

Closing the researcher-practitioner gap: an exploration of the impact of an AHRC networking grant

Hazel Hall, Peter Cruickshank and Bruce Ryan, Centre for Social Informatics, Edinburgh Napier University

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Abstract

Purpose: Results are presented from a study that investigated the extent to which learning gained through participation in three research methods workshops funded by an AHRC networking grant was applied in practice.

Design/methodology/approach: Data were collected by online survey and focus group from individuals who participated in the Developing Research Excellence and Methods (DREaM) project workshops in 2011/12. The survey data were coded and analysed manually, as were the transcribed focus group discussions.

Findings: Following the conclusion of the DREaM project the participants at the core of the network applied their learning from the workshops to innovate in the workplace and to develop information services, with evident impact on end-users of library and information services. The strongest impact of the DREaM project, however, was found in reports of widened opportunities for the researcher and practitioner cadre members, many of which arose from collaborations. This provides evidence of a second proven strategy (in addition to the provision of research reports in practitioner publications) for narrowing the LIS research-practice gap: the creation of researcher-practitioner networks.

Research limitations/implications: Collaborative interactions between academic researchers and practitioners bring benefits to both network participants themselves and to the wider communities with which they interact. These are likely to be applicable across a range of subject domains and geographies.

Practical implications: Network grants are valuable for furnishing learning that may be applied in practice, and for bridging the research-practice gap. In library and information science and other domains that suffer from a research-practice gap (e.g. teaching, social work, nursing, policing, management) the bringing together of researchers and practitioners in networks may address problems associated with misunderstandings between the two communities, and lead to improved services provision.

Originality/value: This study provides an evaluation of network development that goes beyond simply reporting changes in network topology. It does so by assessing the value that network relationships provide to individuals and groups, extending knowledge on mechanisms of collaborative interaction within research networks. It is also the first detailed study of the impact of a UK research council networking grant.

Keywords

Collaboration, community development, Developing Research Excellence and Methods, DREaM, DREaM Again, impact, Library and Information Science Research Coalition, learning communities, networks, scholarly networks

Paper type

Research paper

1 Introduction

This article is concerned with the impact of an Arts and Humanities Research Council (AHRC) networking grant that was awarded in 2011 to the UK library and information science (LIS) community, and supported by the UK Library and Information Science Research Coalition. The findings are drawn from a detailed analysis of data supplied by those who participated at the core of the Developing Research Excellence and Methods (DREaM) network in 2011/12. They relate to applications of learning to practice as reported by the individuals who participated in three DREaM network research methods workshops. As such, it is the first in-depth study of the impact of a UK research council networking grant.

In the analysis presented below it is shown that these core network members drew on their increased research knowledge and confidence from participation in the DREaM workshops to innovate in the workplace. In the case of LIS practitioner members, this led to the initiation of a number of changes to library and information services delivery for the benefit of end users. The most significant impact of participation in the programme, however, is the amount of research-related opportunities that opened up to the membership following the completion of the programme. Many of these have been undertaken jointly, and include, for example, team bids for research funding, collaborative event organisation, and co-authored research outputs.

By presenting an evaluation that goes beyond a simple report of network topology, the work reported here responds to calls in the LIS literature to consider the value that network relationships provide to individuals and groups (e.g. Schultz-Jones, 2009). This topic has been identified as a 'crucial' to the analysis of social networks (Shiau, *et al.*, 2017). This new work is also significant for its contribution to extant knowledge on mechanisms of collaborative interaction within research networks, building on the work of scholars such as Rienties and Nolan (2014). Here, for the first time, it is proven that a second strategy can narrow the LIS research-practice gap - in addition to the provision of evidence summaries in the professional press (Kloda *et al.*, 2014). This is the creation of researcher-practitioner networks.

Given the growing global interest in research impact in general (Marcella *et al.*, 2016, p. 370), and the identified need for enlarging the body of advice and expertise on this theme (Marcella *et al.*, 2018, p. 617), the findings will be of

international appeal to academics and practitioners alike, and especially to those interested in the practical value of research networks established to bring together researchers and practitioners.

Since this work is a contribution to the body of knowledge in LIS on research impact, the first section of the paper is devoted to consideration of the treatment of this theme in the extant literature. Particular attention is paid here to prior investigations of research impact that focus on the relationship between LIS research and practice. An account of the research design and its implementation then follows. Thereafter the findings of the study are presented and discussed. The article concludes with a statement of the main contributions of this study to knowledge on research impact in LIS, and proposals for the future development of work of this nature for the benefit for LIS researchers and practitioners, as well as end-users of the library and information services that the two communities of professionals support.

