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## Measuring research in the university via senior academic promotions and faculty research metrics

Kevin Kiely<sup>a\*</sup>, Niamh Brennan<sup>a</sup> and Ashling Hayes<sup>a</sup>

<sup>a</sup>*Trinity College Dublin, Ireland*

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### Abstract

CRIS systems are well suited for measuring research activity in a university. There are several reasons for measuring research activity from various perspectives: national, university, school, department, research institution, strategic theme, as well as at the individual level. The CRIS system's position as an enterprise system with interfaces to other enterprise systems such as the HR system facilitates this multifaceted approach. This paper describes two recent initiatives based on the Research Support System (RSS) CRIS in Trinity College Dublin. The Senior Academic Promotions call allows academics to apply for promotion to the grades of Professor and Associate Professor. Faculty Research Metrics is the latest iteration of the university's research quality metrics, which allows for each of the three faculties to define their own sets of research productive criteria.

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## 1. Background

The Research Support System (RSS) is a web-based enterprise CRIS system that has been running in Trinity College Dublin since 2002. It allows research staff and students to input and update their biographical data, research projects and research outputs, including scholarly publications, datasets, and conference presentations. The RSS was built as an in-house collaboration between IT Services and the Library. The RSS team has a mission to serve the needs of the entire TCD research community in a responsive way. It contains 100,000 research outputs, many of which have been uploaded to TARA, the Institutional Repository.

There have been several initiatives to measure research activities in the University for a variety of purposes:

- The Calendar of Publications<sup>2</sup> is an annual extract from the RSS of journal articles, books, book chapters, conference papers, proceedings of conferences, items in reference works, journals, patents, reviews and review articles published in the last 2 years. Recently, music productions, theatre productions, film productions, musical scores, scripts and visual productions have been added to capture the research outputs from the School of Creative Arts.
- A major review of the TCD strategic research themes<sup>7</sup> was carried out via the RSS. Results were sent to an external superpanel who recommended the merging of some themes and renaming of others.
- School quality reviews are conducted regularly based on RSS data.
- The PI Quantitative Analytics tool delivers interactive reports and data visualisations based on publication metadata from the RSS and data from the Research Proposal and Awards Management System (RPAMS), which is another inhouse developed system for capturing information about research grants.

## 2. Senior Academic Promotions

The RSS team were approached by HR with a proposal<sup>6</sup> to implement the College's procedure for promotion to the academic grades of Professor and Associate Professor, as well as accelerated advancement within the Associate Professor grade. It was apparent that most of the data required was available in the RSS so there would be a significant reduction in the need for the applicant to manually enter data in an application form. It was decided to develop a promotions workflow in the MyRSS web application. The MyRSS web application complements the RSS and is available to all RSS users.

Having clarified the requirements in August 2016, development started on the Promotions workflow, which was completed in October. Then the RSS was modified where necessary and both applications were released for UAT in November. This included presentations to senior College officers, including the Provost, Vice-Provost and Faculty Deans. Having completed the changes arising from UAT, there was a soft release in March 2017 followed by an open call for applications in April. HR produced user guides and organised drop-in clinics at various locations. The closing date for applications was in May.

The MyRSS workflow pages either contained a link to the RSS for editing or facilitated data entry themselves. The following pages linked to the RSS for editing:

- Degrees & Professional Qualifications

- Honorary Degrees, Awards & Distinctions
- Professional Memberships
- Career to Date
- Key Aspects of Research
- All peer reviewed works
- All non peer reviewed works
- Patents
- Entrepreneurial Ventures
- Service to College
- Philanthropic Activity
- Conference Organising Committees
- Service to Discipline/Society
- External Advisory Roles
- Outreach Activities

Data entry was possible on the following pages, usually where the data required was relevant for the promotions application but not for the RSS:

- Top 10 Research Works
- Overview (incl. citation counts, H-index)
- Grants (RPAMS and non-RPAMS)
- Teaching

On the final page of the workflow, the applicant outputs the Promotions CV to Word and is reminded about how to complete the application by uploading it to the recruitment website: [jobs.tcd.ie](http://jobs.tcd.ie). Prior to the upload, the applicant has a final opportunity to manually edit the Promotions CV.

