Overview of Systems Interoperability Project

Report to the RCUK Research Funding Programme Board

Ian Lyne (AHRC)
Catherine Grout (Jisc)
Balviar Notay (Jisc)

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Executive Summary

A joint project between RCUK and JISC with considerable input and support from the Association of Research Managers and Administrators (ARMA) and other partners has looked at the opportunities for RCUK of greater research information interoperability.

Interoperability in this context means maximising the value of information researchers provide, and minimising the administrative burden on them, through the robust and systematic use and re-use of information. Digital technologies are revolutionising the potential to link information about research funding and the outputs of funding, and to make this available to other systems for analysis and dissemination. Finding robust ways of capturing and linking information will be key to achieving this.

This report is the output from the *Overview of Systems Interoperability Project* (OSIP) - a short overview project under the RCUK Research Funding Programme Board. The project reviewed the complex landscape of research information interoperability, and made recommendations to RCUK regarding the steps that should be taken, or explored further, in order to maximise the interoperability of the research information held, and systems used, by RCUK. While many of the recommendations relate to system changes, the area for greatest improvement are system independent, and instead relates to improvements to the research information we use, collect, and make available for re-use.

This project has facilitated an open and explorative approach with subject experts, looking in an objective way at opportunities and challenges, and starting the conversation about a long-term direction, as well as identifying any quick wins. This conversation is far from over and this report looks to raise awareness and understanding of these issues for a non-technical audience to assist decision making internal to RCUK for the greater good of the UK research base.

Summary of Recommendations

The RCUK Research Funding Programme (RFP) endorsed the following ations:

A top priority for RCUK is to implement a new field in its electronic grants system to capture 'Open Researcher and Contributor Identifiers' (ORCIDs). RCUK will explore how to encourage uptake of ORCID by recipients of its funding. Mandation is one option but this will need to be explored further to understand the full implications of this. RCUK will work closely with JISC who have recently announced a national consortium arrangement for UK higher education institution membership of ORCID.

RCUK will also explore other complementary activities which will support good information management and interoperability including:
- Adoption of the International Standard Name Identifier (ISNI) which allows organisations to be identified by using a unique number
- Supporting initatives which help ROs manage and demonstrate their Open Access obligations
- Development work to the Gateway to Research
- Piloting bulk upload, and;
- Je-S APIs.

Going forward RCUK will continue to work in collaboration with other partners and will identify a senior RCUK lead for Research Information Strategy, and support the establishment of a high-level UK Research Information Steering Group.

(Technical terms and acronyms are explained in full in the report)

Overview of Systems Interoperability Project

Section 1: Overview

1.1 Background to the Project

The Overview of Systems Interoperability Project (OSIP) is a short overview project under the Research Funding Programme Board (RFP Board), reviewing the complex landscape of research information interoperability – and providing recommendations around the areas which should be explored further.

The RFP Board had identified interoperability as a key area early in 2014 as part of its visioning and blueprint development, and the idea of a joint project between RCUK and Jisc was proposed at a meeting between RCUK and Jisc representatives on 24 September 2014. The RFP Board sought an RCUK senior lead for the project, and it was agreed that Ian Lyne (AHRC) would act in this role, following the completion of the Research Outcomes Harmonisation project in December 2014, for which he was the SRO.

The Jisc project leads were Catherine Grout and Balviar Notay (with initial input from Neil Jacobs).

It should be noted that colleagues from across the Councils have been working with Jisc and other partners for a number of years to improve data flows in the wider research information ecosystem. This project sought to take an overview, and draw together the different threads, building on their invaluable work and expertise.

1.2 Overview of the Project

Interoperability in this context is about maximising the value of the information that Research Councils hold on their publicly funded research and its outputs, through the robust and systematic use and re-use of information; and about minimising the administrative burden on researchers, and research managers, in providing it.

This means for example:

- Improved efficiency for ROs around applying for RC funding or monitoring compliance with RCUK policy (e.g. compliance with Open Access requirements).
- Enhancing the effectiveness and impact of RCUK funded research – i.e. by enabling the public use and re-use of information about the research we fund, and its outcomes.
- Improving the analysis and tracking by RCs of the impact of funding and changes in the research base, for example, interdisciplinarity and career development (through use of unique and persistent researcher identifiers), or impact on other partners and businesses (through the use of unambiguous name standards)

At the heart of this project is the recognition of an opportunity to seize recent advancements in interoperability in order to keep the UK in line with global pace and maximise the potential impact that interoperability in research information and systems can yield. Failure to do so could prevent the implementation of more efficient forms of research administration in the RO sector.

1.3 Project Methodology

The project began in November 2014 and has worked by involving experts from across the HEI sector in developing an overview in this complex area. ARMA was approached for support in the project, and an invitation to participate was circulated to ARMA members, outlining the areas in which expertise was sought. The RCUK and Jisc project leads then made a selection in order to form a group of around 20 experts representing a range of experience, roles and HEIs.

Small working groups were formed around nine areas – with each group working collectively to produce a 'Provocation' around particular pain-points, opportunities or wider research information initiatives. The nine areas are listed in the Project Brief (**Annex 1**). Where possible each working group comprised members from RCUK, Jisc and ARMA members. The full list of participants in the project is given in **Annex 2**.

The working groups began work in January 2015 - initial drafts of the Provocations were developed by each working group independently, and then circulated to the wider group for comment and review. On the basis of comments and feedback, each working group then finalised their Provocation, and these were then re-circulated ahead of a Workshop on 22 April 2015.

The projects findings were presented to the RFP Board on 25 June 2015, and this version of the project report reflects and builds on discussions at the Board. Where below there are 'actions endorsed by the RFP Board', the implications around implementation will often need to be explored further - particularly in the light of wider discussions of grant platforms across Governement. However, the endorsement of the RFP Board indicates the desired direction of travel.

1.4 Existing Interoperability Initiatives

The OSIP project has benefited enormously (and fortuitously) by coming at a point when some important work on standards development has come to fruition, and in which RCUK colleagues have been fully involved, alongside Jisc.

For example - a pilot project (2013-15) between Jisc and Casrai has contributed to standardisation in three areas - Organisational Identifiers (see Section 2.3 below); Data Management Plans; and Open Access (OA) Reporting (see Section 4). Casrai – the *Consortium Advancing Standards in Research Administration Information* - is an international consortium seeking to support harmonisation in research information (see Section 7 below).

It is also important to mention that members of the Research Councils have been participating since 2012 in the ORCID Implementation Group. We are now at a stage where a national consortium for subscription to the ORCID service is being set up by Jisc, which will enable HEIs in the UK to implement ORCID IDs (researcher IDs – see Section 2.2 below).

