

Publishers work together to provide electronic access to authoritative publications for the Research Assessment Exercise

With the outcomes of the 2008 Research Assessment Exercise (RAE) just published, Ed Hughes, RAE Manager for the Higher Education Funding Council of England (HEFCE) and Alicia Wise, the Chief Executive of the Publishers Licensing Society (PLS) take a timely look behind the scenes describing the important contribution publishers made to simplify access to articles submitted for the exercise. An innovative partnership approach enabled free access to over 190,000 electronic journal articles for the 2008 RAE. Key project partners included HEFCE, the PLS, CrossRef, Eduserv, and a wide array of publishers.



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Introduction

The Research Assessment Exercise (RAE)¹ is an expert review project to evaluate the quality of research in UK higher education institutions (HEIs). This assessment informs the selective distribution of funds by the UK higher education funding bodies and is administered by the Higher Education Funding Council for England (HEFCE) on behalf of the Councils in England, Northern Ireland, Scotland and Wales.

The four higher education funding bodies intend to use the outcomes of the exercise to determine their grant for research to the institutions which they fund with effect from 2009/10 – over £1.5 billion per year will be allocated for research using the results of the 2008 RAE. Any higher education institution in the UK that is eligible to receive research funding from one of these bodies was eligible to participate in the exercise.

RAE submissions are made to expert panels by eligible HEIs in one or more of 67 discipline-based subject areas. The primary purpose of RAE 2008 is to produce a 'quality profile' indicating the percentage of research judged to have reached

each of a number of quality levels for each submission made by an institution. A submission contains information about the research undertaken in a unit or department including details of the research-active staff selected by an institution for inclusion in the exercise, and up to four research outputs produced by those staff between 1 January 2001 and 31 December 2007. The outputs comprise a very wide range of materials in addition to the common printed research publications, e.g. exhibitions, compositions, patents, designs, but the majority of research outputs are journal articles. The outcomes, including the funding allocated using the results, are collective rather than individual. Nevertheless, there are often perceived to be incentives (particularly in terms of career progression and status) for individuals to be included in their institution's submission.

In 2001, panel members were initially expected to find outputs cited in RAE submissions using their own library resources (most are based at UK HEIs and therefore have access to academic collections). Where an output was not available,

panel members could request these from the RAE team at HEFCE. Institutions had to be able to supply a paper copy of any output requested within three working days, or face the prospect that it would be discounted from the assessment altogether. Although the process was ultimately effective, all the key players involved in the RAE – the RAE team at HEFCE, the panel members and participating HEIs – were agreed that this system needed to be overhauled.

Improving upon the cumbersome, largely paper-based processes of the 2001 assessment exercise was the challenge presented to the publishing community during the planning stages for the 2008 RAE by HEFCE. Facilitating electronic access, without authentication barriers or onerous licence conditions, was the desired outcome.

After discussions with the Publishers Licensing Society (PLS), an enabling organization owned by UK trade associations, approval in principle was obtained from the publishing community, and work began to find some solutions.

With the 2008 RAE just published, it is timely to look behind the scenes at the choreography involved in constructing a single licence for free online access to over 190,000 full-text journal articles.

Method and challenges

So much for the plan: what about the implementation?

It fell to PLS² to broker a deal to allow fee-waivers and direct access to publisher content, and to co-ordinate the project on behalf of publishers while working in close partnership with HEFCE. The PLS is a non-profit organization representing UK publishers on matters relating to collective copyright and collective licensing. PLS works with thousands of publishers both in the UK and internationally, operating with the trade associations for publishers' rights.

The content

Work began with an analysis of research outputs submitted for the 2001 exercise. These were as follows (see Table 1).

Emphasis immediately focused on access to journal articles as these accounted for 70% of the submitted research outputs in the 2001 RAE and would most readily be accessible electronically.

Output type	Number	%
authored book	14,468	7%
edited book	3,716	2%
chapter in book	23,330	11%
journal article	143,117	70%
conference contribution	7,165	3%
patent/published patent application	229	0%
software	130	0%
report for external body	1,509	1%
confidential report for external body	129	0%
Internet publication	605	0%
Internet publication (via subscription only)	119	0%
performance	924	0%
composition	763	0%
design	1,052	1%
exhibition	3,840	2%
artefact	959	0%
scholarly edition	758	0%
other form of assessable output	2,482	1%
Total	205,295	100%

Outputs were classified by the submitting HEI according to a prescribed list of output types.