Late changes to the workflow and CV included the addition of a Senior Author flag for publications and a new page for Philanthropic Activities.

Building on the success of Senior Academic Promotions, a similar approach was adopted for Junior Academic Progressions<sup>5</sup>. New General Information and Summary of Achievements pages were added to the workflow. Top 5 Works were captured rather than Top 10 Works. A Quick Change tool was developed to allow applicants to more easily update the new Senior Author flag for each of their publications.

Senior Academic Promotions was short-listed for the Chartered Institute of Personnel and Development (CIPD) Ireland Award 2018 for ‘Use of Technology in HR & People Management’<sup>3</sup>.

Another round of Senior Academic Promotions is planned for 2018.

### 3. Faculty Research Metrics

The RSS has been used to calculate research metrics using two previous approaches. From 2009-13, the Research Quality Metrics (RQM) Report was delivered. This listed the core funded staff who were research productive. HR defined which staff members were core funded. It was also possible for school administrators to manually set a staff

member to core funded. Research productivity was achieved by either producing a set number of research outputs in the last 4 years. The following publications were counted towards RQM: journal, journal article, proceedings of a conference, conference paper or book chapter.

From 2014-17, the ABC Research Productivity Metrics were reported on. This listed research productive academics rather than core funded staff. Again, HR defined which categories of staff were to be considered academics for the purposes of the ABC Report, with school administrators able to manually change this setting if required. The research productive criteria were similar to RQM, with several new research outputs counted over the last 4 years, resulting in the following list:

1. Research publications (journal articles in peer-reviewed journals of high standing, edited books or special issues of journals, articles or chapters in edited volumes, full length papers (but not simply abstracts) in edited conference proceedings, book, published by a recognised academic publisher
2. Translations (literary, legal, etc.)
3. Curation of exhibitions (art, science)
4. Fieldwork collection for archives (speech, folklore, music, material culture)
5. Data sets and databases: linguistic corpora, online collections of materials, etc.
6. Research bibliographies, discographies, filmographies, etc.
7. Test and assessment development
8. Development of formal protocols in research-based practice (especially in education and health sciences)
9. Geographical information: GIS data mapping, interactive maps, conventional cartography
10. Manuscript editing (including electronic dissemination thereof)
11. Conservation and restoration: art, artifacts, architecture
12. Nonfiction works for the general public
13. Public outreach in radio and television
14. Archaeological excavations (and reports thereof)
15. Research-based websites and CD-ROMs
16. Publicly-available public service reports
17. Film (documentary, dramatic, non-narrative)
18. Creation and maintenance of visual portfolios (art, photography)
19. Creative works (literature, visual arts, music, drama, etc.) as appropriate to university activity
20. Patents and other forms of Intellectual Property xxi. Campus companies (entrepreneurial activity)

Research productive exceptions were introduced. Staff members with research productive exceptions appeared on the ABC Report even if they had not reached the productive criteria. Exceptions were created at the discretion of the Head of School. Typical reasons for deploying exceptions were for maternity leave, leave of absence, time spent serving as a College officer, etc.

Research funding was allocated to the schools based on the percentage of academics who satisfied the research productive criteria. This percentage also represented a baseline which could be compared year on year.

Users are advised to update their RSS profiles in January by a deadline in February. The RQM/ABC/FRM Report is produced in March annually.

For the Faculty Research Metrics, the Dean of Research decided to allow each Faculty (Arts, Humanities and Social Science (AHSS), Engineering, Mathematics and Science (FEMS), Health Sciences (FHS)) to define their own research productive criteria.

In general it is easier for staff to reach the threshold because of the extra criteria. However, the thresholds are increased for senior staff in FEMS (2 thresholds) and FHS (3 thresholds). Most academics reached the threshold once they had populated the new fields added for FRM.