2 Literature review

2.1 Research impact

The impact of academic research and its measurement is an important research topic, particularly at a time when value for money in public spending is paramount (Cruickshank *et al*, 2011; Given *et al.*, 2015, p. 1, p. 7). As is noted on the web site of the International School on Research Impact Assessment (n.d.):

‘The importance of research impact assessment is growing as organisations are required to be accountable for public and donor money invested in research, to analyse and learn how to fund research effectively, to advocate for future R&D investments, to allocate research funds for optimising returns, and to maximise the value of the money invested.’

For example, the *Research Excellence Framework* (REF), designed and implemented to assess academic research in the UK, requires the submission of impact evidence for research by universities¹. Similarly *Excellence in Research for Australia* states that its mission is to ‘to deliver policy and programs that advance Australian research and innovation globally and benefit the community’². (For further details of the evolution of research impact and assessment in the UK and Australia, please see Williams and Grant, 2018.)

Such requirements fuel debate as to the classification of impact, as well as confusion amongst those asked to demonstrate it (Nutley *et al.*, 2007, p. 295; Given *et al.*, 2015, p. 4). In REF terms, for example, impact has been defined as a benefit to the economy, society, culture, public policy or services, health, the environment or quality of life beyond academia. The straightforward use of one person’s research output by another as a citation and impacts of the research

¹ <http://www.ref.ac.uk/about/whatref>

² http://www.arc.gov.au/about_arc/default.htm

process itself ('academic' impacts), however, are excluded in the definition for REF - even though it is accepted that earlier work inspires the development of further research both in its theoretical conception and implementation. In contrast, other frameworks - such as that developed from the Payback Framework (Buxton and Hanney, 1996) for implementation in the UK Economic and Social Research Council (ESRC) Future of Work programme - measured 'knowledge' and 'impact on future research' alongside impacts on policy, practice, society and the economy (Klautzer *et al.*, 2011). In a recent briefing, the Scottish Parliament (2018, p. 2) categorises impact in three ways: (1) direct or instrumental impact on policy or practice; (2) indirect or conceptual impact on the understanding of issues; and (3) capacity-building impact on technical or personal skill development. These examples show that impact may be conceived in a variety of forms, and may be manifest in different ways, from the cultural enrichment of people's lives to the creation of spin-out companies (Gibney, 2012).

2.2 Impact studies in Library and Information Science (LIS) research: bibliographic studies; evaluation studies; methods of evaluation

LIS researchers have regularly turned their attention to impact, and to impact measurement (Given *et al.*, 2015, p. 2). This is often the main focus of conferences and professional events. For example the 2015 Annual Meeting of the Association for Information Science and Technology (ASIST) was entitled *Information Science with impact: research in and for the community*, and *Big ideas - big impact - for big return!* was hosted by the International Library and Information Group in November 2018. Indeed entire conference series have impact as their main theme, including the biennial *International Conference on Performance Measurement in Libraries*³ established in 1995, and *Information: interaction and impact (i3)*, which has also taken place every other year since 2007.

Published outputs on impact and impact measurement from such events, as well as articles in the LIS journal literature, may be broadly classified into four categories: (1) bibliometric studies (or informetrics); (2) reports of evaluation studies of library and information services; (3) discussions of methods for the evaluation of library and information services; and (4) explorations of the relationship between LIS research and practitioner work in the domain. An overview of the first three categories is given in Table 1. Since the empirical study reported in this article falls into the fourth category, the characteristics of this body of literature are treated separately in section 2.3.