Jisc has worked with close input from RCUK and HEFCE to define and standardise the metadata required by institutions to support OA compliance. (This is the 'RIOXX' project). Jisc has also worked with RCUK and Wellcome to develop SherpaFACT (Funders and Authors Compliance Tool) service which supports researchers in choosing journals which

are compliant to RCUK and Wellcome OA policies. These and other key OA initiatives are expanded below in Section 4.

The Provocations written as part of the OSIP project have been able to draw on the work undertaken by the Jisc-Casrai working groups to review options and opportunities in the above areas. The question of the UK becoming a member of Casrai is considered further below.

The sections of the report which follow seek to provide an overview of the major issues, and provide recommendations for the way ahead. The issues are inevitably interconnected, however, which means there is often a degree of overlap between the different sections.

Section 2: Digital Identifiers

2.1 Introduction

Some of the most important tools in enabling the efficient use and re-use of research information are digital identifiers. A familiar example would be the ISBN (International Standard Book Number) which is found on the back of every published book. This unique reference links to a publically available online dataset about the book, with a well-defined set of information which can be drawn into other systems (e.g. libraries, book shops, research outcome collection systems). This seemingly simple idea saves countless hours of effort in terms of entering information regarding a book into different systems; but also just as importantly goes a long way to avoid duplicate entry and double counting. It only takes a tiny change in how a title or author is recorded, for one record to appear different to another. Such digital identifiers are commonly used for journal articles, and it is this which has opened up the possibility of more systematic tracking of the impact of a publication over time – simply because the same article can be quickly and uniquely identified, and information about its production accessed. The standard digital identifier for articles is the DOI system. There are a small number of other authoritative, public digital identifiers for other outputs from research – these include patent numbers, and ISMNs (for musical scores); but for many output types there is little feasibility for unique identifiers. For example: exhibitions, performances, evidence submissions to inquiries, policy documents which cite a researcher or their work, etc, etc – for these there will always be the risk of different researchers reporting these in slightly different ways as outputs of their research, and for them to be double counted.

There are, however, two key areas where digital identifiers are available, but which are not routinely used by RCUK: digital identifiers for researchers, and digital identifiers for the huge number of partner organisations with which our researchers may be working. These are explored in more detail below.

Before looking at these it is worth noting that a key feature of an outcomes collection system, such as Researchfish, is that it does enable the *sharing* of information about the full range of outcomes collected to help avoid duplication. Multiple researchers can report the same uniquely identified outcome (such as a major exhibition which draws on work undertaken in a range of grant projects), because the Researchfish system creates a unique internal identifier for the output. This can be made visible to others – so, for example, project team members at different ROs can see an entry, and don't have to enter it again; they can in turn ascribe the activity or event to one of their other grants as an output, if relevant; and finally their RO can potentially download details into their own research information systems for their own reporting purposes.

In the absence of unique identifiers for a wide range of output types, if PIs enter information into their separate RO record systems, and this is amalgamated at national level, it is practically impossible to de-duplicate multiple references to the same output. This, for example, leaves Research Councils not knowing (without manual checking) whether 10 similar exhibitions have resulted from work on Renaissance art in 2014-15 or just one (which drew on the work of 10 art historians, each of whom reported it). Challenges and opportunities around interoperability in research outcomes collection are explored further below in section 3.

2.2 ORCID

There is an established digital identifier for researchers – the ORCID (the Open Researcher and Contributor ID).

ORCID

ORCID is an open, non-profit, community-driven effort to create and maintain a registry of unique researcher identifiers and a transparent method of linking research activities and outputs to these identifiers. ORCID is unique in its ability to reach across disciplines, research sectors and national boundaries. It is a hub that connects researchers and research through the embedding of ORCID identifiers in key workflows, such as research profile maintenance, manuscript submissions, grant applications, and patent applications.

ORCID provides two core functions: (1) a registry to obtain a unique identifier and manage a record of activities, and (2) APIs that support system-to-system communication and authentication. ORCID makes its code available under an open source license, and will post an annual public data file under a CC0 waiver for free download.

From: http://orcid.org/about/what-is-orcid (accessed 29/04/15)

RCUK and Jisc, along with a broad group of other sector bodies and funders, including HESA, HEFCE, the Wellcome Trust, ARMA, UCISA and Jisc issued a joint statement in 2011 expressing their support for the ORCID initiative: https://repository.jisc.ac.uk/4988/1/ResIDjointstatement.pdf

This then led to the setting up of the Jisc-ARMA pilot project which saw 8 HEI's implement ORCID in their systems. The project has also delivered a cost-benefit analysis of ORCID implementation. The results of this work are available at: http://orcidpilot.jiscinvolve.org Anyone can register for an ORCID ID, and then associate it with information about their research and research outputs into the ORCID system, where it can be accessed by other systems (i.e. to save the individual having to enter the same information again) through APIs. An API or 'Application Programme Interface' is software which allows one computer system to transfer information to another. In this case, an API would allow a system to automatically draw information from the authoritative data registry connected with the ORCID.

As well as the obvious efficiency, the use of a unique identifier (as provided by ORCID) enables individuals with the same name to be uniquely identified (or distinguished from

people with the same name) across multiple systems integrated with the ORCID registry, giving a far more robust picture of the researchers working across different areas. The ORCID site also provides a *neutral harbour* for information that a researcher can take with them when they transfer from one RO to another (i.e. particularly their publications information). The new RO's system can draw down the relevant information from the ORCID site once the new member of staff provides their ORCID, thus saving the information needing to be re-entered – e.g. in order to appear on their profile page on the new RO's website.

A clear recommendation from the Provocation on the use of ORCID IDs was that RCUK should look to integrate the use of these into their funding systems – from application stage through to research outcomes collection, and in the systems for making RC information available for re-use (i.e. Gateway to Research). Researchfish already has a field for the researcher to provide their ORCID, and can present them with publication information that the system has drawn from the ORCID site.

Introducing a field in Je-S to capture ORCIDs is the top prioritised change request for UK SBS and will be implemented as part of a February 2016 release. The benefits of registering for an ORCID accrue predominantly downstream when an individual starts to link their ORCID to publication references, which means that they can be automatically drawn into different systems without re-entry (e.g. for reporting against their grant). To gain benefits for the long-term efficiency and effectiveness in the use and re-use of research information will require take-up of ORCIDs across the research sector. RCUK will consider how best to encourage researchers applying for funding to obtain an ORCID.

