation and, in some cases, a pressure for scholars to normalise their work into a peer-reviewed journal article
    - Increase in collaboration:
        - Participants felt that there was an increased pressure to collaborate on research, within discipline and across discipline and across institution – including international collaboration.
        - Participants thought that people would start increasing the number of citations 'in a spirit of generosity'.
        - Citation circles were mentioned as a form of collaboration to increase citation counts, and this was viewed in a negative way.

- Intellectual autonomy
  - Intellectual autonomy was raised as an important issue by many participants.
  - Concerns arose from conflicts in writing outputs to reach the target audience and conforming to the institutional view of RAE submissable outputs.
  - Participants viewed conferences and workshops as important to certain disciplines due to the speed with which research can be disseminated, but not viewed highly in terms of the RAE.
  - There were also concerns that research outputs are changing, with less emphasis on monographs.
  - Some participants acknowledged that journal editors influence scholarly freedom.
  - Research assessment was also identified as a potential threat to intellectual honesty.
- How impact and quality are measured
  - The impact factor of journals formed a significant part of discussions with many participants.
  - Participants felt frustrated that impact was measured in such a narrow way.
  - In relation to citation, participants felt that impact is usually measured by citing outputs in high impact peer reviewed journals.
- What scholars view as important vs. outputs submitted to research assessment
  - The range of output types discussed by participants as important to individual scholars and to their research communities was markedly more diverse than those perceived to be important to their institutions for submission to the RAE – where there was a predominance of the peer-reviewed journal article.
  - Some participants also identified that there was a tension between outputs deemed to be important to them as individual scholars and requirements placed on them by their institution as a result of influence from research assessment.
- Changing nature of multiple authorship
  - Multiple authorship and order of authors' names is handled differently within disciplines and across disciplines – with many different practices emerging.

- How and why researchers cite other researchers' work
  - Influence of journal editors/reviewers on citation behaviour
    - The influence of journal editors and reviewers on citation practice was raised by almost all participants.
    - Although this was not always seen as a negative influence, some did feel that the suggestions tended towards articles from that journal.
  - Tactical citation practices
    - Many of the participants said that they would tailor their citations to increase the chance of having their article accepted for publication in a journal.

- Some participants had begun to question the practice of citing 'poor' work, as they felt it may lead to people getting credit for undertaking poor work or producing badly written articles.

- How accessibility influences citation
  - Participants specifically mentioned access and accessibility as an influencing factor in what they cited, with a heavy emphasis on the convenience of online access to journals, reports, databases, and 'quality' websites.
  - Mention was made of open access, but surprisingly not in great depth by any of the focus group/interview participants.

- How researchers' decisions on publication and citation are influenced (or not) by considerations arising from research assessment
  - Institutional interpretation of research assessment
    - Institutional interpretation of research assessment emerged as a significant issue for many participants.
    - This may manifest itself as pressure to produce RAE submissable outputs.
    - Institutional interpretation of research assessment may also be apparent in understanding of the Panel's requirement.
    - Some participant's highlighted institution's decisions over which Unit of Assessment they should be entered into.
    - Other participants felt that institutions were influenced by research assessment, leading to reluctance in allowing scholars freedom to develop into new areas of thought.
    - One of the most common perceptions amongst the focus group/interview participants is that the research assessment exercise is a game and that academics are forced into this game playing in relation to their citation practices.
    - Some participants talked about the development of citation strategies within institutions and expressed concerns that citation models within subject disciplines will differ, which could have a positive or negative affect on citation counts.
  - Balance of work to reach audience vs. research assessment requirements
    - Many participants discussed the difficulty in writing for their target audience and meeting institutional requirements for RAE submissions.
    - There appears to be a conflict between what the audience wants or is perceived to want, and what research assessment may require.
  - Research lifecycle
    - Concerns were raised about the research 'lifecycle', in particular, the lead-in time taken to recognize (and therefore cite) an output.

Further conclusions and recommendations can be seen in the overarching report which draws together the findings of all four strands of work undertaken for this project.

1. Introduction

This study was commissioned by the Research Information Network, in collaboration with the JISC, in December 2008, to gather and analyse evidence about:

- The motivations, incentives and constraints that lead researchers in the UK in different subjects and disciplines to publish and disseminate their work in different ways
- How and why researchers cite other researchers' work
- In particular, how researchers' decisions on publication and citation are influenced (or not) by considerations arising from research assessment

The following key issues were investigated, covering three broad areas:

1. Publication and dissemination behaviour:

- What factors make a scholar prefer one dissemination medium over another?
- Has the trend towards electronic publishing, and open access to scholarly outputs of all types affected their preferences, and how?
- To what extent does collaboration across institutions or disciplines affect these behaviours?
- What motivates scholars to publish, and what constrains them?
- What impact will the advent of electronic publishing have in the future on scholars' dissemination activities?

2. Citation behaviour:

- Why do scholars cite the way they do?
- Whether scholars' reading behaviours, and therefore their knowledge of the prior literature, is changing

3. The perceived influence of research assessment (past and anticipated):

- What pressures are scholars feeling regarding dissemination because of the increasing importance of the RAE/REF, and how is that pressure manifesting?
- Whether pressures from the RAE/REF have affected publishing behaviours

Four complementary methodologies were used, and the detailed methods and outcomes are described in a series of four supporting papers to the main project report. These supporting papers are available at: www.rin.ac.uk/communicating-knowledge:

1. Bibliometric analysis
2. Report of focus group findings (this document)
3. Report and analysis of researcher survey
4. Literature review

This mixed method approach has been used to help ensure a holistic view is provided of the publication, dissemination and citation behaviour of researchers across subject disciplines. This

will also establish a baseline for further studies in this area. Consequently, the individual reports of each stage should not be read in isolation, but in conjunction with the main project report, *Communicating knowledge: How and why UK researchers publish and disseminate their findings* (September 2009). Each individual report provides further detail and supporting evidence for the material presented in the main report.

1.1. Scope of study

This report provides findings of data collected from the focus groups and interviews, and should be used in conjunction with findings from the quantitative data collected for the project as a whole (bibliometric analysis and survey results).

This triangulation approach has been used to help ensure a representative picture is provided of the publication, dissemination and citation behaviour of researchers across subject disciplines, and will prepare a firm foundation for further studies in this area.

2. Methods

The data-gathering phase of the qualitative aspect of the project comprised a series of focus groups with research-active academics representing a cross section of institutions and disciplines *(see Appendix 1)*. The aim of the focus groups was to discuss the following:

- The motivations, incentives and constraints that lead researchers in the UK in different subjects and disciplines to publish and disseminate their work in different ways
- How and why researchers cite other researchers work
- How researchers' decisions on publication and citation are influenced (or not) by considerations arising from research assessment.

2.1. Focus group sampling and composition

Having sampled at the coarse-grained level of broad disciplinary groupings (that is, the HESA and RAE 2001 categories), as a way of coordinating sampling across the three methods, we have used Whitley's (2000) organizational theory of disciplines to sample within these broad disciplinary groupings. Thus, the coarse grain disciplinary groups investigated were Physical science, Medical science, Engineering, Humanities, Social sciences and the Arts. Combining these two approaches ensures that the focus groups have breadth of subject coverage both in terms of HESA and RAE 2001 and in terms of the cultural characteristics as identified by Whitley. The typology developed by Whitley (2000) is particularly relevant as a sampling frame for the concerns of this study since it is based on disciplines as reputational systems of organizing and controlling research. As Whitley (2000, p.83) explains one of the particular features of reputational organizations is autonomy from the administrative hierarchy of employers in terms of control over how research is conducted and its competence evaluated.

Published forms of dissemination, e.g. peer reviewed journals, conference papers, monographs etc, act as mechanisms by which researchers structure the results of their work and attempt to persuade colleagues of its importance and significance. In some disciplines researchers are able to contribute to a number of intellectual fields (problem areas) and establish their reputations across different audiences by publishing in different fora, whereas in others fora and audiences are clearly defined and contributions need to be quite specific for their importance and significance to be accepted (Whitley, 2000, p.86). Whitley terms this dimension of how research is conducted and evaluated as 'mutual dependence' and it varies by degree between disciplines and Whitley argues is related to differences in their intellectual structures.

Whitley's (2000) theory argues that similarities and differences in intellectual structures across disciplines are shaped by two fundamental cultural factors:

- The degree of interdependence both between researchers within a discipline and between disciplines in making a valid contribution to the body of knowledge, and
- The degree of uncertainty in producing and evaluating that knowledge.

Mutual dependence and task-uncertainty are closely interrelated and the work of Fry & Tajla (2007) corroborated that the degree of mutual dependence in a discipline's intellectual structure signifies a relative degree of task uncertainty. Selection of a representative sample of disciplines across Whitley's typology, therefore, is possible based on establishment of the degree of mutual dependence alone.

Mutual dependence cannot be measured in absolute terms, but evaluating the relative degree of mutual dependence that characterises a discipline can be based on simple metrics, such as the extent to which researchers work mainly alone or as tight-knit groups, the extent to which they draw on research from other disciplines or from their own parent discipline (Talja *et al*, 2007), and whether they produce single or multi-authored outputs.

The dimensions of functional and strategic dependence need to be conceptualized along a continuum, so that although a particular discipline (subject-based focus group) might be categorized as being in one or other of Whitley's (2000) quadrants, disciplines in the same quadrant will vary in the degree to which they have cultural tendencies towards neighbouring quadrants. For example, Whitley describes the core sub-fields of economics as being almost similar to physics with a high degree of both functional and strategic dependence, whereas the peripheral sub-fields have more affinity with those disciplines in the low functional /high strategic dependence quadrant (for the purposes of our study we have categorized economics in the low Functional Dependence/high Strategic Dependence quadrant).

A brief summary of each of the cultural types represented in Whitley's four quadrants is given below.

High Functional Dependence/High Strategic Dependence

- A high degree of specialization and division of labour
- Strong collective identity and consciousness across field boundaries
- Competence standards are standardized and formal across specializations within sub-fields
- A high degree of theoretical coordination
- The research system is relatively centralized and formally coordinated

High Functional Dependence/Low Strategic Dependence

- Dependence on the results of others' work, so researchers (and research groups) are more oriented to each other than those in the Low Functional Dependence quadrants
- Competence standards are more formalized and shared across groups
- Reputations sought primarily at the level of the sub-field or problem areas, rather than at the level of the discipline
- Integrative theoretical schemes that would create a hierarchical system of intellectual priorities are not highly regarded or sought after
- Hence, theoretical coordination between sub-fields is not strong and there is a relatively low degree of strategic dependence

Low Functional Dependence/High Strategic Dependence

- Researchers do not rely to any great extent on the results of others' work to make contributions

- Rather, they compete and conflict over the relevance of those contributions to the goals and intellectual priorities of the discipline
- The high degree of strategic dependence means that researchers seek to persuade colleagues of the importance of their own approaches and topics
- Emphasis on demonstrating the superiority of their interpretation of central issues in the discipline
- Different research schools work on separate topics with distinct approaches and results are not easily compared across schools
- Reputations are made within research schools and contributions are assessed in relatively diffuse and tacit ways
- Reputations also rely rather heavily on personal contacts

Low Functional Dependence/Low Strategic Dependence

- Lack of coordination between sub-fields
- Broadly defined problems dealt with in a diffuse way
- Contributions not tightly coupled with diverse contributions
- A variety of intellectual objectives using a variety of methods
- Fluid in membership and identity, with considerable mobility between topics (areas and reputations fluctuate as interests alter)
- Ways of evaluating contributions (competence standards) are informal

The focus groups were held at three venues spread across the UK: in London, Manchester and Edinburgh, with scholars from surrounding institutions being invited to participate. A purposive stratified sampling approach was employed to identify scholars – with consideration given to: 1) research activity, 2) institution type and, 3) stage of career. The focus groups were undertaken according to the ethical framework of Manchester Metropolitan University which ensures participants are made fully aware of the purpose of the study, guarantees confidentiality and anonymity, and allows participants to withdraw their contribution at any time should they so wish. A script of the focus group is available in Appendix 2. Additionally, the findings of the focus groups were submitted to participants for validation.

The target number of participants for the focus groups was originally set at 8-10, and the response rate to the invitation to participate was largely excellent. However, it was necessary to overbook focus groups to take into account drop-out due to illness or other circumstances, or failure to attend with no reason given (for example, there were three no-shows for the Psychology focus group session). As a result some focus groups exceeded the expected ten, but it was felt that in these cases the numbers were still manageable for a focus group (thirteen participants in some cases).

Three disciplines (Biomolecular chemistry, Cancer studies and Economics) did not attract sufficient participants to run a focus group and in these cases paired face-to-face interviews and/or telephone interviews were undertaken. Apart from Biomolecular chemistry (which had

fewer contacts to invite, plus a problem experienced with one university which meant that the invitations were not distributed to the appropriate members of staff), it was not obvious why these disciplines did not attract sufficient participants to enable a focus group to take place. The strategy for inviting participation was undertaken consistently across all disciplines.

Figure 1 below shows the key to figures illustrated in this report, and Figure 2 below shows a profile of participation.

Figure 1 Key to illustrative figures

Subject Disciplines	Subject discipline colour code
PHYS: Physics	Physical Science: Green
NM: Nursing and midwifery	Medical Science: Blue
BMC: Biomolecular chemistry	Computer Science: Yellow
CS: Cancer studies	Arts: Purple
CSI: Computer science and Informatics	Social Sciences: Orange
DDPA: Dance, Drama, Performing Arts, & Music	Humanities: Teal
PSYCH: Psychology	
POL: Politics	
EC: Economics	
EL: English literature	
PHIL: Philosophy	

Figure 2 Participants and disciplines

Whitley's Typology *	Fine Grain Subject Discipline	Course Grain Subject Discipline	Attended	Institution spread
High FD/High SD	Physics	Physical Sciences	10	4
High FD/High SD	Biomolecular chemistry	Medical Sciences	2	2
High FD/Low SD	Nursing & midwifery	Medical Sciences	9	5
High FD/Low SD	Cancer Studies	Medical Sciences	4	3
High FD/Low SD	Computer science & informatics	Engineering	9	6
Low FD/Low SD	English literature	Humanities	10	8
Low FD/Low SD	Drama, Dance, Performing Arts & Music	Arts	13	7
Low FD/Low SD	Politics	Social Sciences	10	6
Low FD/High SD	Philosophy	Humanities	9	5
Low FD/High SD	Economics	Social Sciences	5	5
Low FD/High SD	Psychology	Social Sciences	6	6
Total	**11 Subject Disciplines**	**6 Broad Disciplines**	**87**	

* Based on the degree of functional dependence (FD) and strategic dependence (SD)

The focus groups lasted up to two hours, and interviews up to 45 minutes. Data was captured using a combination of sound recording and note taking. The recordings were transcribed in full, and Atlas-ti software was used to manage the data for analysis. The key issues described above provided the basis for a coding scheme to support top-down coding. This was combined with open coding to capture aspects of behaviour and motivation which emerged naturally from participants.

2.2. Presentation of qualitative results

The results of the focus groups are presented according to the main themes of the research and then further grouped by subject discipline. Each area of investigation is initially presented by identification of the main findings with an accompanying table which visually represents the results of the analysis undertaken. Further detail relating to each area can be seen in later sections.

It is important to note that these results are representative of the focus group participants only. They provide rich detail of the thoughts and opinions of the participants who took part in these groups and should be viewed in conjunction with the results of the Review of the Literature, and the Bibliometric and Survey Reports.

2.3. References

Fry, J., and Talja, S. (2007) The Intellectual and Social Organization of Academic Fields and the Shaping of Digital Resources. *Journal of Information Science*. 33(2), pp. 115-133.

Talja, S., Vakkari, P., Fry, J., and Wouters, P. (2007) Impact of Research Cultures on the Use of Digital Library Resources. *Journal of the American Society for Information Science and Technology*. 58(11), pp.1674-1685.

Whitley (2000) (2nd ed.) *The intellectual and social organization of the sciences*. Oxford: Clarendon Press.

3. Results: publication and dissemination behaviour

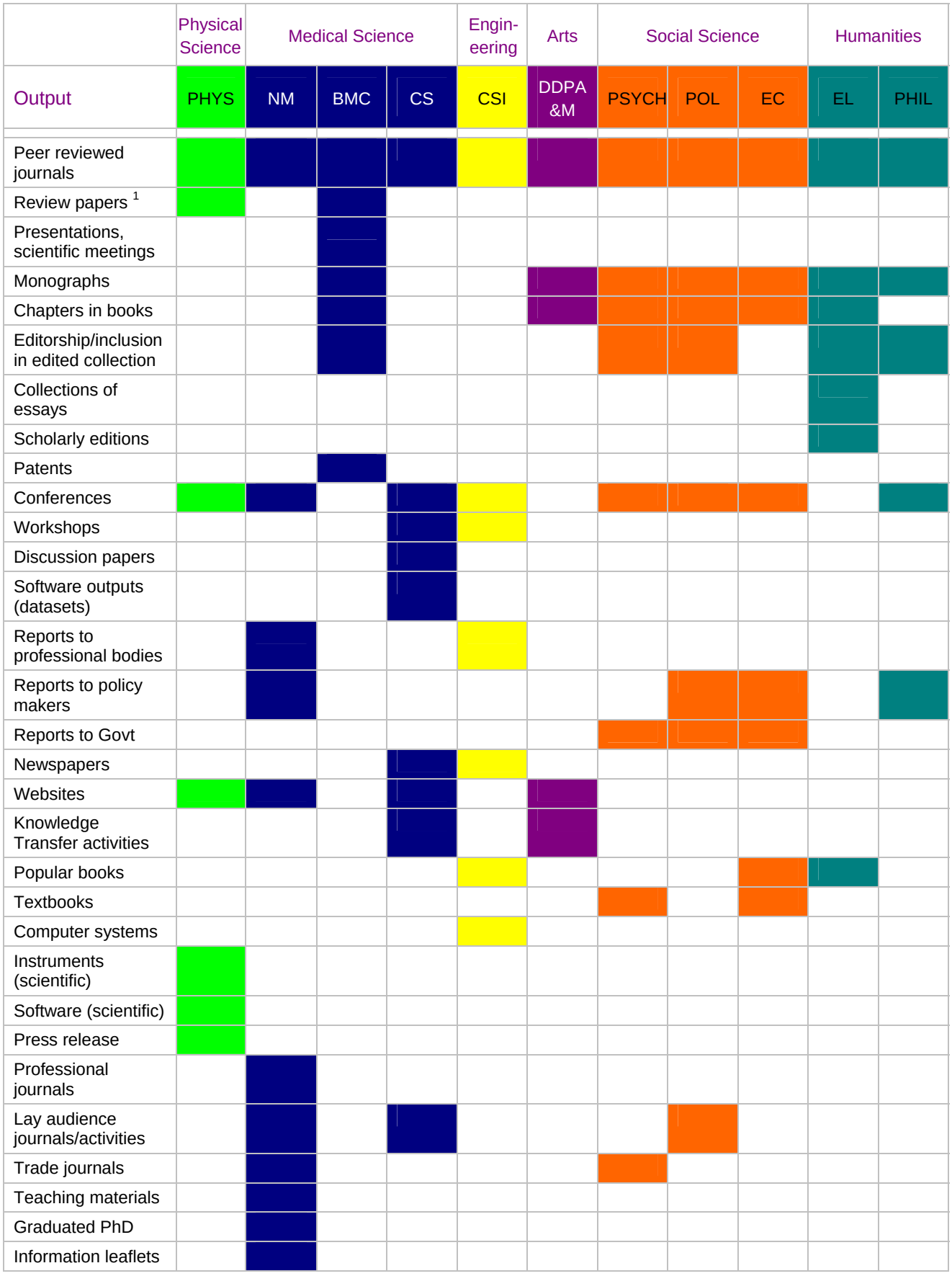
Participants discussed their publication and dissemination behaviour, including the main research outputs - to them as individual scholars, to their research community and to their institution. They also discussed external factors external to their research community or institution which may influence publication and dissemination behaviour, and finally discussed whether current research assessment had influenced them and if they though future research assessment might influence their publication and dissemination behaviour. The following figures illustrate the key findings, with key findings highlighted, followed by an in-depth description of the discussions. It should be noted that the figures are interpretations extracted from comments and discussions from the focus group participants and should not be generalised to the population of each discipline. For a more representative interpretation of data please refer to the Report and analysis of researcher survey. Figure 2.1 above provides a key to the data provided in Figures 3.1 – 3.8.

3.1. Summary of main research outputs

Figure 3 illustrates the main research outputs in each of the focus groups. A wide range of outputs was identified, key findings are as follows:

- Articles in peer-reviewed journals were universally regarded as one of the most important outputs by focus group participants across all subject disciplines.
- A very wide and diverse range of outputs was recorded across the different focus groups.
- Monographs were identified as an important output by participants within the Arts, Social sciences and Humanities broad disciplines and Biomolecular chemistry but were not identified as important by Physics, Nursing & midwifery, Cancer studies or Computer science & informatics.
- Chapters in books were identified by participants in Biomolecular chemistry, Dance, drama, performing arts & music, Psychology, Economics and English literature.
- Edited collections were identified as an important output by participants within Biomolecular chemistry, Psychology, Politics, English literature and Philosophy.
- Only Biomolecular chemistry participants identified patents as an important output.
- Conferences were identified as an important output by participants from all focus groups except Biomolecular chemistry, Dance, drama, performing arts & music and English literature.

Figure 3 Main research outputs



	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
Output	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
Performative science[2]											
Practice led[3]											
Working papers											
Political meetings											
Times Literary Supplement											
Outreach to schools											

1 Critical, thoughtful discussion of a collection of primary papers on a particular topic

2 Performative science = such as film, theatre production, dance, music recitals

3 Practice led = such as documentation of a theatre drama performance, series of dance and technology workshops documented in a single project, series of documented dramas, an education drama and workshops AS WELL AS performance, art, drama, dance etc.

Figure 4 illustrates the main research outputs returned in the main panels in the RAE 2008. The proportion of outputs returned are presented in %. The following are key findings of the focus group data in comparison with these RAE 2008 returns:

- Articles in peer-reviewed journals were universally regarded as one of the most important outputs by focus group participants across all subject disciplines and formed the largest part of the submission to RAE 2008
- A greater diversity of outputs was identified by participants than were submitted to RAE 2008.
- Monographs were identified as an important output by participants within the Arts, Social Sciences and Humanities broad disciplines and Biomolecular chemistry but very few were actually submitted in Panels D (BMC), K (PSYCH) and I (EC). Comparatively more were submitted in Panels O (DDPA&M), J (POL), M (EL) and N (PHIL).
- Chapters in books were identified as important by participants in Biomolecular chemistry, Dance, drama, performing arts & music, Psychology, Economics and English literature but very few were actually submitted in Panels D (BMC), K (PYSCH) and I (EC). Comparatively more were submitted in Panels O (DDPA&M), J (POL) and M (EL).
- Edited collections were identified as an important output by participants within Biomolecular chemistry, Psychology, Politics, English literature and Philosophy but very few submissions were made to any panel for this type of output.
- Only Biomolecular chemistry participants identified Patents as an important output and of these there were very few submissions to that panel.
- Conferences were identified as an important output by participants from all focus groups except Biomolecular chemistry, Dance, drama, performing arts & music and English literature. However, with the exception of Panel F submissions of this type of output were low.

Figure 4 Outputs returned in the RAE 2008 – all disciplines

Panel	E	C	D	A	F	O	K	J	I	M	N
Output submitted to RAE 2008	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
	%	%	%	%	%	%	%	%	%	%	%
A Authored book	0.24	0.62	0.18	0.01	1.16	11.09	5.00	15.97	2.03	22.28	22.81
B Edited book		0.18	0.02		0.07	3.05	0.39	2.23	0.43	5.93	4.82
C Chapter in book	0.77	1.19	0.27	0.01	1.98	16.66	6.61	16.00	2.90	28.45	30.54
D Journal article	97.65	93.90	97.63	98.64	78.64	22.09	83.24	61.76	87.98	36.02	36.89
E Conference contribution	0.18	0.17	0.05	0.01	13.79	4.74	0.55	0.13	1.19	0.75	0.27
F Patent/ published patent application	0.14	0.15	0.15	0.10	0.13	0.21	0.03				
G Software	0.01	0.08			0.25	0.13	0.04		0.05	0.06	0.00
H Internet publication	0.89	2.64	1.57	1.18	3.68	1.62	2.32	1.74	3.96	1.79	2.44
I Performance				0.01	0.01	3.61				0.29	
J Composition						4.49	0.03			0.14	
K Design						2.06				0.00	
L Artefact					0.02	4.47				0.00	
M Exhibition					0.12	16.72		0.03	0.01	0.02	0.01
N Research report for external body	0.09	0.96	0.10	0.02	0.05	0.75	1.65	1.77	0.75	0.06	0.03
O Confidential report (for external body)	0.02	0.06	0.01		0.01	0.13	0.03	0.01	0.01	0.02	0.01
P Devices and products					0.01	0.24				0.02	
Q Digital or visual media					0.03	4.06	0.01	0.02		0.14	0.02
R Scholarly edition						0.49		0.04	0.10	2.50	1.11
S Research datasets and databases					0.01	0.21	0.04		0.07	0.30	0.23
T Other form of assessable output	0.01	0.06	0.02	0.02	0.04	3.18	0.06	0.30	0.52	1.26	0.83

Highlighting in Figure 4 shows those outputs which represent more than 10% of the total submitted for the discipline.

3.1.1. Outputs of importance to the individual scholar

Figure 5 illustrates the research outputs important to individual scholars. A wide range of outputs are identified, with some key findings as follows:

- Articles in peer-reviewed journals were universally regarded as one of the most important outputs by focus group participants across all subject disciplines.
- Monographs were identified as important by participants of Biomolecular chemistry, Dance, drama, performing arts & music, Psychology, Politics, Economics, English literature and Philosophy.
- Chapters in books were identified as important by Biomolecular chemistry, Dance, drama, performing arts & music, Economics and English literature.
- Editorship/inclusion in edited collections were important in Biomolecular chemistry, Psychology, Politics, and English literature.
- Conferences were identified as important for all Social science disciplines, Physics, Nursing & midwifery, Cancer studies, and Computer science & informatics.

Figure 5 Research outputs important to individual scholar

	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
Output	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
Peer reviewed journals											
Review papers (critical, thoughtful discussion of a collection of primary papers on a particular topic)											
Presentations, scientific meetings											
Monographs											
Chapters in books											
Editorship/inclusion in edited collection											
Collections of essays											
Scholarly editions											
Patents											
Conferences											
Workshops											
Discussion papers											
Software outputs (datasets)											
Reports to professional bodies											
Reports to policy makers											
Reports to Govt											
Newspapers											
Websites											

	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
Output	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
Knowledge Transfer activities											
Popular books											
Textbooks											
Computer systems											
Instruments (scientific)											
Software (scientific)											
Press release											
Professional journals											
Lay audience journals/activities											
Trade journals											
Teaching materials											
Graduated PhD											
Information leaflets											
Performative science											
Practice led											
Working papers											
Political meetings											
Times Literary Supplement											
Outreach to schools											

3.1.2. Outputs of importance to the institution

Figure 6 illustrates the research outputs important to the institution. comparatively few outputs were identified, with key findings as follows:

- Articles in peer-reviewed journals were universally regarded as one of the most important outputs by focus group participants across all subject disciplines.
- Monographs were also identified as important to the institution by participants of the Politics and English literature focus groups.
- Edited collections were also identified as important to the institution by participants of the Philosophy focus group.
- Collections of essays were also identified as important to the institution by participants of the English literature focus group.
- Patents were also identified as important to the institution by participants of the Biomolecular chemistry focus group.