³ <https://libraryperformance.org/>

Table 1: Three categories of LIS studies on impact and impact measurement

Category	Coverage	Impact focus	Examples
<i>Bibliometric studies (or informetrics)</i>	<ul style="list-style-type: none"> • Academic impact of prior research • Quantitative analyses of publication collections, with heavy use of citation data and altmetrics • Consumption of research output • Most common and well – established type of LIS impact study 	<ul style="list-style-type: none"> • Bodies of scholarly work • Individuals, or groups of, scholars 	Ahlgren and Järvelin, 2010; Blecic <i>et al.</i> , 2017; Borrego <i>et al.</i> , 2018; Cronin, 1985; Cronin and Shaw, 2002; Drummond and Wartho, 2009; Folk, 2014; Haustein <i>et al.</i> , 2010; Oppenheim, 2007; Penta and McKenzie, 2005; Sugimoto <i>et al.</i> , 2017; Vakkari <i>et al.</i> , 2016; Zhao, 2010
<i>Reports of evaluation studies of library and information services</i>	<ul style="list-style-type: none"> • Societal impact of the use of resources accessed from library and information services • Library and information services conceived as contributing to impact • Common in healthcare librarianship 	<ul style="list-style-type: none"> • Immediate end user populations, e.g. decision making of users of clinical library services • Populations served by end users, e.g. patients 	Appleton <i>et al.</i> , 2018; Brettle <i>et al.</i> , 2011; Brettle and Madden, 2016; Burton, 1995; Garg and Turtle, 2003; Hernon <i>et al.</i> , 2015; Ikeda and Schwartz, 1992; Oakleaf, 2010; Marshall, 2007; Spacey <i>et al.</i> , 2015; Stone <i>et al.</i> , 2012; Stone and Ramsden 2013; Wavell <i>et al.</i> , 2002
<i>Discussions of methods for the evaluation of library and information services</i>	<ul style="list-style-type: none"> • Strategies and tools to evidence the impact of library and information services 	<ul style="list-style-type: none"> • Measurement techniques 	Abels <i>et al.</i> , 2004; Ayre <i>et al.</i> , 2018; Fried <i>et al.</i> , 2010; International Organization for Standardization, 2014; Johnson, 2010; Rooney-Brown, 2011; Hernon and Altman, 2010; Imholz and Arns, 2007; Lockyer <i>et al.</i> , 2007; Marcella <i>et</i>

			<i>al.</i> , 2018; McMenemy, 2009; Johnson, 2010; MacEachern, 2001; Markless and Streatfield, 2005; Melo and Pires, 2008; O'Connor, 2002; Poll and Payne; 2006; Rooney-Brown, 2011; Town 2006; Urquhart and Turner, 2016; Weightman <i>et al.</i> , 2009
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2.3 *Impact studies in Library and Information Science (LIS) research: the relationship between LIS research and practitioner work*

Published studies that fit within the fourth category identified above - *explorations of the relationship between LIS research and practitioner work in the domain* – and of which this study is an example, are less common than those represented in Table 1. This is despite the extent to which the LIS research and practitioner domains are ‘enmeshed’ (Marcella *et al.*, 2018, p. 616), and calls over the years for library and information services to be developed on the basis of sound research evidence (for example, Haddow and Klobas, 2004, p. 40; Hall, 2011; McKnight and Booth, 2010, p. 26; Partridge *et al.*, 2007, p. 2; Powell *et al.*, 2002, p. 49; Turner, 2002, p. 230). The ideal is that:

‘Research and practice, at least in theory, [should] enjoy a mutually beneficial relationship. Research should inform practice and contribute to the development of theory. Practice should benefit from research findings (particularly where those findings go towards improving the product or service provided by practitioners) and raise more questions for research’ (Haddow and Klobas, 2004, pp. 29-30).

A key concern expressed through much of this literature is that there exists a ‘research-practice gap’ in LIS, often characterised as a mutual lack of understanding between practitioners and researchers. Although identified as long ago as the early twentieth century (see, for example, Williamson, 1931), LIS researchers continue to draw attention to the distance between the two parties, and the challenges that this poses (see, for example, Ardanuy and Urbano, 2017; Bawden, 2008, p. 420; Bowler and Large, 2008; Feather, 2009, p. 173; Klobas and Clyde, 2010, p. 237; Kloda *et al.*, 2014, p. 30; McMenemy, 2010; Ponti, 2008, p. 265; Sonnenwald *et al.*, 2009, p. 194). It has been noted that:

‘Too often the gap between what researchers do and what practitioners and even the general population understand is miles apart, creating a paradox. Researchers develop theory for use in real world situations, but practitioners reject because it seems to have no basis in reality.’
(Bowler and Large, 2008, p. 45)

This issue is not unique to LIS. Research-practice gaps have also been identified in other professions such as teaching, social work, nursing, policing and management (Booth, 2003, p. 3; Fyfe and Wilson, 2012, p. 306; Haddow and Klobas, 2004, pp. 29-30; Kratcoski, 2012; Pfeffer and Sutton, 2006; Wilkinson *et al.*, 2012). Cherney *et al* (2012), for example, bemoan that 'In the field of education... academic research rarely has a policy impact and often fails to meet the needs of policy-makers and practitioners' (p. 23).