This project recommends the use of an API to allow Je-S to communicate with the ORCID registry, and either import the existing identifier for an applicant, or enable applicants without an ORCID to create one for themselves, rather than having to direct them to the ORCID website to do this. This should avoid risks to data quality due to typing errors and inadvertent use of incorrect identifiers. The use of an API requires a subscription but the cost is outweighed by the benefits in terms of the data quality validation it offers. RCUK are working closely with JISC who have recently announced a national consortium arrangement for UK higher education institution membership of ORCID (see below). This will help accelerate and smooth the adoption of ORCID. We are exploring what membership of the ORCID consortium would mean in practice for RCUK in terms of integrating ORCID into our systems.

As a result of the Jisc-ARMA pilot project, and the growing momentum behind ORCID adoption in HEIs, Jisc have undertaken a consultation with a view to a national deal for subscription to the ORCID service. So far about 70 HEIs have expressed a positive interest in this. Jisc plan to take this forward with a view to a national arrangement, plus underpinning technical support for HEIs to accelerate the adoption process, to be in place by the autumn of 2015.

There are already examples of ORCID being introduced by ROs in the UK for example Imperial College has taken the step of subscribing in order to enable the creation of ORCID IDs for its entire staff. One of the powerful features of the ORCID system is that it gives the individual control over who can access any information that is part of their ORCID record and they can decide what information to share and who to share it with. The ability for researchers to control who accesses their information is an important message for any communications campaign from RCUK about the introduction of ORCID IDs.

It was felt by those involved in this project that RCUK introducing ORCID IDs in its own systems would encourage ROs to implement ORCID capability and encourage their research staff to use an ORCID ID even if they do not intend to apply to Research Councils for funding. This is because of the separate benefits to the RO of being able to efficiently record and track the publication outputs of all staff. This is increasingly important, and complex, in the view of the Open Access mandate in the next REF. Therefore, any move by RCUK should be signalled with a long lead time, so that ROs can consider their own strategies (e.g. 12 month). Jisc and ARMA are supportive of ORCID adoption, and would be natural partners in taking forward this in partnership with the RO sector.

RCUK and UK SBS staff met with representatives from ORCID on 22 May 2015 for a very productive further discussion. The meeting enabled colleagues to raise queries about the system and its governance, and clarified, for example that other than researcher names and ORCID IDs, other information in a researcher's profile is accessible only with researchers' explicit consent. The system requires researchers to choose which (if any) other systems may post information to and/or access information in their ORCID profile.

Action endorsed by RFP Board:
RCUK should explore how to encourage any PI or Co-I making an application to Research Councils through Je-S to use/register an ORCID ID. This could be through mandating but the implications of that need to be fully explored; work with Jisc to understand what membership of the ORCID consortium would mean in terms of integrating ORCID into our systems; work with ARMA to plan the implementation with a suitable lead-time, and undertake a careful communications campaign with ROs and researchers around the change.

2.3 ORCIDs for PhD Students

The OSIP workshop discussed a further area in which ORCIDs would be useful – in relation to collection of information on students, and the tracking of next destinations.
The interoperability of the Je-S Student Details portal with RO student information systems is discussed in Section 6 below – however, in essence collection of student information by RCUK is a manual process for HEIs. A student record is created in Je-S by an administrator using information that the HEI will hold about the student who has been awarded RCUK studentship funding. There is no unique identifier used between the HEI and Je-S – though a third identifier (the HUSID) is created when the student is reported to HESA (the Higher Education Statistics Agency) as actually registered on the PhD. (Not all applicants to a course are finally recruited and registered, but all applicants will have identifiers in the HEI's information systems). The HEI has the ability to record their own internal identifier, as well as the HUSID, in Je-S in order to create a connection; however, these fields are not mandatory, and their use is variable.

In due course, the HEI collects next destination information on their students (DLHE data – Destination of Leavers from HE), as they are required to do by HESA – and then the issue is how to identify the RCUK funded students, so that the RCs can produce career destination information. This is currently undertaken by a complex matching process which would be greatly aided by the required use of a linking digital identifier between RO and RCUK systems. The ORCID is the natural choice, as this provides a longer-term linkage – i.e. a way of linking an RCUK funded researcher at a later stage in their career back to their previous studentship funding (if they were RCUK funded).

As with ORCIDs for researchers, HEIs could invite PhD students to create ORCIDs through use of the API within their registration systems. HESA already has a field for an HEI to provide a PhD student's ORCID as part of the HESA student data return, and it would be a simple process for this to become automatic once HEIs are routinely collecting ORCIDs created by PhD students as part of the HEI registration process.

For HEIs which choose not to direct new PhD students to create ORCIDs as part of their registration process (perhaps because they have so few), a Je-S based process could be established. However, unless the HEI then stores the ORCID in their own student record system (and also return it to HESA), it provides little advantage compared to the current situation in terms of identifying RCUK funded students in the HESA DLHE data. However, other longer-term benefits will still accrue, simply because the ORCID will allow RCs to understand more about the research outputs of their students in future, particularly if their research is predominantly *non*-RCUK funded, and therefore information about it not collected by the RCs. In other words, it makes sense to create an ORCID for an individual at the start of their research career (i.e. their PhD) in order to be able to track their future research trajectory. (Recognising, of course, the ORCID will be less useful for tracking individuals, and the subsequent impact of their doctoral training, where they move into non-research-active roles.)

2.3 Organisational Identifiers

Unlike the situation with identifiers for researchers, there is no single widely used public digital identifier for organisations. The Provocation on organisation identifiers considered a number of options – all of which have their pros and cons. Again in a very timely way, the group looking at this was able to draw on a Jisc-Casrai pilot project Working Group which has been considering precisely these issues.

Jisc Casrai-UK Pilot – Organisational Identifiers Working Group
The outputs from the group have been:
- Organisational ID Landscape Study – a report to inform the Working Group on the current use of organisational identifiers was commissioned and delivered (Sept 2013)
- Organisational ID Review – commissioned by the Working Group to review a core set of organisational identifiers (ISNI, Ringgold, Digital Science and UKPRN) (Dec 2014)
- Use cases – based on key use cases from the Research Lifecycle, these have been identified by the Working Group and further developed under the OrgID Review (Dec 2014)

http://jisccasraipilot.jiscinvolve.org/wp/2015/03/06/organisational-identifiers-working-group-outputs-and-update/

The identification of organisations is much more fluid than that of individuals – organisations merge with each other, or split, over time, as well as often consisting of multiple legal entities underneath what might seem to be a single external identity. However, the need to adopt a solution here is vital. The Research Councils currently use no public digital identifier for organisations, but rather maintain an internal organisational list which has evolved over time. A benefit of a more robust system for organisational identification would be to allow Research Councils to fully and accurately understand their engagement with external partners. This is increasingly important in terms of demonstrating the wider impact of RCUK funding, and the wide variety of partners engaged in RCUK funded projects.