Table 1. Research outputs submitted for the 2001 RAE by type

However, the RAE team was acutely aware that in some subject areas other output types would be predominant, and that in some cases these too would in theory be available electronically (for example, conference proceedings and chapters in books).

The users

RAE panel members increasingly wanted access to materials, particularly journal articles, in electronic form. They required access to the authoritative final version of an article, and not to a pre-print held, for example, in an institutional repository. However, the panel membership could not be regarded as homogeneous. In all there were about 1,000 panel members across 67 subject-based panels, covering the full spectrum of research activity from cardiovascular medicine to music. Both the nature of the outputs submitted to different panels and the way in which the panel members themselves wished to engage with the submitted material varied. To avoid over-complexity, and to limit the burden on the providers of the material, it was necessary to make some compromises. Most significantly, the decision was taken to make electronic submission of journal articles obligatory, and to collect all other printed output types in hard copy form.

Output type	Main Panel																Total
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O		
A – authored book	2	24	80	30	42	178	62	870	355	3,530	803	680	3,006	2,921	1,767	14,350	
B – edited book	0	3	23	3	0	10	20	237	77	493	64	168	795	617	485	2,995	
C – chapter in book	2	27	151	44	132	301	135	1,228	508	3,532	1,058	915	3,852	3,905	2,645	18,435	
D – journal article	15,239	8,360	11,916	16,102	16,786	11,995	17,485	7,983	15,387	13,655	13,293	1,560	4,836	4,724	3,508	162,829	
E – conference contribution	1	2	22	8	31	2,102	327	292	210	28	87	12	99	34	753	4,008	
F – patent/published patent application	15	0	19	24	24	20	97	4	0	0	5	0	0	0	33	241	
G – software	0	0	10	0	2	38	3	15	8	0	7	3	8	0	21	115	
H – Internet publication	182	216	335	259	153	563	138	204	693	384	370	52	239	312	258	4,358	
I – performance	1	0	0	0	0	1	0	2	0	0	0	0	38	0	574	616	
J – composition	0	0	0	0	0	0	0	1	0	0	4	0	19	0	713	737	
K – design	0	0	0	0	0	0	0	128	0	0	0	0	0	0	326	454	
L – artefact	0	0	0	0	0	3	0	7	0	0	0	0	0	0	710	720	
M – exhibition	0	0	0	0	0	19	0	11	2	6	0	0	2	1	2,651	2,692	
N – research report for external body	3	37	123	17	15	8	39	109	131	391	265	12	8	4	119	1,281	
O – confidential report (for external body)	0	1	7	2	3	2	9	2	2	3	5	0	2	1	20	59	
P – devices and products	0	0	0	0	0	2	3	0	0	0	0	0	2	0	39	46	
Q – digital or visual media	0	0	0	0	0	4	1	6	0	4	2	0	18	2	644	681	
R – scholarly edition	0	0	0	0	0	0	0	5	17	9	0	22	339	142	78	612	
S – research datasets and databases	0	2	0	0	0	2	0	1	12	0	7	5	40	29	34	132	
T – other form of assessable output	3	1	9	3	1	6	11	38	90	67	10	6	169	106	504	1,024	
Total	15,448	8,673	12,695	16,492	17,189	15,254	18,330	11,143	17,492	22,102	15,980	3,435	13,472	12,798	15,882	216,385	

Table 2. 2008 RAE submissions showing submission types by panel.

The subject coverage for each panel is described at <http://www.rae.ac.uk/panels/>. This table shows that over 50% of all conference contributions submitted to the exercise were sent to Main Panel F (which includes computer science) whilst the most diverse array of output types were submitted to Main Panel O. For all the Main Panel areas from A–E (which cover the medical, biological and physical science disciplines) at least 90% of submissions were from journals. In panels L – O (which cover the humanities and arts) books and chapters were more significant.

HEFCE³, as the organization which administers the RAE, also had an interest in finding a more streamlined approach to this. The system in 2001 was so heavily used that it compromised HEFCE's own postal systems. The move to electronic provision supported this interest, as did the decision to collect all other outputs from institutions and store them in a dedicated RAE repository on a different site from the HEFCE offices. As Table 2 (on p. 62) shows, the focus on journal articles was justified as overall 75% of outputs submitted were of this type, indicating a further shift towards this medium of dissemination.