A number of reasons have been forwarded to account for the research-practice gap in LIS. These are summarised with reference to related problems in Table 2 below. While not a focus of this paper, it is worth noting that the roots of some of these problems have been considered in prior work. For example, it is well known that academic researchers are motivated, and often driven, by frameworks for research established by external bodies, and the role of these bodies in encouraging particular types of research and influencing research design has been explored in prior research in LIS (Bornmann, 2013, p. 230; Marcella *et al.*, 2016, p. 373, p. 370, p. 380; Marcella *et al.*, 2018, p. 610). These include REF (cited above) and internal incentive structures within universities that have traditionally rewarded excellence in research without reference to its application in practice, nor to its impact.

A more general issue of relevance here is the notion that research generates knowledge as a 'product'. One set of actors transfers this 'product' to a second set of passive consumers, who are then expected to implement it. This 'linear model' of research (Best and Holmes, 2010, pp. 146-147) fails to recognise that the 'consumers' of research can play a more active role. For example, further insight could be derived from links and exchanges between the two communities, if the model of dissemination were considered more as a relationship between the parties involved.

Table 2: Accounting for the LIS research-practice gap

Why is there a research-practice gap in LIS research?	Examples of related problems
The practitioner audience is not receptive to LIS research	<ul style="list-style-type: none"> • The authors of reports of academic research appear unaware of the priorities and job demands of practitioners • The authors of reports of academic research produce outputs that are irrelevant to needs of practitioners as services providers • Practitioners experience information overload and are too short of time to make sense of poorly written research outputs • Much published research is so context-specific that it cannot be generalised to other environments
The means by which LIS researchers disseminate their research are ineffective	<ul style="list-style-type: none"> • The authors of reports of academic research often fail to draw direct attention to the implications of their research for practice • The authors of reports of academic research rarely provide recommendations for practice • The publication of research outputs is not timely • The authors of reports of academic research publish in journals that are not accessed by/accessible to practitioners
LIS researcher and practitioners have few opportunities to engage together on the theme of LIS research	<ul style="list-style-type: none"> • Unless they have been directly involved in it, librarians rarely make use of research

(Sources: Berg *et al.*, 2009; Bowler and Large, 2008; Eve and Schenk, 2006b; Feather, 2009; Haddow, 2010; McNicol, 2004; Ponti, 2008; Powell *et al.*, 2002; Schögl and Stock, 2008; Sonnenwald *et al.*, 2009; Turner, 2002.)

In 2011 the UK Library and Information Science Research Coalition funded a study to address some of the issues outlined above. The *Research in Librarianship Impact Evaluation Study* (RiLIES) examined the characteristics of research projects acknowledged by the UK practitioner community as having delivered impact (Cruickshank *et al.*, 2011). Five funded LIS research projects – all of which were identified in a nationwide online poll as ‘impactful’ - were treated as case studies for investigation. The research team first sought to identify the factors that enhance (or reduce) the likelihood that LIS practitioners will consult and use research findings produced by LIS researchers. The preliminary findings were then discussed by practitioners in three sector-specific focus groups (public, academic, and healthcare), and subsequently validated in a second online poll. Eleven recommendations emerged from this research. These relate to the ways in which:

- Research projects are conceived and planned - for example, attention should be paid to sectoral difference in LIS practice to ensure project relevance
- Practitioners participate in the research process - for example, their engagement should be sought from the planning stage
- Findings are disseminated - for example, dissemination strategies should make provision for taking findings directly to the practitioner community, rather than expecting its members to access them through the academic literature
- Practitioners are nurtured as an audience that is receptive to implementing research findings in practice - for example, on-going engagement with research should be form part of practitioner's continuing professional development (CPD).

In the second part of RiLIES, these recommendations were fed into the development of support materials for LIS researchers keen to ensure the appreciation of their work by the practitioner community. While the locus of this work was LIS, the recommendations generated in both parts of the study are applicable elsewhere. Indeed some of the recommendations are similar to those found in other domains where the nature of the relationship between researchers and practitioners has been identified as important to the question of whether or not research delivers impact. For example, amongst other advice, environmental scientists Reed and Attlee (2014) also recommend using multiple modes of communication to engage with stakeholders.

Two key conclusions may be drawn from this analysis of the literature on the relationship between LIS research and practitioner work. First, there are several barriers to practitioner engagement with relevant research. Second, as a consequence, knowledge generated from research that could lead to innovations in the workplace, and improvements in services provision, remains unexploited, and practitioner/services needs are distanced from the LIS research agenda. The empirical study discussed below is a contribution to this body of work on the relationship between LIS research and practitioner work in the domain. Here is presented an evaluation of the impact of a specific intervention that was initiated in the UK to narrow the gap between LIS research and practice.