Even if an organisational identifier is selected for adoption by RCUK, there are multiple challenges – primarily the cleansing of current organisational name data in RC systems; as well as resolving how such a decision by RCUK will impact on other systems – for example, Researchfish.

GtR pulls information from the Je-S internal database of contacts, the CDR. This contains around 52,000 organisation entries – around 45,000 of which are active. As part of managing the duplicate data in the CDR, organisational entries can be made inactive (i.e. a grant applicant can no longer see them in the organisational list) where, for example, an organisation name has changed; but unfortunately duplicate records are not merged, and the inactive names still appear in GtR as duplicates. Merging is not always appropriate because of the relevance to other live or historical records. As GtR increasingly integrates data from other systems (e.g. Innovate UK) the potential for duplication increases which creates a bad impression of UK research information and so we are keen to address this. Information reported through Researchfish on external partners is also made available in GtR. Researchfish Ltd maintains a careful control on organisational names that are entered into the system by researchers reporting collaborative work. The system prompts users to select a pre-existing name as they start typing an entry, and if the researcher wishes to add a new organisation, this is checked manually (and various additional meta-data added) by the company. In this way, Researchfish Ltd has created an important business asset – i.e. it is a system that itself seeks to solve the problem of organisational identification for research funders. The drawback is that its database of organisational names is internal only – it does not use (or generate) digital identifiers in the sense of a publically available authoritative registry.

As noted above, the working group developing the Provocation on organisation identifiers was usefully able to draw on the thinking of the Jisc-Casrai working group on Organisational Lists. In addition, a second Provocation on the issue was developed to provide an analysis from the perspective of the current state-of-play of organisational names in RCUK systems. At the OSIP Workshop a clear consensus emerged both around the importance of dealing with the RCUK's organisational name data, and the adoption of the ISNI (International Standard Name Identifier) as the preferred digital identifier to adopt and integrate into RCUK systems.

The ISNI is an international approach to organisational identifiers which amalgamates other institutional identifiers provided by authoritative registries (it is a 'bridging identifier'). It is built from 100s of existing organisational data registries, providing interoperability between different proprietary identifiers. Other identifiers can be added under the ISNI umbrella, with individual IDs linking information together. The Provocation in this area made a strong case for thinking that the ISNI looked to provide a stable, long-term and internationally scalable answer to the problem of organisational identification. Part of the reason for preferring ISNI is that one of the key organisational registries used by ISNI is that maintained by *Ringgold* – a company that specialises in the interoperability of scholarly information. Ringgold is, in turn, used by ORCID to provide their list of organisational identifiers.

To move forward in this area the current data in RC systems will require audit, cleansing, and for the ISNI to be added to the Je-S CDR record. RCUK will explore the best way of undertaking this work which may well be through an expert company.
The systems used by RCUK to collect outcomes information should also, then, incorporate the ISNI identifier. If Researchfish does not currently offer this, then any future pre-procurement of an outcomes collection system should certainly require this. However, once

RCUK adopt ISNI as their organisational identifier of choice, it would be natural for Researchfish to also adopt it in order to add further value to their offer.

Finally, the ISNI of an organisation cited by a researcher in their project application, or cited in connection with the subsequent outcomes of their research, should also be made available via GtR in order to enable a richer analysis of RCUK data by third parties.

Action endorsed by RFP Board:
RCUK should adopt ISNI as its organisational ID of choice. RCUK and Jisc should issue a joint commitment to taking forward the results of the Casrai-UK working group, with ISNI as the backbone of the UK research community's approach to identifying organisations. RCUK should then take forward the planning and implementation of ISNIs within its systems.

Section 3: Information on the Outcomes of Research

3.1 Introduction

The collection of information on the outputs and outcomes of research raises a range of issues around interoperability. Increasingly researchers need to report the outcomes of their work to their institutions, as well as to potentially multiple funders. From an institution's perspective, the collection of such information may be part of individual performance management, or as part of an institution's impact capture for a future REF, or as part of managing Open Access payments and compliance with funder OA policies. Of course, not all academic staff will be Research Council funded, but for an institution issues such as compliance with OA requirements or the development of impact case studies, certainly now concern all staff.

The key dimensions of interoperability in this area concern how to reduce the administrative burden on researchers, and ROs, from having to return the same information multiple times, and how to maximise the effective use that can be made of the information.

3.2. Common Question Set

The move by the Research Councils in 2014 to adopt a single system involved harmonisation on a single framework (the Common Question Set) for collecting outputs across the whole range of disciplines - arts, sciences, humanities, and social sciences, and this is a European, if not global first. The implementation of the harmonised framework in Researchfish also involved agreement by the 70+ other funders who use the system – introducing a considerable degree of consistency. The framework has been made publically available for others to use – for example, other funders or even institutions wishing to collect information in the same structure from their non-RC funded staff.

3.2 Bulk Upload

Bulk upload can appear a straightforward solution to avoid researchers having to enter the same information into different systems. However, as explored above, in the absence of unique digital identifiers for an output type, the amalgamation of data from multiple sources into a single national system simply produces huge duplication. The lack of bulk upload

functionality is arguably not a weakness of the system, but rather the reason that the data it collects across multiple funders is so robust.

Duplicate information undermines the value of the information for the Research Councils and the effective use which RCs can make of it. For many output types the more robust flow of information would be the capture of information in a single national system (which helps avoid duplication), and the harvesting of this information by ROs into their individual systems. (The case of publications which have unique identifiers is considered further below).

The downward direction of information flow out of Researchfish has been demonstrated to be feasible by Symplectic (a supplier of RO research information systems). As part of exploring interoperability issues around Researchfish in 2014, they successfully demonstrated proof of concept around being able to display information from Researchfish within the Symplectic system.

In other words, the Symplectic system was able to harvest information from Researchfish so that a researcher sees it seamlessly within their RO's system. They can then continue to enter information on non-RCUK funded research activity and outputs into their RO's system, but report anything relating to RC grant funding into Researchfish, confident in the knowledge that it will appear in their RO's system without having to duplicate its entry. It should be fairly straightforward for an RO to communicate that outputs related to RCUK funded research (or other funders using Researchfish) are reported via the Researchfish system (from where the RO then extracts them), whereas any other outputs are simply reported into the RO's system.

3.4 Research Outcomes Interoperability Roadmap

As part of the Research Outcomes Harmonisation project RCUK made a commitment to continue exploring the issues around interoperability, and to develop (and keep under review with the sector), a 'roadmap' seeking to explore solutions. This area of work is overseen by the RCUK Research Outcomes Management Board (ROMB).

As part of this roadmap, a simulated trial of bulk upload for publication information has been undertaken with a number of ROs. This has sought to test the feasibility of the approach in a low risk area - where an RO has a digital identifier for the publication clearly linked to a RCUK grant reference. The findings from the trial were published in May 2015 in the Interoperability Pilot Phase 1 Report.

