RESEARCH MANAGEMENT SYSTEMS AS AN EVOLUTIONARY BACKWATER

A Management System for Australian University Research Quality Framework Data

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Abstract: Since 2004 the former Australian Government had been working on developing some means of measuring the quality of research from Australian universities. A recent change of Government has meant that the implementation of a Research Quality Framework (RFQ) in the form proposed by the former government will not now take place. The new Commonwealth Government made an election promise that if elected it would review this controversial plan. It did so and in June 2008 preliminary plans for a new version of the RQF, called Excellence in Research for Australia (ERA) were unveiled. One aspect of the planned RQF that will probably be retained, however, is the creation of digital repositories for storing copies of all research output at the local university level, linked with a central government repository. This paper discusses the RQF with particular reference to the creation of digital repositories and the likely RQF Information Management System.

Keywords: Research Quality Framework (RQF), Excellence in Research for Australia (ERA), information management systems, accountability, journal ranking, quality metrics.

1.   INTRODUCTION

As an example of the application of information systems in university research management, this paper considers a new research quality system that was to be introduced in Australia in 2008. In a study that investigated problems with research management systems in a number of countries, Davey and Tatnall (2007) concluded that: "To properly manage the growth of human capital a knowledge management system must inform the manager of the increase in research output, the emerging new research areas and be able to add research value by using a knowledge management system." The article noted that while the need to provide information to funding bodies cannot be ignored, an added capacity to allow researchers to locate others

with similar areas of research interest, both inside and outside their own institution, was often missing. This study showed that many such systems were slanted towards the reporting needs of funding bodies rather than genuinely contributing to the growth and quality of research outputs.

Since 2004 the former Australian Government had been working on developing some means of measuring the quality of research output from Australian universities. The system it came up with was called the Research Quality Framework (RQF) and was to be implemented early in 2008. As future research funding for each university was to be based on its RQF score, this was to be a very significant and controversial development, but a change of government at the Federal election in November 2007 changed all that.

The new government had pledged, as an election promise, to scrap the controversial RQF in its proposed form and develop a new quality measure in consultation with the university sector (Australian Government 2007b). On taking up government this pledge was honoured, and in June 2008 a consultation paper (Australian Government 2008) for the new system: Excellence in Research for Australia (ERA) was released. It is not at all clear, at this stage, exactly what ERA will be like, except that it will probably be based more solidly on some form of quality metric. One aspect of the new system that is unlikely to change from the previously proposed RQF, however, is the need to keep track of research output and manage this in such a way that it can be properly checked, assessed and made generally available. This paper discusses the originally proposed Research Quality Framework and the likely changes in any new system, concentrating on the means that could be used to manage the research output data.

2.   THE ORIGINALLY PROPOSED RQF

In May 2004 the former Prime Minister, John Howard, announced the Federal Government's intention of implementing a new Research Quality Framework for assessing research at Australian universities and other publicly funded research establishments (Howard 2004). After some work, in November 2006 the Minister of Education, Science and Training released an Australian Government document called "The Recommended RQF".

"The Australian Government seeks to ensure that public money is being invested in research of the highest quality that delivers real benefits not only to the higher education and research sectors but also to the wider community. Research conducted in universities by individuals or teams of researchers is supported by the Australian Government through a dual funding system. This system comprises:

- *Direct funding from agencies (including the Australian Research Council and the National Health and Medical Research Council) determined on the basis of competitive peer review; and*

- *University block grants which are performance based and are made up of the Research Training Scheme (RTS), IGS and Research Infrastructure Block Grant Scheme.*

The Research Quality Framework (RQF) provides the Australian Government with the basis for redistributing a significant proportion of the block funding on the basis of ratings for research quality and research impact. Currently, there is no system-wide and expert-based way to measure the quality and impact of research conducted in universities and its benefits to the higher education sector and the wider community.

The existing distribution of university research block funding is based on quantitative measures (i.e. numbers of publications, external research income and Higher Degree by Research (HDR) student load and completions) that have been used as proxies for quality. These particular quantitative measures do not provide sufficient information upon which to identify and reward areas of research excellence or to encourage the wider community to increase its investment in Australian research. Consequently, the Australian Government is committed to the development of a Research Quality Framework (RQF) that will provide a broad assessment mechanism for research quality and impact."