3 The context of the empirical study: DREaM and DREaM Again

The main goal of DREaM was to develop a UK-wide network of LIS researchers through the delivery of five events over a period of twelve months. These comprised a launch conference held at the British Library in London on July 19th 2011, then three linked workshops focused on research methods training on October 25th 2011 (Edinburgh Napier University), January 30th 2012 (British Library), and April 25th 2012 (Edinburgh Napier University). A concluding conference was the final event, held at the British Library on July 9th 2012.

Two hundred and forty-six people participated in the DREaM events in person. A further remote audience participated at the periphery through the consumption of online content generated over the course of the project. This content took the

form of dedicated pages and blog posts on the LIS Research Coalition web site at <http://lisresearch.org>, slide decks posted to SlideShare, videos hosted on Vimeo, audio material shared on SoundCloud, and around 800 hash-tagged tweets.

Places were made available for 35 people to join the core of the DREaM network as members of the workshop cadre. When these 35 signed up for the programme, they committed to participate in *all* three linked workshops⁴. In the workshop sessions a wide range of techniques was evaluated beyond those most commonly deployed in LIS research. They were led by experts on the topics covered in each respective session. Half the presenters were active LIS researchers; the rest came from a range of academic disciplines including, for example, computing, psychology, and social policy. The workshop session themes are summarised in Table 3, with full details available on the LIS Research Coalition web site at <https://lisresearch.org/dream-project/dream-workshops>.

Table 3: workshop sessions

Theme	Workshop 1	Workshop 2	Workshop 3
Broad research approach	Ethnography	User involvement in research	Horizon scanning
Quantitative method	Social network analysis	Webometrics	Data mining
Qualitative method	Discourse analysis	Techniques from history	Repertory grids
Research practicality	Research ethics and legal issues	Tying research output to policy	Increasing research impact

In addition, there was an ‘unconference half hour’ at each workshop. During this slot participants were invited to give updates on their latest research activity in short unscripted presentations of under 10 minutes.

An early intervention to measure the impact of the participation in the DREaM workshops amongst the cadre was implemented at the end of the workshop series in 2012 (Brettle *et al.*, 2012). The findings of this Critical Incidents Analysis indicated a substantial increase in the theoretical knowledge of cadre members, limited application of new skills learnt at the workshops, greater confidence of individuals in respect of their status as researchers, and widened networks across the group.

There was also early anecdotal evidence of the impact of DREaM. For example, in 2013 Facet published a new book on methods for LIS practitioner-researchers entitled *Research, evaluation and audit* (Grant *et al.*, 2013). The first editor of this book was a member of the DREaM cadre, and a third of the book’s contributors had been associated with the wider activities of the LIS Research Coalition between 2009 and 2012. Similarly, a number of DREaM cadre members had

⁴ 33 (rather than 35) names feature on the DREaM cadre web page at <https://lisresearch.org/dream-project/dream-workshops/dream-workshop-cadre>. This is because two people who initially signed up for cadre membership – a public librarian and an academic – withdrew from the programme.

taken the lead in organising events focused on LIS research after completion of the workshop programme and had involved peers from the DREaM project in their implementation. These included, for example, the major international conference of the European Association for Health Information and Libraries (EAHIL), which was held in Edinburgh in June 2015.

Klautzer *et al.* (2011) suggest that impact is best evaluated between two and ten years after a project end. This gives distance in time for impacts to be felt, yet sufficient proximity for memories still to be fresh and supporting evidence accessible. Thus three years after the conclusion of the DREaM project advantage was taken of further opportunity to assess its impact formally in a study named DREaM Again. Its focus was five research questions:

- RQ1: Have the DREaM workshop participants (i.e. the cadre members at the core of the network) innovated in the workplace since 2012?
- RQ2: Has their post-DREaM research determined services provision or influenced the LIS research agenda?
- RQ3: To what extent can they point to any impact of their post-DREaM research on end-user communities?
- RQ4: Has the DREaM network opened up new opportunities for their research?
- RQ5: Do they continue to operate as a network?

Detailed findings for RQ5 are explored in an earlier article (Hall *et al.*, 2018), in which the endurance of a loose, persistent network of cadre members - where social ties are more important than work ties - is reported. The DREaM Again findings as related to RQ1-4 are considered here in this article as a second output from the study.

4 Methodology

4.1 Challenges associated with impact research

Tying the output of research projects to practice in an attempt to measure its impact is problematic across many disciplines (Fairbairn, 2018; Ternouth *et al.*, 2010, p. 6) including LIS (Given *et al.*, 2015, p. 5; Kloda *et al.*, 2014, pp. 31-32; Marcella *et al.*, 2016, p. 382).