- Knowledge Transfer outputs were also identified as important to the institution by participants of the Dance, drama, performing arts & music focus group.
- Popular books were also identified as important to the institution by participants of the English literature focus group

Figure 6 Research outputs important to the institution

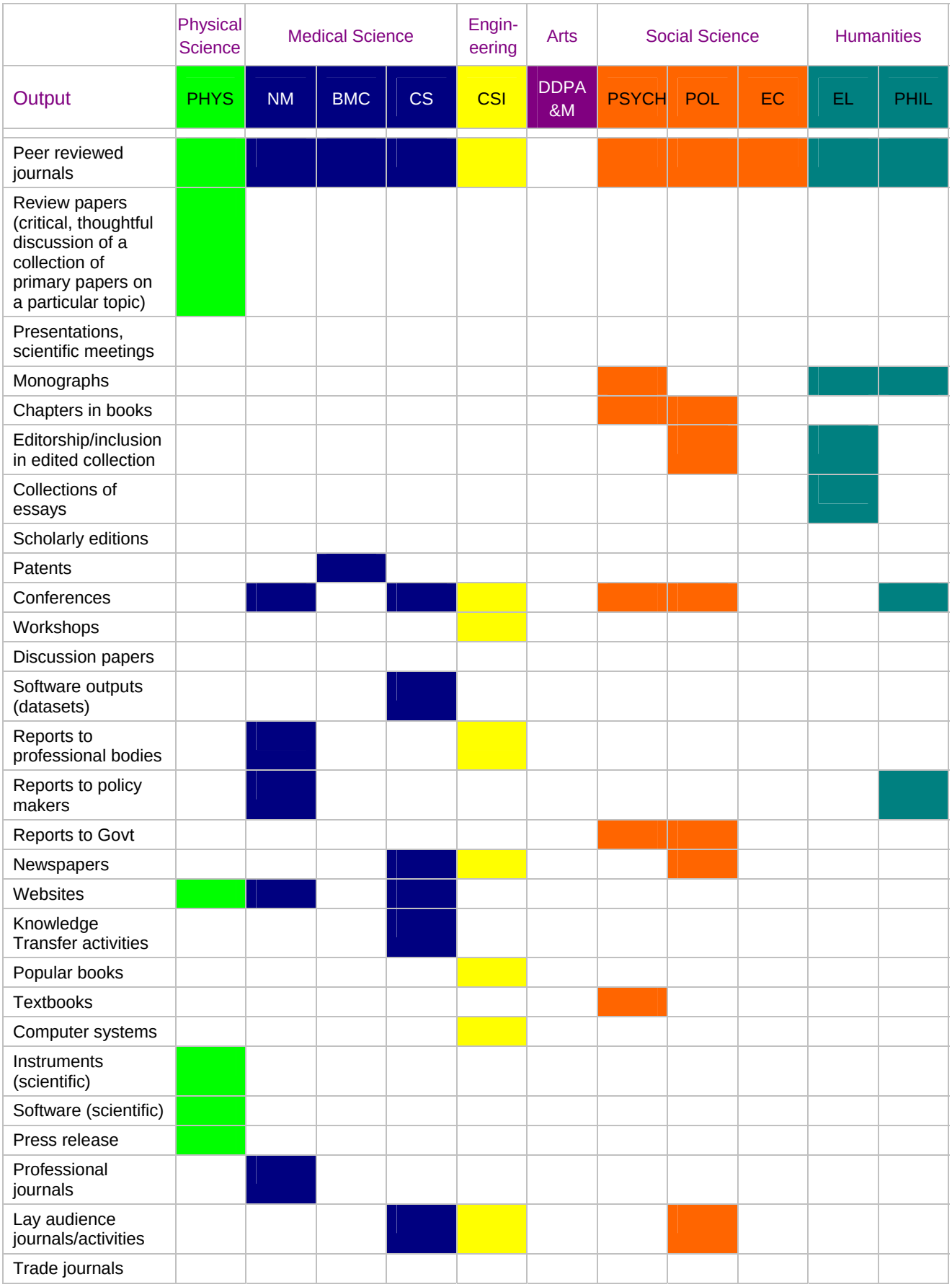
	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
Output	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
Peer reviewed journals											
Monographs											
Editorship/inclusion in edited collection											
Collections of essays											
Patents											
Knowledge Transfer activities											
Popular books											

3.1.3. Outputs of importance to the research community

Figure 7 below illustrates the research outputs important to the research community. A wide range of outputs are identified, with some key findings as follows:

- Articles in peer-reviewed journals were universally regarded as one of the most important outputs by focus group participants across all subject disciplines, except Dance, drama, performing arts & music.
- Conferences are viewed as an important output to the research community by participants of Nursing & midwifery, Cancer Studies, Computer science & informatics, Psychology, Politics and Philosophy focus groups
- Monographs are viewed as an important output to the research community by participants of Psychology, English literature and Philosophy focus groups.
- Chapters in books are viewed as an important output to the research community by participants of Psychology and Politics focus groups.
- Edited Collections are viewed as an important output to the research community by participants of Politics and English literature focus groups.
- Patents are viewed as an important output to the research community by participants of the Biomolecular chemistry focus group.
- Websites were identified as important by participants in the Physics, Nursing & midwifery and Cancer studies focus groups.

Figure 7 Research outputs important to the research community



	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
Output	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
Teaching materials											
Graduated PhD											
Information leaflets											
Performative science											
Practice led											
Working papers											
Political meetings											
Times Literary Supplement											
Outreach to schools											

The following sections provide a more in-depth description, with quotes to illustrate points, of the focus group discussions according to the broad disciplines of Physical science, Medical science, Engineering, Arts, Social science and Humanities, with the separate subject disciplines within.

3.1.4. Physical science: focus group discussions

Physics

Participants of the Physics focus group mainly disseminate their research through peer reviewed journal articles, with much use made of electronic versions of papers.

Some dissemination occurs through conferences, particularly for very specific or very small research areas which would not otherwise be published in a peer reviewed journal. Other outputs put forward by participants were instruments, both large scale such as a major telescope which may take up to ten years to build before use, and also small scale instruments, which may take two to three years in actually making an instrument.

Outputs of greatest importance to the university are papers in peer reviewed journals, although participants did also comment that *'It seems like you are judged completely on how much you publish, your volume of publications, not how good it is, how much'.*

Outputs of greatest importance to the research community include electronic information, as one participant commented *'the primary source of information is electronic … so if you want a realistic picture of how this community operates, the electronic version is what drives it'*. Other outputs identified included instrument building, for example

> *'physics is basically, it's an instrument building - instrument building always has problems to be made visible, you don't necessarily want to write twenty seven papers if all you get from the beginning of an instrument to the end of it ten years later'*

One participant noted 'you can't put a stamp on the telescope and send it to HEFCE …you can't do that'.

Software development was also noted to experience the same difficulties with recognition as instrument building. Other outputs discussed include websites, press release and review papers – the latter of which were used by the community but seemed not to be recognised by research assessment *'I wrote a review article that was going to take another six months so I basically decided to walk away from it'*.

3.1.5. Medical science: focus group discussions

Nursing & midwifery

Participants of the Nursing & midwifery focus group disseminate research through a variety of outputs including: 1) papers in peer reviewed journals – academic, professional and lay journals, 2) official reports, 3) conference proceedings, 4) teaching material, 5) information leaflets and, 6) graduated PhD students. One participant commented, *'if you're an active academic, to be quite honest, to be able to pitch four good papers shouldn't be that difficult'*.

There was a view that as an applied discipline publishing in professional journals is highly important, but that academic institutions, although recognising this, still view peer reviewed journals to be the output of greatest importance to the institution. Participants identified this as an area of conflict, for example

> *'that is a serious conflict for me and my colleagues is that, because they're in an applied area, we do want to make the material very accessible to clinical staff on the ground. You know, there's the magazine they pick up when they go for their coffee, that sort of thing. But the pressure is on always trying to get into high impact journals, so you know, it's up to us, I think, we've got to be quite innovative in doing both and that's quite difficult'*

Outputs of importance to the research community are varied, and there was an acknowledgement amongst participants that they write for many audiences, for example

> *'we obviously write for several audiences. The practice audiences is hugely important because obviously all the research we do really, ultimately that should be our main priority in terms of influencing how nursing is practised, but then there's also the influence on fellow researchers and our peers in terms of our work influencing maybe what others might go on to do or actually building up evidence and knowledge around nursing. So you write for both'.*

Papers in peer reviewed journals (with concern noted over publication time lags) and in professional journals are seen as important, fostered by a strong sense of *'influencing the discipline and how it develops and seeing that as part of our responsibility'*. Other outputs include conference presentation, reports and evidence to support policy making and commissioning, websites and online dissemination and creative endeavours such as film, theatre production, dance, music recitals – known in the discipline as performative science, '*More and more now, performative science is coming into a way of disseminating now*'.

Biomolecular chemistry

Respondents of the Biomolecular chemistry focus group tend to disseminate research mainly through research papers in peer reviewed journals, with occasional additional review papers. Presentations at scientific meetings, both nationally and internationally, specialised monographs, contributed chapters in books and editorship of a volume were also considered suitable channels for dissemination. It was thought important that research is semi-complete or comprehensive in order to be published in a good peer reviewed journal.

Patents featured highly in discussion concerning dissemination of research, with a view that chemistry patents have not counted as highly as a high impact research paper in previous research assessment despite information that they would be treated equally. Additionally concerns were expressed that the speed of the patent process constrains publication of research work and that *'it stops you from being the first to publish'*. Conversely there was recognition that a successful patent may bring a lot of resources to the university or institution. As one participant commented *'in America people will turn it over very quickly and it's not like that for us. If it was, then we'd patent and then publish but because we know for the RAE the papers are much more important'*.

Outputs of greatest importance to the institution are patents and papers in the best peer reviewed journals.

Outputs of importance to the research community are patents and research papers. Additional outputs include outreach activities to schools (primary and secondary) and the wider public at popular science level. As one participant commented, *'the public stuff … wouldn't be considered very seriously in your research part … unless you were doing something very very high profile or if you had got maybe public engagement money from the research council'*.

Cancer studies

The main output reported by participants of the Cancer Studies focus group was peer reviewed papers in academic and professional journals. Some dissemination does occur through conference proceedings – more so for applied areas of the field and new areas of practice. Preliminary results to practitioners are also disseminated through presentation at workshops, nationally and internationally. Discussion papers are also circulated. Software outputs are also valued highly by some technical academics in the field. Where research has been funded by a professional body reports are made directly to that body and research is also shared through reports to clinical colleagues.

> *'The important thing is that you get your work published in a peer-reviewed journal, because not only do you want to get your results out there, but it's only when you get your results out there that you've got any hope of raising research funds. And I'm not aware, on the whole, that publishing in sort of a lay format has any impact on those at all'*

Outputs of greatest importance to the institution are papers in peer reviewed journals. Some participants also felt that knowledge transfer (and conferences are a quick way of doing this), some internal dissemination to colleagues and externally to clinical and professional colleagues were of importance, but to a lesser degree.

Outputs of importance to the research community are activities with lay audience (particularly where there is an obligation required from the funder), software datasets and scientific databases. This output created some differences in opinion, for example, one participant commented *'software is another thing which is very useful to researchers, other researchers but it's not important to the institution'*, another stated *'databases of genetic information and proteomic information and they don't get an awful lot of scientific publications out of that. And that's a problem because a lot of the work they do doesn't get evaluated in the standard way'*, whilst a third put forward

> *'I use datasets, the datasets is simply a platform to analyse the results to publish, so at the end of the day the ultimate--, the ultimate outcome is the publication, and the datasets are transmitted from, you know, well, the datasets are either kept in house for analysis or they are transmitted to other collaborators. So, in that sense, the dataset is not that important, it's simply a stepping stone to getting to where you want to go, which is the publication'.*

Other outputs included outputs via newspapers, World Wide Web, knowledge transfer and conferences. Conference presentation was seen as important due to the speed with which outputs can be disseminated, thus

> *'in cancer when you're looking at things like technical innovations or professional practice development where it moves very, very quickly in our field. You know if you send something to a journal it does take two years perhaps before you even get things to print. It's almost like it's printed and it's out of date because people are reading it and saying, well we did that like a year ago! Whereas I think if you can present at things like conferences or disseminating that kind of way at workshops or you know discussion boards on the internet or whatever. What you're doing is hitting your audience at the point, probably when they can then take that and use that in their practice at a more appropriate point. I don't know how that fits with the university'.*

They were also seen as particularly useful for small, specific subject areas which struggle to get published in high impact peer reviewed journals.

Participants also identified difficult choices in disseminating research to the people who need to read it and satisfying their institution in light of research assessment requirements, for example

> *'there's a real dilemma there, so you're trying to reach as many people as you can because they're the ones that are going to implement your practice but one way around that is either to publish in a kind of lower level journal that they're going to read, or to send the report directly to their manager, so that it can be disseminated locally, or go out and report back to them face to face'*

> *'the value of research for me is giving something back to the professional community that I know they're going to use and take in to practice and can move that forward. So perhaps the ones that wouldn't rate as highly in the RAE, which might be more about professional packs and how to move the service forward using a particular model wouldn't score so very high in RAE'.*

Not all participants are concerned with dissemination through other outputs to other communities, *'I personally concentrate on the research community. It's not because I'm not interested in lay audiences, but there's no incentive or imperative to get out to a lay community'.*

3.1.6. Engineering: focus group discussions

Computer science and informatics

Participants of the Computer science & informatics focus group primarily disseminate their research through papers in peer reviewed journals, however conferences and workshops are seen as important to the discipline as they are at the forefront of development and innovation due to the speed with which research can be disseminated and their ability to be responsive to developments. Some participants expressed feelings of tension between publishing work and *'making a difference. Because fundamentally my incentive is making a difference and that isn't necessarily through academic publication'*.

Outputs of greatest importance to the institution are papers in peer reviewed journals, as one participant commented, *'there seems to be a blanket policy of four general papers'*, and *'I'm not suggesting I have 15 high, top rate conference papers sitting in a file somewhere, but I certainly would've re-thought the profile of my research if there hadn't been this blanket policy of journals'*.

Outputs of importance to the research community are conference papers, engagement with the public, articles in the media, book at popular science level, accessible reports to the profession and working systems.

Conferences are seen as important due to the speed and responsiveness to current development, for example *'you go to conferences to see what's really happening because they are more forefront'*, and *'we're all familiar with the notion of very good hard conferences … which are much harder to get a paper into than a vast majority of journals and yet they're completely inadmissible'*.

Popular science books were raised as important to the wider community but inadmissible in research assessment terms due to their lack of original research – which also raised the possibility of a considering scholarship, thus

> *'I wrote a popular science book which was a biography of the field. It brought it to a wide audience and lots of people read it and it got a lot of attention, generated a lot of articles in the media and so on. I would like to think it was quite a scholarly piece of work, certainly the reviews suggested it was quite rigorous, but good serious accessible science and yet it was two years in the writing and it was actually inadmissible in terms of the RAE because nobody would consider it as an original piece of research and I think we need to consider exactly what we mean by research. A mix maybe or a rather more broad definition of scholarship'.*

The development of systems is also important to the research community, and again raised questions as to the definition and scope of research, for example

> *'we did some work on […] and I know we contributed [..]. Now in terms of a piece of research that is probably one of the most important bits of research I've ever done. But to actually get it recognised we had to write in various journals and the problem, we had a paper accepted in a journal called […]which I guess probably nobody's heard of here,*

because that had to be one of the leading journals in politics which was frowned on at the RAE and was seen to be a waste of time'.

3.1.7. Arts: focus group discussions

Dance, drama, performing arts and music

Respondents in the Dance, drama, performing arts & music focus group reported that monographs, chapters in a book and refereed paper in a peer reviewed journal are the main outputs for disseminating their research work. Alongside this, practice led outputs such as documentation of a theatre drama performance, series of dance and technology workshops documented in a single project, series of documented dramas, an education drama and workshops are regarding as major outputs for the field.

In addition to this websites to self-publish ware also used to disseminate work, with some participants viewing this as *'almost essential now that you have web presence of one form or another'*. Another emerging channel for dissemination is e-journals, with a view that, as the technology develops and people become more comfortable with the technology, more outputs will be disseminated in this way.

Outputs of greatest importance to the institution are refereed papers in peer reviewed journals, written pieces of work accompanying practice-led work and knowledge transfer. Participants spoke about difficulties in some institutions regarding recognising practice-based work, for example *'The faculty just couldn't decide on practice based work'* and *'In composition, it doesn't mean you have to do it, but several former heads have had to write documents about how composition is'*. Other participants had differing experiences, such as *'I was actually was planning to submit four written pieces of my portfolio to the RAE and I was encouraged to submit practice led research because the university knew about practice and they were interested in it and they thought it was worth putting forward'.*

Outputs of importance to the research community are practice-based outputs such as composition, performance, art, drama, dance in many forms and formats. Concerns were raised as to understanding and definition of these, such as

'why is it that practice as research is, by definition, such a difficult thing for the many panels to actually understand … . Is it because it's a piece of art in many way which comes out and as a result it hasn't matured, it hasn't been out for a while. A five year period which we have to submit on all these things, so its shelf life has really been tested yet whereas some things on paper have got references and peer review for it goes to publication automatically seems to carry the clout with it. Is it just fear? I may make the wrong judgment about whether this is a good piece of art'.

3.1.8. Social science: focus group discussions

Psychology

Participants in the Psychology focus group reported that peer reviewed journal articles are the main output for disseminating research, as one participant commented *'that's the one that really counts and the one that you're judged by'*. However, Psychology participants working in more applied areas also identified that other outputs, such as trade journals, are as important and useful as peer reviewed journals, commenting *'I'm constantly being told off for not publishing in the right places'*. Conference papers and posters are also used to disseminate work.

The interdisciplinary nature of some of the work undertaken by these participants was also highlighted, with a recognition that psychology research can be scattered amongst other subjects, such as medicine, sociology and anthropology.

Early career researchers viewed publication of their thesis in book format as an ideal to strive for.

The output of greatest importance to institutions are papers in peer reviewed journals. One participant commented

> *'if I want to make a case for Psychology REF entry I'm having to go around and saying to colleagues "make sure you put it in the journal with psychology in the title, look at these impact factor lists". I kind of don't like doing it, but I also know that that's the game and you know you've got to try to balance it to some extent'.*

Early career researchers felt that advice from the institution was helpful to them, commenting,

> *'It's often talked about, the better journals to go to, which ones would accept the kind of work that you're doing and it's quite nice for the department to give you direction to that because obviously we have no experience at this stage of which journals would take which specific items', and 'it's just by word of mouth. We do have, I can't remember exactly what it's called but we do have a list of the ratings, it is ratings of the journals? The impact factors'.*

Outputs considered important to the research community are peer reviewed journal articles, edited books and book chapters and text books, although there was an acknowledgement that *'there's almost an inverse relationship between how many people read it and how much it counts'*.

Other forms of output used by the more applied fields of Psychology are reports (often to specific user groups the scholar is working with), government reports and conference presentation. One participant noted that difficulties in the value and impact of getting her work recognised by research assessment thus,

> *'there were some conferences that the […] service and academics go to and I get to directly report to the chief there and actually it's quite frustrating, the fact that it will never get included in the research assessment exercise. It really frustrates because people actually change policy because of the work I do and for me that's impact, whereas publishing in the journal of a certain impact factor doesn't mean anyone's ever going to read that article or do anything about it'.*

Politics

Participants in the Politics focus group disseminate research through a wide variety of methods, with the primary method being peer reviewed journal articles. Other dissemination outputs include: 1) monographs, either single author or two authors, 2) edited volumes through the publishers (although these are seen as being harder to get publishers to print), 3) working papers online, 4) conference papers, 5) political meetings such as meetings organised by political societies or student groups (not party political), 6) dissemination through the government, for example consultation on government committees or with individual ministers or agencies, both national and international and 7) reports which are research based but which feed into trade negotiations or other kinds of policy documents.

Of greatest importance to the institution are papers in peer reviewed journals, monographs from specific publishers, additionally one participant identified that *'the universities will never have criteria that will be significantly different than what the RAE may ask of them'*.

A wide variety of outputs are considered to be important to the research community of Politics, these are conference papers, political meetings, government contacts *('Government contacts are not viewed in the REF very highly in fact they are not cited, they're not viewed'*), book chapters, edited collections, press publishing, specific newsletters such as Lock *('within the academy people might think very highly of the piece, and if you want to reach people who work in your particular area you might actually go there'*), newspaper editorials, online journals and local community outputs, TV, radio and publication in the popular or semi-popular press.

Economics

The predominant form of output reported by respondents for the Economics discipline is peer-reviewed journal articles. The writing of books and book chapters varied across participants, some viewing this as a valuable output (especially when writing at a more popular level), some dismissing this completely *'publishing your research in a book is not common at all, from good people'* – with the exception of textbooks. There was a view that economics is a very technical, fast moving subject which does not lend itself to *'until you collect, you know 150 pages of stuff in order to publish'* because it is then too late.

Working papers are used to disseminate work, as are conference papers – these are sometimes seen as a useful way to elicit feedback before publication in a peer reviewed journal, but of limited use for full research papers, for example *'it's not a full research article and therefore has much less value'*. Reports are also used to disseminate research, often available through the Internet.

There was a clear opinion that outputs of greatest importance to institutions are papers in peer reviewed journals, *'only submissions to peer-rated academic journals are counted'*. Indicators of esteem were also put forward as important to the institution, but to a lesser degree.

Again, there was a clear opinion that the outputs important to the research community are mainly papers in peer reviewed journals. Other outputs mentioned to a lesser degree included working papers, circulated amongst colleagues, for example *'where you kind of get your idea circulated, because unfortunately, as you probably know, getting things published in a journal takes quite a long time. So working papers, once the work is quite polished it can just go out, so they are online'*.

3.1.9. Humanities: focus group discussions

English literature

Participants in the English literature focus group disseminate their work primarily through monographs, chapters in edited books, collections of essays, scholarly editions and articles in top peer reviewed journals. There was a view that this was changing, particularly in light of increasing use of electronic journals and access.

The output of greatest importance to the institution is the monograph and collections of essays, with participants commenting, '*there's a very strong institutional emphasis on things in hard cover books, so either the monograph or any other collections of essays or collections'*, and *'the monograph has incredible status but now increasingly they're looking at where it was published and they're developing a hierarchy within that'*. There was also an acknowledgement that institutions value *'cross over books because they generate massive publicity. They get reviewed in The Guardian, you know people's names are out there and that gives a kind of esteem for the institution'*, but there was also a feeling that *'RAE panels have difficulty accessing quite serious academic endeavours which is written in a way to appeal to a kind of wider market'*.

Outputs of importance to the research community are monographs, edited collections and articles in peer reviewed journals, for example *'intellectually in terms of turnaround time, you've seen something comes out and the contribution it can make to the field, either a journal article or a special issue of a journal or editing a journal'*. There was also the suggestion that electronic or online dissemination is becoming more acceptable, *'online one is not a bad place to start if you're struggling to get published and they're becoming more easily accessible'*.

Some concerns were raised over the assessment of edited collections, for example

> *'there seems to be one question mark over collections and I find those the most useful things that you're ever going to come across, actually, you know. But there seems to be a kind of question mark, are they peer reviews, how have people got on to enter, what's the quality of it and it seems to have fallen down below the monograph … and actually I think it's a very serious endeavour … but it seems not to have recognition within this kind of framework'.*

> *'Really it's a literary process in which in a sense is aimed at students to a certain extent but nevertheless a really wonderful example of literary process and it might or might not score well in any other area read by somebody with the right mindset or whether they were just doing some kind of metric with some kind of other mechanical way of doing it. A bit like the introductions to appending editions and things, you know, I mean they can be very, very good sometimes these introductions but they're not normally thought of as RAE type'.*

The *Times Literary Supplement* is also seen as an important output for the community, particularly in the use of footnotes, thus *'I mean it's a very important part, the Times Literary Supplement, but in the footnotes, you know they actually are extremely scholarly and they have quite a big impact … but they don't quite fit into an RAE type, REF type category as research'*.

There was also a view that a scholar in the English literature discipline ought to have a monograph at a certain point of their career, and that if they didn't judgements would be made over their abilities, thus

> *'it's a certain stage in your career if you don't have a monograph and people might ask why and then there's certain stages if you haven't published in top journals they're going to ask why and some of these things are not on, in terms of career development and there seems to be very little recognition of that in the kind of snap shots that the RAE takes which is a constant kind of relentless'.*

Philosophy

Respondents from the Philosophy focus group were highly unified in their view that the primary output for dissemination of their research was that of peer reviewed journal articles. It was noted that there had been a change from monograph to journal articles, with participants commenting *'Ok, I'm old [room laughs] … I mainly publish books and it's very interesting to me to be told differently, that publishing books is not what you suppose to do'*. Another participant followed this by commenting

> *'I think a lot of people wouldn't mind developing their ideas into larger scale bodies of work but you're highly discouraged and my younger colleagues aren't in a position to allow their ideas to develop because they've got to get them out before they're even baked'.*

Outputs of greatest importance to the institution are papers in peer reviewed journals and contributions to edited collections, and it was noted that this marks a change in the dissemination practices of Philosophy, participants commented, *' I was explicitly told "Oh we don't give you research time to write books" I feel angry actually just thinking about it'*, and *'forbidden to even think about applying for a teaching buyout in order to get me the time to write a book'*, and *'it's sort of actually forbidden by my department to write a book'*.

Some participants commented that short word counts in peer reviewed journals restricted their ability to write, *'where I'm going all the time its irritating, irritating. Words in scientific journals, 3000 words, 2000 words. It's kind of like writing a shopping list'*, but early career researchers found that feedback received on short peer reviewed journal papers valuable in helping them to develop further their work and ideas, *'I find it good to be able to publish short papers in which I can get the main idea and that helps me a lot to get feedback on what I want to say'.*

Outputs of importance to the community are the monograph, papers in peer reviewed journals, conference presentations and reports which feed into policy documents, *'I don't think anything like that really counts but I think it's actually very useful and important'*.

Monographs are still viewed as important, for example *'once we have published a book you have a certain standing in the field, you then get asked to do things for volumes, for handbooks …handbooks are quite substantial in the profession they're one of the main ways in which I deal with getting disseminated'.*

3.2. External factors influencing dissemination practices

Participants were asked if they felt there were any factors external to the areas of research or subject discipline community that influenced their dissemination and publication behaviour. Figure 8 illustrates external factors mentioned and discussed in the focus groups. Key findings are as follows:

- Funding bodies were identified as an external factor influencing behaviour by participants of Nursing & midwifery, Biomolecular chemistry Cancer Studies, Dance, drama, performing arts & music, Psychology, Politics, Economics and Philosophy focus groups.
- Research Councils were identified as an external factor influencing behaviour by participants of Biomolecular chemistry, Dance, drama, performing arts & music and Economics focus groups.
- European funding was identified as an external factor influencing behaviour by participants of Nursing & midwifery, Biomolecular chemistry, Economics and Philosophy focus groups.
- Other factors identified included pressure to publish, recruitment and staffing levels, professional bodies, pharmaceutical industry, patenting, intellectual property rights, publications costs to individuals, journal editors, collaborative work, journal publishers, time in terms of assessment period, market forces and the European Referencing Index for the Humanities..

Figure 8 External factors influencing publication and dissemination practices

	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
External factor	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
Pressure to publish											
Recruitment & staffing levels											
Professional Bodies											
Pharmaceutical industry											
Patenting											
Intellectual Property Rights											
Funding bodies											
Research Councils											
European funding and Commission											
Publication costs to individual											
Journal Editors											
Collaborative work											
Journal Publishers											
Time (assessment period)											

	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
External factor	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
Market											
ERIH[1]											

1 ERHI – European Referencing Index for Humanities

The following sections provide a more in-depth description, with quotes to illustrate points, of the focus group discussions according to the broad disciplines of Physical science, Medical science, Engineering, Arts, Social science and Humanities, with the separate subject disciplines within.

3.2.1. Physical science: focus group discussions

Physics

There was discussion amongst the Physics discipline concerning *'pressure to publish'* and an acknowledgement that publication practices have changed, for example *'I don't even spend much time writing longer papers … mainstream journalist because it's a bit of a waste of time'* and *'I published five reviews in the period between 1970 and 1980 and published twenty five papers and I don't think you're allowed to do that now'*. Other external factors included low recruitment followed by an increase in more recent times which *'actually has a very big effect on how publications go and how things work'*, and the assessment exercise emerged (to be discussed in section 3.5).

3.2.2. Medical science: focus group discussions

Nursing & midwifery

The Nursing & midwifery discipline identified a number of external influences on their dissemination behaviour, including professional bodies' commissioners, the European Commission, the pharmaceutical industry *'they often put tabs on what we do'* and funders of research where policy is concerned. For example

> *'some of the policy related research, and clearly there's a purpose for getting permission from all those before you publish. They see what you publish then you usually get 28 days in which they can comment and you make changes, and especially there's a little bit of influence there about what gets published, so yes, I think if you're going to write a fairly critical paper they're going to say, well, you need to negotiate that'.*

Biomolecular chemistry

Patenting and the rights to intellectual property influences dissemination practices for the Biomolecular chemistry discipline. One participant noted:

> *''If you've got the right agreement to patent first and then let you publish afterwards but sometimes they'll go on to keep intellectual property secret instead because that's more advantageous for them than actually patenting it because then everybody knows about it'*

Research Councils are also seen as influencing behaviour in that there are requirements to make publications open access, with either pre-print or the full paper being published on personal or university websites. An additional influence from Research Councils was noted as the drive to more collaborative research, with a resultant increase in the number of collaborative publications, for example *'I think there will be an increasing number of collaborative publications coming out of that and that is driven by where you are getting your funding from and how you get it'*.