The pilot project found that the linking of a publication ID with an RCUK grant reference was itself a considerable challenge for some ROs. The reasons for this arguably relate to the lack of interoperability between Je-S and RO systems, which is explored below. In brief, when an academic starts preparing a grant project, an internal RO reference is used for costing purposes, and this is the key identifier for the project from the RO's perspective. Only at the final stage is the proposal submitted though Je-S, and an RCUK grant reference created – and the lack of available interoperability with Je-S means that RO systems cannot extract this in an efficient way.

The trial found a considerable variation in the quality of data held by ROs – but demonstrated that it was possible for some ROs to generate paired lists of grant references and publication digital identifiers. This suggests that there are lessons that can be learned, and good practice shared, regarding the creation and checking of data by ROs – for

example, the verification of DOIs and RCUK grant references (for example, through using the API available as part of Gateway to Research). ROMB has been considering the findings from the trial, and without wishing to rule out the approach entirely, it is clear that significant risk assurances will be needed before agreeing for Researchfish to provide this option to ROs. In particular, over and above data quality, there is the risk of confusion that this could introduce for researchers. Researchers would need to bear in mind that certain outputs should be reported into their RO's system (where they will be uploaded into Researchfish) while others should be entered directly into Researchfish (from where some ROs could download them into the RO's system).

By contrast, when researchers are directed to a single system for collecting both publication information and information on a wider set of output-types, they are implicitly reminded that RCUK is interested in this wider set of outputs. If a researcher knows to use the RO system for publications (and perhaps regards these as the most important outputs of their research for promotion or other reasons), there is a risk that they will be less inclined to make the separate and additional effort of using the Researchfish system to report other outcome types.

In the face of the risks to data completeness in allowing bulk upload, automatic *download* of information from Researchfish (as demonstrated by Symplectic) appears to offer a more efficient and effective solution to information sharing and re-use for most HEIs. There is a small fee (£1000 p.a.) that Researchfish charges for supporting extensive download functionality.

ROMB has been considering the findings from the trial. It has been recognised that this approach introduces certain risks to data quality and potential confusion about what can be uploaded from RO systems and what still needs to be entered directly into Researchfish for example outcomes other than publications. RCUK would not want to see a dip in reporting across other outcome types. In an further pilot phase, clear success criteria would need to be established beforehand in regard to levels of information provision on non-publication output types.

3.5 Moving Beyond Bulk Upload

There are more sophisticated alternatives to bulk upload that RCUK should also explore. If ORCIDs are widely adopted, this opens the possibility of automatic harvesting of publication information by both Researchfish and RO systems. Given that institutions will increasingly need to record information about the funding source of the research on which an article is based at submission stage (e.g. for the purposes of the paying of open access charges), it would seem plausible to think that information about the funding (funder and funding grant reference) may in due course be captured in the metadata for a publication (see Section 4), and available via its digital identifier, further improving the efficient flow of information.

The opportunities offered by the use of ORCIDs combined with the capturing of funding information as part of the metadata held against a publication digital identifier represent a compelling picture of an efficient and effective system for publication data. The information provided by a researcher as part of article submission will (in this picture) be seamlessly available to other systems, and research funders as appropriate.

For the foreseeable future, of course, there will be publications in journals that do not have a digital presence. And as with any other output *without* a unique digital identifier, the most robust way of avoiding duplicate entries (for example, the multiple authors of the article all

separately reporting it) will be through a single national system (from which individual ROs can extract data).

Achieving this efficient and effective system will take thought and effort by a range of stakeholders, and RCUK should seek to play a clear leadership role in making it happen – through encouraging uptake of ORCIDs, and integrating them across its systems; and through setting clear expectations around the adoption of metadata standards for information relevant to the open access agenda. This is explored further in the next section.

Action endorsed by RFP Board:
- ROMB should give consideration to a further pilot phase around bulk upload, and maintain on-going dialogue with research managers via ARMA. However, any further pilot phase would need to go forward in a carefully controlled way, and where ROs have acceptable risk mitigation strategies in place.
- As part of the longer-term Research Outputs Interoperability Roadmap, there needs to be a clear message that more sophisticated solutions need to be pursued, to support the efficient flow of output information around the system via the use of ORCIDs and publication metadata.

Section 4: Metadata for the Management of Open Access

4.1 Introduction

A report Counting the Costs of Open Access (November 2014, by London Higher and SPARC Europe) highlighted the significant costs associated with the administration of OA in the current environment.

All stakeholders recognise that reducing the financial and administrative cost for institutions is a pressing need. The Open Access agenda for research publications has driven (and in turn depends on) considerable advances in the collection, and interoperability, of information about research publications. A large number of separate pieces of information (the 'metadata') about each research article need to be accumulated, shared and updated in order ensure the article is discoverable by systems which make research outputs public, and also to allow compliance with funder and publisher policies on the open accessibility of the article to be checked and monitored.

At the moment the collection of these key metadata is not consistent across scholarly systems. The required metadata are originated at different times and in different systems, and it is not always obvious where. At the same time, the systems involved are seldom interconnected and are generally operated by different stakeholders for different purposes, and this results in substantial difficulties in tracking with even modest precision the aggregate impact of these policies and investment. The common use of standards and unique identifiers are crucial here: for authors, organisations, funders, funders' awards, copyright licence terms, the journal, and the article itself in order to start to take the strain out of the system and allow efficient monitoring and compliance activities.

4.2 Open Access Initiatives

Considerable progress is being made in this area, which has driven interoperability in the information which is required to underpin OA. For example, RCUK have been closely involved in Jisc projects to help ROs demonstrate compliance with RCUK and HEFCE OA policies. This area still requires more effort, however, in terms of the integration of these data fields in scholarly systems; improving wider system interoperability (e.g. Gateway to Research and Researchfish); and engaging with publishers to provide key pieces of information in a standardised format and aligning with international metadata initiatives.

There are a number of initiatives in this area to take note of:
RIOXX (as mentioned above) seeks to specify an agreed set of key and common metadata (including identifiers) to be held by institutional systems to enable them to manage their OA compliance. Once ROs start to populate these fields, it will be easier to track research articles across scholarly systems and it will support more robust business intelligence activities required by research funders, Jisc Services and ROs.

Jisc Sherpa Services offers three services which provide transparency for journal article deposit and transparency of open access policies. In particular, SherpaFACT (Funders & Authors Compliance Tool) provides advice to UK authors on compliance with funder's policies (RCUK and Wellcome) in their journal of choice. The SherpaFACT advisory group (which RCUK is a member of) have initiated discussions with publishers to standardise journal policy expression and standardise the information required from them at the journal and article level. The intention is for funders and HEIs to make their requirements clear and for them to work with publishers on providing that standardised information through efficient workflows.