For each faculty, a scores page is available to allow each academic to review their score for each metric. It is also possible to drilldown into the data for review and to link to the RSS for editing.

The research productive exceptions added for ABC also apply to FRM.

### **3.1 Faculty of Arts, Humanities and Social Sciences**

The AHSS FRM Metrics align closely to the ABC metrics, with a combination of the following research outputs, produced in the last 4 years, required to meet the FRM criteria:

1. Be the author or co-author of a book, published by a recognised publisher
2. Journal articles (single authored or co-written) in refereed or peer-reviewed journals of high standing.
3. Edited or co-edited books (including an introduction), issues of journals or conference proceedings, published by a recognised publisher.
4. Chapters and other major contributions (single authored or co-written) in edited volumes published by a recognised publisher.
5. Full length papers in conference proceedings published by a recognised publisher.
6. Translations (literary, legal, etc.) published by a recognised publisher or for sign language a recognised international equivalent.
7. Manuscript editing (including electronic dissemination thereof) published by a recognised publisher.
8. GIS, databases, data sets and other research-based websites, as well as transferable uses of information technology, hosted by TCD or a recognised international equivalent.
9. Substantial refereed or peer reviewed contributions to major works of reference.
10. Publicly-available public service research reports.
11. Curation of an exhibition, which includes a published catalogue.
12. Fieldwork collections for publicly-available archives (e.g. speech or sign, folklore, music, material culture).
13. Publicly-available tests and protocols for educational, developmental, psychological, and other assessments
14. Published report of an archaeological excavation.
15. Creative work (literature, visual arts, music, drama), substantially documented and appropriate to university activity.
16. PI on a major grant application appropriate to the relevant discipline.

The main difference from ABC is the use of the RPAMS data to calculate the number of major grant applications. All other metrics were calculated based on the research outputs available in the CRIS.

Due to the similarities with the ABC metrics, the AHSS FRM metrics were the first to go live.

### 3.2 Faculty of Engineering, Mathematics and Science (FEMS)

The FEMS FRM metrics are informed by some of the principles set out in the Leiden Manifesto<sup>4</sup>:

1. Publication metrics are supporting evidence, but not the final word.
2. Research evaluation should be “open, transparent and simple”.
3. Different norms in different fields should be accommodated.
4. Consider as much information as possible, including the career stage of the individual.
5. The choice of research metrics can have an impact on how people conduct their research.
6. Research metrics should be updated regularly to adapt to changing practices.

Staff are assigned 1 of 2 thresholds depending on seniority: Assistant/Associate Professors have to reach a lower threshold and Professors a higher threshold.

Metrics are categorised into two sections: Recognition and Scholarship, with a maximum recognition score limit. This ensures that a contribution from both Recognition and Scholarship is required to satisfy the FRM criteria.

These criteria are counted over the last 5 years and weighted accordingly:

#### Recognition:

- leadership roles in learned societies and organizations, including conference organization.
- membership of editorial board.
- editor in international publication (book or journal).
- research publications/proposals reviewed.
- invited seminar in Ireland.
- invited seminar international.
- invited talk at an Irish conference.
- invited talk at international meeting/conference.

#### Scholarship:

- For an original high-quality, peer-reviewed research publication (journal article, conference paper, book chapter) or other recognized research output as appropriate to the discipline, as sole, first or lead/senior/corresponding author, with journals, conferences and publishers ranked A, B or C
  - Journal articles, conference papers and book chapters must have at least one non-self citation in order to be counted.
- A multiple of 0.5 of the points system for senior authors (above) may be used to calculate points for co-author publications.
- accepted patent.
- original, high-quality, peer-reviewed book.
- major grant funding awarded as PI to support their own research

School research administrators can set the ranking of journals, conferences and publishers via new web application pages. It is also possible to load in the rankings via file import for the initial ingest. This is done manually by the RSS development team, after the rankings spreadsheet has been signed off by the school. It is up to each school to decide on a method for setting the rankings. SCImago<sup>1</sup> Journal Rank and Google Scholar are possibilities for journals and conferences.