The costs of publication required to be published in some peer reviewed journals is also seen as an influence on dissemination behaviour, participants commented *'it's getting really I think too much, you know, especially if you want to publish in good journal'* and *'They're very expensive. By page, you know so for example, some journal of $500 to $1000 a page'* and *'some good research, very good research from you know, … they forced to publish and sort of, you know, low impact journal because they are free or much less'.*

Cancer studies

Funding bodies of research are seen as influencers of dissemination behaviour for the Cancer studies discipline. For example, one major cancer research funding body

> *'have a directive that all of the research coming from groups that they fund must be open access to all. So it can't go to journals where it has to be paid for. So you either have to pay page charges so it's available free online or have to submit to one of the online journals, like the BMC ones are all open access to all and relatively high impact. So that's made a difference in the last year or so'.*

Additionally, participants in Cancer studies also highlighted evaluation undertaken by other funding bodies, for example *'departments like this are being evaluated all of the time. The research assessments exercise isn't the only one … of course it probably goes along the same lines as the research assessment but it's happening continually'.*

3.2.3. Engineering: focus group discussions

Computer science and informatics

For the Computer science & informatics discipline journal editors are considered to be an external influence of dissemination behaviour. That is, participants felt that innovations made by researchers are being stifled by more traditional notions of some journal editors, for example

> *'academics are there to actually extend the boundaries of knowledge and to do research into actually breakdown misunderstandings and find these new ideas, okay. And so what happens? The editors of the academic journals, they are the most traditional people you can possibly find because they will not move away from what they traditionally do in terms of publishing and a lot of it is to do because they have vested interests. They have huge vested interest to have a status quo, you know in terms of this is the way we operate and this is what we publish and everybody thinks this is a great journal and then that puts us down and all the people who operate in that area they then publish in those sorts of journals and it is self-perpetual'.*

There was also a concern that movement from responsive modes of funding to more managed programmes would seriously hamper an individual's opportunity of winning funding, thus *'funding is so important and research council funding over the last 20 years has been academic has changed enormously ... Twenty years ago it was mostly responsive mode with the odd managed programme in areas that were regarded as meeting a group, needing to be driven. Now it's mostly platform grounds, managed programmes which means that the researcher in the pocket of experts has virtually no chance of getting funding'*.

3.2.4. Arts: focus group discussions

Dance, drama, performing arts & music

Funding bodies are seen as an influence on dissemination behaviour due to the obligations and requirements which are placed onto a grant winner, such as

> *'you have obligations to meet their requirements for dissemination. If you count dissemination as a performance then you have to do so many places and so many audiences that you have do, it might require you to do it to people in communities'.*

Participants also felt that Research Councils require some prediction of the outcome of the research work, *'All the funding capital with the aid of the Arts Council require you to predict what it is you're going to make in some form or other'* and that there is a concern that this does not fit well with Dance, drama, performing arts & music *'you're knocking your head against a well meaning mathematician, I think there's a model of practice or research which doesn't quite square with our model'*.

It was also noted that collaborative work also has an influence, *'it depends what collaboration you might have. And, that can actually be very very important. It may not be anything to do with RAE or a REF'.* And that this is a major cause for concern, as one participant noted

> *'From the AHRC, that's obviously the major driver because they, university is only interested if you're getting a three figure sum. Three figure of thousand. And that therefore must be collaborative. Therefore, and this is the phenomenal paradox that the RAE proved by statistics, the monograph and the chapter in the book are very very rarely outcomes of major collaborative piece of research. The AHRC is forcing us into a journal article to become the dominant mode of research output because the individual scholar and the majority of monographs in our subject are written by individuals as indeed chapters in peer reviewed books. They're being squeezed out because they don't earn enough money to the department. You've got to earn big bucks and therefore that's the AHRC'.*

3.2.5. Social science: focus group discussions

Psychology

Funding bodies are thought to be external factors for the Psychology discipline. One participant noted

'What they'd like me to do is go round the country doing workshops with their professionals and practitioners which I enjoy doing, but is an absolutely, not entering into the REF kind of frame of the world'

It was also noted that Studentship funded by external organisations may have certain requirements, but as one participant noted *'I'm funded by the EPSRC and they've got no restrictions'.*

Politics

For the Politics discipline external factors included publishers of journals who might expect *'that you give them some working papers or that you publish instead of doing an edited collection'* and that in-house journals will be given first refusal on a paper *'if they have a journal in house usually it's expected that you give them a publication'*. Some of the influence from publishers and journals is seen as informal,

'there are sometimes kind of informal … many people have involvements in journals or their different committees and often times they will ask you if you in the future saying … can you give us a piece on this. So there is a kind of interpersonal kind of exchange that goes on'.

Funding bodies are also seen as an external factor influencing behaviour, for example *'if you want to get funding from the HEFCE it seems that a lot of focus is on non-academic users and you have to do the whole dissemination strategy, how will you tell them about your research'* and *'it doesn't affect it think the core of the research I do but it just means I have to do it a few extra things in addition to that'.*

Time was also thought to be an external factor, with participants noting that research assessment periods drive academics, and that this is problematic if you feel that you want to move into a new area of research, such that

'if you want to switch research to a new area, a new topic and a completely new topic I mean, but of course within the broad discipline, then you of course need, lets say, a two or three a year run up time before you can actually start producing something meaningful'.

Other participants felt that internal constraints are as strong as the external constraints in that *'you have to very strongly stick to the ongoing hot topics debate in order to be published and in order to be recognised in the RAE, in order to get a job'.*

Economics

Funding bodies in the form of Research Councils (and European funding) are seen as influencing dissemination behaviour by requiring certain dissemination activities, such as *'we also get our core money from ESRC … want you to impact, not just on the academic community but also … the practitioner or user community, be that the public policy community or the private sector. So, we spend an awful lot of time trying to impact on that'*. Another participant noted

'we have to have a form of communications plan is clearly imposed on us by ESRC. Whenever we sign our new contract we have to produce all sorts of plans for whole, almost unimaginable range of things. But having said that, I think most of what we do in

the communications plan, we would do anyhow; it would just be a bit more disorganized. I suppose it's an external factor - the need to raise money basically. ESRC provide us with a core funding

3.2.6. Humanities: focus group discussions

English literature

In the English literature discipline it was felt that the market influenced dissemination behaviour, for example *'there's also the market skewing research'* and *'the market, I mean nobody buys one … particularly academic but I'm waiting for the e-Book and these other modes of dissemination to possibly bring back this'.*

Other factors influencing dissemination behaviour included the ERIH (European Referencing Index for Humanities) which was circulated, this resulted in one participant noting *'we tried to get the whole of … scholars together to object to it because is was completely suspicious in the rankings and we just felt the, a colleague on the continent was saying it already was affecting where they were publishing'.*

Philosophy

Funding bodies, including the European Commission, are seen as an influence on dissemination behaviour in the Philosophy discipline, for example *'I'm under slightly different pressure from funders'* and *'I'm supposed to stick things on the web that's part of my funding, so that's both in terms of contributable blogs and maintaining websites'*. Sometimes the requirements and expectations of funding bodies are seen as unreasonable, such as *'The EU originally wanted me to produce an ethics newsletter every month. They had no idea, they had no idea of how to produce an ethics newsletter across the EU'*.

3.3. Collaboration on multi-author works

Participants were asked what were the norms and customs when collaborating on multi-author research. Figure 9 illustrates the collaboration practices discussed in each of the focus groups. Key findings are as follows:

- Collaboration even within discipline has many different practices.
- Alphabetical order is used by participants in Physics, Computer science & informatics, Politics, Economics and Philosophy focus groups.
- The author making the greatest contribution as first author was used by participants in Physics, Nursing & midwifery, Biomolecular chemistry, Cancer Studies and English literature focus groups.
- The most senior or important author as first author was used by participants in Physics, Computer science & informatics, Dance, drama, performing arts & music, Psychology and English literature focus groups.
- Use of formal author guidelines was only discussed by Nursing & midwifery participants.
- Use of ***** used by participants of Biomolecular chemistry, Cancer Studies and Computer science & informatics focus groups - but ***** can have different meanings.

- Collaboration across discipline is handled in a similar way to within discipline for most participants of the focus groups.
- Negotiation seen as important when collaborating across discipline or between institutions.
- Nursing & midwifery felt that they would appear lower down the order if collaborating across discipline, or between institutions.
- Different practices were noted by some participants.
- Collaboration across institutions also handled in a similar way to within discipline for most participants of the focus groups.

Figure 9 Collaboration on multi-author works: author order

	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
Author order	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
Alphabetical											
Reverse alphabetical											
Greatest contribution 1st											
Most important/senior person 1st											
Journals requiring indication of contribution											
Use of formal guidelines											
Rotating order											
Junior author first											
Acknowledgements											
Last name project manger/senior researcher/ grant holder											
* = corresponding author											
* = senior people											
* = indicator of contribution											
AND = equal contribution											
Collaboration across discipline											
Similar to within											
Negotiation											
Lower down the order											

	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
Author order	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
First name/team = greatest amount of work											
Last name project manger/senior researcher											
Different practices											
Alphabetical											
Rotating order											
Collaboration across institution											
Similar to within											
Negotiation											
Lower down the order											
First name/team = greatest amount of work											
Last name project manger/senior researcher/senior team											
Different practices											
Alphabetical											
Female 1st											
Tactical order											

The following sections provide a more in-depth description, with quotes to illustrate points, of the focus group discussions according to the broad disciplines of Physical science, Medical science, Engineering, Arts, Social sciences and Humanities, with the separate subject disciplines within.

3.3.1. Physical science: focus group discussions

Physics

The order of authors on collaborative works for the Physics discipline uses either an alphabetical approach, *'one, two, three, four kind of authors, alphabetically'* or order of greatest contribution or importance, for example *'the important guys first'* and at other times a combination approach is used, *'You have the person who writes the paper and then two other people who might have contributed work and everyone else is alphabetical'*. Some peer reviewed journals require an indication of contribution. It was also noted that *'the boss' name will definitely never be on the paper if he hadn't done the work. That would be banned ... totally, utterly frowned on'*.

It was also identified that agreement of order of authors is not normally difficult, *'I don't see it's difficult. The National Academy of Science is you have to write down who did what'*, and that all contributors to projects will normally be recognised

> *'if it's a big astronomy survey … they start thrashing out the policies happily, a lot of people involved in surveys … where there are people doing the science, they were doing data processing. But they will get rewarded for it by being on papers'*

Collaboration across disciplines was generally seen as being no different to within discipline, but with the proviso that negotiation would be required and that individual peer reviewed journal requirements would be adhered to. It was also noted that cross country collaborations also arise, with teams of researchers operating in different countries. Negotiation here was also seen as required.

Collaboration across institutions was also seen as needing negotiation *'the issue doesn't seem to be very different to either one or many … They have issues and you just have to negotiate it'.*

3.3.2. Medical science: focus group discussions

Nursing & midwifery

The handling of collaboration within the Nursing & midwifery identified a number of issues. Some participants felt that there were no guidelines to adhere to *'there's no guidelines that are part of doing tha*t', whilst others noted that *'there are guidelines published but usually I try to stick those in a place right up front'*.

Guidelines used include *'the LJ guidelines for authorship generally are pretty good place to start'* and *'there are authorship guidelines that I think can be very useful and I think people to tend to use the BMJ ones mos*t'. Where guidelines are used these will often be stated at the beginning of a project, for example, *'they can be quite flexible but I think each project should set up its own example of what those guidelines are, how they apply'* and *'you set it out at the very beginning and I've always just taken the tack that you know, in order of contribution, amount of contribution to the project or to the paper'*. On occasion, however, these guidelines are not always respected, *'on projects that we've worked on recently, we have quite fair guidelines about authoring, but then it would appear that not all partners adhere to'*.

In terms of the order the main practice is that the lead author is first, followed by a rotating term after that, *'the main author came first and then the second, third and fourth just followed on so we all had a go at things, second, third and fourth. So that's the only democratic way we could think of doing it'*. Other participants identified that rotation was their accepted method, *'we just took it in turn and we didn't really get angst to who wrote each publication'*. There was also an acknowledgement that whilst *'obviously the person that does the most work's name tends to go first and second but actually they potentially haven't done the real thinking of it'*.

Changes in author order practices were also noted

> *'I think there are some exercise – I would call them ancient practices that are now rather tricky … you really would probably try and put the junior person on the project and the first author … because you want to get them started … so we'll often do that'.*

This would then result in the senior person being placed last in the order. It was also recognised that this practice *'relies partly on generosity'* and on *'the real strong philosophical feeling that you know has to be addressed, is that yes, integrity and scholarly generosity towards – are the same towards junior colleagues to enable them to develop their own careers'.*

Other participants also agreed *'it's the same in my discipline as well but it's changing now. You get to look at the end author to see whose project it was, but now because of having to be accountable, it's reversed itself*'.

Some participants felt that order of authors is now becoming *'fraught with difficulty, actually' and 'it's been a huge problem and I don't think it's dealt with that well … I don't think it's particularly well acknowledged. I think it's a whole – there's a lot of underlying conflict'.*

Underlying all of these practices the importance of negotiation was emphasised.

Cross discipline collaboration was seen as similar to within discipline, with the added proviso that their contribution may not be rated as highly by colleagues from other disciplines which would result in their names appearing further down the list of contributors, for example *'we, I suppose, just resign ourselves to being down the list especially on big reports'*. Some wondered if this was a cultural issue related to their discipline *'a cultural thing as actually putting other people first and I think we're willing to do that in publication as well'* and *'we tend to be the ones that do a lot but don't necessarily, you know, you tend to be led by consultants who, I don't know – I just wonder whether it's that sort of nursing has'*.

It was suggested that indicators of contribution might combat this problem - *'document what people have actually done and I think that's really useful'*, and,

> *'I'd like actually the contribution, contributors guidelines at some of the major journals have been really helpful because they do allow you to address, you know, I'm not just putting this person's name on because they happen to walk through the office that day'*

Across institution collaboration also raised the issue of large teams in different locations, for example

> *'sometimes you can get into collaboration with 20 people on and actually then you've got an issues about how technically – for the devices like coming up with a name for the research group, so it's either such a person on behalf of x research team, or it's the kind of acronym for the research project, by the x group'.*

Some participants noted that Acknowledgements are sometimes used to assist with this, but, as one participant stated *'it's always nice to be acknowledged but in terms of something like the RAE it doesn't count. So acknowledgement is nice but it's sort of voice issue'.*

Biomolecular chemistry

The order of authors on collaborative works for the Biomolecular chemistry discipline uses the first as the author who has written and undertaken the work and the last name as the project manager or supervisor. It was also noted that there are occasions when

> *'the senior researcher wants to be the first name because it's cited it would be the first name et al and sometimes the senior person will insist on being first so it's always them*

et al even though they haven't done the work. So that's in conflict with the norm but then most people wouldn't recognise that'.

There is also a practice of using * to denote authors to whom correspondence should be addressed, and to indicate senior people. In a collaborative project *'you'd star at least one person from each group as the main person'*. This practice has led to some pressure from institutions, such as *'we weren't allowed to submit any papers where we weren't the starred author so if your collaborator had persuaded you didn't need to be a corresponding author you were in trouble'*.

There was also a feeling that author order practices have changed over time

'things have changed over the years. When I started out … the convention was just strictly alphabetical and that suited me quite well starting with a B, so many of my early papers I'm first author. But there was no pecking order, there was nothing read into it other than alphabetical, but things have slowly, I would've said, what's the word, you know I thought that was the best way to do it. But now of course everyone's jostling for, you know, to be like the lead author'.

Across disciplinary author order is handled in a similar way to within discipline, that is *'the person who's clearly dominating the project, whose laboratory has maybe initiated and dominated the project, the lead person there would usually put their name at the end'*. It was also noted that clear negotiation was critical.

Across institution practices are also similar in their handling of author order, with the addition that institutions would be grouped and then normal author order within those groups. The order of institution would also follow the norm of the first being the institution where the majority of work on the research and who has written up the paper, and the last would be the institution who won the grant and drove the project. The importance of negotiation was again noted.

Cancer studies

Within the Cancer studies discipline it is thought standard practice that *'the first author is the person who wrote the paper, who physically typed it and the last author is the grant holder'. Another participant agreed with this and added 'after that there's some jockeying for position' and 'everybody else, including Uncle Tom Cobley and all, go somewhere in the middle'*. It was generally agreed that the closer an author's name appears to the end the more senior that person is.

Flagging or starring authors is also used as a means of denoting level of contribution, and of using this to denote that authors contributed equally.

It was also noted that some collaborations are very formalised, with publication policies negotiated and written as a policy document. Other agreements may be more informal *'generally a sort of gentlemen's agreement'*. There was also acknowledgement that agreeing order of authors can be challenging *'it's a very difficult one and it's often one we struggle with when we're doing collaborative work'*.

When discussing across discipline collaboration, it was noted that statisticians will rarely be first author when collaborating on medical papers, for example,

'often they'll be second or third author on say a paper which had about eight authors … but they may have made a significant contribution... the results will almost certainly have been written by the statistician'.

It was also noted that some publications require a statement on author contributions, for example,

'the BMC journals, they ask what the author contributions are which are always funny when you get to a stage where you can't think what this author actually did. They said you could consent their patients to take part in this study or something which is fair enough that gives them the right to an authorship'.

Other participants felt that, whether working across disciplines or across institutions *'it's the extent of the contribution that is important. And the extent of the contribution is generally determined, by, you know, who has initiated that particular piece of work'*.

3.3.3. Engineering: focus group discussions

Computer science and informatics

In the Computer science & informatics discipline several author order practices emerged – alphabetical listing of authors, requirement by journals that contributions of authors are outlined, being closer to the beginning of the author list and the use of 'and' to denote equal contribution.

It was noted by participants that their author order practices sometimes differ with other disciplines, for example

'in biology you've got these huge author lists … so if they're not doing it alphabetically, they look at the first name, they look at the last name on the list, so the two people who top and tail the author lists are the most significant authors'.

Another participant expressed concern that failing to be first author affected potential promotion and esteem

'I've been asked over multi-disciplinary, I've been asked, well I've recently went for promotion, they said yeah but you're not the first author … I mean this is my, you know I'm the senior officer of all these papers and in some of them it's my master student so who is the main person here and they said well then you should put your name first, which I was shocked about'.

No comments were made regarding across institution collaboration.

3.3.4. Arts: focus group discussions

Dance, drama, performing arts, & music

A number of different practices emerged within the Dance, drama, performing arts & music disciplines, including rotation of collaborators' names *'you just hope yours comes up on a good one'*, and of equal contribution. It was noted that some principal researchers *'insisted on always putting their name first and that's extremely frustrating'*. Within the discipline it was thought to be good form to name the younger scholar first. There was also an acknowledgement that author order is in part dependent on the nature of the project and of the output and that many

arrangements are loose and informal. This was not always the case, one participant had encountered difficulties in the past where *'there have been a couple of occasions when people have almost come to blows'.*

Across discipline collaboration and the order of authors has led to some frustrations, for example *'I did a couple of co-orb's of books … with a Sociologist … he insisted on being named first. Although the tradition was that the younger scholar would be named first I thought'.*

Across discipline collaborations it was thought that collaborations tend to be less equal in terms of contribution and was therefore easier to identify the lead partner, for example

> *'the same issues don't come up in the same way because usually they do lead a paper or the arts team lead the paper. It's very rare that we really produce papers where we are all equal co-authors because of the nature of where we're placing it or the focus of what we're doing. So actually there, there tends to be a more natural tendency for one group to take the lead'.*

Some cross collaborations resulted in inclusion on papers authors felt they had not contributed to, that is *'we normally never put our names on a paper unless we've written part of it. But [computing] insist on putting our names on their papers even when we haven't even seen them and I find it quite frightening. So, I've got about five I haven't actually read'*.

It was also noted that differences in the value or esteem of journals is different across disciplines, for example, *'we have a sense of the esteem of journals can be different either between disciplines or else between countries'*, and *'having worked with someone in North America, my idea of what a good publisher is and their idea of what a good publisher is, is slightly different'*.

The experiences of participants regarding cross institution collaboration varied, with some difficult situations being reported such as *'shouting matches about who's going to be the lead'*, *'if we collaborate between yet we try and publish about it and all hell breaks loose'* and *'I started 15 years ago doing something like that with other institutions but now I'm just going to do it entirely on my own. That's the way we're heading'*. There was an acknowledgement that everyone wants to be named first but cannot, which creates tensions.

It was also noted that the status of participants, and their institutions, has a bearing on the attitude towards author order, *'it depends on the status in your own institution and how secure you feel about your own work'* and,

> *'also a tendency …for researchers from less established, or coming from an institution where they feel that research is more precarious, really pushing very very hard to get their names at the front because they feel it's extremely important to their own careers. And that sometimes they causing friction between across different institutions'.*

3.3.5. Social science: focus group discussions

Psychology

Participants in the Psychology focus group were unified in their view that the most important author is listed first for multi-author outputs.

Some misunderstandings across discipline collaboration were noted by participants, for example *'there's some discipline problem especially in some areas they are more important senior person goes last and in other areas that's absolutely not the case'* and

> *'this is particularly pertinent for psychology because for psychology it generally means for the fields that goes first for even psychiatry it's last and so a lot of the stories of psychiatrists are very generally actually saying oh don't worry about me I'll just go on the end. While psychologists seem to think oh that's very generous and not realising'.*

and

> *'I've published in with medical colleagues in journals like Medical Education and you know just miscommunication of sort of saying oh just put me last, I didn't realise you know, rather overstating myself and we managed to work out why we were not communicating on it because as you're saying it's completely different tradition'.*

Order of authors of work written by PhD students usually conforms to the student being first named author. However, this is not always adhered to, for example

> *'pressure that was put on them [students], you know, supervisors were automatically going on, sometimes the papers were put as first authors by the supervisor which we just would never do'…. but in some institutions it seems to be almost automatic and I'm sure that this is to do with the RAE, you know and it is likely to increase the REF because the pressure on the academic'*

Across institution collaboration was seen as very similar to within institution collaboration, for example *'I don't find it particularly much different than collaborating with somebody within my institution actually'* and it was noted that *'in some ways it's easier'*, because *'there's less sensitivity and in some way you can have a more open, frank conversation'*. This is in part due to the proactive nature of seeking out a colleague to work with, *'you're very much proactively choose who you collaborate with and they're likely to be people who share your outlook and maybe they're people who've become friends over the years'*.

Negotiation was also raised as an important part of the collaboration process, *'we actually sat down and we negotiated who would take the lead on which aspects of it which was really helpful actually. I might not have done that for someone in the next office'.*

Politics

The Politics discipline was very unified in the view the order of authors should be alphabetical, with some humour one participant commented *'all the ones I've ever published have always been … my colleagues sometimes get fed up of being 'al' as in 'et al''*.

Across discipline collaboration was also dealt with alphabetically, *'it's been the same with all the one's I've dealt with'*. Some exceptions do occur with collaborators who undertake a lot of writing together, in which case order of authors is rotated, *'the only time there's something different is if there's a team that publish together a lot, and sometimes you see they switch the names'*.

Across institutions, attribution is also often alphabetical, with some exceptions where one party has notably taken the lead, for example *'some pieces we do it if one person has, let's say the*

lead grant if you wish and who asked someone to collaborate within your project or that you were the initiator. So then you might put your name first'. It was also noted that politeness and gender are sometimes used to order names, for example,

> *'there's actually a great politeness I would say amongst collaborators and you just sort of put the most female persons name up. Even if they haven't put the greatest input in and even though they never asked for it, it's just I don't know, it's acknowledging in someway the hierarchy without any word ever have been spoken'.*

> *'I was collaborating with one of the foremost trade negotiators for […] … for me it was very attractive to work with […] because I could actually get the fresh data from what they're actually negotiating in the government whom I work. And when we did the first draft we sort of both put our pieces separately and then we exchanged, and […] sent over the first exchange and […] very politely put my name first and […] second and I very politely switched the order and put […] name first and mine second. And that is the way I pushed it through, because for me it was very interesting to have […] material'.*

In other instances the order of names is tactical in order to have a piece accepted, for example, *'where we're not publishing in academic journals ... and the last piece we published, we let his name be first because he would be known and I wouldn't in those circles'.*

Economics

Within the Economics discipline alphabetical order is the author order norm, *'we have a golden rule within the centre, which is its alphabetical, with very very few exceptions'*. It was also noted that this is *'a discipline specific guideline'* which has always been the norm.

Across discipline collaboration is rare, *'I've never had that experience'* and *'I do nothing - I don't much work across disciplines'*.

Across institutions, collaboration also uses alphabetical order, *'with the outsiders? It can sometimes be a little bit more tricky that one, but by and large, I go for alphabetical as well'*. It was noted that differences in practice had sometimes caused tension, for example

> *'sometimes you might get an author who thinks they have put most of the work into it, as it were, who happens to come after you in the alphabet. I think it's happened to me a couple of times, and in both cases they put most of the work in, though I always thought the really good ideas were mine, and in such circumstances, I personally say do what you bloody well like really!*

It was also noted that research assessment ought to recognise collaboration within institutions as well as across institutions. One economics interview participant was particularly concerned about the issue of inter-departmental collaboration, as s/he understood that the RAE rules prevented submission of the same output by two authors from the same institution:

> *'because of the RAE rules, you cannot submit … it under your heading and your co-author's heading. So in other words, if you and I are both at the University of X, we co-author an article, we're not allowed to submit it twice … in subjects where there's a lot of co-authoring going on, it's a massive disincentive to co-authoring with people in your department. And if … the RAE is going to accept co-authored work, you know, in good faith, then it ought to accept co-authored work you know, full stop'.*

3.3.6. Humanities: focus group discussions

English literature

Collaboration in the English literature discipline seems to occur less frequently than in other disciplines, but where it does occur participants identified differences in opinion regarding the importance of author order, with participants' commenting *'I don't think it's a huge issue to be honest'* and

> *'I did co-author … there was a little argument about the order of the names and it was sort of news to me. I hadn't thought anyone paid any attention to the order of names but there were three of us basically and he thought I should be third rather than second. Have it your own way, you know I don't care. I've never actually paid any attention to the order of names in introductions at all but my colleague obviously thought it was an issue and he thought it should probably proportion of writing that was actually in the interaction'.*

Other practices were noted as author making the greatest contribution as first author and senior *'man's name has gone first'*. Participants also noted that where collaborations are undertaken it is most often with a colleague well known to them *'you end up writing with somebody and you know them really well, you've been working with them already for quite some time and you kind of have a sense of who has done the real work'.* It was also noted that *'this will become an issue for big collaborative projects'.*

The only cross-disciplinary collaboration discussed by participants was the cross-disciplinary edited collection. The importance of this type of work was emphasised by participants, as was concern that this type of output is not published sufficiently, for example *'I think intellectually is one of our best endeavours is becoming increasingly difficult to publish because the very few places that take edited collection analysis as its theories'*.

Participants commented that cross institution collaboration occurs *'much more across than within them'* because *'there will usually be just a few people or even one possibly in each institution working in the area but actually the people that you tend to talk to are your colleagues in other institutions working in other area'.*

It was also noted that there has been an increase in collaborations with non-academic institutions such as *'recently we've had a lot of impetus to do collaborations with non-academic institutions to work with museums and libraries and that kind of breed of industry'* and that *'some of the [European] frameworks are interested if you do a collaborative bid across institutions'*.

Philosophy

Collaboration and joint authorship is not common in the Philosophy discipline, for example *'its not common, joint authors'*. It was noted that more collaboration occurs on edited collections, for example *'you'll get more co-editorship perhaps where two people have run a conference or seminar'*.

Where collaboration does occur authors are usually listed alphabetically, but it was noted that this practice is changing, with a feeling that *'that maybe is a result of RAE type pressures'* and

'it's becoming I think more like science where I think the order of names is deemed to suggest something about the contribution to the paper, so I think people will now say pay attention to this more than they did ten years ago'

Other experiences showed that a practice of reverse alphabetical order, with rotation of names was also used. The importance of negotiation was noted by participants.