The technology

Various technical challenges related to facilitating electronic access were explored, and – through collaboration with CrossRef and Eduserv – solved. This meant that it was possible for RAE panel members to access full-text electronic content directly from publisher websites. HEIs were required to provide the digital object identifiers (DOIs) alongside other bibliographic information to HEFCE, which then populated a secure data collection system with links to full text via CrossRef DOIs. This required changes to the design of the RAE data collection system, with the provision of a specific field for the DOI of journal articles, and a facility for HEIs to check DOIs against the CrossRef database. A virtual Athens organizational ID was established for the RAE, and publishers added this information into their customer records. This allowed HEFCE's systems team to automatically download the full text of the vast majority of those outputs which were provided via the DOI. CrossRef and Eduserv kindly provided these services at no cost to publishers or HEFCE. Where DOIs were not available, institutions had to provide a scanned PDF of the full text of the output. These PDFs were added to the database of output captured via the DOI, and then made available to the relevant panels via a secure website and a specific CD/DVD.

The higher education institutions

The process employed in the 2001 RAE of providing outputs at three days' notice was very inconvenient for HEIs. It required each HEI to have some type of temporary repository for RAE outputs and someone on standby to respond to requests from panels throughout the assessment phase. Informal consultation with institutional

RAE contacts indicated that there would be a preference for collecting some material electronically, and for collecting all submitted output at the beginning of the assessment phase and returning it to HEIs once the exercise was completed. Institutional familiarity with DOIs was relatively limited, and there were numerous queries about identifying and resolving DOIs to the RAE team in the lead-up to the submission deadline. Learning about how DOIs work was undoubtedly an additional challenge that those responsible for RAE submissions in University administrations needed to overcome during their preparations for the exercise.

The licence

There were several unique features of this licence: it was a publisher-focused collective licence; it provided access to works published internationally (although all the authors were based in the UK); it facilitated electronic access to full-text content controlled on publishers' sites.

The licensed material was accessible only to RAE panel members and to HEFCE staff administering the RAE, the works were made accessible only for the purposes of conducting the RAE, and it was agreed that all text would be deleted from the data collection system at the end of the exercise. PLS has the right to audit the deletion of materials from the data collection system. The exercise will formally end in June 2009, by which time the submissions made by HEIs, including the bibliographic details of the outputs cited, will be made publicly available.

Book, journal and magazine submissions which are not accessible in an electronic format were also needed by RAE panel members. For this reason HEFCE also needed the right to authorize universities to photocopy or scan the full text of submissions for deposit in the RAE repository. Although university staff (often librarians or research administrators) did the photocopying or scanning, the universities were not authorized to retain a copy or to store copies in any way, including in institutional repositories.

The licence negotiated between HEFCE and PLS was free of charge and issued by the Copyright Licensing Agency (CLA). No fee was charged despite the fact that it has value for HEFCE in significantly saving administrative costs. This reflects the fact that photocopied works underpinned previous RAEs at no cost under a 'gentleman's

agreement' between HEFCE and publishers, and also the value to the publishing industry in demonstrating that it can work collaboratively to provide extremely innovative licensing and access solutions.

To grant such an international licence, PLS minimized its risks in the following ways:

- no new precedent was set for photocopying rights as there had been a 'gentleman's agreement' in place to underpin previous RAEs
- in order to scan from print, at least one university had to purchase original work
- wide dissemination of the news to the publishing community through international trade associations and CrossRef
- for digital access to works behind authentication barriers, the participating publishers needed to opt-in by voluntarily adding an RAE account into their authorization modules
- large multinationals had seen the licence in advance and approved it.

The publishers

As one would expect, building momentum was a challenge and early endorsement by influential organizations played a critical role in the success of this project. In particular, support from the Association of Learned and Professional Society Publishers, the Publishers Association, the International Publishers Association, and the International Association of Science, Technical, and Medical Publishers was essential. Early adopters also played a critical role and these publishers included Blackwells, the British Medical Journal, Cambridge University Press, Elsevier, the Institute

of Physics Press, Oxford University Press, the Royal Society of Chemistry, SAGE, Taylor & Francis and John Wiley & Sons.