Isolating impact is a key issue (Klautzer *et al.*, 2011). Reasons for this are varied. For example, research from an unexpected domain often has a bearing on the practice in another (Feather, 2009, p. 179; Marcella *et al.*, 2016, p. 382), and this may not be known by the originators of the research in question (Bornmann, 2013, p. 230; Given *et al.*, 2015, p. 5; Upton, 2014, p. 359). For instance, LIS research on the history of the book has led to the development of new resources and access to other knowledge (Feather, 2009, p. 176). Equally some research endeavour does not focus on immediate applicability (Scottish Parliament, 2018, p. 4), yet may have far reaching consequences. In medicine, for example, it has been estimated that it takes 17 year on average for evidence-based findings to

reach clinical practice (Balas and Boren, 2000). Defining actual measures is also problematic (Bornmann, 2013, p. 230; Given *et al.*, 2015, p. 2; Hernon and Schwartz, 2015; Marcella *et al.*, 2018, p. 616).

A further issue noted in the LIS literature is that practitioners are generally unaware that new learning such as that gained from attending a training event may be based on mediated research findings (Eve and Schenk, 2006a; Haddow and Klobas, 2004).

4.2 Implementation of DREaM Again

Taking into account the challenges of designing impact studies (as noted in Section 4.1), data from the cadre membership that could be analysed to generate indicators of impact as connected to the activities of the data subjects (as advocated by Struck, 2018) were gathered for DREaM Again. This was achieved primarily (1) by an online survey implemented using NoviSurvey, and (2) from focus group discussions. Some additional data were also supplied by DREaM cadre members by email and telephone.

All the cadre members who began the DREaM programme of workshops (n=35) were eligible to take part in the DREaM Again study. In the event, 32 provided useable data for analysis. The thirteen librarians in this group came from a range of sectors, with the representation of academic and public librarians reflecting the proportions of UK library practitioners known to work in higher education and for local authorities, as noted in the CILIP/ARA workforce mapping project (Hall *et al.*, 2015c). Beyond these two main employment sectors, there was strong representation of government, health, and national libraries. This does not match the spread of employment in these sectors at national level in the UK, and is at the expense of other specialist areas such as commerce, law and the third sector. Also amongst the respondents were 6 academics and university researchers, 8 PhD students, and 5 'others' (for example, independent consultants, officials in LIS professional bodies). All those who supplied data were assured that their responses would be anonymised in the outputs of the project, and that no participants would be identifiable in any reports generated from DREaM Again.

The format of the survey allowed for the collection of data related to all five research questions noted above, plus demographic data. The survey questions of most relevance to RQs 1-4 (as discussed in this paper) were designed to establish:

- The extent to which the DREaM cadre members had implemented their learning from the twelve workshop sessions
- The theme and format of any research outputs that the DREaM cadre members had disseminated post-DREaM
- The perceived impact of any research that the DREaM cadre members had undertaken since DREaM workshop participation as related, for example to policy formulation, the LIS research agenda, or information services provision
- The involvement of DREaM cadre members in new research initiatives

since the end of the programme. These could include, for example, writing grant proposals, winning research funding conducting new research, peer reviewing, and/or organising research-related events

- Any changes to the personal circumstances of the DREaM cadre members in terms of job role and/or qualifications

The formatting of the questions required the participants to first select survey responses from a choice of pre-determined answers. The option of also providing further details in free text allowed for the collection and analysis of qualitative data, as advocated by Given *et al.* (2014) for work of this nature. Following piloting of the survey, it was live for four weeks in June and July 2015. In total 29 participants provided usable survey responses.

There were ten focus group participants. Six joined the London focus group: two librarians; two PhD students; two 'others'. In Edinburgh there were four focus group participants: two librarians; one researcher; and one PhD student. The discussions at the focus groups centred on the value of individual training sessions at the workshops, and the extent to which any learning from these had been implemented in practice. For example, the focus group participants:

- Spoke about the research outputs that they had disseminated since their participation in DREaM
- Considered the degree to which their own research post-DREaM had delivered impact as related to services delivery or policy formulation, both directly and indirectly
- Reflected on the influence of the implementation of the DREaM workshop series on their own approaches to event organisation

The focus group conversations were audio-recorded, and a scribe also took notes during the meetings. The focus group data were then transcribed for manual coding and analysis. This was completed by two of the co-authors of this paper, with checking by the third.