Differences in opinion also emerged with regard to the senior researcher appearing as the final author despite having little or no input to the work, some participants thought this was not occurring in Philosophy, others disagreed.

Cross discipline collaboration highlighted some difficult experiences for some of the participants of the Philosophy discipline, with occasions where

'we were just doing loads of work, the PIs were never there, they were just has almost no input and of course they wanted their name on even though they done nothing'

'joint authorship … in the sense has become a kind of racket. It's actually starving me of research in a way'.

Other participants agreed that *'We do stuff without telling other people'* and *'because we don't want people to say, let's do a joint paper on that then'*. Other participants felt that this varied from department to department.

Some tactical ordering of authoring was also noted, for example *'some journals don't seem to blind review, and so there is an element of saying oh could you put your name on it because its more likely to get published then'.*

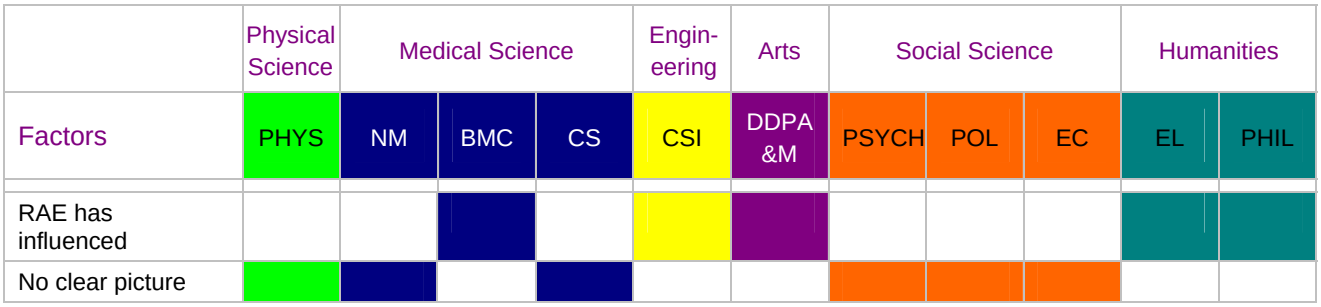
A more unified view on cross institutional collaboration emerged, with participants commenting *'negotiate at the beginning'* and *'it's always been alphabetical'*.

3.4. Current research assessment factors influencing dissemination behaviour

Participants were asked if current research assessment had influenced their publication and dissemination behaviour now or in the past. Figure 10 illustrates the responses discussed in each of the focus groups. Key findings are as follows:

- Biomolecular chemistry, Computer science & informatics, Dance, drama, performing arts & music, English literature and Philosophy participants felt that current research assessment was influencing their publication and dissemination behaviour.
- No clear picture emerged from discussion with participants of the remaining focus groups.

Figure 10 Current research assessment factors influencing publication and dissemination behaviour



The following sections provide a more in-depth description, with quotes to illustrate points, of the focus group discussions according to the broad disciplines of Physical science, Medical science, Engineering, Arts, Social science and Humanities, with the separate subject disciplines within.

3.4.1. Physical science: focus group discussions

Physics

There was no clear picture of the influence of current research assessment from discussion within the Physics focus group. Some participants felt that current research assessment did not influence their behaviour and others expressed concern that early career researchers may feel some pressure, for example *'early career astronomy … well you're sort of pressures to publish but more to get jobs and obviously your departments want you to publish'*. Following on from this participants identified that scholars are more likely to secure academic posts if they have a publication record which is submissable to the RAE, for example *'because this person has a publication with the RAE, that's the first question. So I think those will get jobs quicker'.*

An additional influence of previous research assessment is the perceived importance of publication of journals into high impact factor journals, as one participant commented.

> *'we never used to think about impact factors, ever. I used to think that […] was a real good journal until about eight years ago I discovered it didn't have an impact factor of less two'*

There was also a suggestion that the purpose of the previous form of assessment was *'a management tool for the universities'*.

3.4.2. Medical science: focus group discussions

Nursing & midwifery

Participants in the Nursing & midwifery focus group had mixed opinions as to whether their publication and dissemination behaviour has been affected by previous research assessment. Some felt that it had little influence, for example,

> *'about the RAE, and I think we're in danger of focusing too much on it and making it a great big bogie, where if we are doing our jobs properly and publishing for our own satisfaction, then it happens anyway and we don't have to be you know, beating*

ourselves about publishing in these journals. And four good publications in five years, or whatever should have happened anyway'.

Others felt that it had little relevance to them, such as *'I've been working as a full-time lecturer for eight, nine years now and I've never really seen the RAE as being anything to do with me'*

Other participants thought it was a significant influence, *'It's the first priority and then, if you've got time, you do the other things'*. Others identified that the pressure brought by the institution in response to research assessment would be a critical influence, *'I find it depends how aggressively your university was in the RAE … and those who really wanted to rise up the ladder, pressure's on'.*

Participants also discussed the influence of impact factors, but one participant identified that, as the Panel for Nursing & midwifery had stated that the impact factor of journals would not be a strong factor in assessing the quality of publication, their institution had adhered to this, so that

'in our university we kind of took that to heart and there was, generally, you know, an approach that it had to be the right journal for the paper and you know, a respected journal, but we weren't actually looking at impact factors and saying, "Oh strewth, let's fly over that one because it's got .3 of an impact factor more'.

Biomolecular chemistry

The participants in the Biomolecular chemistry focus group were unified in their feeling that current research assessment has an influence on the publication and dissemination behaviour. For example, *'Yes, just try to publish in the journals that I think would be most highly regarded by the panel'*. Participants also felt that there was a need to balance research assessment requirements with those of the institution, thus

'you've got the panel think but then you've got what the institution thinks whether they are going to put you forward or not. So there is two games to play if you know what I mean. There is a lot of politics in it'.

The importance of a good publication record was also highlighted for obtaining a post and achieving promotion, *'yes, I think, it influences, definitely, promotion as well' and 'if you are research active that would be important part of your promotion course'.*

One participant noted that other colleagues were more influenced,

'I haven't been influenced as much as both my colleagues, so some of my colleagues would have published a lot and then just chosen their four best papers whereby I tend to publish very little, which is not being frowned upon, but, and I try to put it in the best journal'.

The notion of the need for many publications was also noted, *'I would say that most people go for quantity with a bit of quality to make sure'.*

Difficulties in recognition of the importance of an individual's contribution to collaborative work was also identified, for example

'I like to collaborate but it became very clear to me … that I would also have to show that I can do my own projects and that is really driven by the RAE I think but if you put it all

collaborative work people don't rate you as highly as if you had your own high profile work as well'.

Cancer studies

Participants in the Cancer Studies focus group identified the pressure exerted from the institution as a result of research assessment, for example *'there are internal pressures in the organisation that really says, you know we do have to be pushed to publish you know things that are going to score much higher in the RAE'* and *'the research centre is very keen, because of the RAE, that we publish any peer-reviewed journal'* and *'yes it does in a sense and that's really passed down to me from my boss and my superiors because they understand how important it is and so it does come down to me'*. Whilst another participant felt that there was no influence from the current form of research assessment on his behaviour, *'pressure is only exerted through the RAE exercise, and since I have no actual role in the RAE exercise itself, it's neither here or there'* and *'No I mean mine hasn't I think'* and *'for me personally I don't that I've felt any pressure or expectation'*.

The influence of high impact factor journals was also noted by participants, for example *'four years ago I didn't know what an impact factor is but I do now' and 'determines whether you publish in the highest impact journals are not necessarily how good the results are – it depends on how the journal views your particular field of research' and 'there was definitely drive for making sure that the work we produce was submitted to impact-rated journals that would be recognised'*. One participant noted the dilemma of choosing where to publish, *'we kind of tread on a very careful line between encouraging them to go for very high impact journals...But – as well as, you know, we do have a kind of moral commitment to getting research into practice as well'.*

3.4.3. Engineering: focus group discussions

Computer science and informatics

Scholars in the Computer science & informatics focus group felt that there is

'a game to play in terms of getting a good rating and then there is doing research … they do their research and they just ensure that they have got sufficient trump cards to play whatever game in terms of on the day'.

Participants also highlighted their thoughts on assessment and how it influences them on a more general level, with participants stating,

'the research community and what we do is not simple and you can't assess it in a simple way … our world is complex and there had to be a recognition that this world of research is complex and it requires complex assessment, not simple assessment'.

This was echoed by another participant who referred to categories identified by Dearing , such that

'he came up with four categories, generating your knowledge, contribution to world creation, quality of life, informing teaching and training researchers for the future. All of which are important, but they are not given equal weight … the impact of research is more multi-faceted'.

Concern was also expressed at the volume and quality of outputs required of scholars, for example *'when I went in I was … told four publications per year, that means every three months I have to write something, you know, which was like oh, it's going to be hard, yeah, to make a good impact' and 'towards the end that they actually put the crunch and you pressurise your students'.*

Participants also felt tension in their choice of output, that they *'don't throw it in a conference' because 'if you put it in a conference then you will not be able to submit it to a journal'*. Another participant discussed the difficulty in balancing the effort required to disseminate work

> *'you have a finite amount of energy to expend on doing research then you're dividing it … this, this and this and the impact of each output may well be moderate. Whereas if you could devote a lot more energy to one or two outputs that could have potential, you know major papers that are potentially high impact. Which is more useful? I would suggest the latter'.*

3.4.4. Arts: focus group discussions

Dance, drama, performing arts, and music

Participants in the Dance, drama, performing arts & music focus group felt that they were influenced by current research assessment in their choice of outputs submitted, for example

> *'there is a difference between your research output and what you necessarily indicate in RAE. Because you can play a different game. I have a quite reasonably high profile theatre companies internationally and I could have put three or four pieces in but I only chose to put one it because I didn't want to be a completely practice based submission and that was done through my university who were very keen to actually frame absolutely a monograph for a chapter in a book or the whole would be down to me in the end.'*

Other participants also were restrained from submission of practice outputs, *'I wasn't sure how my practice might be perceived in terms of how it was documented and validated and so I held back putting the practice into … submission' and 'I had a colleague who solo performance practice really … I think in the end she submitted a very traditional piece because she thought that was safer.*

3.4.5. Social science: focus group discussions

Psychology

Participants in the Psychology focus group expressed mixed views on whether the current research assessment influenced their publication and dissemination behaviour, for example *'has absolutely no impact on what you do. But that's a personal choice though'* and *'the only thing that it affects me is that every year at my appraisal I get bollocked for not having … instead of publishing in the way that I published. Yeah that causes tension but other than that it influences the people who speak to me, it doesn't influence me at all because I don't buy it'* and *'I treat it in the same way that I see SATS in schools, you know, it's a meaningless exercise done to legitimise the funding. It's not done actually as any kind of index of quality in way at all'*.

Other participants felt that they were influenced, *'sometimes be influenced in certain ways that you may not be conscious of but we try to do our work and not to look at, you know, what's the impact factor of the journal'* and *'even though it's not been explicit you kind of feel the atmosphere in the department that you should be aiming high'* and *'I don't think it's necessarily a bad thing, but I think it's quite a nice push along that we need at this stage because you can get very lazy in your research'*.

Other participants felt that their choice of output had been influenced by late decisions of the institution as to which Unit of Assessment they should be entered into, for example,

> *'the idea was that … we were going to go in Social Work and so I published a couple of things which they would've gone in … so I made those decisions, then they changed their minds a year before the deadline … and they were going to create a Sociology unit and I mean it's daft, if we'd known that the three of us who went into sociology as social psychologists we could've been publishing in Sociology journals'.*

Politics

Respondents in the Politics focus group expressed mixed views on the influence of current research assessment, for *example 'I wasn't really worried about impact … now that I'm head research I worry about these things', 'I didn't really care about an impact I really targeted where I thought my audience would read it and now I don't do that'*. Other participants felt strongly that research assessment should not influence a researcher's behaviour *'as a matter of principle anyone that changes the kind of research they do because of something the RAE, if that fits to the calling of being an academic then I think … there has to be that autonomy of thought and not being pushed and pulled'*.

Other participants felt that institutions were influenced by research assessment, leading to a reluctance in allowing scholars freedom to develop into new areas of thought, *'that is actually an institutional constraint which is put on from the universities, a mass pressure to stay within your field of expertise'* because they do not want to lose publications as the researcher spends time embedding themselves into a new strain of work.

Another participant felt *'torn about this [influence of research assessment]'* because

> *'if there hadn't been an RAE would I have spent ten years writing a big book, I don't know and you know I look at my younger colleagues and I think they behave in certain kinds of ways and one could say they're behaving in those kinds of ways because of the internal constraints or if you just say that's the way they grew up. They grew up knowing that the HEFCE was going to ask about impact. So they're not responding to a constraint, they're just moulded by a different world to the world in which I was moulded'.*

Economics

Some participants in the Economics focus group felt that they were not influenced by current research assessment, for example *'If you are talking about my personal behaviour, not at all'* and *'I don't think so. Of course, we always try to send our output to good journals but – and that would help in the Research Assessment Exercise, but I think I would do it anyway'* and *'I don't think I've been particularly influenced by the Research Assessment Exercise'*. Others felt that they were not influenced but recognised that other colleagues were, *'Not mine, personally, but yes, other people'* and

'I look at the staff of the centre as a whole, I think the more junior the staff the more they are influenced in this way … doesn't influence me personally, and I don't think it influences my staff terribly much either, no. But I think if you were talking to the average new member of faculty in the department of economics, they probably would respond differently and say yes'.

Other participants identified that they were influenced by current research assessment, thus *'Yes, I think this is the biggest impact that I have seen' and 'everything is focused on getting published in good journals and then the research grant authorities focus you on disseminating you know, more broadly, so you know, I think we have to get a lot cleverer on all dimensions'*.

It was also noted that influences from current research assessment have impacted on the types of output Economics scholars publish, with a move away from chapters in books and monographs and articles in journals (other than peer-reviewed) and towards articles in peer-reviewed journals, for example *'I think … there is too much of a tendency to look for the journal articles in the conventional academic journals, in my view, even if compared to standard book chapters and books'* and *'I am perhaps more aware then I might otherwise have been of the need to keep churning journal articles out, whereas my natural instinct might have been to do books or whatever'*. Another participant, whose position was exacerbated by indecision as to which UoA he would be submitted to, also felt affected by this,

'in the discussion about which RAE panel I should be submitted to, had I gone into Economics I would have had to drop one of my strongest pieces of work which appeared in a book, as a chapter in a book, and so in a way that chapter in a book as far as that RAE panel was concerned would have been a waste of time, which I think is absurd. Even the books that one writes within the Economics and Management area, books don't count'.

Another participant had a similar experience,

'I'm mindful within my own workplace … that I need to be hitting certain ranked journals. So I know I have to do that, and so when it came to the RAE there was a competition between two different areas for my output. But it didn't result in any great favours to me'.

Concern was also raised regarding the internal assessment of scholars' work by the institution and that work submitted to current research assessment is not read, thus

'ironically we are managed by people that don't publish … so there's a sense in which they need some kind of reference book, they need a reference to rate the quality of your publication, so we use the Association of Business Schools, ABS ranking of economic journals to assess the calibre of the work that we produced'

'anyway there is the empty claim made that they read the paper – which of course no-one believes. So you know, if they read the paper, then it doesn't really matter where I send it to publish'.

3.4.6. Humanities: focus group discussions

English literature

Scholars in the English literature focus group felt that current research assessment is influencing their publication and dissemination behaviour in a variety of ways. For example, some participants felt a pressure to undertake more collaborative work,

> *'one thing that came back is that we had so many monographs and that we were too individualistic and they wanted to see more collaborative … work than monographs, they just weren't impressed if people were going off in their little corner and writing monographs … we'll just be driven by whatever the people at RAE have to say'*

> *'we had the same thing, I think … in the wake of the RAE we must all go and do collaborative projects, but a lot of us feel that this is sort of pre-developed and then next time it'll come out everybody's doing too much collaborative stuff. So I think a lot of people are very kind of sceptical about, you know, one panel says this and then the next panel says something different and how do we, you know, it seems very incoherent'*

Participants also identified that current research assessment is directly influencing the decisions made by institutions and this permeates to individual scholars and their research activities, such that

> *'unfortunately the RAE categories and decisions are, at least to my institution, permeating decisions that they make about research activity and about the way the research leave and their increasingly looking for publications, RAE publications'.*

> *'quite active research which is not hitting the top bracket within the RAE is now being questioned and they've even gone so far as saying that possibly they're going to down-scale their resources for research and other certain, you know, standing, as an international standing. So they are importing, at least in my institution, they are a criteria to them. In a sense effectively monitor people's research and parts of their careers'*

There are also fears that innovative work will also be affected by this, for example,

> *'I also have colleagues in creative writing who are bringing a really innovative sonnet books, massive reviews they're getting, get to the top. It's so innovative, they just don't know what to do with it'*

Others noted *'I have colleagues who run prison reading groups and publish on it, you know prison newsletter and the impact of that is probably quite significant' and 'it's a huge impact on, you know sort of, a scholarly and out reach kind of publication which isn't top RAE'.* One participant expressed the view that *'I just think that it is kind of distorting more people'.*

Philosophy

Participants in the Philosophy focus group did feel that current research assessment influences their publication and dissemination behaviour. For example, *'so much of it now is driven by … these research assessment exercises'*. There was also a recognition that whilst some participants did not feel pressure, junior colleagues may do so, *'I think in some ways I've been*

sheltered from it because, A) I'm older but B) I'm in a very volatile department, so impact to the RAE is not pressing … younger people have this. I feel bad, I feel very bad for them'.

Participants also identified that there was a tension between outputs deemed to be important to them as individual scholars and requirements placed on them by their institution as a result of influence from research assessment, thus *'if I was asked to compile a list of the articles of which I am most proud, these would be the articles that I was encouraged to submit for RAE. It would be one overlap'* and

> *'even at that level attention between what you are encouraged to do for the RAE and what you're encouraged to do for career progression, because the norms for career progression, especially if you're ambitious to reach chair, still insist on the book and the monograph in a way that the RAE specifically doesn't. So you have people torn very which way thinking in terms of what they have to do for the next five year research cycle and what they have to do to establish them over a career at which has a longer timeline running through it. I think junior researchers do find this confusing, and those of us just old enough to have escaped are very fortunate'.*

Concern for early career researchers was again highlighted by another participant, *'I feel bad for people with great potential, but not with enough publications don't get jobs'.*

3.5. Future research assessment factors which may influence dissemination behaviour

Participants were asked if they thought it likely that they will change their publication and dissemination behaviour if the REF(or similar form of assessment) was implemented. Figure 11 illustrates the responses as discussed in each of the focus groups. Key findings are as follows:

- Participants in nine of the eleven focus groups felt that their publication and dissemination behaviour would be influenced by future research assessment, these being Nursing & midwifery, Biomolecular chemistry, Cancer Studies, Computer science & informatics, Dance, drama, performing arts & music, Psychology, Politics, English literature and Philosophy.
- Participants in the Physics discipline felt that their publication and dissemination behaviour would not be influenced.
- No clear picture emerged from Economics participants.

Figure 11 Future research assessment factors which may influence publication and dissemination behaviour

	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
Factors	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
REF will influence											
REF will not influence											
No clear picture											

The following sections provide a more in-depth description, with quotes to illustrate points, of the focus group discussions according to the broad disciplines of Physical science, Medical science, Engineering, Arts, Social science and Humanities, with the separate subject disciplines within.

3.5.1. Physical science: focus group discussions

Physics

Participants in the Physics focus group identified no potential influences of the future research assessment but did highlight a concern that the proposed future assessment methods are not clear, for example *'what are the rules going to be? That's what everybody is terrified of'*.

3.5.2. Medical science: focus group discussions

Nursing & midwifery

Some of the participants in the Nursing & midwifery focus group felt that *'it hasn't filtered down to actually for people to change their practice'* but others felt that potential influences were noticeable, such as an increase in submissions to international journals, and in particular American journals, *'I notice that … citations if you publish in a US-based journal are much higher than if you publish in a UK journal. I'll be thinking about that next time I submit'* and *'the really good journals having really good papers, but that doesn't have an impact factor. So I would feel you have to think twice about publishing in there even though I think they're good'*.

Other participants expressed concerns over the use of citation metrics, for example *'we have lots of issues around rates of citation… typically you'd expect a much slower roll-out on citations from any of our publications'* and

> *'the ones that have the higher citation impact factors are the methods papers, they're not the original research findings papers and that's because people want a nice little reference put in their paper about the method … they're useful papers, I use them and I've written a couple, but they're the ones that tend to get cited so that's not research – that's not original research which is going to contribute to those in practice in that discipline'.*

Biomolecular chemistry

Participants in the Biomolecular chemistry focus group were definite in their opinion that changes to future research assessment will influence their publication and dissemination behaviour, for example *'Oh God yeah. It will, I'm sure'* and *'if its going to be on citations it's going to be, 'how do you maximise your citation' and everyone will be playing that game'* and *'and sort of thinking … about your sort of publications, thinking about, your know you were talking about the team work and collaboration and how you play to the panel'*. One participant stated in relation to citation metrics *'I hope they not going to put a lot of emphasis, high emphasis on it'*.

The influence of impact factors of journals in relation to future research assessment was also noted, with one participant stating

'this has now been formalised with impact factors, but a few years ago… before impact factors were even there … you knew there was a generally accepted pecking order. So you always thought you know what's the best journal you could get this into and often you would appreciate maybe it's not bad work but it's probably not likely to get into one of the top journals. So you'd sort of aim for a middling one … but presumably in the new bibliometric world maybe they will, so maybe one would always be looking over one's shoulder at the impact factors of the journals'.

Cancer studies

Participants in the Cancer Studies focus group were mainly of the opinion that their behaviour would be influenced by the proposed future research assessment, for example *'we have to think constantly about any kind of Research Assessment Exercise in the future'*, *'I think it might do'* and

'yes I think I would take notice of whatever the guidelines are and I know, well I don't that much about bibliometrics, although it's a nice word but I know that the impact factor isn't the only measurement of publications work, I know there's a lot of others and ones which are personal to people as well'

Other participants were concerned with maintaining the most appropriate output for their work and the intended audience, for example

'I changed completely the way I publish stuff. I ditched the idea of publishing in high-impact journals and I just published in the journals which I thought were very relevant to the subject matter, which had papers in that subject areas, and that was fine'

'the highest priority as far as I'm concerned will be to get the work published, I mean obviously you know one does aim for the best journal, but, it will be tempered by a certain amount of realism as to what the prospects are in getting the work published in a particular journal'

'the priority will be to get the work published, firstly; the second priority will be to get it published in a good journal rather than the opposite way round. I will not select the highest-impact journal and spend weeks and months trying to get a paper in there that's not going to get in there, when I could have got that paper published well beforehand'.

It was also identified that competition to get papers into high impact journals would be fierce and may result in a slowdown of the publication process *'it's going to be very difficult to get it published in a high-impact journal – maybe once in a blue moon you've get lucky – and of course what that means is it slows the whole dissemination process down'.*

Participants also discussed output types in relation to future research assessment *'I suppose I will have to think about ways to make sure other than making my work more sensational, make sure, well to try and make sure that papers are cited'*, *'if you write, even as a co-author with, on something central to the subject, it's quite likely to get cited a lot'* and,

'I know you're not supposed to submit review articles under the Research Assessment Exercise but if you were an author on a review article you're likely to be a cited probably more often than in a scientific paper in something that's a little obscure'.

3.5.3. Engineering: focus group discussions

Computer science and informatics

There was a general consensus that participants in the Computer science & informatics focus group would be influenced by future research assessment, for example *'I mean you have to'* and *'you will definitely'*.

Participants also highlighted concern over the ability of smaller institutions to compete with larger institutions in future research assessment, for example *'there's absolutely no doubt that larger critical mass in coherent research has a tremendous advantage for research assessment'* and

> *'HEFCE already back tracked on the use of the phrase "pockets of excellence" because the term pocket implies potential growth. They're now preferring the term "islands of excellence" because it emphasises the fact that these are isolated regions of excellence, I don't know, in a sea of something else and they actually explicitly said because islands can be connected to the mainland and they're basically saying these islands can be bridged, that you can build bridges between these people and the mainland. The mainland being the top end, the critical mass institution'.*

Participants also identified that the next research assessment is influencing institutions now and that this is being manifested by recruitment selection and procedures and individual assessment, for example

> *'the high powered researcher institutions or research they are writing now their plan … it will be a research strategy and that's going to inform recruitment. It is going to inform assessment ... in another four or three years time they're going to do a half pan check and they will expect everybody to have, you know, their full papers'*

The same participant also recognised that this is not the case for every institution, *'in some other institutions … it tends to work the reverse, you know. In the last year it's what have we got'.*

3.5.4. Arts: focus group discussions

Dance, drama, performing arts, and music

The majority of participants in the Dance, drama, performing arts & music focus group did express potential influences of future research assessment. For example,

> *'I feel the pressure already. As a composer the considered publication is that of a public performance. So to compose the piece, one can't compose the piece and submit it unless it's then performance. It is the performance which is considered for publication'*

Participants also identified concern over the type of output they felt expected to produce, *'not many of us can produce two monographs in a year. You know, it's a four year project, writing a monograph generally speaking'* and *'it's tremendous pressure to normalise upon something like a 6000 word journal article'*. Another participant voiced concerns over the possible use of a portfolio for future research assessment, thus

'the latest REF document I read where they talk about a portfolio … it was suggesting that a portfolio might consist of the arts equivalent of blue sky research at one end and the other end things which are done in a very close relationship with industry or performance or what have you that have a very clear impact. So I think the pressure may well be upon individuals to create a balanced portfolio of research output. Horrendous thought'

The nature of outputs was also discussed, with concern that the tone of outputs may change as a result of the proposed changes in research assessment, *'one way out of it if it's going to be citation based then one of the people might well produce something controversial'* and *'drama as a performance doesn't tend to be certainly on this side of the Atlantic, very combatitive. We tend to be quite polite to each other. Unlike the Americans actually who really swing a few right hooks at each other'*. Others did not see this as necessarily a bad thing, *'people having a real intellectual debate about core things'*.

Participants also identified concern over the degree of pressure placed on scholars, for example

'the guidance coming down from faculty is that we are expected to have, from each member of staff, the promise of at least two REF support outputs, per year, and then we look at how we support them in producing that … But, I feel that I am being required to put pressure on my colleagues in my discipline'

Another noted, *'within our institution we've been told we're expecting a 95% submission rate for the REF, for research contractors that are, so they're really under pressure'.* There was a recognition that this will not be the case for all scholars and all institutions, *'I think that the situation will be very different in different kinds of institutions … But I think, maybe less self-censorship and rather more potential for institutional selection steer'.* Concern was also expressed at how this might affect new or more junior colleagues, *'God help you if you're a new … now they're talking about setting up committees, … to look at how do we steer the people ... They know actually this is what you need to do and if you don't do it, well there might be recriminations'*. One participant commented, *'what would my opinion be? When's retirement?'*

3.5.5. Social science: focus group discussions

Psychology

Participants in the Psychology focus group identified a number of factors which may influence their behaviour in light of the proposed new research assessment methods. The first of these was concern over tensions of publication and the applied nature of some participants' work, thus *'I can publish in social psychology journals, health psychology and so on. But there's other things that, you know if you're doing it for, you know, with an applied end in mind and there is a tension'*.

Participants also noted the interdisciplinary nature of their work and stated that they are often placed in other Units of Assessment than Psychology, *'I've been in three different units of assessment. I think I've been in business, social work and this time sociology. But it means that no-one has been breathing down my neck saying you really need to publish a means APA journals'*.