As part of supporting how publishers might help universities implement OA Jisc is in discussion with CrossRef. CrossRef provides a number of scholarly services based on the metadata provided by publishers. The discussions are about aligning the metadata specified by RIOXX and for publishers to push this metadata to CrossRef via their systems. This clearly has the potential for greater efficiency in other national shared services (RCUK systems and Jisc national shared services) and in university systems.

One national shared service which is under development is the Jisc Publications Router. This aims to pass notifications, metadata and full-text from publishers systems directly to institutional systems (repositories and research information systems). The Jisc Publications Router team are in discussions with various publishers and could potentially also use CrossRef data as part of the workflow. The benefits would be timely information and content from publisher systems to institutional systems, increased proportion of UK research outputs captured within institutional repositories, increased compliance with OA policies of funding bodies and of course increased efficiency.

The Total Cost of Ownership (TCO) initiative at Jisc Collections supports the collection of reliable article processing charge (APC) data from institutions. APC data is now being collected and openly released in a standardised format. It informs Jisc Collections' negotiation strategy with publishers by requiring the implementation of offsetting mechanisms to reduce the Total Cost of Ownership for HEIs. This also supports institutions with RCUK compliance reporting for their APC expenditure.

OA policy alignment and standardisation is another key area. The PASTEUR4OA project (Open Access Policy Alignment Strategies for European Union Research) is developing a metadata schema for OA policies themselves. It covers general requirements expressed in research funders and research performing organisations OA policies. The benefits will be the

ability to express OA policies using a consistent language, reducing the administrative burden of interpretation of particular requirements that pertain to a number of different OA policies, allowing compliance with OA policies to be monitored systematically.

The Open Access Reporting Jisc-CASRAI pilot working group has been looking specifically at centrally documenting the metadata required to support an RO's OA *monitoring and compliance*. The RIOXX metadata descriptions are included and other use cases, such APC, REF, Horizon2020 descriptors are in the process of being added. Documenting the UK OA reporting requirements in a central place will hopefully make it easier for institutions to see what the best approach is for their particular OA requirements, and also provide useful input into technical specifications for system vendors.

Finally, the Jisc Monitor project is developing a number of prototypes to support HEIs in meeting their OA policy obligations holistically – e.g. monitoring all publication activity to ensure compliance with funder mandates, monitoring publication activity to understand what has been published, and monitoring spend (on publications). These prototypes will seek to understand and improve existing service functionality. The improved functionality can only be built on robust standards which are implemented commonly in scholarly systems.

4.3 The Future Information Landscape

With these various initiatives, it is possible to glimpse a future information landscape in which a researcher only has to enter minimal information about funding source (funder and reference) and their ORCID at the submission stage. The publisher then registers a digital object identifier (DOI) at or soon after acceptance which follows through to the publication with all the machine readable licensing information. The details of the article then appear in the researchers ORCID profile (via CrossRef). At this stage the information can be populated in a number places such as both university systems *and* Researchfish, and subsequently in Gateway-to-Research. The Publication Router can use the publisher metadata to provide key notifications, including passing the full text to university systems. This reduces the need for duplicate entry of information at any stage and to reduce the administrative burden that institutions currently face.

This idealised situation is still some way off, but RCUK should offer continued active support to existing standards initiatives, such as RIOXX, and participate in the dialogue with publishers to encourage the provision of key metadata and clear policy OA expression.

Action endorsed by RFP Board:
Continue to work with Jisc and other partners to support initiatives which help ROs manage and demonstrate their OA obligations, and which enable the efficient flow of information about open access publications.

Section 5: Making RC Information Public

5.1 Introduction

The importance of the creation of Gateway to Research (GtR) as a single portal for accessing information about RCUK funded research should not be underestimated. It has been a vital step in relation to increasing the potential for the efficient and effective use, and re-use, of the information held by the Research Councils.

While ostensibly designed to make information available to SMEs and other interested parties, GtR has never simply been about just getting the information out there. It has been designed from the start with a view to allowing other systems to access, and re-use, the information available through APIs. For example, one of the APIs produces output in XML (a key internet language for structuring, sharing and presenting information) according to the CERIF schema.

CERIF
CERIF (Common European Research Information Format) was developed with the support of the European Commission to assist with the sharing of research information across Europe. It is a relational data model covering people, organisations, projects, funding, publications, products, patents, measures/metrics, equipment/facilities, etc. It is maintained and developed as an open and freely available standard by euroCRIS, a not for profit organisation of 228 member institutions in 46 countries, including HEIs, funders, system suppliers and other standards bodies.

The main third-party RO information systems in use by UK Institutions (Pure, Symplectic and Converis) are CERIF-compliant. The Jisc Cerif in Action project created plug-ins for Pure, Symplectic and ePrints to exchange research information using CERIF between institutions and funders.

Implementation of digital identifiers for researchers and organisations will further increase the ability of users to explore trends – for example in research funding for disciplines and interdisciplinarity. And indeed the use of such identifiers will be crucial to avoid the quality of its data being corrupted as information is drawn together from more public funders (e.g. all using different organisational names).

5.2 Next Steps for GtR

GtR is the only common, systematic, mechanism Research Councils have to put information into the public domain from their internal systems, combined with information provided by grant holders to Researchfish (or information harvested by Researchfish from other sources and linked to RCUK grants). On-going investment in the system should be recognised as a priority and a fundamental public responsibility for the Research Councils in terms of their data stewardship. The GtR Management Board has made great progress in developing plans for the further development of the system and this should continue to be highlighted as an important area going forward.

One important development for GtR would be for it to become in effect the registration agency for the creation of RCUK grant references *as* digital identifiers. Currently, the URL (web address) for a grant entry in GtR bears no relationship to the RCUK grant reference; equally there is no easy way to generate the GtR URL for a grant, given its grant reference. A digital identifier is said to be resolvable when it can be used as part of a URL to point to information about the object in question (in this case the grant project) which is machine-accessible. GtR has the potential to be the system by which grant references themselves become public, persistent and resolvable digital identifiers for the projects in question, thereby improving the use and re-use of information held by the Research Councils, and made available through GtR.

Section 6: Interface with RO Systems

6.1 Introduction

The Je-S system is the primary interface between RC systems and the research information systems used by ROs – and there is considerable potential to create efficiencies through greater interoperability in this area. The OSIP workshop considered two main aspects of this interface – the submission of grant applications; and the submission of student data.