<div align="right">(Australian Government 2006)</div>

The basis of the RQF was to be an expert review process involving the examination of evidence from each university for the **quality** and **impact** of its research output. Researchers were to be grouped into one of the following areas:

1. **Biological Sciences**: Biochemistry and cell biology, Genetics, Microbiology, Botany, Zoology, Physiology, Ecology & evolution, Biotechnology, other biological sciences.
2. **Physical, chemical and earth sciences**: Astronomical sciences, Theoretical & condensed matter physics, Atomic & molecular physics; Nuclear & particle physics; Plasma physics, Optical physics, Classical physics, Other physical sciences, Physical chemistry, Inorganic chemistry, Organic chemistry, Analytical chemistry, Macromolecular chemistry, Theoretical & computational chemistry, Other chemical sciences, Geology, Geophysics, Geochemistry, Oceanography, Hydrology, Atmospheric sciences, other earth sciences.
3. **Engineering and technology**: Aerospace engineering, Manufacturing engineering, Automotive engineering, Mechanical & industrial engineering, Chemical engineering, Resources engineering, Civil engineering, Electrical & electronic engineering, Geomantic engineering, Environmental engineering, Maritime engineering, Metallurgy, Materials engineering, Biomedical engineering, Computer hardware, Communications technologies, Interdisciplinary engineering, other engineering & technology.

4. **Mathematical and information sciences and technology**: Mathematics, Statistics, Other mathematical sciences, Information systems, Artificial intelligence & signal & image processing, Computer software, Computation theory & mathematics, Data format, other information, computing & communication sciences.

5. **Agricultural, veterinary, food and environmental sciences**: Industrial biotechnology & food sciences, Soil & water sciences, Crop & pasture production, Horticulture, Animal production, Veterinary sciences, Forestry sciences, Fisheries sciences, Environmental sciences, Land, parks & agricultural management, other agricultural, veterinary & environmental sciences.

6. **Clinical sciences and clinical physiology**: Medicine – general, Immunology, Medical biochemistry & clinical chemistry, Medical microbiology, Pharmacology & pharmaceutical sciences, Medical physiology, Dentistry, Optometry, Clinical sciences (exc. Psychiatry), mental health.

7. **Public health and health services**: Nursing, Public health & health services (exc. mental health), Complementary/alternative medicine, Human movement & sports science, other medical & health sciences.

8. **Psychology, psychiatry, neurological, behavioural and cognitive sciences**: Neurosciences, Psychology, Psychiatry, Cognitive science, other behavioural & cognitive sciences & Linguistics.

9. **Social sciences and politics**: Political science, Policy & administration, other policy & political science, Sociology, Anthropology, Human geography, Demography.

10. **Economics, Commerce and Management**: Economic theory, Applied economics, Economic history & history of economic thought, Econometrics, Other economics, Accounting, auditing & accountability, Business and management, Banking, finance and investment, Transportation, Tourism, Services, other commerce, management, tourism and services.

11. **Law, Education and Professional Practices**: Education studies, Curriculum studies, Professional development of teachers, Other education, Journalism, communication and media, Librarianship, Curatorial studies, Social work, Other journalism, librarianship & curatorial studies, Law, Professional development of practitioners, Justice & legal studies, Law enforcement, other law, justice, law enforcement.

12. **Humanities**: History & philosophy of science & medicine, Other studies in human society, Art History and appreciation, Language studies, Literature studies, Cultural studies, Other language & culture, Historical studies, Archaeology & prehistory, other history & archaeology, philosophy, Religion & religious traditions, Other philosophy & religion.

13. **Creative arts, design and built environment**: Architecture and urban environment, building, Other architecture, urban environment and building, Performing arts, Visual arts & crafts, Cinema,

electronic arts & multimedia, Design studies, other arts (exc. Art history & appreciation).

<div align="right">(Australian Government 2006)</div>

Each individual researcher would then be allocated by their university to one of these groups, the idea being to find groups of researchers sharing a common focus. Each university Research Group had to have at least five members, and research was then to be assessed for quality and impact.

To provide some means of determining research quality, each of the thirteen research areas was asked to come up with some form of journal ranking. This was done in different ways, but in each case an attempt was made to produce something that would be internationally acceptable.

2.1 Research Quality

For each Research Group, evaluation of research quality was to be based on the four best research outputs for each researcher in the Group, the full list of research outputs for the Group produced in the six-year assessment period and evidence of research quality provided as part of a context statement. Research quality was to be based on the following five-point, criterion referenced scale:

"5 Research that is world leading in its field or makes an equally exceptional contribution in an area of particular significance to Australia.