Other participants felts that there was a 'game' to play and a strategy to use for future research assessment,

> *'if I want to make a case for psychology REF entry I'm having to go around and saying to colleagues "make sure you put it in the journal with psychology in the title, look at these impact factor lists". I kind of don't like doing it, but I also know that that's the game and you know you've got to try to balance it to some extent'*

> *'If it's in your area there will be more people working in your area and more people would mean more citations at the end of the day, so you have to do everything selfishly, you should do everything that makes your area grow because this citation thing, it will be … how popular an area is, how many people are working in it. So you want to make your area as big as possible, never work on some small problem where there are a few people working on it'.*

Other comments on this theme included, *'one of my colleagues was talking about this a while back and he was saying that the thing to do is to write the paper with some outrageous claim in it'* and *'it could actually be a negative about your work. It could be you've done something crap then and everyone's like it's across the board where you've got the highest citation rate because of it'.*

Other participants expressed the view that strategies may not be employed explicitly,

> *'some for whom the motivation is the career and they're not that bothered about their particular subject and will change to what's fashionable. But I think most of us, we do research because we're into it, we enjoy it, we do things that are meaningful to us. So I don't think, I mean I'm certainly not going to become terribly strategic, you know, what gets cited the most'*

> *'I don't think that we … go out and play the game, sort of like conscious way of saying this is what we're trying to do to maximise our citations, but it could source a pressure and it makes you change your decisions sometimes*

There was also a concern that collaboration may be affected, *'it could potentially discourage collaboration … because if you work in a small area instead of pooling the knowledge there you're almost encouraging people to work separately … instead of drawing from one another to work together'.*

Potential influences on the reviewing process of outputs was also raised, with participants feeling that bias and pressure may be felt, *'effectively it's a conflict of interest which is always a problem … suppose I review a paper and they cite me, well, I've a vested interest … to get that paper published than if they don't cite me'* and *'I don't want to have those kind of conflicts of interests, I want to be able to judge a paper for its value, I try to not think about it but I would rather not be put in positions where I have this sort of indications of my decisions that would affect my career'*.

Concern was expressed for early career researchers,

> *'I don't know how it's going to affect the ones who are just graduating, you know the last kind of batch of new starters … if the new batch that starts are being told citation,*

citation, it might well change the way they approach things. I mean maybe it won't for us because we've seen many differences along the way'.

Whilst an early career researcher felt *'I'm quite confident that the process will stay similar because a lot of academics are very stuck in their ways, so even if the policies are changed I don't think they will necessarily take those policies on board'.*

Politics

Participants in the Politics focus group felt that the types of outputs they create would be influenced by future research assessment, with a concern that outputs important to them as individual scholars and to their research community would fail to be recognised or valued, for example

'Government contacts are not viewed in the REF very highly in fact they are not cited, they're not viewed. Technically speaking they're still peer reviewed, and those who Peer Review pieces are generally not allowed to go through once you get to a higher level research committee'

'book chapters which … or edited collections can actually be quite useful particularly if you have an edited collection from a major conference and it has been evolving over periods of time.… REF anyway would discount that, or discourage it outright'.

'you're going to have to make more general articles rather than very in-depth empirical material. You're going to have to try and publish more comparative stuff, rather than again going in-depth on a very narrow issue particular to a very particular location if you will, or subject'.

Participants felt that there will be a move to a much more strategic approach to publication, *'Oh completely! I've been told not to publish with some high named people because the publication's going to go into a book' and 'I've been told to ditch this, don't waste my time!', 'I've told people not to publish as many; I've told people to stop publishing book chapters instead of research', 'I've now had to think strategically I've had to, decided it now to do it because I want to concentrate on journal articles' and 'you're going to have to start behaving a little more strategically about where you place it'.*

Other participants strongly emphasised that freedom to publish where the individual scholar thought most appropriate was critical, *'it should be up to us to decide!'* and *'any kind of … don't publish there; it's a violation of academic freedom!'*. Other participants felt that statements of output types were less directive and more advising, *'our approach though is being to take whatever's being said and really sort of try and fit around it', and*

'my attitude would … to go to colleagues and give them advice … to say, well look if you think of the RAE or REF as a collective research feed which in some sense it is, then you have obligations to your colleagues to help out and make things bid. We make the wrong kind of bid, we get a 50% cut in income, but our attitude hasn't been do this or don't do that! It's been what are you planning to do and can we give you advice about how best to place that'

Participants are also feeling pressure to publish now in order to have publications which will be out in time for other people to start citing them,

'we're being told immediately now, that now we should be getting our journals, our journal articles in now in order for them to count, in order for them to be cited in order, in time for the next cycle'

This time pressure was causing concern over the type and quality of research being undertaken,

'you just don't that space if you want to do anything innovative, anything you know original otherwise you're just repeating and you're just taking the easy route to adding to it and it also when we get up to the bibliometric then, that would bring us all sorts of I think ethical questions too because you know I could do, I could do it the easy way and support my colleagues and friends and cite them for instance'.

'issue of time to publish because well … our turnaround time in our major journals have you know, I've just had an article that took three years to come out. Well I don't even agree with what it says anymore if I'm honest'.

Participants also commented on the proposed method of future assessment, with one participant stating *'one of the things concerned as a slightly more overarching level is the concern that it's a one size fits all mentality across the disciplines and that a model that may be appropriate for other disciplines or not'*.

Economics

Respondents in the Economics focus group felt that influences from future research assessment would be determined, to some extent, on the interpretation and standpoint of their institution, for example, *'I think the only answer is I don't know. It depends how prescriptive institutions are'*, *'it depends how draconian our employers choose to be on these things'*, *'well, yes. If they tell you to do something else, then, I will do something else'* and *'I suspect what will happen is that we will be managed in a particular way and be told internally what is required of us … and then we will have to try and respond'*. One participant felt that they would not be influenced, *'no, I think I'll carry on writing'*.

It was also acknowledged that whilst more senior researchers may not feel influence, earlier career researchers may do so, *'I see myself very unlikely to change, mostly because I'm not terribly worried about my career prospects. You know, I'm a professor, so…. but younger people might. Younger in the sense of more junior'.*

Concern was also expressed regarding institutional collaborative work,

'you cannot submit, as you know, a co-authored article with somebody in your institution … this has proved to be incredibly unpopular … it's a massive disincentive to co-authoring with people in your department. And if you're going to accept … co-authored work, you know, in good faith, then it ought to accept co-authored work you know, full stop'.

One participant commented, *'one might not like the game, but you know, we're on the playing field'.*

3.5.6. Humanities: focus group discussions

English literature

Scholars in the English literature focus group felt that future research assessment may influence the type and format of their output for example, *'our institution like many others is now making electronic copies of things people have published available. So that they can get more hits'* and *'I think there are also inexplicable ways in which research is framed by assessment and, you know, I was very aware of pitching an article that I knew which was not what I wanted to write and I wrote the article very fast and got the research lead for that because it fitted'.*

It was also identified that the content and area of research scholars investigate may also be affected, *'it's all the subject matter as well as formats of publication. I mean it's a real incentive to write something on Jane Eyre and David Copperfield in my field because people are going to be citing it and reading it'.*

Philosophy

All participants in the Philosophy focus group felt that their publication and dissemination behaviour would be affected by future research assessment, although one participant did acknowledge that *'since I can't tell what the REF's going to look like today, I'm not quite sure how I could adjust my publications practice accordingly'.*

Participants identified that they would become more aware of where there outputs were published in order to be cited more frequently, *'if there's going to be a bibliometric element and that will in anyway be weighted in, then I think everyone is going to be thinking, right where to do publish to get cited'* and that as a result submission to the best peer-reviewed journals, and in particular to American journals, would increase,

> *'the journals with the best reputation normally have the largest circulations, but given that its worldwide citations. My guess is the first thing is people might thinking about the American market a bit more, because there's a bigger, there's just so many more Philosophers so there's going to be more people who might find you'.*

Participants also discussed the possibility of citation rings occurring, *'people talk about citation rings as well, I mean you cite me I cite you, but I think this is fantasy I don't think it's actually going to happen'*, whilst others identified that the impact of citation rings was already understood, *'the evidence that the REF so far has considered it suggests it makes no impact overall'.* It was also acknowledged that small research communities do, by default, cite each other frequently, *'if you look at small research communities, they're in a, small research communities which have their own adrenaline which cite each other like crazy. And that you know inflates the impact factor that those journals'.*

4. Results: citation behaviour

Participants in the focus groups and interviews discussed their citation behaviour, including the types of output they cite, the quantity of citations and their motivations for citing. They also discussed external factors external to their research community or institution which may influence citation behaviour, and finally discussed whether current research assessment had influenced them and if they though future research assessment might influence their citation behaviour. Figure 1 *(page 6)* provides a key to the figures in this section.

4.1. Citation practice and motivations

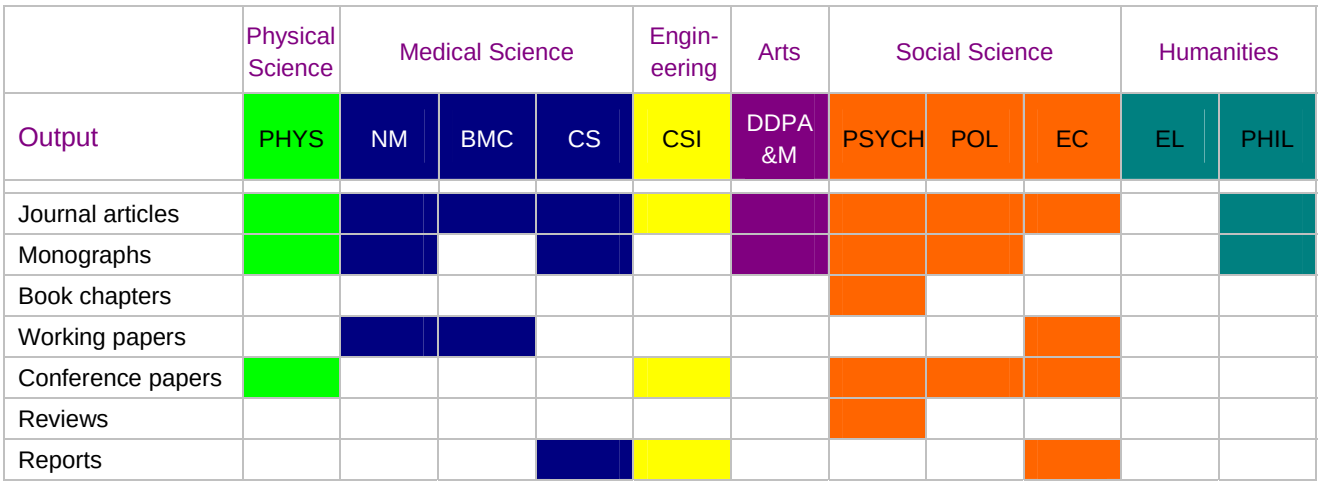
Figures 12 to 14 illustrate the key findings concerning citation practice an motivations, followed by an in-depth description of the discussions. It should be noted that the figures are interpretations extracted from comments and discussions from the focus group and interview participants and should not be generalised to the population of each discipline.

4.1.1. Citation practice

Figure 12 illustrates the types of output cited by participants in each of the focus groups/interviews. A wide range of outputs are identified, with some key findings as follows:

- Journal articles (peer reviewed) are the most popular citation output mentioned by participants in all focus groups apart from English literature.
- Monographs are cited by participants in all focus groups apart from Biomolecular chemistry, Computer science & informatics, Economics and English literature.
- Conference papers are cited by participants of the Physics, Computer science and informatics, Psychology, Politics and Economics; but not Nursing & midwifery, Biomolecular chemistry, Dance, drama and performing arts and Music, English literature or Philosophy.
- Websites are cited by participants of the Physics, Computer science and informatics, Psychology, Politics and Economics, Nursing & midwifery, Biomolecular chemistry and Philosophy focus groups.
- Personal communications are cited by participants of the Dance, drama and performing arts and Music, English literature and Philosophy focus groups.

Figure 12 Citation practice



	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
Output	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
Trade publications											
Media (e.g. magazines)											
Websites											
Personal communication											
Policy documents											
EU documents											
Observation											
Anecdotal											
Primary sources											
Secondary sources											
Footnotes (rather than citations)											
Reference tools/databases (Endnote, ACM Portal)											
Self citation											

4.1.2. Number of citations

Figure 13 illustrates the number of citations mentioned by the focus group/interview participants across each discipline. The key findings are as follows:

- Focus group/interview participants in all disciplines said that the number of citations depends on the type of output or the journal requirement.
- Participants of the Physics, Nursing & midwifery, Biomolecular chemistry, Cancer studies, Psychology, Politics and Philosophy focus groups specifically mentioned journal restrictions.
- Participants of the Computer science and informatics, Dance, drama and performing arts and Music, Nursing and midwifery, Psychology, Economics, English literature and Philosophy focus groups specifically mentioned the type of output will depend on the number of citations used.

Figure 13 Number of citations

	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
Output	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
Many (20 plus)											
Few (up to 20)											
Depends on journal restrictions											
Depends on type of output											

4.1.3. Motivations to cite

Figure 14 illustrates the motivations to cite. Key findings are as follows:

- Focus group/interview participants in all disciplines apart from English literature said demonstration of knowledge is a motivation to cite.
- Focus group participants in Physics, Biomolecular chemistry, Computer science & informatics, Psychology, Politics, English literature and Philosophy said that they would cite to acknowledge work previously undertaken.
- Participants in Physics, Biomolecular chemistry, Cancer studies, Computer science & informatics, Politics, English literature and Philosophy said they tailored their citations to meet journal requirements.
- Focus group participants in Nursing and midwifery, Computer science and informatics, Politics, English literature and Philosophy said they cited work they disagreed with or to demonstrate poor work.

Figure 14 Motivations to cite

	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
Motivation	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
Demonstrate knowledge											
Corroborate argument											
Acknowledge previous work											
Justify a study											
To help people											
Acknowledge colleagues											
Demonstrate poor work											

	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
Motivation	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
Tailor citations to a journal											
Demonstrate recent work											

The following sections provide a more in-depth description, with quotes to illustrate points, of the focus group discussions according to the broad disciplines of Physical science, Medical science, Engineering, Arts, Social science and Humanities, with the separate subject disciplines within.

4.1.4. Physical science: focus group discussions

Physics

Participants in the Physics focus group cite journal articles, conference papers, general papers with references, and websites. Some mention was made of self citation practices *'there's always referring to yourself all the time'*, as well as personal communications.

Participants said that the number of citations depends on which journal – high impact peer reviewed journals have a word limit so *'you only have room for ten to fifteen citations, then you try not to make all of them go in and then you try and cite the ones that in high impact journals..'*.

Motivations for citing include demonstration of knowledge and inclusion of relevant work *'I cite the papers of people I respect and who I happen to know do good work'.* Citing *'potential referees'* was another motivation. Mention was made of using the citation index, although this was not considered very good practice. Referring to work undertaken in the past was also a motivation *'Some very good work was done back in the 1970s – it ain't got forgotten and it's come back again now and turns out to be correct'*. This led to a discussion about delays not only in publication but in citation because *'many of the most important papers …. People really don't understand them for quite some time. There is a built in delay which could be quite a delay'. A*n example was given of the development of a telescope, but for some time the people working on it had great difficulty getting their work published, and therefore cited, *'because everybody thought it wouldn't work'.*

4.1.5. Medical science: focus group discussions

Nursing & midwifery

Participants in the Nursing & midwifery focus group tend to cite journal articles (both in print and online), working papers, monographs, reports, policy papers (on the web) and 'pink literature'. Other citation practices include newspapers, magazines, websites (reputable) and even chat rooms *'I have even cited a chat room, because it was something about practice and it's been discussed there and it didn't seem to be followed through anywhere else'.* Free access journals were also mentioned, and this was also discussed in terms of accessibility *'to me, online*

journals will become more and more important because they're so easily accessed', 'I think there is a tendency to cite the ones you can get easily, that are easily accessible'. Some mention was made of self citation practices *'It may not count as such, but what it's doing is putting your work in front of other people again, so upping your chance of being cited and I think that people take that gain'*.

The number of citations depends on the output, in particular if there is a word limit *'some journals limit your number - you can only use three to support an idea, for example', 'If your references are counted in your word limit you're much more frugal about what you cite'.*

Motivations for citing include demonstration of knowledge *'I want to cite the seminal work in the area, because that then shows that I've done the background stuff'*, to corroborate an argument, and to support a methodology *'to compare your results with those of other authors and to make a comparison and to therefore come to a conclusion'*. It was felt that references need to be appropriate *'you don't want to be putting a big long list of references because actually it makes it look like your argument is a bit weak'*. Other motivations include justification of a study *'to show that other work wasn't sufficient and therefore you're completely justified in doing the work that you've done'*, to *'expose poor work that's been published'*, or to build on work previously done *'you're building the history of an idea, trying to say something, developing, thinking'.* Also, to help readers *'who may not be familiar with the field'*.

Biomolecular chemistry

Participants in the Biomolecular chemistry interviews tend to cite journal articles and review articles, also websites, mainly if they were established databases rather than just providing information. There were mixed feelings about whether it was worth citing conference papers. Monographs were not often cited.

The number of citations depends *'on the field and on the paper'*. For example, if publishing a new method there may be 10 – 20 references; if publishing a review there could be many references; and if publishing a full blown research article *'you could have 100 references'.* It was noted that some peer reviewed journals restrict the number of citations, specific journals mentioned were 'top journals' such as *Nature* and *Science 'they're very, very strict on references and they try to keep you to below about 20…'.*

The main motivations for citing are to demonstrate knowledge in a particular field and to acknowledge the work of others. This includes citing colleagues *'people whose work you know very well'* including colleagues who *'aren't necessarily the big-shot, but you want to help highlight their work…'.* Other motivations were to help the reader and *'improve the readability'* of a paper. Mention was also made of motivations relating to journal submission, in particular submitting to American peer reviewed journals *'you've got to cite the American work more, you see. You've got a lot of American editors who have more knowledge of the American work, you know, than the European work'.*

Cancer studies

Participants in the Cancer studies interviews mainly cite journal articles, particularly in peer reviewed journals, as well as a mixture of other media such as monographs, text books, and reports. Conference papers and abstracts were the least likely to be cited *'I don't really use them very much'* unless they were published in a journal (special issue, for example). Online

journals were also mentioned *'I think there's been a move to online journals', 'I think there has been a change to online journals and journals which don't get published in paper'.* Citations are also sometimes derived from reference tools (e.g. Pubmed), but it was felt that *'people aren't really using to do that very often'.*

Participants said that the number of citations depends on which journal a paper is submitted to. It was noted that many peer reviewed journals restrict the number of citations, particularly the *'more important journals'*. The *Journal of Clinical Oncology* and the *New England Journal of Medicine* were given as examples *'they want short high impact papers only'*, so you *'tend to sort of tailor the number of citations to what you think the editor of a particular journal will accept'*. 'Short' was defined here as *'five printed pages normally'*, and in such cases this can lead to *'an enormous amount of supplementary material on websites'.*

Motivations for citing are to demonstrate knowledge in a field, to *'avoid having to prove or show something myself'* and to corroborate an argument, for critical reason, or to demonstrate good practice. Citing relevant and recent work was mentioned and some mention was made of avoiding citing very controversial work. Tailoring your citations toward a particular journal was also acknowledged.

4.1.6. Engineering: focus group discussions

Computer science & informatics

Although participants in the Computer science & informatics focus group said they cite traditional references such as journal articles, reports, and conference papers, as well as trade journals, much of the discussion centred around the use of electronic references such as reports (found on Google), articles from Google Scholar, and publications via online portals such as ACM and ITrip – raising the issue of accessibility (i.e. citing what is accessible) and the web *'I think that the new way we produce material is through the web and on the web and so everything that is not web linked is out of the old citation'.*

The number of citations was not discussed in much depth, but some said that they *'normally look for the top three … in a particular area, and especially if we are sending it to a top ten journal'* – referring here to high impact peer reviewed journals which can restrict the number of citations per paper. Accessibility issues were also raised *'if you can't find it electronically we probably wouldn't use it'.*

Motivations for citing include demonstrating knowledge *'I think it's the narrative that glues all the evidence together',* citing relevant work *'it's not about the reputation of the person, it's about the relevance of the work'*, critical reason, acknowledgement of work and to justify their own work. Motivations also depend on the purpose of the output, for example *'.. Whether you claim that the evidence is my conference paper which showed our academic view or my journal paper that shows how we started'*. Citing personal communications was mentioned *'people who I meet in conferences, talk personally, you know, so that should influence the citation'.*

Participants also mentioned being influenced by particular peer reviewed journals. There was some discussion about citing poor papers and indeed writing a paper that was deemed poor, which got a high number of citations criticising it *'I wrote a paper for the weekend in two days and that got 20 citations, and another one I wrote in six months I got only 4 citations which was a really good article ….. my [first] paper was not good, that's why 20 people cited it'.*

4.1.7. Arts: focus group discussions

Dance, drama, performing arts &music

Citation practices amongst participants in the Dance drama performing arts & music focus group were difficult to define; whilst some mentioned journal articles and monographs, including text books, the general feeling was that *'there aren't any norms within the Dance drama performing arts & music discipline area', 'I think it's very very subject specific in areas specific .... endless'.* Participants gave other examples of how these subject disciplines do not fit into the more traditional practices of citation *'it might be observation, it might be looking at the audience, it might be partly anecdotal'*, also having prior knowledge of 'players' in your field *'if you were writing a play …. for a particular company … you really have to know the likely performers who are going to be playing. That greatly affects the work you do'.*

Discussion about the number of citations revealed that it participants of the focus group felt the practice of citing is not really used or encouraged in these subject disciplines *'we don't want the citations', 'would keep the number of references down 'to a bare minimum'.* An example was given of a piece of work submitted to a German publisher who *'took them all out virtually … because they said the readers weren't interested in that'*. Others talked more specifically about their citation behaviour *'as I got more confident as a writer, I now don't cite much because I feel like I know what the argument is I'm iterating..'.* They also said that it depends on where you are disseminating your 'output' to.

Motivations for citing include demonstrating knowledge *'I [gave a talk at a] conference about how I was going to make this play …. I made the play and then I wrote an article which largely drew upon what I had said at the conference ….'*. Citing colleagues was discussed, with some concerns *'you're going to cite people and expect citation in return..', 'we were all encouraged to piggyback through a kind of triangulation system. If I cite you, you will cite so and so, and so and so will cite you', '… intellectual name dropping really, I wouldn't want to get into that kind of area'.*

4.1.8. Social science: focus group discussions

Psychology

Participants of the Psychology focus group said they tend to cite a variety of outputs, depending on *'where it's going - I mean it is horses for courses with different kinds of output and whether it's more practitioner, academic or more straight academic journal'*. Outputs cited include journal articles, monographs, and websites (including websites which publish articles). It was felt that empirical papers *'are the gold standard'* followed by review papers or book chapters. Conference papers are also cited, but peer reviewed journal articles are *'a lot more stable to cite than a conference proceeding'* because peer review is considered more credible.

Some experience difficulties where very little has been published on a particular topic*, 'if you're working in an area when no-one's done anything, you take whatever you can get',* and *'I did some work on the fire-fighter strike and there was just nothing ….. So I was taking newspaper articles, a little bit of stuff written by the trade union leader … I was taking anything I could get because there was no literature'.*

An early career researcher mentioned they were *'encouraged to read widely, so it would be a mixture of websites, journal articles, monographs, but in practice if I was to write a paper it would be probably 99% journal articles because we're looking at the most recent research'.*

The number of references depends on where the work is going to be submitted, for example, trade journals do not require academic references, and on the size of the work *'if you're looking at a four page article you'd be looking at a good 40 references, possible more than that, it could go up to 60 or 70'*. Also, if working in a disciplinary field *'if it was going to sociology journals I'd use far fewer references because they don't like that kind of scientific evidence'*. It will also depend whether the work is of a quantitative or qualitative nature or a mix of methods. Qualitative articles would be more about context setting and more likely to be applied, and therefore require fewer academic references, whereas quantitative studies (such as validating a scale) would produce *'a huge body of literature'* which would need to be referenced.

Motivations for citing include acknowledgement of key principles, credibility, and demonstrating previous knowledge. Whilst there is motivation to cite recent work *'the pressure on people to come up with something new … one great way of coming up with something new is to forget the past'*, it was noted that older works should not be ignored *'sometimes papers are 15 years old and still the authoritative resource and sometimes the lost paper, you know we're losing knowledge … we're constantly having to re-discover bodies of knowledge', 'sometimes there is a paper, even an empirical paper 15 years ago, that actually is the best paper on that topic …. we shouldn't be feeling we have to sort of gloss over it or something'*.

Politics

Participants of the Politics focus group cite journal articles, monographs (including edited collections), conference papers, speeches and newspapers. Other outputs cited include websites, magazines, European Union documents or government documents, or the outputs of various business and commercial organisations. However, it was noted that often 'citing' means citing a document rather than a person *'my citations are actually EU government documents … I'm not really citing anybody; I'm reading primary documents and working on that'.*

Focus group participants said that the number of citations depends on what is being written, for example, political theory is likely to have produced less outputs and therefore fewer citations than (for example) documentation from the European Union *'it can range from one end to the other'*. The focus of the paper can also influence the number of citations *'if you are weaving an argument then you're much more likely to cite more things, simply because you're likely to be using more sources'*. The tendency in this discipline does not seem to be to *'fill in citations'* where *'some poor PhD student has added a million citations to the footnote' – 'I would say, we don't do death by Harvard in the way some do'*.

Motivations for citing include demonstration of knowledge and to corroborate an argument *'some key works as recognition or as a way of framing the particular argument', 'trying to bring together a whole group of stuff and presenting it to people'.* Other motivations include acknowledgement of relevant work *'intellectual honesty'* and to justify work undertaken *'I need to cite the thing that's the most vexatious to the spirit because it's the thing that helps me formulate my argument'*.

Discussion also took place about citing poor or controversial work *'even if they are what I call in very colloquial terms, you know, rubbish, I still need to reference them to acknowledge that I*

think they are rubbish', 'sometimes very bad works get more citations than good works, or concepts that become very, let's say, controversial …. ', 'everyone should write one piece that's really controversial and submit it so that everyone would cite it!'.

It was noted that citation practices by early career researchers may be different to more established researchers *'because my PhD is inter-disciplinary I'd be all over the place … I'd end up with huge footnotes but I'd loose a lot of focus', '…. as I've gone on, I tend to cite far less often [than when a PhD student] and I only cite if it has actually had a direct influence on the particular thing I have written'*.

Economics

Participants in the economics interviews tend to cite journal articles, monographs, book chapters, conference papers, reports and non-official publications including online reports and working papers which are not yet formally published. Although *'there is this issue with a working paper in the sense that it doesn't have the stamp of approval – it has not been refereed, you know, one has to be a little bit more careful'*, it does address the issue of *'huge lags, publication lags, if you want to be up-to-date'*. Papers on personal websites were mentioned *'there's so many things available on the internet'*. A participant from an interdisciplinary area also mentioned trade publications but did not cite conference papers. Another participant did not cite monographs *'since books are not very highly rated in the profession'.*

The number of citations depends on the output – for example a review would cite *'quite a lot of other people's work'*, whereas a short article *'.. would cite maybe … two, three or four'*. Focus group participants felt that in general the economics subject discipline tends to be light on references, although it was not always clear what was meant by a little or a lot *'about twenty to thirty, it depends what you mean by a lot'.* Interdisciplinary areas (such as economic history) require a lot of verification *'so it's quite rigorous'*. The use of footnotes was mentioned *'I am not sure it's a good practice, but it's very standard'*. Citation circles were also mentioned *'… there are about 6 citation circles that I am aware of …. which is part of the corruption of the game of course'*.

Motivations for citing include authenticity, legitimacy, validity and demonstration of prior knowledge *'you want to convince the reader that you are aware of what's out there', 'one has to know what the accumulated knowledge is'* and to put the paper within a context. Other motivations include putting strength to an argument *'tracing the genesis of the particular debate or set of arguments about an issue'*, and to demonstrate originality *'the big issue is that your contribution is original, new, you know – does it add something?'*

4.1.9. Humanities: focus group discussions

English literature

Participants in the English literature focus group felt that citation practices appear less easy to define for this subject discipline than in the science based disciplines *'I think the citation in English are much more loose and idiosyncratic than in science', 'its boundaries are very blurry and … most of what I cite, most of the theory I use, there's no literary theory at all…', 'the citation model is not just from science, but from social sciences and the convention in social sciences is you write an article….', 'I think it's distorted, you know, to look at citations the way we do them. We have reasons for citing and not citing and … it becomes a factor in which the*

quality of our research is measured'. Mention was made of citing primary sources and secondary sources, and also the use of footnotes as a method of citation *'when I'm writing a book I would want to have a footnotes that would really cover a particular, you know, this is all the work on this', 'I'm quite an obsessive footnoter'*.

Focus group participants felt that there appear to be *'no hard and fast rules'* about the number of citations, *'it depends on what you are writing about'*, so for something quite obscure there may be less to cite, or you put in the *'standard references'* or, in areas like Shakespeare *'you are totally defeated'*. Writing on very well known areas (such as Shakespeare or Dickens) allows flexibility in citation practice *'you just write a piece, but then you would put in the standard references … so you know, if you 're writing on a certain novel, you know, everyone knows'*. It also depends on the word count because some journals have a strict word count, and in these cases citations would often be placed as footnotes and *'really only mention a few'*.