PLS first approached a senior publisher in each company. This sometimes led to immediate 'in principle' approval, but more often triggered the start of careful internal discussion within the company. Most of the larger publishers carefully considered the background to the agreement and reviewed the full text of the licence prior to committing themselves. Many publishers consulted with their trade bodies, and sought additional information from the PLS. A number of international publishers sought a deeper understanding of the purposes of the RAE and the detail of the process itself, which was provided by the RAE team.

Translating an agreement in principle into action occasionally proved challenging. Different teams within each publishing company needed to take action. For example, sales teams added the RAE account into their customer databases, and technical teams liaised with HEFCE over authentication arrangements – especially if they did not use Athens – and also resolved any out-of-date DOIs. A very small number of publishers preferred to have a direct agreement with HEFCE rather than participating under a collective licence, and in these cases legal teams drafted bespoke agreements. Larger commercial publishers consulted with the learned societies for whom they publish to gain support for the inclusion of titles. Much of this action happened quite naturally, but a certain amount of chasing was required by PLS and HEFCE teams, who were assisted in this task by John Cox Associates.

Table 3. Publishers who provided electronic access for the 2008 RAE

Acoustical Society of America	American Chemical Society
AEAweb	American College of Chest Physicians
Alexandrine Press	American College of Sports Medicine
Allen Press	American College of Veterinary Pathology
Alliance Communications Group	American Dairy Science Association
AlphaMed Press	American Diabetes Association
American Academy of Neurology	American Geophysical Union
American Accounting Association	American Heart Association
American Association for the Advancement of Science	American Institute of Aeronautics and Astronautics
American Association for Cancer Research	American Meteorological Society
American Association for Clinical Chemistry	American Physical Society
American Association on Intellectual and Developmental Disabilities	American Phytopathological Society
	American Psychiatric Association

American Psychological Association	Duke University Press
American Physical Therapy Association	Ecological Society of America
American Physiological Society	EDP Sciences
American Public Health Association	Elsevier
American Society of Agronomy	Emerald
American Society of Animal Science	Endocrine Society
American Society for Biochemistry and Molecular Biology	Environmental Health Perspectives
American Society for Bone and Mineral Research	EPP Publications
American Society for Pharmacology and Experimental Therapeutics	Equine Veterinary Journal
American Society for Cell Biology	Equinox Publishing
American Society of Civil Engineers	European Respiratory Society
American Society of Clinical Oncology	Faculty of Family Planning and Reproductive Health Care
American Society of Hematology	Faculty of General Dental Practice
American Society for Investigative Pathology	Federation of American Societies for Experimental Biology
American Society of Nephrology	Genetics Society of America
American Society of Plant Biologists	Geological Society of America
American Speech Language Hearing Association	Geometry & Topology Publications
American Thoracic Society	Guilford Press
American Veterinary Medical Association	Harvard Business
Annals of Family Medicine	Health Affairs
Annual Reviews	HFSP Publishing
Applied Probability Trust	Hindawi Publishing
Association for Computing Machinery	Histochemical Society
Association for Research in Vision and Ophthalmology	Hogrefe and Huber Publishing Group
Association for Symbolic Logic	Human Factors and Ergonomics Society
Atlantis Press	Humana Press
Australian Academic Press	IEEE
Austrian Academy of Sciences	IFP
Baywood Publishing Company	Inderscience Publishers
Beech Tree Publishing	Indiana University Press
Berkeley Electronic Press	Institute for Operations Research and the Management Sciences
Berg	Institution of Chemical Engineers
Berghahn Journals	Institution of Engineering and Technology
BioMed Central	Institute of Mathematical Statistics
BioOne	Institute of Physics
Blackwell Publishing	intellect
BMJ Publishing Group	International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers
Brill	International Association of Hydrological Sciences
British Institute of Non-Destructive Testing	International Society of Diabetes and Vascular Disease
British Institute of Radiology	Inter-Research
British Psychological Society	International Union of Crystallography
CABI Publishing	IWA Publishing
Cambridge University Press	Japan Society of Mechanical Engineers
Canadian Academic Accounting Association	John Benjamins Publishing Company
Canadian Medical Association	John Wiley & Sons
CFA Institute	Journal of Bone and Joint Surgery
Channel View Publications	Journal of Clinical Investigation
Cleft Palate-Craniofacial Journal	Journal of Marine Research at Yale University
Cold Spring Harbour Laboratory	Journal of Orthopaedic and Sports Physical Therapy
Commonwealth Forestry Association	Journal of Rheology
Company of Biologists	J-Stage
Cornell University Library	JSTOR
CSIRO Publishing	Karger
de Gruyter	