Apart from the major grant funding metrics, which is calculated based on RPAMS data, all other metrics are calculated based on research outputs and biographical data available in the CRIS.

The process has completed a pilot in the School of Computer Science and Statistics. A date for rolling out FRM to the other seven schools has not been set yet.

### **3.3 Faculty of Health Sciences (FHS)**

FHS staff are assigned one of three thresholds depending on seniority according to the following ranks:

- Assistant Professors
- Associate Professors
- Professors

The threshold is weighted by full time equivalence (FTE) and rounded up to the nearest 0.5. This made the process fairer for part-time staff.

There were 4 categories of metrics, counted over the last 4 years and weighted accordingly:

Publications:

- co-authored article in an international peer-reviewed journal.
- co-authored an article in a national peer-reviewed journal
- co-authored a book chapter

Grants:

- 1 major or 3 minor grants submitted to applicant as PI or Co-PI
- additional points for each grant above secured as either as PI or Co-PI

Intellectual Property:

- invention disclosure form submitted
- patent granted
- licencing of patent

#### National & International Recognition [Maximum value applies]

- member of Organising Committee for a national conference.
- member of Organising Committee for an international conference.
- Editorial Board membership of an international journal.
- Editor of a book.
- invited talk at national conference.
- invited talk at international conference.
- invited reviewer for at least 5x papers for well-respected journals in the discipline or for 5x grant applications
- national public leadership\*

\*Examples: Chair of a learned society; membership of International or national working group where involvement results in output such as policy document, consensus document, advisory document, accreditation panel output, forum/discussion group moderator/chair (online or at meeting/group); Invited Member of Scientific Advisory Board for industry or a University or an Editorial Member of journal; Evidence of patient, industrial, regulatory/governmental/professional body/association and/or public involvement is expected as appropriate to discipline

All metrics, including grants, are calculated based on research outputs available in the CRIS.

The FHS FRM metrics are in beta and available to all FHS academics. Some minor changes to the metrics are expected followed by a formal pilot with one of the schools.

#### 4. **FRM Lessons Learned**

It is important to look for synergies between the FRM criteria for each faculty. For example the RPAMS data was used by all two of the faculties in different ways. The work done on the user interface when piloting with the School of Computer Science and Statistics was of benefit to the Faculty of Health Sciences i.e. a detailed Scores page arose out of the pilot process. A common method of capturing the number of grant proposals reviewed and journal articles reviewed by year was introduced for both FEMS and FHS.

Clearly defining the metrics up front would have simplified the development process. Weightings can be customised later in the process without major impact.

Where different categories of criteria were present, limiting the maximum score of one ensured a balance between the categories e.g. it was not possible to satisfy the FRM criteria using recognition criteria alone.

The research productive exception mechanism has proved to be a flexible method of accounting for academics with lower FRM scores, for example in the cases of maternity leave, leave of absence, administrative service, etc. It is possible to set a future expiry date for the exception. This approach is preferable to capturing personal data that is not appropriate for CRIS systems.

The CRIS system proved to be invaluable for both of these processes because it contained a mature database of research outputs which users had already been keeping up to date for other reasons (Calendar, Themes, Quality Review, PI Quantitative Analytics). The user interface was familiar to RSS users so there was less of a learning curve

when completing an application for promotion. School research administrators familiar with the ABC research productive metrics reports were quickly able to grasp the Faculty research metrics.

## 5. Conclusion

Arising out of the success of Senior Academic Promotions, HR are considering a new web application for managing academic career progression including performance review, probation, 4 year tenure review and promotion. This would involve moving the current promotion workflow from MyRSS to the new application. All of the application functions have a dependency on CRIS data.

The FRM criteria will continue to be tweaked, especially by FEMS and FHS. The use of an inhouse developed CRIS facilitates these adjustments. It has been decided to default the journal, conference and publisher ranking to 'C' while waiting for the other schools in FEMS to produce their rankings.

These processes demonstrate again the versatility of a CRIS system in supporting the dynamic environment of the university.

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