Motivations for citing include acknowledgement of previous work, which could include controversial or poor work *'some people who are cited the most are actually the worst', 'citing in order to discard them, not because they've had any impact on the field at all', 'So, these people all get credit for doing the boring thing, again and again'.* Other motivations mentioned were of a more inter-personal nature *'if someone intervenes at a conference and makes a point and you actually incorporate this point into your article, you really ought to say that you got it from them'*, although this can be problematic as there may not be a standard reference to cite this intervention *'the man in the black jumper on the second row'*. Accessibility of articles etc was also mentioned as a motivation for citing *'people cite journals that are easy to access … because it's not available electronically, it's not cited'*.

Philosophy

Participants in the Philosophy focus group tend to cite mainly journal articles, both print and online. Accessibility can be an influencing factor *'I kind of tend to cite things which are in my possession', 'I'm much more likely to cite something I can get on the web, there are some philosophy journals which are just hard to find, and I can't be bothered going to the library …'*. They also cite other outputs such as monographs, unpublished manuscripts and doctoral thesis, personal communications *'conversations!'* and other media such as items in the *Times Educational Supplement*. Criticism was made of conference papers *'you get a lot of very shoddy stuff published because people buy it, and you know the chief way of doing this is to publish conference proceedings'*.

The number of citations *'depends on what you're doing',* but the focus group participants felt that philosophy practice is different to disciplines such as medicine where *'you'll get these papers which may have five or six times as many citations as a philosophy paper'*. Mention was made of citation programmes (such as Endnote) which will *'just bang out ten things or things that are relevant to your topic'*. Word limits could also influence the number of citations *'.. you've only got 6000 words to produce your argument, so you can't defend all the assumptions..'*.

Motivations for citing include demonstration of knowledge, to corroborate an argument, to include relevant work and to acknowledge previous work and show the 'leaders and players' in a particular field. Other motivations for citing include increasing the chance of getting published in a particular journal *'…if you want to get it published you find who else has published and you stick it in…', 'some people are more prone to accept a paper or look more favourable if it*

mentions their own work', as well as decisions to leave out certain citations because your peers may *'think this is not the sort of thing that you should be citing'.*

Some discussion took place on the citing of poor articles or a weak argument; in Philosophy it seems to be general practice to expose poor work *'I might cite an article or a series of articles by somebody in my field, precisely because it was wrong and I wanted to rebut it'*. There seemed to be a general agreement that citing a paper doesn't necessarily mean the paper is good *'Some citations are there because there's the craziest argument you've ever come across. Everybody's hyped about it'*. This led to a discussion on the power of the 'extreme argument' and how *'it would be easy to get a racket in bioethics – if you want to get a lot of citations you say it's fine to eat babies or something!'*, *'they get highly cited because they produce the same bad arguments again and again'*.

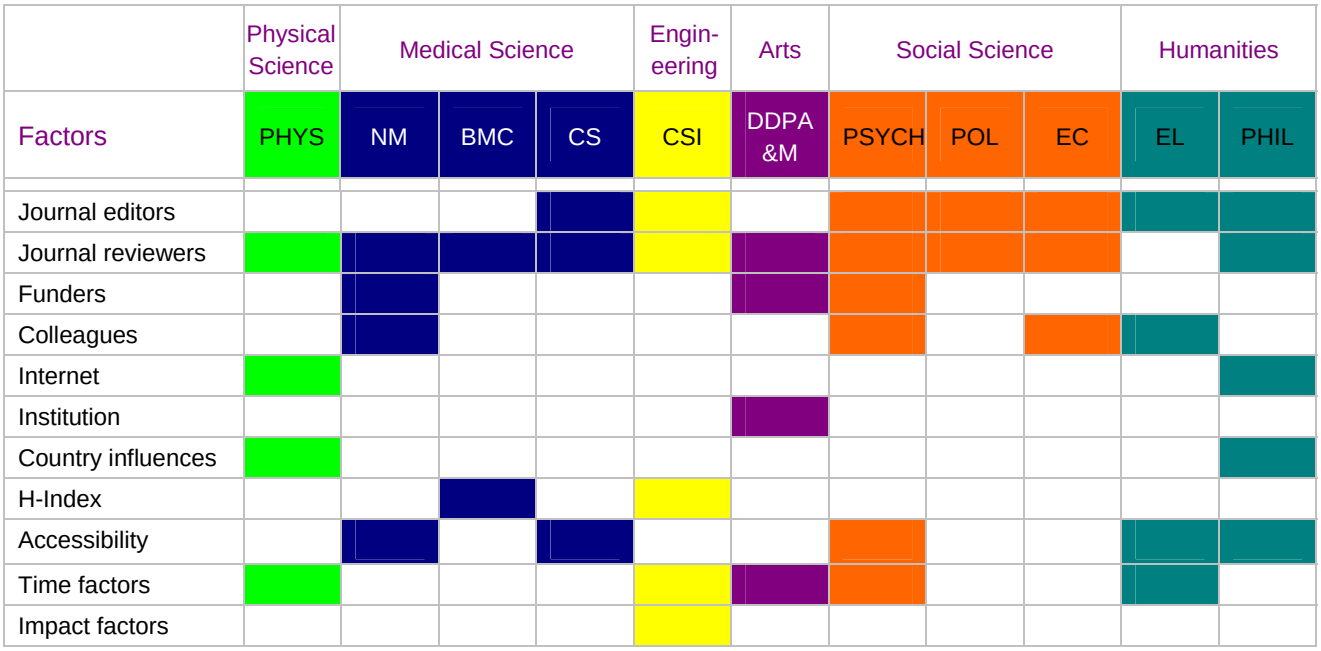
4.2. External factors influencing citation behaviour

Participants were asked if they felt there were any factors external to their areas of research or subject discipline community that influenced their citation practices.

Figure 15 illustrates external factors mentioned and discussed in the focus groups. Key findings are as follows:

- All focus group/interview participants said they had been influenced by either journal editors or reviewers
- The majority (participants in focus groups/interviews in all subject disciplines apart from English literature) said journal reviewers had influenced their citation practice.
- Participants in the subject disciplines of Nursing & midwifery, Dance drama performing arts, & music, and Psychology said that funders had an influence on their citation behaviour.
- The influence of colleagues was mentioned by participants of the Nursing & midwifery, Psychology, Economics and English literature focus groups.
- Accessibility of resources influenced the citation practice of participants in the Nursing & midwifery, Cancer studies, Psychology, English literature and Philosophy subject disciplines.
- Time factors influenced focus group/interview participants in Physics, Computer science & informatics, Dance drama performing arts, & music, Psychology and English literature subject disciplines
- Time factors included the time taken to recognise (and therefore cite) an output (such as a monograph, a performance, and instrument) (mentioned by participants in Physics, Dance, drama and performing arts & music, and English literature focus groups) as well as time taken to publish journal articles on a topic which was then deemed inaccurate (by the author) because technology had advanced and the findings were out of date (Computer science & informatics participants).

Figure 15 External factors influencing citation behaviour



The following sections provide a more in-depth description, with quotes to illustrate points, of the focus group/interview discussions according to the broad disciplines of Physical science, Medical science, Engineering, Arts, Social science and Humanities, with the separate subject disciplines within.

4.2.1. Physical science: focus group discussions

Physics

Participants in the Physics focus group discussed the internet as an external factor influencing citation practice *'one of the effects of the internet is the Indians, Russians, whatever, are suddenly much more accessible, you know, you don't have to get a Siberian subject librarian….', 'half the Russian academics are cited in the USA now..'*.

Mention was also made of country specific issues *'I sit on the Japanese Government panel and they are trying very hard to get the Japanese to read other people's journals, because at the moment they don't'.*

Journal reviewers were also mentioned, as well as influences from contacts and colleagues *'my colleague only half jokingly said to me can you cite this paper next time you write on that'*.

4.2.2. Medical science: focus group discussions

Nursing & midwifery

Participants of the Nursing & midwifery focus group discussed several external factors which could influence their citation behaviour. The main factors were influences from journal reviewers *'if you have a good reviewer they would come back and say 'you didn't explain this point very well, but I would suggest you look at the work of X' that can sometimes be helpful', 'as a reviewer I have said ".. you might like to look at these references" as a way of helping a*

colleague'. Although this was generally viewed as a positive influence, some commented that *'it's playing a game', 'you've been asked to review the paper because you seem to have some expertise, you could then suggest that they cite your work, and then they might well do.', 'yes, it is playing a game and is does feel very uncomfortable to do that actually'*.

Mention was made of influences from funders *'if projects are being funded by aid organisations or NGOs I think citing their work is good, it gives kudos as well'*.

Networking contacts and collaboration with external colleagues was also discussed *'working on international projects can be quite useful because often we can have our material published in English and then translated into Swedish'.*

Biomolecular chemistry

Participants in the Biomolecular chemistry interviews said the main external factor influencing citation behaviour comes from journal reviewers who, having received a paper submission often come back to the author with suggestions for added references *'…. You have ignored all this work by such and such et al, so please include that…'.* Although it was felt this influence is sometimes driven by the reviewer feeling that *'the author has omitted one of their favourite papers..'*, or *'quite often what comes to mind in the reviewer is the reviewer's own articles'*, it was not necessarily seen as a negative influence *'sometimes that doesn't matter if it's a helpful and positive sort of reference'*. Another external influence mentioned was the H-index *'people are looking over their shoulder at the H-index, you know it can encourage self-citation for example'*. This was viewed as a negative influence *'there is a negative side to these H indices, it can be distorted'*.

Cancer studies

Participants in the Cancer studies interviews said journal editors and reviewers can have some influence over citation practice *'we did submit to a relatively high impact journal recently and they wrote back saying they did like the paper but could we try and change the references to references in their journal in as many cases as possible', 'occasionally you'll get a journal where the reviewer is obviously keen to have his paper cited'*. However this was not necessarily seen as a negative influence *'…because they've written something particularly important [and] the researcher or author hasn't listed an important area'*. Some were reviewers themselves and did not think this was something practiced by all journals or journal editors.

Some discussion took place about whether there was any influence from funding bodies in citation practice, and it was generally felt that this did not take place although one example was given of a group of people working for a department that was funded by a private organisation which did try to influence referencing from American papers.

4.2.3. Engineering: focus group discussions

Computer science & informatics

Participants in the Computer science & informatics focus group seem to be influenced by the impact factor of peer reviewed journals, although they see this as a negative influence *'So unfortunately because of the RAE you don't publish in the journal that you think would be the best audience for your paper. You look at which one … what size .. impact'*. They discussed the

influence on citation behaviour by journal editors and reviewers *'most likely there's a view of such a paper and then they'll tell you can you suggest some more of our papers, that's the feedback we get', 'we had a paper accepted in the journal and then before it got published we got an email which said one final thing you need to do is add four more references from the publications of the journals that we promote'*. Time factor also seems to be an influence *'But of course there's a lead-in time as well isn't there. We're relying on the fact that papers are going to be cited immediately and attract a big buzz..', 'only really have its biggest impact maybe five to ten years down the line'*. The H-index was also mentioned *'… it's flawed and yet if you go for promotion or whatever, you have to specify your H-index from at least two sources'.*

4.2.4. Arts: focus group discussions

Dance, drama, performing arts, & music

Citation practice amongst participants of the Dance, drama, performing arts, & music focus group was difficult to define, but external factors which have an influence on these disciplines and may also influence citation practice were discussed. Initial discussion took place on the development of citation methods in these disciplines

> *'you're not going to get that idea received simply because it's cited all over the place or whatever …. You must constantly fight to maintain that ability to allow our … citation practice, if there is such a thing, to be determined by the absolute nature and the integrity of our ideas'.*

Also, whereas institutions may have a list of recommended journals to publish in *' …. obviously the composer is working in a different way … we have very different things going on'.*

Funding appears to be an influence *'because of the vast amount of money it takes for an orchestra to play a piece, a 15 minute piece is a huge amount of expense', 'it's very hard to premiere a piece in a relatively popular concert hall. The economics aren't going to allow it'*. Also, the amount of time it takes for a piece to 'mature' or be recognised (and thus 'cited') *'… 5, 10 or 20 years before it really gets on ….. so many people realise it is a phenomenal work and everyone is talking about it after some time… it's the sheer funds stance which seem to give the work a lot of gravitas', '.. if you can get it going elsewhere and then over time, and it does take time, to get the work out'*.

Participants felt that the practice-led nature of Dance drama performing arts, & music can result in pressure to produce outputs which can be cited, this can lead to *'awfully, clunking, exhibition catalogues', 'the audience want some pictures of the actors what the actor had been in on TV… they don't want to hear about your ideas. That's the last thing they want to hear about', 'you can produce a programme for our practice which includes citations … who's interested? I've come to watch the play, I'm not interested whether you've read x, y or z'*. It was also felt that the Arts Council has a different view of the quality of work *'they're not interested in research and the way that you think', and that the venue is of importance 'certain venues have a reputation for new work … certain riskier venues…'.*

Influence by journal reviewers was briefly discussed and it was acknowledged that this can happen *'reviewers came back saying you appear to not have read the following important works'*.

4.2.5. Social science: focus group discussions

Psychology

Participants in the Psychology focus group mentioned a number of external factors which might influence their citation behaviour. These factors include networking contacts and colleagues *'If I'm missing a point that could be backed up by a number of references and I only want to pick one, I'm going to pick one where it's a mate or I like the person', 'I tend to cite people who I see are competent and who I know and who put themselves about a bit really', 'early career researchers do a kind of a deal with each other, that they put each other's names on everything they wrote singly to double their output'*. Early career researchers discussed the influence of tutors *'I suppose the feedback you get from the tutors, that could be an indirect influence'*.

Influence of journal editors and reviewers were also mentioned *'yes, reviewers, sometimes they quietly, discreetly suggest something that would be useful to look at, and some times it's transparent that they are pointing to stuff from the same journal', 'I have had a reviewer say you seem to have overlooked X , but never an editor', 'If you're sending a paper to say a journal, you might check who is the editor and who is on the editorial board'.*

Funding was discussed as a potential influencing factor *'depending on the funder, if I was going to the government I'd probably have to say engineering and stuff', 'it would probably affect my bid writing but I don't think it would affect dissemination'*.

Accessibility issues were also discussed as influencing factors *'I think there is an element of I can't possibly keep on top of all the literature that's out there so there's an element of what is available to me', 'so availability is going to make a difference I think now, with all the electronic databases, … it's probably made our research poorer in many ways, to see what's available'*. This includes open access journals *'we give advantage to articles of people who publish in journals which are open access'*. Early career researchers also talked about accessibility *'as an early career researcher the way you learn to cite influences your whole career, and the databases that you chose to search – you tend to find you have a favourite one because it's just easier to find the articles that you want'.*

Politics

Participants in the Politics focus group felt that the main external factor influencing citation is journal editors and reviewers *'occasionally a referee will say, you haven't referenced this article, which is often their own article!', 'I have had two pieces returned saying, would you extend your references, which I thought was interesting', 'you often give comments like, oh you didn't mention India or you didn't mention X and this is common behaviour'.*

Economics

Participants in the Economics interviews thought journal editors and reviewers were one of the external influences on their citation practice:

> *'when they come back with comments, they suggest papers maybe that I might have missed or they think are relevant. But I don't see that as an imposition, I see that as a way of helping to get the paper published', 'sometimes depending on the piece, the reviewers will make perfectly good comments and that can lead to reasonable substantial intellectual changes', 'if you cite a particular journal, maybe I would have a*

look at who is on the editorial boards and see if I knew those people have published in my area and maybe check their view',

'I mean obviously if you want to get the damn thing published you've go to allow yourself to be influenced until the extent they say they won't publish it unless you do X'.

Influences from networking contacts or from colleagues were also mentioned *'I suppose one forms friendships or associations with people around the world in one's area that one respects and so I suppose one would look to use their work as a reference', 'when you go to conferences and you meet other people and you get to know what they're doing a bit more, that could influence'.*

4.2.6. Humanities: focus group discussions

English literature

Participants in the English literature focus group mentioned a number of external factors that influence their citation practice. These include influences by journal reviewers, time factors and influences from networking contacts or from colleagues. Regarding journal reviewers, this was mainly viewed as a positive influence *'Generally speaking it's a positive and constructive process that will actually tell you some things that you haven't read or hadn't thought about', 'It was actually helpful to me, it wasn't counterproductive'*, although some did question the motives *'…I was surprised, but it wasn't unreasonable, but I had no idea what was motivating their request and I've not had it since'*.

Influence by colleagues or contacts made through networking were discussed *'so much of our work is private communication …. So often our work circulates in an unpublished form', 'you get one or two seminal theories, you get some really detailed questions, you send it to a couple of friends, colleagues you send you back written comments', 'just colleagues basically, talking to colleagues and they might say something … it's normal'.*

The time factor in the production and dissemination of work is an influence on participants, and how it gets cited *'It's the time line … a book takes about seven years and even after it's come out it's about two or three years after it's published that people actually cite it', 'it's about turn around… I think there are turn around times for articles'*

Philosophy

Participants in the Philosophy focus group discussed possible external factors which might influence their citation behaviour. Some did not feel they are influenced to cite in a particular way. Those that did feel there were external influencing factors, identified journal editors or reviewers *'the editor of the journal or the referee who edited wrote back and wanted us to cite a particular body of literature including lots of literature they were involved in and people'*, they also identified country specific influences *'I noticed that countries tend to cite within countries and this is particularly acute in the US', 'in computer science there is a huge cultural difference between American computer science and European computer science and that affects citation practices', 'if you read the American Journal of Bioethics you could carry on the publication practice and only citing things that are theory in the American Journal of Bioethics'.*

The internet was also discussed as an influencing factor

'I think the internet makes a big difference because suppose I'm writing a paper and I come up with something that I think is kind of a truth, so what I'll do is put it in Google and when it comes up confirming what I wanted to claim I will then type it in'.

4.3. Current research assessment factors influencing citation behaviour.

Participants were asked if current research assessment had influenced their citations practice now or in the past. Figure 16 illustrates the responses. Key findings are as follows:

- Participants in the Physics focus group were the only participants who thought research assessment (in the form of the Research Assessment Exercise: RAE) had influenced their citation practice.
- Participants in the broad disciplines of Dance, drama and performing arts and Music, Psychology, Politics, Economics, English literature and Nursing & midwifery thought that research assessment had not influenced their citation practice.
- No clear picture emerged from focus group participants in the subject disciplines of Biomolecular chemistry, Computer science and informatics, and Philosophy.

Figure 16 Influence of current research assessment on citation behaviour

	Physical Science	Medical Science			Engin-eering	Arts	Social Science			Humanities	
	PHYS	NM	BMC	CS	CSI	DDPA &M	PSYCH	POL	EC	EL	PHIL
RAE has influenced											
RAE has not influenced											
No clear picture											

The following sections provide a more in-depth description, with quotes to illustrate points, of the focus group/interview discussions according to the broad disciplines of Physical science, Medical science, Engineering, Arts, Social science and Humanities, with the separate subject disciplines within.

4.3.1. Physical science: focus group discussions

Physics

Participants in the Physics focus group mostly thought that their citation behaviour was influenced by research assessment *'well obviously, I think we have just been saying that', 'Yes but I mean ideally you want to improve the quality of the citation', 'from the Government point, the answer is yes'*. Some did not altogether agree though *'I would say that is an assertion, I don't think it is necessarily true'.*

4.3.2. Medical science: focus group discussions

Nursing & midwifery

Participants of the Nursing & midwifery focus group felt that their citation behaviour had not been influenced by research assessment *'there was no motivation to do that', 'not yet, but it might'*. They felt that their citation behaviour is influenced by other factors *'whether or not it is a research assessment exercise, you always want to get your work published in what you consider to be the most influential or most widely read journal', 'you want to produce the best quality paper you can …. so it's the same ambition as the RAE but not doing it for just that'*.

Biomolecular chemistry

A mixed response was received from participants in the Biomolecular chemistry interviews as to whether their citation practice had been influenced by current research assessment . Some felt it had not influenced their citation behaviour *'no, not in the slightest'*. Others were not sure *'I think people will have changed their behaviour on the basis that it will be based on citation in the future', 'in the last two years, I would say yes [it has influenced my citation behaviour]'.*

Cancer studies

A mixed response was received from participants in the Cancer studies interviews as to whether their citation practice had been influenced by current research assessment . Some felt it had not influenced their citation behaviour *'No, not at all', 'I do the work that I do, and my first priority is the people who fund me, the second is the my, sort of, patient group, and then to the staff who work with me', 'I think people are just getting on, into it, and doing their own thing'*. Others thought it had influenced their citation behaviour *'I've only been involved in this latest 2008 RAE and certainly my strategy for dissemination was heavily influenced by that'.*

4.3.3. Engineering: focus group discussions

Computer science & informatics

Participants of the Computer science & informatics focus group did not seem to have any strong feelings whether their citation behaviour had been influenced by the current research assessment exercise *'I mean for me not or not yet', 'Probably at the last moment'.*

4.3.4. Arts: focus group discussions

Dance, drama, performing arts, & music

There was a general agreement amongst participants of the Dance, drama, performing arts, & music focus group that research assessment had not influenced their citation behaviour. In part, this attitude seems to have been driven by the process itself *'this is where the subject discipline has really bucked the trend in both the RAE criteria in 2001 and 2008, it's been said we don't give a damn about where the thing is published', 'RAE panel is saying to us that what they're looking at is not where it's published by the quality of the research'*. However, a few felt that it had influenced them *'that greatly affects the work you do and that whether or not that kind of work could go into the RAE in the first place', 'I think they don't need a period of grace right now, but in the next 18 months they need to change'*.

4.3.5. Social science: focus group discussions

Psychology

In general, participants in the Psychology focus group did not think research assessment had influenced their citation practices *'not in any meaningful way really', 'not at all',* although one example was given of how behaviour had been influenced

> *'we had someone who had been on the previous year's panel look at all our entries …. I think partly why we did better than we expected was that he did a really good job and the paper of mine which he rated most highly is my least cited chapter and actually I think it is a good paper – it is good, but it's obscure'.*

Politics

Participants in the Politics focus group did not think research assessment had influenced their citation practices *'mine was influenced only by the journals own requirements'.*

Economics

Participants in the Economics interviews felt that their citation behaviour had not been influenced by research assessment *'No, not at all', 'No, I've been influenced by reading other articles , so in other words I have learned how to do it as a result of being a scholar for a number of years'*.

4.3.6. Humanities: focus group discussions

English literature

Participants in the English literature focus group felt that their citation behaviour had not been influenced by research assessment

Philosophy

A mixed response was received from participants in the Philosophy focus group as to whether their citation practice had been influenced by current research assessment. Some felt it had not influenced their citation behaviour *'certainly not, I cite stuff that's been worth citing', 'I'm not under any institutional pressure'.*

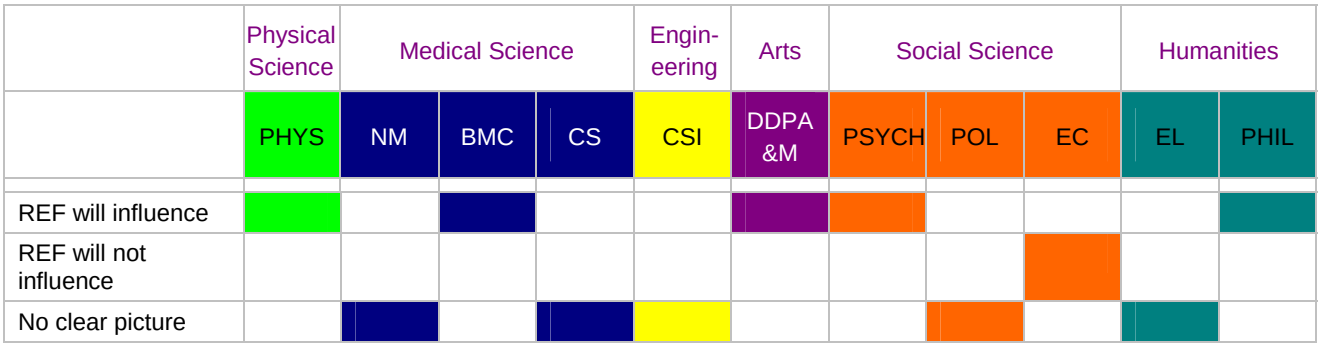
Others thought it had influenced their citation behaviour *'Yes I think so, …I'm going to cite in a way I think maximises my probability of a piece getting out and getting published…', 'I think so yeah'.*

4.4. Future research assessment factors which may influence citation behaviour.

Participants were asked if they thought it likely that they will change their citation practices if the REF (or a similar form of assessment) was implemented. Figure 17 below illustrates the responses. Key findings are as follows:

- Focus group/interview participants from the subject disciplines of Dance, drama, performing arts and Music thought that their citation behaviour would be influenced by future research assessment.
- Participants from subject disciplines of Biomolecular chemistry, Psychology and Philosophy also thought that their citation behaviour would be influenced by future research assessment.
- No clear picture emerged from participants from the subject disciplines of Physics, Nursing & midwifery, Cancer studies, Computer science & informatics, English literature, or Politics.

Figure 17 Influence of future research assessment on citation behaviour



The following sections provide a more in-depth description, with quotes to illustrate points, of the focus group/interview discussions according to the broad disciplines of Physical science, Medical science, Engineering, Arts, Social science and Humanities, with the separate subject disciplines within.

4.4.1. Physical science: focus group discussions

Physics

Participants in the Physics focus group responded in a negative way to the question of their citation behaviour being influenced by future research assessment, although they did seem to think their citation behaviour would change *'as soon as we know, as soon as they tell us, as soon as they know….'*

They felt there should be a better method of assessment *'so that would be driven by the community rather than by UK game playing'.*

4.4.2. Medical science: focus group discussions

Nursing & midwifery

No clear picture emerged from participants of the Nursing and midwifery focus group. Some thought that their citation behaviour would be influenced by future research assessment; some felt that this would certainly be the case, for example, *'In the last [assessment exercise] there was a lot of game playing, but I wouldn't expect it to be any different', 'if citation rate raises its head then what will change our practices as well', 'I will be looking towards more American journals, definitely. If I think I'm going to be cite more often if I put them in a different journal, I will do that', 'yes, because income follows that, I mean especially in the research community*

when so many researchers are on fixed term contracts', and *'I'm hoping citation won't be used, I don't think it's a reliable quality indicator, but if it is then I think it will be hard not to be influenced by it'.*

Some were less sure whether their citation behaviour would be influenced *'I like to think that we've built respect by our principles and that we wouldn't get into the business of playing games, which is what this could end up..', 'I think we've all really an aversion to playing games'.*

Biomolecular chemistry

Participants in the Biomolecular chemistry interviews thought their citation behaviour is likely to be influenced by future research assessment *'yes definitely because you want your publication to be highly ranked or considered and yes I am sure that would influence citation', 'both citation and publication behaviour, for sure, We shall write more reviews which you know you'd be cited for', 'yes I think researchers would try and play the game to enhance the outcome of any sort of bibliometric based exercise'*. Some thought their behaviour would change, even if they were not happy about this *'well if it can make a difference yes, but frankly researchers get very irritated over what you call the bureaucratisation of science and research and funding, so they'll play the game, they'll do whatever is necessary to improve their image or whatever you would call it*'.

Cancer studies

Participants in the Cancer studies interviews gave a mixed response was received to whether future research assessment – in whatever form – would influence citation behaviour. Some felt it would influence their citation behaviour *'I think whatever we need to score high will be fed down to us', 'I think it probably will', 'if someone picks up a trick then they'll pass it on. We'll share it, yeah'.*

Others did not think their citation behaviour would be influenced *'No, I think that would be bad, extremely bad', 'what is important when you cite work is how relevant it is to the work that you are writing up … I would not want to be driven by any other external factor, certainly not something which is related to the RAE'.*

4.4.3. Engineering: focus group discussions

Computer science & informatics

Participants in the Computer science & informatics focus group did not seem to have any strong feelings either way as to whether their citation behaviour would be influenced by future research assessment.