6.2 Je-S Proposal Submission

Around 7,500 grant proposals are submitted to the RCs every year. As explained above, standardly a grant proposal is costed in an RO's internal system before the information is manually transferred into Je-S. There is already an API that allows an ROs system to automatically transfer information into Je-S however this is not widely known about. Only one example has been identified of a university (Bristol) making use of this functionality both for transfer of information into Je-S and automatic transfer of information from Je-S into ROs systems.

A very quick win, therefore, would be for funding to be found to undertake a technical audit of the functionality available, drawing on Bristol's help, and provide open documentation of the functions offered. This would at least put the RCs in a position to understand whether the current functionality is still fit for purpose, or how possible it would be to develop it to become more widely useable.

As part of this audit, an exploration should also be made of the potential for automatic transfer of information in the other direction, i.e. from Je-S *into* RO systems – for example, relating to grant reference, grant status or deliverables. Again, limited functionality is already available, but used only by Bristol. For example, Bristol uses an API to query the Je-S system for the internal Je-S IDs used for researchers, so that these can be used as part of project costing. Wider consultation (e.g. through ARMA) to understand RO requirements in this area is important here.

6.3 Je-S Student Data

No similar interoperability appears to exist in regard to the functionality in Je-S to collect information on the postgraduate students funded by the Councils. This means that the entry and updating of student information in Je-S is a purely manual process. Around 5,500 RCUK funded PhD students start every year – with each record taking around 10 minutes to set up. In addition, while functionality exists for the bulk-update of records, many student records require additional manual change.

Given that HEIs need to collect detailed student information for their own management purposes, as well as for return to the Higher Education Statistics Agency, it would seem

natural to consider how greater interoperability between Je-S and RO systems could provide considerable administrative savings. The development of an API is the key step – which will enable information from RO systems to be transferred into Je-S; and for ROs to query and extract information regarding their students in Je-S (e.g. for checking or monitoring purposes).

As discussed above in section 2, this is another area where system interoperability needs to go hand-in-hand with the adoption of robust identifiers. Key information for a studentship will include the identities of the supervisors, as well as of any partner organisations. It may well be easier to initially limit information transfer to fields that can be more robustly defined – project summary, contact details, date of birth, equality and diversity information, etc. Additional information about individuals and organisations would need to be added manually using the current methods prior to the wide scale adoption of ORCIDs and ISNIs.

Given that the PhD is the starting point for a career in research (as well as a career in many other sectors) it makes sense to capture data from the start in a form, and with a robustness, that will be carried through to their other potential interactions with RCUK funding later in their careers.

Action endorsed by RFP Board:
RCUK should seek to explore the development of an API to allow interoperability between the Je-S Student Data system and HEI student information systems.

Section 7: Working in Partnership to Advance Interoperability

Information interoperability is a network phenomenon – that is, it depends on multiple actors agreeing explicitly or implicitly to adopt a standard for the sharing, use and re-use of information. It is an area, therefore, that requires *partnership* – different partners working together to understand how to improve the efficiency and effectiveness of the movement of information between them. For example, if RCUK adopts the use of ORCIDs, they are more likely to be used by ROs; if they are used by ROs, they are more likely to collected by publishers as part of article submissions; if they are used by publishers, the publication information can be more automatically collected by ROs, saving researchers' time, and helping ROs demonstrate OA compliance to funders.

Further, however, the UK is not alone in looking at the opportunities of using digital and internet technology. Casrai is an international consortium seeking to support the development of robust research information interoperability in member countries, providing a network for the sharing of good practice and relevant information standards. The UK is not a member, and so risks falling behind the global pace in this area. It also is missing out on the opportunity to contribute to, and shape, this important global effort.

As has been mentioned, Jisc has been testing the Casrai approach in a number of areas - in a pilot project 2013-15. The conclusions of this project show that there would be value in Jisc becoming a Strategic Member of Casrai on behalf of the UK, and acting as the key contact point for the purposes of inputting into Casrai's dictionary of interoperability standards and initiatives.

However, alongside this, the project has demonstrated the importance of a coordinated UK-wide approach to research information. The formation of a high-level UK steering group to

oversee and coordinate activity made by key partners in the research landscape is a vital step.

Action endorsed by RFP Board:
- Partnership working with others in this space is vital, e.g. Jisc, HEFCE, ARMA, Wellcome, HESA, etc. RCUK should support Jisc in its on-going coordination of key interoperability initiatives in this space with partners.
- Consideration should also be given to establishing a UK Research Information Steering Group, possibly led by Jisc, that would bring together the main partners in this area, and chaired by a senior Research Information champion from the sector.

Section 8: Conclusion and Next Steps

The approach taken by OSIP has been to provide an overview of the main issues facing RCUK in regard to the interoperability of research information. The broad conclusion is that while there is much good work being done nationally, there are some clear areas for improvement in RCUK capability and strategy in this area. RCUK recognise the nationally important contribution its staff has made to the areas of Open Access information management, research outcomes collection, and research information publication in GtR. This good work needs overarching coordination through RCUK.

A significant area for improvement is in how Je-S enables interoperability. Considerable functionality to support interoperability already exists within the system and we need to raise awareness. For example providing information about the functionality available would be a step in the right direction. Je-S is not only the key interface with the RO sector in terms of grant funding, it is also the key lever by which RCUK can exercise leadership in the area of research information interoperability – for example, through capturing ORCIDs, and using a unique identifier for organisations such as ISNI. Such improvements will require close working with UK SBS who manage the system.

The recommendations made in the report to address and improve the situation will all require investment, but they are not issues that will go away. The initiatives described in this report will improve the quality of information that RCUK holds on researchers, organisations, the research it funds and its outputs. These improvements will allow the UK to keep pace with other countries which are also seeking to improve the efficiency and effectiveness of their information usage.

An overarching recommendation is, therefore, that RCUK identifies a clear senior lead to drive greater interoperability as part of a wider research information and systems strategy. This individual can serve as the focal point for discussions with other partners (bringing in, as necessary, the key RCUK staff who are already making significant contributions), and with key RCUK system owners. Resource will be needed in terms of business and technical analysis, as well as the resource needed to implement system changes and to oversee robust communications with the research sector. With the formation of the new RCUK Research Funding Team, and the appointment of the RCUK Executive Director, there is the potential to make real progress in this area as part of a coherent, overarching, RCUK Research Information Strategy.

Finally, the valuable work and engagement by colleagues from across the sector in assisting with the OSIP work needs to be recognised. Participants in the project felt that the

opportunity to take an overview of the complex interoperability landscape had been extremely useful – and were keen that their analyses of the way forward could be shared publically to inform UK discussions.