4.3 Limitations

The design of the study was rigorous across all stages, including methods selection, data collection, data analysis, and interpretation. This resulted in a successful implementation of the project. However, there are limitations to the approach undertaken that are worth addressing here. First, it should be recognised that just a small portion of the full population associated with the DREaM project provided data for analysis in this study. Only the cadre members at the heart of the programme were invited to take part. A more comprehensive study would have extended the invitation to the other 211 individuals who participated in person at one, other, or both of the DREaM conferences. Furthermore, although it would have been more challenging to reach them, data collected from a sample of others who have used the resources generated by the DREaM project remotely for developing their learning about, and engagement in, research could have provided valuable additional insight. For instance, it would be interesting to explore the statistics for the consumption of online content.

Why, for example, has the presentation on horizon scanning⁵ on Slideshare been viewed so many more times than the others? Thus inclusion of a broader set of data subjects in the study would have provided the opportunity to explore the wider impact of the programme beyond the narrow focus of the cadre members. This would have also allowed for consideration of its influence on a broader range of LIS research activities, including efforts to strengthen the links between LIS researchers and practitioners in Australia under the auspices of Library and Information Science Australia (LISRA) (Library and Information Science Australia, n.d.).

A number of challenges presented themselves in respect of the data collected for analysis. One initial issue was the level of detail requested of the study participants in their survey returns. This was especially pertinent to those who were very research-active in the period under review, and thus had much to record. Indeed some more prolific data subjects were found to have under-reported their research activity when the data supplied in their survey responses were matched with details in publicly available CVs and publication lists. (This has parallels with findings of unreciprocated network relationships discussed in Hall *et al.*, 2018.) Even so, at the data analysis stage it was realised that additional data would have been useful to the study to investigate particular issues in greater depth. For example, in respect of RQ4, although the data collected could be analysed to provide an overview of collaborative research communication activities amongst cadre members (see Table 4 below), it was not sufficiently detailed to allow an analysis of this activity by job role. Similarly, data on any collaborative activity between cadre members and LIS researchers and practitioners who were not involved in the DREaM project would have served to benchmark the intra-cadre levels of collaboration reported in this article. A further issue relates to the secondary reporting of impact. In studies such as this there is greater confidence in data that relate to study participants themselves (in this case, for example, on their own research outputs) than those with whom the study participants interact (i.e. service end-users in this instance).

A third limitation of the study relates to the question of attribution. Other factors will have influenced the development of the DREaM cadre members as researchers in the period under review. This is especially true of the PhD student participants whose progress is subject to training needs assessments and meeting knowledge gaps through their university programmes. In addition, the individuals who took part in this programme were highly motivated. It might be argued that they would have participated in activities related to developing their research learning and engagement whether or not the opportunity to participate in DREaM had been on offer. The one difference is that these activities would not have been undertaken in collaboration with the other cadre members, unless they had chance contact through other means.

⁵ <https://www.slideshare.net/LISResearch/dr-harry-woodroof-horizon-scanning> 18,383 views on 4th December 2018. The next most popular set of slides is that for webometrics at <https://www.slideshare.net/LISResearch/mike-thelwall> with 4,683 views.

5 Findings

5.1 *Cadre research profile in 2015: involvement in the execution of research and the communication of research findings*

The majority of the 29 survey respondents were actively involved in research projects at the time that data were collected for the DREaM Again project. Since 2012, a third had led research projects, and amongst them were two cadre members who had shared the Principal Investigator role for the same project. Almost half (13/29) had participated in research as team members, i.e. other than as project lead. Of these, three stated that they had completed this role with other members of the cadre. Nine had contributed to grant proposal writing, of whom six had won research funding.

The themes of the research projects undertaken were wide-ranging. As anticipated, many were related to LIS, on topics such as data protection, information literacy, and knowledge management. However, the project themes also covered wider areas of enquiry, including cultural heritage, economics, employability, law, politics, psychiatry, and social justice.

The majority of cadre members had also communicated their research. Dissemination activities ranged from delivering presentations within their own organisations to publishing articles in international peer-reviewed journals. In total 87 research outputs were recorded in the survey responses. Thus DREaM cadre members reported having produced 'on average' 2.8 outputs in the three year period under review.

The number of cadre members who recorded undertaking research communication activities in their survey responses is presented in Table 4, together with a note of the number of cadre members who reported collaborating with another member of the group in such endeavours. Here it can be seen that they were more active in presenting their work at events, rather than as publications. It is also worth noting that although partnerships in the collaborations related to communicating research included practitioners, the majority of participants were from academia.