4.4.4. Arts: focus group discussions

Dance, drama, performing arts, & music

There was a general feeling amongst participants from the Dance, drama, performing arts, & music disciplines that future research assessment probably would have some influence, despite the nature of these disciplines, which do not have a strong practice of citation

> *'It's always been there to a certain extent, although you may not actually say, give a list of French philosophers that might have been useful for the REF and therefore cited',*

'can only be trusted if you feel that the REF or RAE system is able to look at your work, is able to look at enough of it to be able to make a judgement',

'if we are going to move into this kind of premiership league table then being at a sports festival might not help',

'I think it's partly of the magpie nature of what we do, it's inherent in that we will probably never be specialists in any way',

'at XXX it was speculated, a special task group was going to be set up to look at the implications of the REF and how that group was going to steer academics to work in a certain way so it is quite alarming, but that was just speculated'.

Assessment of the quality of research rather than citations was discussed with concerns expressed *'The RAE panel is saying to us that what they're looking at is not were it's published but the quality of the research'*, but it is unclear how 'good quality' is defined. This led to a discussion about knowledge transfer.

'sometimes when you cite a blog or when you appear on YouTube – if that has the potential for dissemination to thousands upon thousands – how is this going to be translated? - has to have documentation of how knowledge is transferred – as opposed to thousands of people being enthused by the web…'.

4.4.5. Social science: focus group discussions

Psychology

Participants in the Psychology focus group generally felt that their citation behaviour would be influenced by research assessment *'Yes, I think it will inevitably', 'I think it would be kind of stupid not to. You know, these things are a game aren't they', '[as an early career researcher] I think if you are in a successful department then you have to follow the changes that the department is going through'*.

However, although they felt their citation behaviour would be influenced, they did express some concerns *'It all depends on whether the model retains something of the old style of selecting a subset of your work, because if you do that , then you've go to have your name on enough things to make a good choice', 'I think there's so many multiple manipulations, it's kind of like chaos theory and you don't quite know how it's going to work out … maybe that's a good thing … the danger is somebody works is out and, you know, what will happen is we'll talk to each other and then we'll all be playing the same game'. 'it's all so bloody structured, what you're meant to be doing anyway'.*

The time factor was also discussed *'it all does seem to me its going to take some quashing innovative research and research into new areas because if you do something new, no-one is citing you', 'If they could start assessing it in, I don't know, five years time, how long have they got to allow people to read this new stuff and cite it and get it published'.*

Politics

A slightly mixed response was received from participants in the Politics focus group as to whether their citation behaviour would be influenced by research assessment. Some thought it would *'I think I will probably change my citation practice …. I think there's something to be said for making more out of the research and one way to do that is to cite it', 'we're still a bit English about it, we tend to be a bit modest about ourselves and I think that's probably a mistake and there's not a lot to be modest about'*, although they were not necessarily positive about this *'realistically you might find yourself having to do it, depending on what they decide', 'the problem is, I come from a little department but there's a lot of pressure from the centre..', '… university research communities are suddenly talking about university research committees and politics conferences. I don't, nobody ever mentioned them a few years ago and suddenly they're important and I think that will grow'.*

Some did not agree *'I hope not!', 'it's difficult to judge how one's institution is going to play the game versus how another institution is going to play the game'.*

Economics

Participants in the Economics interviews did not think that their citation behaviour would be influenced by future research assessment *'No, we could all collude together, that is a fear. In economics we have these games you see, we have games theories', 'no, because I think the practices we use are designed for what we believe is academic completeness and that's how it should remain'.*

However, one thought their citation behaviour might change *'I think that's possible, depending on what the rules are – maybe the whole profession will decided that instead of citing 15 articles we will cite 100 because that increases our performance in the REF'*.

Concerns were also expressed about how the design of research assessment could influence behaviour *'I think if the REF is not carefully designed then it might have this crazy consequence of people citing, you know, I scratch your back, you scratch mine'*.

4.4.6. Humanities: focus group discussions

English literature

Participants in the English literature focus group thought that it was possible that their citation behaviour might be influenced by future research assessment *'It may change because you are conscious of it'*, *'you might not cite people who are really bad so much', 'I think people will respond to it, sometimes consciously and sometimes not'.*

However, it was felt that even if citation behaviour was influenced by future research assessment, this would only happen in the UK, and *'because we are international scholars it's not going to change what they do in the US, or Canada, Australia, you know, where presumably you hope our work is sometimes cited'.*

Philosophy

Participants in the Philosophy focus group generally felt that their citation behaviour would be influenced by research assessment *'I think if it comes out that citations are going to be*

important, people in a spirit of generosity will start upping the number of citations', *'It might be then that we start citing more recent stuff I suppose', 'particularly if we think it's the work that comes out in the next five years that has to be cited… I mean we just don't know exactly whether it will be stuff in the next five years … who knows how the citation thing is going to work'*

However, some also expressed concerns *'It's taking it seriously, going the way the money flowed from the last research assessment. I don't know why we don't sit down and say we're not going to do any of it!', 'it will lead to a lot of early retirement!'*

5. Additional issues raised in relation to dissemination and citation practice

Focus group/interview participants raised a number of issues in relation to their dissemination and citation practice, apart from those directly relevant to the questions. The main issues identified are:

- Strategic approaches
- Accessibility
- Reaching the audience
- Research and teaching
- How impact and quality are measured
- Footnotes as an alternative acknowledgement

5.1. Strategic approaches

The biggest perception amongst the focus group/interview participants is that research assessment is a game:

> *'…. I mean if I know it's going to be on citations, it's going to be "how do you maximize your citation" and everyone will be playing that game, and that sort of thinking about your publications, thinking about … team work … and collaboration' (Biomolecular chemistry).*

> *'There's a game to play in terms of getting a good rating and then there is doing research and I think the research groups around the country need to be aware of that so they do their research and they just ensure that they have got sufficient trump cards to play whatever game..' (Computer science & informatics).*

> *'There's a difference between your research output and what you necessarily indicate in RAE, because you can play a different game'.(Dance, drama, & performing arts, and Music)*

> *'Across the board what most politics academics did was produce many more than four and not of a sufficiently high quality…. What that tells me, actually I think that either we are pretty bad at playing the game or we refuse to, or in fact we don't actually respond very well to external constraints' (Politics).*

Some participants expressed concerns about game playing

> *'I think the problem is the REF game has already been played before the rules were set, so we are addressing ourselves within a framework which we are guessing' (Dance, drama, performing arts, & music).*

> *'…. Does that lead to better research? No, it's purely gamesmanship about the grant funding process, but it's the only game in town so that's what they do' (Philosophy).*

> *'One may not like the game, but you know, we're on the playing field' (Economics).*

'I don't think we go out and play the game, sort of like conscious way of saying this is what we're trying to do to maximise our citations, but it could source a pressure and it makes you change your decisions sometimes' (Psychology).

Another perception amongst the focus group/interview participants was that academics are also forced into this game playing in relation to their citation practices

'researchers get very irritated over … the bureaucratisation of science and research and funding … so they'll play the game, they'll do whatever is necessary, you know, whatever they can to improve their image or whatever you want to call it' (Biomolecular chemistry),

'In economics you have these games, we have game theories' (Economics),

'I would talk about it with colleagues and say, you know, if we're going to play the REF game make sure you publish some methodological papers because people will cite those' (Psychology).

Although 'game playing' seems to be an acknowledged practice among many participants across the subject disciplines, feelings about this are generally negative, *'We can't bow down and say, oh my god, we're going to have to learn how to cite and we're going to have to do all these stupid citation games'* (Dance, drama, performing arts, & music), *'Yes, it's playing a game and it does feel very uncomfortable to do that actually'* (Nursing & midwifery).

A concern, linked to the above, is the development of citation strategies and models, *'It will encourage people to write on Jane Eyre and discourage people to do, you know, the kind of research that presumably HEFCE are wanting us to do, actually new directions and obscure areas'* (English literature), *'It's very different from the sciences, so you could be doing something with medical people, you'll get these papers which have maybe five or six times as many citations as a philosophy paper'* (Philosophy). One participant felt that a citation strategy had already been considered at his institution

'at XXX it was speculated, a special task group was going to be set up to look at the implications of the REF and how that group was going to steer academics to work in a certain way so it is quite alarming, but that was just speculated' (Dance, drama, performing arts, & music).

5.2. Accessibility of outputs

Being able to make outputs accessible to a wider audience was a factor which influences may of the participants *'it's really important that everybody gets access to that sort of stuff [top quality outputs]'* (Computer science & informatics). However, making work accessible can conflict with what is perceived as appropriate outputs for the purpose of research assessment

'I think RAE panels have difficulty assessing quite serious academic endeavours which is written in a way to appeal to a kind of wider market' (English literature),

'I think that this is a serious conflict for me and my colleagues, because they're in an applied area, we do want to make the material very accessible to clinical staff on the ground' (Nursing & midwifery).

Online access was also discussed as a factor which could influence dissemination behaviour *'I work with peer reviewed, recognised international journals which I can access online, through my university library'* (Cancer studies), *'especially electronic access, I think that's quite accessible'* (English literature), and

> *'we're aware of the hierarchy that we want to be in published journals but the suggestion from the kind of community pitches is that online is not a bad place to start if you're struggling to get published and they're more accessible' (English literature).*

Open access journals were mentioned *'free access…. would like to support this endeavour of making research be really accessible to everyone… and there are some e-journals'* (Economics), also that some funders make open access dissemination a requirement of the funding structure *'one of our funders … a major cancer research funding body … they now have a directive that all the research coming from groups that they fund must be open access to all'* (Cancer studies).

Being able to access journals easily does seem to influence citation. Participants in seven of the subject discipline focus groups/interviews specifically cited access as an influencing factor in what they cited, for example: *'people cite the journals that are easy to access, you know'* (English literature), *'I think there is a tendency to cite the ones you can get easily, that are easily accessible'* (Nursing & midwifery)*, 'it has to be an absolutely phenomenal abstract for me to request it'* (Nursing & midwifery), *'I tend to cite things which are in my possession because they are a lot easier and would certainly sum up a whole, you know, a huge array of general literature'* (Philosophy).

Accessibility of journals included online access, and again this has an influence on citation practice amongst the focus group/interview participants *'because you don't have to go to the library and pick the paper and pick the magazine up because you can just look at it on the internet and print it out'* (Cancer studies), *'to me, online journals will become more and more important because they're so easily accessed'* (Nursing & midwifery). *now we can search from Google Scholar and all sorts of articles come out…',* (Psychology) *'it's nice to have a really good stocked library, digital library'* (Psychology).

Several participants admitted that if a journal wasn't available online it was unlikely they would cite it, *'if you can't find it electronically, we probably wouldn't use it'* (Computer science & informatics), *'because it's not available electronically, it's not cited'* (English literature), *'I'm much more likely to cite something I can got on the web, there are some philosophy journals which are just hard to find, I can't be bothered going to the library to find them'* (Philosophy).

Some made use of online databases in order to find and cite work *'with the electronic databases, you know, our literature searching practices have shifted I think from pulling piles of things off stacks to sitting at your desk looking at what's there'* (Psychology)*, 'the database that you choose to search you tend to find you have a favourite one because it's just easier to find the articles that you want'* (Psychology).

Subscription costs influence what people cite, for example not being able to access a journal because an institution would not pay for it: *'my university hasn't got a full subscription and quite often I can't get the papers that I'm interested in'* (Psychology). Open or 'free' access journals are also considered an influencing factor in citation practice, *'well, there's the problem of cost with that. There's free access ones, I would say our organisation I don't think would pay'*

(Nursing & midwifery), *'if they are going to publish in a free access journal there's going to be a limit to what can be approved'* (Nursing & midwifery*), 'we give an advantage to articles of people you publish in journals which are open access'* (Psychology).

5.3. Research and teaching

This issue was discussed mainly in relation to dissemination of outputs. Several participants expressed feelings of uncertainly of how the two could be joined in terms of assessment, for example:

> *'There was a paper years ago by Dearing who actually started a lot of business movement of attachment and metrics and everything else, and he asked the question "what's the purpose of research?" and he came up with four categories: generating your knowledge, contribution to world creation, quality of life, and informing teaching and training researchers of the future. All of which are important, but they are not given equal weight' (Computer science & informatics).*

Some posed the question of whether research (and research assessment) was less important to 'teaching' institutions because of funding:

> *'I suspect that in teaching in universities like my own there will actually be less pressure on us than colleagues would feel in research led universities, where income hinges on this. It's a tiny proportion of our income' (Computer science & informatics).*
>
> *'I'm interested in teaching and trying to make [research and teaching] join up in some way …. But I couldn't even tell you whether we plan to be research led, I wouldn't know how to define that' (Dance, drama performing arts, & music).*

Funding, and how this may impact on research and teaching was also discussed:

> *'It does seem to be that because funding has shrunk so much, the nature of the funding which would fund us to get time to do other research and teaching, so that's the actual winning of the grants is in a way the esteem that is almost as much as the product' (English literature).*
>
> *'Increasingly [research funds] it's becoming tied to teaching and knowledge transfer and sometimes I don't really know how to respond to that because the sort of research I do isn't really accountable to this particular area … I feel as though the nature of what it is we do is forced to change to that structure, and that's problematic' (Politics)*

Other participants talked about the changing nature of research and teaching

> *'I've been working as a full-time lecturer for eight, nine years now and I've never really seen the RAE as being anything to do with me. I know that might sound a bit …. But I've always seen that as something the researchers are involved in and my role was involved in teaching and writing teaching material and supporting students and supporting my clinical partners …. It's only more recently that this has become a bigger thing and I guess it's because the changes are being thrown out that I need to think about it more' (Nursing &midwifery)*
>
> *'… and teaching materials are, you know, I think are important'*

'I find a lot of my teaching does feed into my research eventually, especially the sort of more practical bits… teaching people to programme computers gets you thinking about how people actually reason about stuff'

'and just being a better teacher … you know, being a more valuable teacher to ones students' (Philosophy).

5.4. Reaching the audience

Ensuring their research outputs reach a broader audience (e.g. a 'lay' audience rather than an academic audience) is an important factor for many of the participants:

'We have an obligation to produce things for a lay audience through our funding' (Cancer studies)

'If you can present at things like conferences or disseminating that kind of way at workshops or discussion boards or the internet or whatever, you're doing is hitting your audience at the point, probably when they can take that and use it in their practice at a more appropriate point. I don't know how that fits in with the university' (Cancer studies).

'If you count dissemination as a performance then you have to do so in many places and so many audiences … it might require you to do it to people in communities' (Dance, drama, performing arts, & music)

'It's helpful if those conference proceedings are then published because they're available to a much wider audience than the actual attendees' (Nursing &midwifery)

'the practice audience is hugely important because obviously all the research we do really, ultimately that should be our main priority in terms of influencing how nursing is practiced…' (Nursing & midwifery)

For some, the audience was a higher priority than the impact factor of the journal *'Where it will be the biggest impact, the biggest relevant audience and then, you know, the best journal that will take it…'* (Biomolecular chemistry). Others felt that this was changing

'… until then I didn't really care about an impact – I really targeted where I thought my audience would read it – and now I don't do that' (Politics. Some talked about a conflict between reaching a wider audience and publishing in high impact journals 'I think the RAE panels have difficulty assessing, you know, quite serious academic endeavours which is written in a way to appeal to a kind of wider market' (English literature)

Several participants talked about the influence of their 'audience' and how this might in turn influence citation behaviour. There appears to be a conflict between what the audience wants or is perceived to want, and what research assessment may require. An example was given relating to the production of a play and performance programmes

'the problem with practice based … you have to cite practice in articles but practice isn't a citation itself, I mean you can produce programmes for our practice which cites everything I have read. Who's interested? I've come to watch the play, I'm not interested

in what you have read …. I'm not interested in the audience knowing what I've read'. (Dance, drama performing arts, & music)

Some discussion then took place on who the audience is, and if the audience is coming from a research background *'I guess your 300 word demonstrates the framing of what you're doing so from that point of view someone is actually interested'* (Dance, drama performing arts, & music).

A participant thought that rather than publishing in a journal that would be the best audience for a paper, they would target journals of a high impact factor, or that are widely read *'unfortunately because of the RAE you … look at what size and impact.'* (Computer science & informatics).

5.5. How impact and quality are measured

Discussion around impact and quality seems to be related mainly to citing outputs in high impact journals. Several felt that they were influenced by the impact factor of a journal when citing, *'obviously 99 time out of 100 the citations are in other peer reviewed journals of a good standing, of various impact levels', 'if it's in a high impact journal you know it's going to be a good paper on the whole', 'you cite what's uncontroversial as often as possible and from high impact journal'* (Cancer studies), *'the way in which citations impact on what I do is that I do buy a publication towards the higher impact sector journals'* (Computer science & informatics). However, looking to the future of research assessment, it was felt that other aspects of citation practice could also be influenced

'If we take the impact factor stuff as an example. Before RAE, that didn't bother us, did it? We just published wherever it was most appropriate. Impact factor suddenly raised its head and that changed our practices - if citation rate raises its head, then that will change our practices as well' (Nursing & midwifery).

Some discussion took place around the lack of high impact factor journals in the Philosophy discipline, *'High quality journals in philosophy and impact factors don't always match very well'* ,*'I'd be happier to see citation as indirectly leading informing impact factors of journals'* (Philosophy).

Others felt that the impact factor a journal did not have an influence on their citation behaviour

'I don't check the impact factor on the journal … you tend to be able to make the decision about how good it is or not depending on what it's actually published in a particular field so you can see that just by instinct', (Cancer studies)

'not necessarily super-duper high powered high impact journals, but any journal which has got a good reputation' (Cancer studies)

'…what you are doing is peer review and so the things that you cite are true peer review, nothing to do with impact', 'personally … I change who I cite, I do not pay any attention to impact as a citation policy', (Computer science & informatics)

'we don't expect eight kind of impact papers, we expect, wow! He's done one really decent paper' (Computer science & informatics).

Discussion also took place regarding how impact is defined: *'I think we all agree that we need a broad definition of impact'* (Computer science & informatics) and how it might be calculated: *'you know, impact factor is calculated in just a nebular way', 'and so the question goes, is the impact factor important?'* (Computer science & informatics), *'documentation [of research] became problematic because the practice was acknowledged as having impact but actually how we document and present it to RAE becomes a complication and document is central to that'* (Dance drama performing arts, & music).

A number of other issues and potential conflicts relating to impact were discussed, one being that the nature of applied work in some disciplines means that citations will be of a practice-based nature. Therefore, rather than citing from high-impact journals, the tendency would be to

> *'direct publications to the journals where they might have an impact on practice, so that they're journals for the practitioners' (Philosophy),*
>
> *'you know, I would very much prefer that they looked at the number of different aspects so that there … would be some way of measuring impact in terms of real-world influence' (Psychology ').*

The potential conflict between real-world impact and journal related impact was picked up on again: *'Not so much about necessarily reflecting on your own work, but being conscious of the impact that it potentially has for other people as well'* (Psychology). Some participants were journal editors, and they felt that impact rating did influence their strategies: *'especially when writing papers and a writing review if it, articles, and citing other papers within that journal'* (Cancer studies).

5.6. Alternative acknowledgement

The most popular alternate acknowledgement to citation and referencing is the use of footnotes *'I'm quite an obsessive footnoter and like footnotes'* (English literature). Participants felt this practice is particularly useful when writing for a journal that has a strict word count, but other reasons discussed were pointing people towards a particular view relating to the topic under discussion and *'other thoughts about a general topic'* (Politics). Some questioned the heavy use of footnotes in a text: *'I'd end up with huge footnotes but I'd loose a lot of focus'* (Politics), *'you mention fifteen papers that are in that area, which I'm not sure it's a good practice, but it's very standard'* (Economics).

5.7. Reading behaviour

Reading behaviour was not discussed in great depth in the focus groups and interviews, however, participants did comment generally on their reading behaviours, for example, *'I've been influenced by reading other articles so in other words, I've learned how to do it as a result of being a scholar for a number of years'* (Economics); *'For my PhD, I'm encouraged to read widely, so it would be a mixture of websites, journal articles, books, but in practice if I was to write a paper it would be probably 99% journal articles because we're looking at the most recent research and it tends to be published in that way'* (Psychology); and *'I used to be told don't read so much, don't quote so much just go and think and write it that way'* (Philosophy)

Some focus group participants discussed factors which prevented them from reading books, *'it's only really summer holidays that I get the time to do that. I can read a journal article in an hour*

but obviously it takes a little longer to read a book' (Philosophy). The difficulty that some find in reading books is perhaps reflected in the decrease in citations to books found in the bibliometric analysis *(see 3.1 above).*

Participants also mentioned how reading behaviour may – or may not - influence their citation practices: *'I'm working on the European Union now and my citations are actually to EU government documents. So if you're thinking about the bibliometric well it makes a mockery of it! I'm not really citing anybody; I'm reading primary documents and working on that.'* (Politics); and *'I have to read and find out which direction – I mean I read them all but it doesn't mean I can cite them all because I have to select the ones that related to me as well'* (Psychology).

6. Discussion and conclusions

6.1. Publication and dissemination behaviour

6.1.1. Predominance of journal articles

There was an almost universal view that there is an expectation and, in some cases, a pressure for scholars to normalise their work into a peer-reviewed journal article, for example *'it's tremendous pressure to normalise upon something like a 6000 word journal article'* (Dance, drama, performing arts & music) – often practice-led pieces would be written up as an article or accompanying piece of text.

Another participant felt that the capacity to develop a line of thought and argument was being hampered by the shoehorning of work into small articles rather than a monograph, for example *'where I'm going all the time its irritating, irritating. Words in scientific journals, 3000 words, 2000 words. It's kind of like writing a shopping list'.* Another participant commented *'I think a lot of people wouldn't mind developing their ideas into larger scale bodies of work but you're highly discouraged and my younger colleagues aren't in a position to allow their ideas to develop because they've got to get them out before they're even baked*'.

6.1.2. Increase in collaboration

Some participants felt that there was an increased pressure to collaborate on research, within discipline and across discipline and across institution – including international collaboration. It was noted that the push for this stemmed from funding bodies such as the Research Councils, for example *'I think there will be an increasing number of collaborative publications coming out of that and that is driven by where you are getting your funding from and how you get it*'. (Biomolecular chemistry). Other participants felt that current research assessment had brought about a pressure to collaborate – even when this might not be a natural thing for a scholar to do, for example *'one thing that came back is that we had so many monographs and that we were too individualistic and they wanted to see more collaborative … work than monographs, they just weren't impressed if people were going off in their little corner and writing monographs … we'll just be driven by whatever the people at RAE have to say*'.

With regards to citation, participants of the Dance, drama, performing arts & music focus group discussed the practice of citing colleagues: the 'I cite you, you cite me' approach. This was raised by participants in other focus groups and interviews. For example the Philosophy focus group participants thought that people would start increasing the number of citations 'in a spirit of generosity'. Early career researchers of the Psychology focus group discussed strategies for doubling output such as always naming other early career research colleagues. Citation circles were mentioned in the Economics interviews as a form of collaboration to increase citation counts, and this was viewed in a negative way.

6.1.3. Intellectual autonomy

Intellectual autonomy was an important issue raised by many participants during the course of the focus groups. One of the main concerns arose from conflicts in writing outputs to reach the target audience and conforming to the institutional view of RAE submissable outputs, for example *'that is a serious conflict for me and my colleagues is that, because they're in an*

applied area, we do want to make the material very accessible to clinical staff on the ground. You know, there's the magazine they pick up when they go for their coffee, that sort of thing. But the pressure is on always trying to get into high impact journal' (Nursing & midwifery).

Another example came from participants of the Computer science & informatics focus group who view conferences and workshops as important to the discipline as they are at the forefront of development and innovation due to the speed with which research can be disseminated but which are not viewed highly in terms of the RAE, *'fundamentally my incentive is making a difference and that isn't necessarily through academic publication'*.

Respondents in the Philosophy focus group were also concerned that their research outputs were changing *'I was explicitly told "Oh we don't give you research time to write books" I feel angry actually just thinking about it'*, and *'forbidden to even think about applying for a teaching buyout in order to get me the time to write a book'*, and *'it's sort of actually forbidden by my department to write a book'*. Another participant commented *'I think a lot of people wouldn't mind developing their ideas into larger scale bodies of work but you're highly discouraged and my younger colleagues aren't in a position to allow their ideas to develop because they've got to get them out before they're even baked'*.

Computer science & informatics participants also acknowledged that journal editors influence scholarly freedom, for example *'academics are there to actually extend the boundaries of knowledge and to do research into actually breakdown misunderstandings and find these new ideas, okay. And so what happens? The editors of the academic journals, they are the most traditional people you can possibly find because they will not move away from what they traditionally do in terms of publishing and a lot of it is to do because they have vested interests. They have huge vested interest to have a status quo, you know in terms of this is the way we operate and this is what we publish and everybody thinks this is a great journal and then that puts us down and all the people who operate in that area they then publish in those sorts of journals and it is self-perpetual'.*

Research assessment was also identified as a potential threat to intellectual honesty by Politics participants, for example *'I wasn't really worried about impact … now that I'm head research I worry about these things'*, *'I didn't really care about an impact I really targeted where I thought my audience would read it and now I don't do that'*. Other participants felt strongly that research assessment should not influence a researcher's behaviour *'as a matter of principle anyone that changes the kind of research they do because of something the RAE, if that fits to the calling of being an academic then I think … there has to be that autonomy of thought and not being pushed and pulled'*.

Tension between the most appropriate output type and the need to produce peer-reviewed journal articles is also discussed in section 6.1.5. What scholars view as important vs. outputs submitted to research assessment and 6.3.2. Balance of work to reach audience vs. research assessment requirements.

6.1.4. How impact and quality are measured

The impact factor of journals formed a significant part of discussions with many participants across many of the focus groups. Many participants felt frustrated that impact was measured in such a narrow way, for example one Psychology participant noted that difficulties in the value

and impact of getting her work recognised by research assessment thus, *'there were some conferences that the … service and academics go to and I get to directly report to the chief there and actually it's quite frustrating, the fact that it will never get included in the research assessment exercise. It really frustrates because people actually change policy because of the work I do and for me that's impact, whereas publishing in the journal of a certain impact factor doesn't mean anyone's ever going to read that article or do anything about it'.*

Some participants talked about departments using internal lists of journals with high impact factors – with an understanding that these were the journals scholars should be targeting. Other participants highlighted that journals in their field were all rated low impact, leaving them with difficult choices in publication.

Participants also discussed institutional interpretation of the RAE Panels, where one participant stated that the impact factor of journals would not be a strong factor in assessing the quality of publication their institution had adhered to this, so that *'in our university we kind of took that to heart and there was, generally, you know, an approach that it had to be the right journal for the paper and you know, a respected journal, but we weren't actually looking at impact factors and saying, "Oh strewth, let's fly over that one because it's got .3 of an impact factor more'.* (Nursing & midwifery).

In relation to citation, focus group and interview participants felt that impact is usually measured by citing outputs in high impact peer reviewed journals. There seems to be mixed feelings amongst focus group and interview participants about whether the impact factor of a journal is an influence when citing; a participant in the Philosophy focus group talked about the general lack of high impact factor peer reviewed journals in the Philosophy discipline. Looking to the future of research assessment, participants of the Nursing & midwifery focus group thought that other aspects of citation practice could also be influenced depending on now the REF is developed.

How to define 'impact' was seen as an important factor and a number of issues and potential conflicts relating to impact were discussed amongst many of the participants, one being the nature of applied work in some disciplines and the conflict between real-world impact and journal related impact . Some participants were journal editors, and they felt that journal impact rating did influence their strategies.

6.1.5. What scholars view as important vs. outputs submitted to research assessment

The range of output types discussed by participants as important to individual scholars and to their research communities was markedly more diverse than those perceived to be important to their institutions for submission to the RAE – where there was a predominance of the peer-reviewed journal article. Further evidence of the domination of peer-reviewed journal articles as a method of output of research can be seen in the actual submissions of Units of Assessment. According to RAE 2008 data submissions of peer-reviewed journal article for disciplines were as follows:

- **97.65%** of submissions for the Physical Sciences (Panel E, includes **Physics**)
- **93.90%** for Subjects allied to medicine (Panel C, includes **Nursing & midwifery**)

- **97.63%** for Biological sciences and related subjects (Panel D, includes **Biomolecular chemistry**)
- **98.64%** for Hospital and lab-based medicine (Panel A, includes **Cancer Studies**)
- **78.64%** of submissions for Mathematics (Panel F, includes **Computer science & informatics**). Other submissions include 13.79% for conference contribution.
- **22.09%** for Art and related subjects (Panel O, includes **Dance, drama, performing arts & music**). Other submissions included Exhibition 16.72%, 16.66% chapter in a book and 11.09% authored book.
- **83.24%** of submissions for Education and related subjects (Panel K, includes **Psychology**).
- **61.76%** for Social work and related subjects (Panel J, includes **Politics**). Other submissions included 16.00% chapter in a book and 15.97% authored book.
- **87.98%** for Business and related subjects (Panel I, includes **Economics**).
- **36.02%** for Languages (Panel M, includes **English literature**). Other submissions included 28.45% chapter in a book and 22.28% authored book.
- **36.89%** for History and related subjects (Panel N, includes **Philosophy**). Other submissions included 31% chapter in a book and 22.81% authored book.