Action endorsed by RFP Board:
- A senior RCUK lead for Research Information Strategy should be identified and empowered to act as the prime RCUK contact for strategic discussions with other partners as part of this group, drawing in existing expertise from across the Councils as necessary.
- RCUK should publish a version of this report, following consideration by the RFP Board.

RCUK-Jisc Overview of System Interoperability Project (OSIP)

Introduction

At an information sharing meeting on 24 September 2014 between RCUK and Jisc staff, it was agreed to establish a short project to review the current interoperability landscape in relation to research information, and make recommendations to RCUK regarding the external interoperability of their research information management systems.
This document outlines a project - *Overview of System Interoperability Project* (OSIP) - which has been formulated through discussion between Ian Lyne (AHRC), and Neil Jacobs and Catherine Grout (Jisc). The output from the OSIP will be a comprehensive but succinct report to the RCUK Research Funding Programme (RFP) Board on the current research system and research information interoperability landscape (including organisations involved, initiatives underway, current standards, emerging trends etc).

The aim is to provide informed advice and guidance to senior managers at the Research Councils, as part of the RFP, to enable the Councils to make considered in principle / investment decisions. The work will be undertaken by RCUK and Jisc staff, and ARMA will be invited to participate to provide further expertise.

OSIP has a broader scope than the separate stream of work in the Research Outcomes Harmonisation (ROH) Project to look at interoperability with the Researchfish system, and the workshop being held on 8 December 2014. However, it is expected that the work being undertaken as part of the ROH project will directly feed into OSIP.

Background

There have been many discussions over the years, and including a number of RCUK staff, regarding the ways in which RC research information systems interoperate with third party systems, especially but not exclusively HEI-based, to improve data flows between them. Interoperability in this context is understood to mean minimising the administrative burden on researchers and maximising the value of the information they provide, through the robust and systematic use and re-use of information, including 'improving the business capacity of research institutions and funders' (wording taken from Casrai – the Consortia Advancing Standards in Research Administration Information).

However, there has not been a systematic review of either the pain points / opportunities, or the relevant interoperability initiatives that might address them.

Aim

The aim of this work is to develop for the Research Councils a clear understanding of the main areas where investment to improve Council system interoperability might be justified,

and where further work and analysis should be focused. This includes initiatives aimed at maximising the value of research information by making information held by the Research Councils on grants and their outputs available to third-party systems. However, initiatives aimed at deriving or developing metrics, performances measures, benchmarking tools (e.g. G4HE) using research information sources and standards are not included.

As described above, the main output from the project will be a report to the Research Funding Programme Board - but the aim is not to provide a detailed analysis of all the technicalities involved. Rather the project intends to facilitate an open and explorative approach, looking in an objective way at opportunities and challenges, and seeking to provide long-term direction as well as identifying any quick wines. The project is not intending to produce a final and definitive set of recommendations, but rather an initial overview of the main parts of a complex landscape, in order to help inform further work in this area.

Approach

Ian Lyne, Neil Jacobs and Catherine Grout will jointly lead and coordinate the project. The approach to be taken comprises:
   a) The engagement of expert staff from across the RCs, Jisc and ARMA to join a Project Review Group (PRG).
   b) Members of the PRG, working in small virtual groups of two or three, develop "think pieces" or "Provocations", on specific issues (see below).
   c) These Provocations will then be circulated for comment to the wider PRG, as part of an initial 'peer review' - i.e. review by peers in the PRG.
   d) Revised versions will then be prepared and circulated; and then used to underpin discussions at a workshop, which will then inform the final report.
   e) The final report will be co-authored by Ian Lyne, Neil Jacobs and Catherine Grout, with input and advice from the PRG.

Two types of Provocation are proposed, one around particular 'pain points' / opportunities, and one around particular national or international interoperability initiatives. Each Provocation should be short (4 pages max. with a more technical annex if need be), and written in a way which is understandable to a non-technical audience, and will need to cover:
   a) A short description of the issue or initiative
   b) A clear articulation of the value or benefit that enhanced interoperability would offer (e.g. if we adopted a given data standard, if a system interface were available, etc) - either to the Research Councils directly or in terms of reducing administrative burden on researchers and/or RPOs, or maximising the value of research information held by the RCs.
   c) A summary of any existing evidence on the issue or use of a given standard.
   d) An outline of how the change would be made, and an indication of the size of the change needed.
   e) An indication of any 'quick win' steps that could be taken, pending any more significant changes to RC systems.

The proposed areas for Provocation are given in the table below.

Project Timetable

1 December 2014	Potential project members identified against the Provocations
w/c 8 December	Provocation 'teams' finalised and individuals contacted.
31 January 2015	Deadline for first draft of Provocations for circulation to the Project Review Group.
3 March 2015	Deadline for comments and feedback from Project Review Group
30 March 2015	Deadline for Finalised Provocations
Early April 2015	Re-circulation of final Provocations to Project Review Group
22 April 2015	Project Workshop (involving all members of Project Review Group)
May 2015	Completion of report co-authored by Ian Lyne, Neil Jacobs and Catherine Grout, with input and advice from the PRG.

Provocations

The following tables list the proposed provocations. It should be noted that this is a constantly changing landscape and some of the points written may already be out of date.

Pain points / opportunities

#	Provocation
1	Interface between Je-S Grant Application System and HEI systems
2	Interface between Researchfish and HEI systems
3	Gateway to Research - and Third Party systems
4	Standardising Non-HEI organisational names in RC systems
5	JeS Student Details and RO Student Information Systems

Interoperability initiatives

#	Provocation
a	ORCID (Open Researcher and Contributor ID)
b	Syntax
c	Organisational Name standards
d	Open Access metadata standards

Ian Lyne	AHRC
Catherine Grout	Jisc
Balviar Notay	Jisc
Bob Innes RCUK	RCUK
Iain Cameron	RCUK
Alan Cox	NERC
Ashley Moore	EPSRC
Ben Ryan	EPSRC
Gavin Reddick	MRC
Geraldine Clement-Stoneham	MRC
Mark Allinson	MRC
Paul Chitson	BBSRC
Ailsa Ballard	BBSRC
Gerald Owenson	BBSRC
Anne McFarlane	SBS
Verena Weigert	Jisc
Christopher Brown	Jisc
Ben Johnson	Higher Education Funding Council for England
Dan Cook	Higher Education Statistics Agency
Simon Kerridge	University of Kent
Soma Mukherjee	The University of Nottingham
Kirsty Lindley	The University of Sheffield
Steven Hardy	The University of Nottingham
Torsten Reimer	Imperial College London
Nicola Meenan	University of York
Anna Clements	University of St Andrews
Arianna Ciula	University of Roehampton
Hanna Payne	Aberystwyth University
Ian McArdle	Imperial College London
Valerie McCutcheon	University of Glasgow