Lawrence Erlbaum Associates	Royal Society of Chemistry Publishing
Learned Publishing	Royal Society of Medicine Press
LibraPharm	SAGE Publications
Linköping University Electronic Press	E. Schweizerbart Science Publishers
Lippincott Williams and Wilkins	Scientific Electronic Library Online
Logical Methods in Computer Science	Scientific World
London Mathematical Society	M.E.Sharpe
Maney Publishing	Social Science Research
Mary Ann Liebert	Society for Applied Spectroscopy
Massachusetts Medical Society	Society for Endocrinology
Mineralogical Society	Society of Environmental Toxicology and Chemistry
MIT Press	Society of Exploration Geophysicists
Multilingual Matters	Society for General Microbiology
Multi-science	Society for Industrial and Applied Mathematics
National Library of Serbia	Society for Information Display
National Research Council of Canada	Society for Leukocyte Biology
Nature Publishing Group	Society for Neuroscience
Neoplasia	Society for Nuclear Medicine
Oldenbourg	Society for Reproduction and Fertility
Oncology Nursing Society	Society for the Study of Reproduction
Optical Society of America	SPIE Digital Library
Oxford University Press	Springer
Palgrave Macmillan	Symposium Journals
Pharmaceutical Press	Taylor & Francis Group
Physica Scripta	Thomas Land Publishers
Physiological Society	Thomas Telford Journals
Pion	Turpion
Policy Press	UBC Press
Portland Press	University of California Press
Proceedings of the National Academy of Sciences	University of Chicago Press
Professional Engineering Publishing	University of Michigan
Project MUSE	University of Wisconsin Press
Public Library of Science	Vathek Publishing
PubMed	Westburn Publishers
Radiology	White Horse Press
Rockefeller University Press	Wolters Kluwer Health
Royal College of Surgeons	Woodhead Publishing Ltd
Royal Meteorological Society	World Health Organization
Royal Society	World Scientific

Summary

The vast majority of panels, and panel members, found the electronic provision of journal outputs beneficial in assessing the enormous amount of material associated with the RAE. However, a number of minor complications arose during the assessment phase. There were a number of panels (or individuals within panels) who were prepared to consider outputs only in hard copy form, and the RAE team therefore had to make arrangements to print physical copies of outputs from the PDFs in greater numbers than anticipated. There were also calls, from both panel members and some

institutions, to treat conference proceedings in some areas, most notably computer science, in the same way as journal articles, which would have significantly increased the complexity of the process of collecting outputs for HEIs. There were only a relatively small number of erroneous DOIs provided as there were systems in place to check the DOIs against the CrossRef database; in these cases it was relatively straightforward to ask HEIs to resupply these in scanned PDF form. Finally, there was a very small residue of journal articles which, because a publisher refused or did not respond to requests, were not available through these mechanisms, and contingency arrangements

to provide these outputs were put in place where necessary.

In summary, this innovative partnership approach enabled free access to over 190,000 electronic journal articles for the 2008 RAE and will aid the UK funding bodies in allocating funding to the HEIs. Project partners included HEFCE, the PLS, CrossRef, Eduserv, the CLA and a wide array of publishers and publishing trade associations.

The project was conceived very much as a one-off: it was for a worthy cause, and, in order to be efficient it required collaborative action by publishers. Furthermore, there were detailed technical issues to address. It does, however, seem a shame not to license the resource created through this exercise for appropriate further use. It involved so much effort by so many parties to create a unique and intriguing resource of high quality research from UK academics.

References

- 1 RAE 2008:
<http://www.rae.ac.uk/> (Accessed 26 January 2009)
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- 3 The Higher Education Funding Council for England (HEFCE):
<http://www.hefce.ac.uk/> (Accessed 26 January 2009)

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