Even in those disciplines where peer-reviewed journal article is not above 80%, it still forms the largest proportion of submissions to its Panel.

Some participants also identified that there was a tension between outputs deemed to be important to them as individual scholars and requirements placed on them by their institution as a result of influence from research assessment, thus *'if I was asked to compile a list of the articles of which I am most proud, these would be the articles that I was encouraged to submit for RAE. It would be one overlap'* (Philosophy) and *'even at that level attention between what you are encouraged to do for the RAE and what you're encouraged to do for career progression, because the norms for career progression, especially if you're ambitious to reach chair, still insist on the book and the monograph in a way that the RAE specifically doesn't. So you have people torn very which way thinking in terms of what they have to do for the next five year research cycle and what they have to do to establish them over a career at which has a longer timeline running through it. I think junior researchers do find this confusing, and those of us just old enough to have escaped are very fortunate'* (Philosophy).

Tension between the most appropriate output type and the need to produce peer-reviewed journal articles is also discussed in section 6.1.3 Intellectual autonomy and 6.3.2 Balance of work to reach audience vs. research assessment requirements.

6.1.6. Changing nature of multiple authorship

Multiple authorship and order of authors' names is handled differently within disciplines and across disciplines – with many different practices emerging (section 3.3). However, discussions with participants also uncovered changes in collaboration and multiple author practices within some of the focus groups disciplines, particularly Nursing & midwifery, Biomolecular chemistry, English literature and Philosophy. For example, in Nursing & midwifery changes in author order practices were noted, *'I think there are some exercise – I would call them ancient practices that*

are now rather tricky … you really would probably try and put the junior person on the project as the first author … because you want to get them started … so we'll often do that'. This would then result in the senior person being placed last in the order. Other participants also noted *'it's the same in my discipline as well but it's changing now. You get to look at the end author to see whose project it was, but now because of having to be accountable, it's reversed itself'* (Nursing & midwifery).

Some Nursing & midwifery participants felt that order of authors is now becoming *'fraught with difficulty, actually'* and *'it's been a huge problem and I don't think it's dealt with that well … I don't think it's particularly well acknowledged. I think it's a whole – there's a lot of underlying conflict'*.

Biomolecular chemistry participants also felt that author order practices have changed over time *'things have changed over the years. When I started out … the convention was just strictly alphabetical and that suited me quite well starting with a B, so many of my early papers I'm first author. But there was no pecking order, there was nothing read into it other than alphabetical, but things have slowly, I would've said, what's the word, you know I thought that was the best way to do it. But now of course everyone's jostling for, you know, to be like the lead author'.*

English literature participants also noted that there has been an increase in pressure to collaborate, even though it may not be a natural activity for them, and that collaborations with non-academic institutions were increasing, such as *'recently we've had a lot of impetus to do collaborations with non-academic institutions to work with museums and libraries and that kind of breed of industry'* and *'some of the [European] frameworks are interested if you do a collaborative bid across institutions'*.

Collaboration and joint authorship is not common in the Philosophy discipline. It was noted that more collaboration occurs on edited collections, for example *'you'll get more co-editorship perhaps where two people have run a conference or seminar'*. Where collaboration does occur authors are usually listed alphabetically, but it was noted that this practice is changing, with a feeling that *'it's becoming I think more like science where I think the order of names is deemed to suggest something about the contribution to the paper, so I think people will now say pay attention to this more than they did ten years ago'* and *'That maybe is a result of RAE type pressures'.*

6.2. Citation practice

6.2.1. Influence of journal editors/reviewers on citation behaviour

The influence of journal editors and reviewers on citation practice was raised by almost all the focus group and interview participants. Although this was not always seen as a negative influence, in some cases participants thought it was extremely helpful to be given suggestions of areas to cover and authors to cite, others did feel that the suggestions tended towards articles from that journal, or they could work out that references suggested were those of the reviewer.

The majority of focus group and interview participants said that the journal requirements would influence the number of citations included in an article. Differences across the disciplines were discussed amongst focus group and interview participants, for example in some subject

disciplines the high impact peer reviewed journals have a very strict word limit which would reduce the number of references that could be included. Participants in the Physics focus group discussed how, as well as being restricted by the number of references, they would also try to cite work that is published in high impact journals.

Participants discussed the perceived pressure from journal editors/reviewers in the US to cite American work. Although focus group and interview participants thought this tendency to cite within counties was evident in other countries, it was felt that this was particularly acute in the US.

6.2.2 Citation strategy

Motivations to cite other's work discussed by the focus group participants include the demonstration of knowledge and to acknowledge work previously undertaken. To corroborate an argument, to acknowledge colleagues and to justify a study were also mentioned by some participants. Participants also discussed the use of footnotes as an alternative to referencing, which can be useful when writing for a journal that has a strict word count,

Other, more tactical, motivations for citing include tailoring citations to meet journal requirements and to demonstrate poor work. Many of the focus group and interview participants said that they would tailor their citations to increase the chance of having their article accepted for publication in a journal; this would include citing articles published by the journal they are submitting to, or even leaving out references if they think this may improve their chances.

Participants discussed motivations for citing and one aspect was the citing of work or articles which they disagreed with, or thought was bad work. Their motivations for this included exposing poor work, providing a justification for further work or studies in a particular area, and to put forward a controversial or extreme idea. With regard to citation counts, participants had begun to question this practice as they felt it may lead to people getting credit for undertaking poor work or producing badly written articles. Participants in the Philosophy and Politics focus groups discussed the notion of developing a tactical approach to raising your number of citations by adopting a practice of writing very controversial articles.

6.2.2. How accessibility influences citation

Participants of seven of the focus groups specifically mentioned access and accessibility as an influencing factor in what they cited, with a heavy emphasis on the convenience of online access to journals, reports, databases (such as Endnote, to find and cite work) and 'quality' websites. Several admitted that if a journal wasn't available online it was unlikely they would cite it.

Participants thought that subscription costs could influence what they cite, for example not being able to access a journal because an institution would not pay for it, and mention was made of open access, but, surprisingly, not in great depth by any of the focus group participants.

6.3. Research assessment

6.3.1. Institutional interpretation of research assessment

Institutional interpretation of research assessment emerged as a significant issue for many participants of the focus groups. This may manifest itself as pressure to produce RAE submissable outputs, *'I find it depends how aggressively your university was in the RAE … and those who really wanted to rise up the ladder, pressure's on'* (Nursing & midwifery) and *'there are internal pressures in the organisation that really says, you know we do have to be pushed to publish you know things that are going to score much higher in the RAE'* (Cancer studies).

Institutional interpretation of research assessment may also be apparent in understanding of the Panel's requirement, for example, *'you've got the panel think but then you've got what the institution thinks whether they are going to put you forward or not. So there's two games to play if you know what I mean. There's a lot of politics in it'* (Biomolecular chemistry) and *'there is a difference between your research output and what you necessarily indicate in RAE. Because you can play a different game'*. Other participants also were restrained in their submission of practice outputs, 'I *wasn't sure how my practice might be perceived in terms of how it was documented and validated and so I held back putting the practice into … submission'* and *'I had a colleague who solo performance practice really … I think in the end she submitted a very traditional piece because she thought that was safer'* (Dance, drama, performing arts & music). Many participants discussed the importance of the impact factor of journals (and their institution's expectation that these journals would be targeted for publication), despite many of the Panels' indications that this would not be a factor in their assessment of the quality of an output.

Some participants highlighted institutions' decisions over which Unit of Assessment they should be entered into as an area of difficulty, for example, *'the idea was that … we were going to go in Social Work and so I published a couple of things which they would've gone in … so I made those decisions, then they changed their minds a year before the deadline … and they were going to create a Sociology unit and I mean it's daft, if we'd known that the three of us who went into sociology as social psychologists we could've been publishing in Sociology journals'* (Psychology).

Other participants felt that institutions were influenced by research assessment, leading to a reluctance in allowing scholars freedom to develop into new areas of thought, *'that is actually an institutional constraint which is put on from the universities, a mass pressure to stay within your field of expertise'* (Politics) because they do not want to lose publications as the researcher spends time embedding themselves into a new strain of work.

English literature participants also identified that research assessment directly influences the decisions made by institutions and this permeates to individual scholars and their research activities, such that *'unfortunately the RAE categories and decisions are, at least to my institution, permeating decisions that they make about research activity and about the way the research leave and their increasingly looking for publications, RAE publications'* and *'quite active research which is not hitting the top bracket within the RAE is now being questioned and they've even gone so far as saying that possibly they're going to down-scale their resources for research and other certain, you know, standing, as an international standing. So they are*

importing, at least in my institution, they are a criteria to them. In a sense effectively monitor people's research and parts of their careers'

There are also fears that innovative work will also be affected by this, for example,

> *'I also have colleagues in creative writing who are bringing a really innovative sonnet books, massive reviews they're getting, get to the top. It's so innovative, they just don't know what to do with it', 'I have colleagues who run prison reading groups and publish on it, you know prison newsletter and the impact of that is probably quite significant' and 'it's a huge impact on, you know sort of, a scholarly and out reach kind of publication which isn't top RAE'. One participant expressed the view that 'I just think that it is kind of distorting more people'.*

Ultimately it was perceived by some participants that *'It depends how prescriptive institutions are'* and *'it depends how draconian our employers choose to be on these things'* (Economics).

One of the most common perceptions amongst the focus group/interview participants is that the research assessment exercise is a game and that academics are forced into this game playing in relation to their citation practices. Although the participants felt that 'game playing' seems to be an acknowledged practice among many subject disciplines, feelings about this are generally negative. As one Economics participant stated, *'One may not like the game, but you know, we're on the playing field'* and there is *'a game to play in terms of getting a good rating and then there is doing research … they do their research and they just ensure that they have got sufficient trump cards to play whatever game in terms of on the day'.* (Computer science & informatics)

Some participants talked about the development of citation strategies within institutions and expressed concerns that citation models within subject disciplines will differ, which could have a positive or negative affect on citation counts. For example, it was felt by Philosophy focus group participants that whereas their discipline tends to include only a few citations, other disciplines – such as medical science - can produce papers with up to six times as many citations. Participants in the English literature focus group said that they do not necessarily produce outputs which contain literary theory, and they felt that the convention for publishing and citing seems to be derived from a social science background rather than humanities. Related to this, participants in the Dance, drama, performing arts & music focus group felt that, as a practice-led discipline, they may be put under pressure to produce outputs which can be cited, but are not necessarily appropriate for their discipline. Examples were given of adding references to exhibition catalogues or performance programmes, which participants felt were unnecessary and unwanted by the audience but perceived as important for research assessment.

The transfer of knowledge was also discussed in relation to how institutions may perceive the quality of research and thus citations. Participants from the Dance, drama, performing arts & music focus group talked about citing blogs and clips on YouTube which could reach a huge audience, but may not be perceived as being important in terms of a quality citation.

6.3.2. Reaching the audience vs. research assessment requirements

Many participants discussed the difficulty in writing for their target audience and meeting institutional requirements for RAE submissions,. In Nursing & midwifery, outputs of importance

to the research community are varied, and there was an acknowledgement amongst participants that they write for many audiences, for example

> *'we obviously write for several audiences. The practice audience is hugely important because obviously all the research we do really, ultimately that should be our main priority in terms of influencing how nursing is practised, but then there's also the influence on fellow researchers and our peers in terms of our work influencing maybe what others might go on to do or actually building up evidence and knowledge around nursing. So you write for both'.*

Some participants in Cancer studies felt that conference presentation was important due to the speed with which outputs can be disseminated but felt this did not meet institution RAE requirements, thus *'in cancer when you're looking at things like technical innovations or professional practice development where it moves very, very quickly in our field. You know if you send something to a journal it does take two years perhaps before you even get things to print. It's almost like it's printed and it's out of date because people are reading it and saying, well we did that like a year ago! … What you're doing is hitting your audience at the point, probably when they can then take that and use that in their practice at a more appropriate point. I don't know how that fits with the university'.*

Conferences for some aspects of Cancer studies were also seen as particularly useful for small, specific subject areas which struggle to get published in high impact peer reviewed journals.

Participants also identified difficult choices in disseminating research to the people who need to read it and satisfying their institution in light of research assessment requirements, for example *'there's a real dilemma there, so you're trying to reach as many people as you can because they're the ones that are going to implement your practice'* and *'the value of research for me is giving something back to the professional community that I know they're going to use and take in to practice and can move that forward'.*

With regards to citation practice, participants of the Psychology focus group discussed how 'trade' journals often do not require academic references, so if producing an output for a wider audience (i.e. rather than a peer reviewed journal) the tendency would be to cite less or not at all.

Other participants talked about the influence of their 'audience' and how this might in turn influence citation behaviour. There appears to be a conflict between what the audience wants or is perceived to want, and what research assessment may require. An example was given by a participant of the Dance, drama, performing arts & music focus group relating to the production of a play and performance programmes where the inclusion of discussion and references may be perceived as good practice in terms of research assessment but is not required - or wanted - by the audience.

A participant of the Computer science & informatics focus group thought that rather than publishing in a journal that would be the best audience for a paper, they prefer to target journals of a high impact factor, or that are widely read because this would be better in terms of research assessment.

Tension between the most appropriate output type and the need to produce peer-reviewed journal articles is also discussed in section 6.1.3 Intellectual honesty and freedom and 6.1.5 What scholars view as important vs. outputs submitted to research assessment.

6.3.3. Research lifecycle

The research 'lifecycle' was discussed by several of the focus groups and interview participants, in particular, the lead-in time taken to recognize (and therefore cite) an output. Examples included monographs which, according to participants in the English literature focus group, could take two or three years after they are published before they are likely to be cited, and perhaps around seven years before they would be recognized as an important piece of work. Other examples included a performance, which a participant of the Dance, drama, performing arts & music focus group suggested could take up to 20 years before being recognized; and an example from a participant of the Physics focus group who experienced difficulties getting work published (and therefore cited) in the early development stages of an instrument because of a lack of understanding or belief in the work. Another lifecycle issue raised was that of version control; participants of the Computer science & informatics focus group talked about the difficulty of publishing work that is from a rapidly changing environment (i.e. technology) – by the time a monograph or a peer reviewed article is published there is a good chance that the technology discussed has moved on and may be out of date.

Other lifecycle issues discussed amongst several focus groups and interviews were the conflict between the value of recognizing and citing older work (published in the 1970s, for example) and the pressure to come up with something new to cite more recent work. It was felt that the past should not be forgotten.

Further conclusions and recommendations can be seen in the overarching report which draws together the findings of all four strands of work undertaken for this project.

Appendix 1: Focus group profile

Biomolecular chemistry

A total of two participants took place in the focus group, one female and one male. Both considered themselves to be mid career researchers. The occupation of the participants included one academic (full time) and one research/academic (part time).

Participants were asked to indicate the subject area of their study, research or work, to specify whether their Department submitted to the RAE 2008 and if so, to state whether it was submitted either under the same or a different subject area:

Main area of study/research/work	RAE 2008 submission
Nutrition and Human biology	Dietetics and biological sciences
Biophysical chemistry	Chemistry

Cancer studies

A total of five participants took place in the focus group. Three female and two male. Two out of five participants identified themselves as early career researchers, one as a mid career researcher and two as established researchers. The occupation of participants included three research staff (full time) and two academic staff (full time).

Participants were asked to indicate the subject area of their study, research or work, to specify whether their Department submitted to the RAE 2008 and if so, to state whether it was submitted either under the same or a different subject area:

Main area of study/research/work	RAE 2008 Submission
Cancer research/ studies	Cancer studies
Allied health	Allied health
Theoretical and physical chemistry and life science, spectroscopy, structural biology	Chemistry
Professional development of therapy radiographers	Allied health
Cancer, childhood leukaemia lymphoma immuno-genetics	Cancer studies

Computer science & informatics

Six participants took place in the focus group, one female and five male. Participants identified themselves to be one early career researcher, two mid career researchers and three established researchers. The occupation of the participants included five research/academic staff (full time) and one research staff (full time).

Participants were asked to indicate the subject area of their study, research or work, to specify whether their Department submitted to the RAE 2008 and if so, to state whether it was submitted either under the same or a different subject area; no participants indicated whether this was the case:

Main area of study/research/work
Computing and mathematical sciences
Computer science (3 participants)
Computer science- Virtual reality and serious games
ICT Ethics, Social responsibility, professionalism, technology assessment

Dance, drama performing arts & music

Eleven participants took place in the focus group, three female and eight male. Two participants identified themselves as early career researchers, five as mid career researchers and four as established researchers. The occupation of the participants was academic staff (ten full time and one part time).

Participants were asked to indicate the subject area of their study, research or work, to specify whether their Department submitted to the RAE 2008 and if so, to state whether it was submitted either under the same or a different subject area; no participants indicated whether this was the case:

Main area of study/research/work
Drama\performance\anthropology
Dance, drama and performance (2 participants)
Art + design [theatre sub panel]
Shakespeare and gesture, movement analysis in performing arts; modernist performance
Music
Drama- screen studies
Dance
Music (musicology)
Screen studies/ Film music
Drama

Economics

A total of five participants took place in the focus group, four female and one male. All five participants identified themselves as established researchers. The occupation of participants included two research staff (full time), two academic staff (full time), and one research/academic staff (part time).

Participants were asked to indicate the subject area of their study, research or work, to specify whether their Department submitted to the RAE 2008 and if so, to state whether it was submitted either under the same or a different subject area:

Main area of study/research/work	RAE 2008 Submission
Economist, running multi disc research centre for ESCR	Economics
Economics/econometrics	Submitted but not sure
Economic history of movies	Economics and business and management
Micro-economic theory	Economics and econometrics
Economics of innovation of growth and productivity	Economics and business and management

English literature

Ten participants took place in the focus group, eight female and two male. Three out of ten participants identified themselves to be early career researchers, three as mid career researchers and four as established researchers. The occupation of participants included one research staff (full time), seven academic staff (full time), and two research students (one full time and one part time).

Participants were asked to indicate the subject area of their study, research or work, to specify whether their Department submitted to the RAE 2008 and if so, to state whether it was submitted either under the same or a different subject area:

Main area of study/research/work	RAE 2008 Submission
Renaissance drama, English	English
English literature and Cultural history	English literature
18th and 21cent literature and cultural	English
Travel writing on the middle east	Submitted but not stated
Popular culture/ Gender studies	Media/cultural studies
Dickens, Victorian Empire, Race and culture	English language and literature
English literature	English (some Dept staff were submitted under European studies or Art and design)
The use of Shakespearean text in anthologies	English
20th cent literature, gay studies	English
English literature	English

Nursing & midwifery

Eight participants took place in the focus group all of whom were female. Two participants identified themselves as early career researchers, one as a mid career researcher, four as established researchers and one ‘other’ but did not give details. The occupation of participants included three research staff (full time), five academic staff (four full time and one part time).

Participants were asked to indicate the subject area of their study, research or work, to specify whether their Department submitted to the RAE 2008 and if so, to state whether it was submitted either under the same or a different subject area:

Main area of study/research/work	RAE 2008 Submission
Health professional competence, applied genetic	Nursing and midwifery (Dept also included a submission to Social policy)
Midwifery, Pharmacy	Nursing and midwifery
Nursing	Nursing and midwifery
Nursing and midwifery/Mental health	Submitted but not stated
Nursing, Interprofessional working	Nursing, Allied health, Epidemiology
Nursing, Sociology, Social Science, Mental Health	Nursing
Education/Midwifery	Nursing and midwifery
Urgent care	Nursing and midwifery

Philosophy

Nine participants took place in the focus group, four female and five male. Three participants identified themselves as early career researchers, two as mid career researchers, two as established researchers, one as an early/mid career researcher and one identified themselves as 'other' having recently returned to work after a career break. The occupation of participants included two research staff (full time), two academic staff (full time), and five research/academic staff (four full time and one part time).

Participants were asked to indicate the subject area of their study, research or work, to specify whether their Department submitted to the RAE 2008 and if so, to state whether it was submitted either under the same or a different subject area:

Main area of study/research/work	RAE 2008 Submission
Philosophy (3 participants)	Philosophy
Philosophy and psychology	Philosophy
Philosophy of science, Epistemology, metaphysics	Philosophy
Bioethics	Law
Medical ethics, Philosophy of education	Philosophy of education
Philosophy of action	Computer science
Ethics, medical ethics, philosophy and genetics	Not sure

Physics

Ten participants took place in the focus group, two female and eight male. Four participants identified themselves as early career researchers, two as mid career researchers, three as established researchers and one 'other', who was retired (but with research responsibilities). The occupation of participants included four research staff (full time), three academic staff (full time), research student (full time) and two 'other (one retired and one Emeritus Professor).

Participants were asked to indicate the subject area of their study, research or work, to specify whether their Department submitted to the RAE 2008 and if so, to state whether it was submitted either under the same or a different subject area:

Main area of study/research/work	RAE 2008 Submission
Radio/Survey astronomy	Physics, Astronomy
Physics/ Plasma physics	Physics
Physics	Physics
Condensed matter/ chemical physics	Physics
Astronomy	Physics
Musical Acoustics (Physics)	Physics
Laser Physics, spectroscopy, environmental physics, chemical physics	Physics
Soft Condensed Matter (Physics)	Physics
Soft Matter & biological Physics	Physics
Astronomical instrumentation	Physics

Politics

Ten participants took place in the focus group, five female and five male. Five out of ten participants identified themselves as early career researchers, one as a mid career researcher, three as established researchers and one as an early/mid career researcher. The occupation of participants included nine academic staff (full time), and one research student (full time).

Participants were asked to indicate the subject area of their study, research or work, to specify whether their Department submitted to the RAE 2008 and if so, to state whether it was submitted either under the same or a different subject area:

Main are of study/research/work	RAE 2008 Submission
International Politics	Politics
Political Theory	European studies
Politics, Democratic Development	Submitted but not sure
Political Economy	Politics
Politics (peace and conflict studies)	Politics
Political Theory, Environmental politics	Politics
Political Philosophy	Politics and International studies
Social Theory, EU Governance, Public policy	Politics
International Relations theory, security, European politics	European studies
US Foreign and Diplomacy relations	Politics and International relations

Psychology

Six participants took place in the focus group, four female and two male. Three out of six participants identified themselves as early career researchers, two as mid career researchers and one as an established researcher. The occupation of participants included one research staff (full time), three academic staff (full time), two research student (full time).

Participants were asked to indicate the subject area of their study, research or work, to specify whether their Department submitted to the RAE 2008 and if so, to state whether it was submitted either under the same or a different subject area:

Main area of study/research/work	RAE 2008 Submission
Clinical Psychology	Submitted but not stated
Applied psychology in health/organisational areas	Sociology
Psychology of critical occupations and of disaster	Psychology, also to Social Policy
Psychology-Visual Perception	Submitted but not stated
Female bodies in organisations	Sociology
Cognitive Psychology	Psychology

Appendix 2: Focus group and interview script

Publication and dissemination behaviour of researchers
Focus Group schedule

Introduction

The HEFCE put out a consultative document on their proposed REF in late 2007. The replies were analysed in early 2008. The key areas of concern were:

- The proposal of two different methods of assessments, one for the science-based subjects and one for the rest, (arts, humanities, social science, mathematics and statistics)
- The removal of peer assessment panels and the reliance on bibliometrics in the science-based group
- The identification of suitable metrics-based indicators to adequate measure quality
- The assessment of multidisciplinary subjects that spanned the two different assessment methods
- The lack of any assessment on the ramifications of the new process, such as the effect on early career researchers (ECRs)

Following a consultation period, the HEFCE is now proposing a more unified framework with a combination of peer review and a mixture of metrics-based indicators such as bibliometrics, used where appropriate for each subject group under assessment.

HEFCE has announced a new schedule, allocating a year extension to the design of the REF in order to sort out and agree revisions to the framework; but they remained committed to the REF being in place in 2014 for use in the allocation of funding in 2015.

As part of this extension of the REF design phase, HEFCE have started their pilot study of the proposed bibliometric indicators involving 22 universities. They have also held a workshop to consider how to measure the user-valued component of research. This is part of their intention to “develop proposals for other aspects of the REF across all subjects” and identify metrics for use with the varying and different subject groups.

The aim of this focus group is to establish a further base of evidence as to how research assessment influences researchers’ behaviour in the areas of publication, dissemination and citation, which will be used to inform those participating in the design and development of the REF about its potential impact on researchers’ behaviour and on the development and take-up of new modes of scholarly communications and of research information services.

Go round table to introduce ourselves

DISSEMINATION

A major area of interest to this study is the publication and dissemination behaviour of researchers. Thinking specifically about dissemination we would like to discuss with you motivations, incentives and constraints that you to publish and disseminate your work in

different ways, and how you address issues such as multi-authorship and cross-discipline dissemination.

10.10-10.25

Q1 What are the main research outputs in your area of research (this does not necessarily need to be published outputs, but might include pre-prints, blogs, conference papers, performances, exhibitions etc) and what is important? (e.g. speed of communication, depth of communication, as wide as reach as possible etc.)

Q1a Thinking in terms of recognition and reward which are the most important outputs to you? AND ….. to your institution? AND …to your research community?

Q1b In terms of getting your research message 'out there' are these research outputs the same as those that are important for recognition and reward?

Q1c Do you feel that there are factors external to your research/disciplinary community that influence your dissemination practices?

Q2 Thinking about the cultural practices and discipline norms for your subject discipline, what do you do when you collaborate on multi-author works?

P2a For example, in terms of the order of authors?

P2b How are different norms handled across disciplines?

P2c How are different norms handled across different institutions?

Q3 In what ways do you feel that your dissemination behaviour is influenced by Research Assessment now?

Q4 Do you think that it is likely that you will change your dissemination practices if the REF (or a similar form of assessment) was implemented?

CITATION

Of course REF is also likely to have an impact on citation practices, and again we would like to build up a picture of what your current citation practices are before moving on to discuss your perceptions of the possible influence (e.g. steering effect) of the REF (or any alternative forms of assessment that looks and feels similar to the REF.

Q5 What are the citation practices in your research area? (what are the norms - do you feel under pressure to keep to traditional outputs, such as articles, books, conference proceedings, rather than pre-prints, open access etc.).

Q5a Is it the norm to cite many references in order to corroborate your arguments, or are just a few key references sufficient?

Q5b What types of outputs do you cite?

Q5c Do you feel that there are factors external to your research/disciplinary community that influence your citation practices?

Q6 What are your main motivations for citing other authors? (to demonstrate depth of knowledge in a particular field; to acknowledge the work of others; as a dissemination activity).

Q7 Do editors or institutions influence scholars' citations?

Q7a When preparing to publish in a journal, have you noticed any influence from the journal editors as to who, how, and which version you cite? Does your institution recommend or give guidelines regarding citation?

Q8 In what ways do you feel that your citation behaviour is influenced by Research Assessment now?

Q9 Do you think that it is likely that you will change your citation practices if the REF (or a similar form of assessment) was implemented?

Q10 Are there aspects of how the REF may influence the types of outputs you produce, the ways in which you disseminate them and how you cite other authors that we have not covered, but you feel is an important issue?

About the Research Information Network

Who we are
The Research Information Network has been established by the higher education funding councils, the research councils, and the national libraries in the UK. We investigate how efficient and effective the information services provided for the UK research community are, how they are changing, and how they might be improved for the future. We help to ensure that researchers in the UK benefit from world-leading information services, so that they can sustain their position as among the most successful and productive researchers in the world.

What we work on
We provide policy, guidance and support, focusing on the current environment in information research and looking at future trends. Our work focuses on five key themes: **search and discovery, access and use of information services, scholarly communications, digital content and e-research, collaborative collection management and storage.**

How we communicate
As an independent voice, we can create debates that lead to real change. We use our reports and other publications, events and workshops, blogs, networks and the media to communicate our ideas. All our **publications** are available on our website at **www.rin.ac.uk**

The full report is available at **www.rin.ac.uk/communicating-knowledge** , along with these supporting papers. Hard copies can be ordered via email contact@rin.ac.uk

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