4 Research that meets world standards of excellence in its field or makes an equally excellent contribution in an area of particular significance to Australia.

3 Research that is recognised internationally as excellent in terms of originality, significance and rigour but which nonetheless falls short of the highest standards of excellence.

2 Research that is recognised as methodologically sound in its field and of high originality, significance and rigour.

1 Research that is deemed to fall below the standard of recognised quality work."

<div align="right">(Australian Government 2006)</div>

2.2 Research Impact

Research impact was defined as "the social, economic, environmental and/or cultural benefit of research to end users in the wider community regionally, nationally, and/or internationally" (Australian Government 2006, 21). The impact assessment for a Research Group would have been based on an impact statement that was evidence-based against generic and panel-specific impact criteria. This would need to have included verifiable indicators to support these claims, up to four case studies that illustrated the Group's claims of impact, and details of end users who could verify the Research Group's claims. It was to be based on this scale:

"A   Adoption of the research has produced an outstanding social, economic, environmental and/or cultural benefit for the wider community, regionally within Australia, nationally or internationally.

B   Adoption of the research has produced a significant social, economic environmental and/or cultural benefit for the wider community, regionally within Australia, nationally or internationally.

C   Research has been adopted to produce new policies, products, attitudes, behaviours and/or outlooks in the end user community.

D   Research has engaged with the end user community to address a social, economic, environmental and/or cultural issue regionally within Australia, nationally or internationally.

E   Research has had limited or no identifiable social, economic, environmental and/or cultural outcome, regionally within Australia, nationally or internationally."

(Australian Government 2006)

3.   RQF INFORMATION MANAGEMENT SYSTEM

Implementation of the RQF would have required that the research outputs to be assessed be placed in a digital storage system or repository (wherever this was possible). A funding program for the Australian Scheme for Higher Education Repositories (ASHER) was designed to assist individual universities in establishing such digital repositories.

The idea was to allow institutions to put their research outputs, including journal articles and other less tangible outputs, in an accessible digital store for RQF assessment. The funding program was to provide assistance to universities to establish and support the installation or upgrading and population of digital repositories for use in the RQF, as well as technical and administrative support for digital repositories (Australian Government 2007a).

Over the longer term another intended aspect was that these repositories would make information about research more widely accessible to business, the community and the government. A Research Accessibility Framework was to be developed by the Australian Government "to ensure that information about research and how to access it is available to researchers and the wider community" (Australian Government 2006). The RQF Information Management System was to allow for this and be based on the following principles:

- It should involve research repositories and the standardisation of data acquisition, given that research repositories and reporting systems are still evolving.
- It should be designed to enable the contents of evidence portfolios and the results of the RQF assessment process to be made generally available at the completion of the process, subject to resolution of issues around intellectual property, privacy and ethics.
- It should include provision for submission of evidence of non-traditional research outputs such as software development, creative works and designs.

- universities should be given sufficient advance notice of RQF Information Management System data specifications and submission requirements for the necessary preparation of the evidence portfolios for each of the nominated Research Groups.
- The specifications for RQF data collection, submission, access and retention should recognise the need for cost effectiveness.
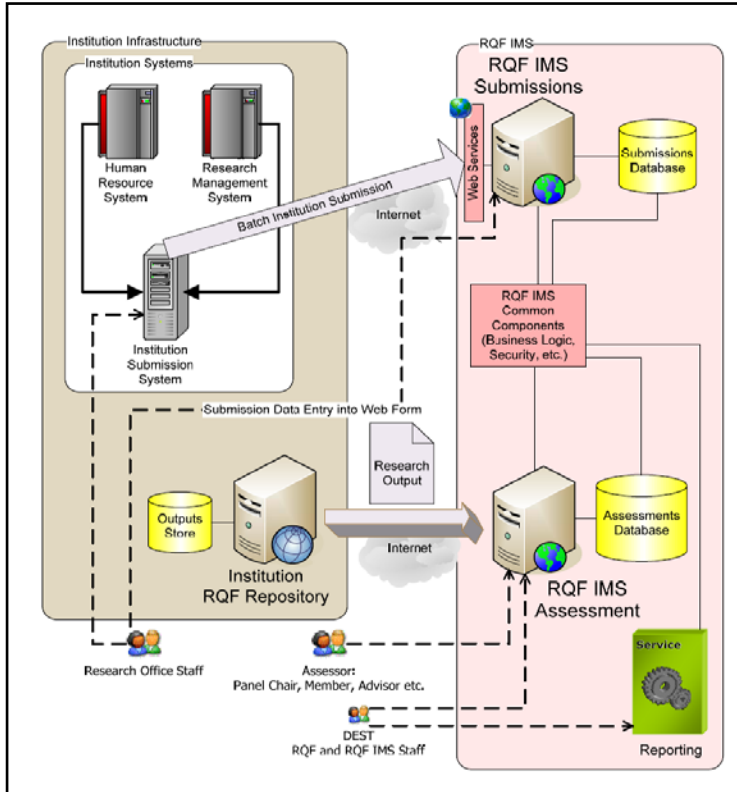
(Australian Government 2007c)

Figure 1: RQF IMS overview

The RQF data submission process was planned to transfer data on the best four outputs for each researcher in each Research Groups from the University's own repository to the RQF Information Management System (IMS), so it was necessary that each university first have its own repository before the system could operate. For the purposes of the RQF the repository would have to be available only to RQF assessors and could remain closed to the general public. Even prior to the announcement of the RQF many Australian universities already had set up some sort of digital repository for their research publications. At Victoria University this was located at: http://eprints.vu.edu.au/. The idea was that the RQF IMS would collect institution-level data and evidence portfolios, using either online or batch interfaces, as part of the university's submission.

What this meant was that the central RQF repository would need secure access and be limited to RQF assessors and authorised university personnel

only. Its purpose would be limited to storage of RQF documents, preferably as published PDF versions of journal articles, or at least pre-publication versions from the authors. Copyright agreements needed to be negotiated for RQF purposes, and this has already been achieved for a number of major publishers. An individual university's research repository, on the other hand, would ideally be open access, with no passwords required. It would be Internet searchable, and provide full text access to contents. Its purpose of would be to showcase the university's scholarly output and make this research accessible to the public. Copyright, however, is still an important issue.

Many universities were thus looking at setting up their repositories, but doing so in their own different ways. Given the difficulty of building such a system, most universities went searching for an appropriate off-the-shelf product. Once set up, the university's repository would then need to be populated, usually overseen by staff from the university library. Victoria University has used the ASHER government funds to set up its own repository in a product called Scopus that claims to be the world's largest abstract and citation database of peer-reviewed literature (Scopus 2007). Scopus also offers a service to hold an institutions internal research publications repository, and this is what Victoria University will use. "Scopus now provides easy access to an institution's repository by internal and external parties, generating added global exposure of the research their staff is conducting" (Scopus 2006). Victoria University pictured the process of setting up the repository as shown in Figure 2 below.
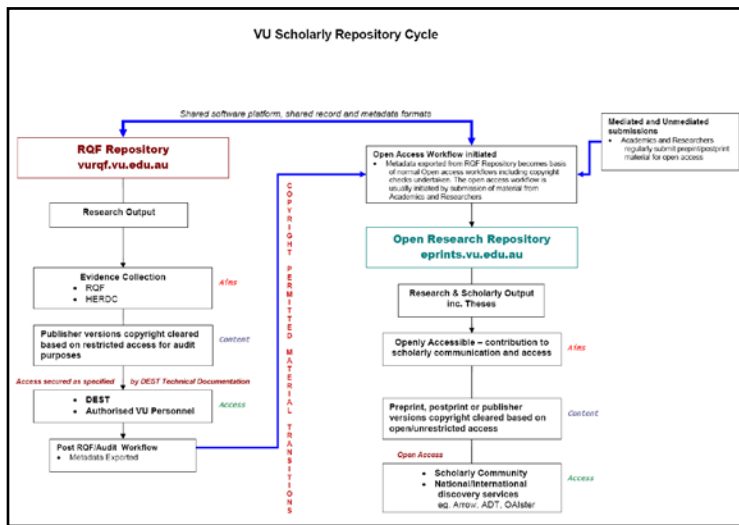

Figure 2: Victoria University's Scholarly Repository Cycle

4. EXCELLENCE IN RESEARCH FOR AUSTRALIA (ERA) – THE REPLACEMENT FOR THE RQF

In June 2008 the new government produced a consultation paper which notes that: "ERA reflects the Government's commitment to a transparent, streamlined approach for evaluation of the excellence of research undertaken in Australia's universities, using readily available information where practical." (Australian Government 2008). The paper states that the new research framework will aim to:

- Identify excellence across the full spectrum of research activity
- Compare Australia's university research effort against international benchmarks
- Create incentives to improve the quality of research
- Identify emerging research areas and opportunities for further development

The consultation paper noted that the first stage of evaluations was planned to access research excellence using a combination of indicators and expert review by committees comprising experienced, internationally-recognised experts (Australian Government 2008). These evaluations will be based on 3 broad categories:

- Measures of research activity and intensity
- Indicators of research quality
- Indicators of excellent applied research and translation of research outcomes

Evaluation of the research is planned to take place in the following discipline clusters:

- Physical, Chemical and Earth Sciences (PCE)
- Humanities and Creative Arts (HCA)
- Engineering and Environmental Sciences (EE)
- Social, Behavioural and Economic Sciences (SBE)
- Mathematical, Information and Communication Sciences (MIC)
- Biological Sciences and Biotechnology (BSB)
- Biomedical and Clinical Research (BCR)
- Public and Allied Health and Health Services (PAHHS)

It is interesting to see what is contained with the cluster for **Social, Behavioural and Economic Sciences** (SBE) as this also covers business, sociology and education: Accounting, Auditing and Accountability; Banking, Finance and Investment; Business Management; Marketing; Services; Tourism; Transport and Freight Services; Other Commerce, Management, Tourism and Services; Economic Theory; Applied Economics; Econometrics; Other Economics; Sociology; Social Work; Anthropology; Human Geography; Demography; Political Science; Policy and Administration; Criminology; Psychology; Cognitive Science; Other

Psychology and Cognitive Sciences; Education Systems; Curriculum and Pedagogy; Specialist Studies in Education; Other Education.

ERA plane to consider all publications within a publication reference period of each the following publication types:

- Book
- Book chapter
- Journal article
- Refereed conference publication

The consultation paper indicates that interdisciplinary research should not be disadvantaged in ERA and will be permitted in more than one cluster where relevant. It goes on to say that it is also important that ERA encourages collaboration across institutions.

5.   RESEARCH QUALITY METRICS

Not everyone, however, agrees that using research quality metrics is a useful path to follow. Alexander et al. (2007) found that systems of quality and impact measurement that were built around journal rankings were not globally consistent. They found that the differences between systems adopted by different countries could be explained by cultural embeddedness, and concluded that "Administrators of business schools that benchmark their faculty's intellectual contributions should identify how a particular journal ranking system reflects the mission, culture, and resources of their own business schools, rather than blindly selecting one journal ranking system over another."

Chen and Hoshower (2006) conducted a survey of 320 faculty members at 10 business schools which showed that faculty members who assign higher importance ratings to both the extrinsic and the intrinsic rewards of research exhibit higher research productivity. Joan Rogers et al. (2006) have created an alternative method for ranking research output that shows different results than some previous methods. Similarly Priscilla Rogers (2007) has found that the discipline area of the research has as much influence on journal rankings as any other measure of research quality. The ability of research output rankings to be manipulated by method demonstrates that research management built around convenience numbers is flawed.

6.   CONCLUSION

In common with many other information management systems in education, information systems designed for handling research are often designed primarily to serve the needs of the funding agencies' demands for accountability (Sessions and Collins 1988; Spurgeon 1994; Tatnall 1995). In

this regard, the information system proposed for the Australian Research Quality Framework is no different, except that the funds provided to each university to set up their own repositories do offer other possibilities.

Senator Kim Carr, the new Minister for Innovation, Industry, Science and Research said that the previous government's proposed RQF was "... poorly designed, administratively expensive and relies on an 'impact' measure that is unverifiable and ill-defined" (Australian Government 2007b). He indicated that he wanted "... to implement a less cumbersome and less costly process that still provides the Australian Government and taxpayers with an efficient and transparent process. A process that ensures valuable research dollars are allocated to the university sector using internationally verifiable measures" (Australian Government 2007b).

Like many other information management systems in education, those systems intended for handling research data are often designed primarily to serve the needs of the funding agencies' demands for accountability. We have previously suggested (Davey and Tatnall 2007) that as well as being designed to handle accountability and funding requirements, features to facilitate putting researchers in touch with others working on topics that are possibly related to their own would be useful. It is, however, still too soon to see how ERA will develop, and whether its IMS will be similar to that intended for RQF. Hopefully the new system, whenever it comes into operation, will address this need. At the very least, individual university digital repositories should assist in this.

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