Table 4: research communication outputs

Format of research communication	Outlet	No. of cadre members who had undertaken such an activity	With other cadre members
Presentation	Internal event	16	2
	Regional event	10	-
	National event	13	4
	International event	13	2
Publication	Journal article	15	3
	Book chapter	6	1
	Book	2	-

In addition, 16 cadre members had used social media hosted by others to communicate their research (one with another cadre member), and 14 deployed social media feeds of their own for the same purpose (three with other cadre members).

5.2 Adoption of research methods explored in DREaM workshop sessions and the generation of research outputs

The DREaM cadre members identified that the content of the workshops bore influence on the production of their research outputs in 72 cases, as summarised in Table 5.

Table 5: Influence of research methods sessions on content of research outputs

Ranking	Topic	No. of outputs influenced	Session category
1	Research ethics and legal issues	16	Research practicality
2	Increasing research impact	14	
3	Tying research output to policy	7	
4	Horizon scanning	6	Broad research approach
5=	Ethnography	5	Broad research approach
	Social network analysis	5	Quantitative method
	User involvement in research	5	Broad research approach
8=	Data mining	4	Quantitative method
	Discourse analysis	4	Qualitative method
10=	Repertory grids	2	Qualitative method
	Research techniques from history	2	Qualitative method
	Webometrics	2	Quantitative method
Total instances of session influence		72	

As might be anticipated, Table 5 shows that the sessions devoted to research practicalities were claimed to have had the greatest impact (in terms of being 'most used'). Equally, with the exception of Social Network Analysis, those on more specific methods were cited the least.

In order to assess the value of each research methods session to the production of these outputs, participants in the study were also asked to score the level of influence of each. Here they used a scale of 1-3, where 3 represented the highest influence. The figures assigned to each session were then added and averaged to provide an 'influence score' for each session. These scores are displayed in Table 6. The top score is 2.24, the bottom is 1.50, and the average 1.94.

Table 6: Relative value of research methods sessions to the production of research outputs

Ranking	Topic	Influence score
1	Increasing research impact	2.24
2	Social Network Analysis	2.13
3	Tying research output to policy	2.07
4	Research ethics and legal issues	2.06
4	Horizon scanning	2.06
6	Ethnography	2.00
6	Discourse analysis	2.00
8	Research techniques from history	1.83
9	User involvement in research	1.81
10	Webometrics	1.79
11	Data mining	1.77
12	Repertory grids	1.50

Again, it can be seen that with the exception of Social Network Analysis, research practicalities feature higher in the ranking than those on specific research techniques.

The combined rankings displayed in Table 7 provide a relative assessment of the impact of the sessions in terms of both frequency of use in research outputs and perceived value.

Table 7: Combined rankings of research methods sessions

Combined ranking	Topic	Output impact rank	Influence score rank
1	Increasing research impact	2	1
2	Research ethics and legal issues	1	4=
3	Tying research output to policy	3	3
4	Social network analysis	5=	2
5	Horizon scanning	4	4=
6	Ethnography	5=	6=
7	Discourse analysis	8	6=
8=	User involvement in research	5=	9
8=	Research techniques from history	10=	8
10	Data mining	8	11
11	Webometrics	10=	10
12	Repertory grids	10=	12

Where the influence score rank is higher than that for output impact, this may indicate that the learning from the session in question was considered of possible relevance to future work, but was yet to be applied. If this is the case, these findings imply, for example, greater use of Social Network Analysis in the future research projects of the cadre members.

It is also worth highlighting that simply because a session features lower down the rankings, this does not mean that the cadre members did not engage with it. For example, on the repertory grid technique a PhD student explained 'I had a good look into [the technique] before rejecting it' and an academic/research cadre member noted that he/she had submitted a funding application for a project that would use the technique, if awarded. Likewise on the webometrics session a librarian (academic) explained:

'Although I have not used [webometrics] in my own research, the introduction to sentiment analysis has been really helpful in allowing me to understand and participate in discussions about research methods drawing on social media data.'

Similarly, another librarian (health) said:

'[Webometrics are] incredibly interesting and I expect to be looking [at this] for a study that I will be leading which will look at usage patterns of clinicians' online information.'

It should also be noted that in some cases the survey respondents indicated the impact of individual research methods training sessions in more general terms, i.e. without reference to specific research outputs. For example, the content of session on ethics and legal issues was noted as having been applied in practice across a number of contexts including in PhD fieldwork, in PhD proposal work, in consultancy work, and in a Masters degree completed after the project end. In other cases individual sessions had prompted exploration of other techniques. For example, one PhD student cadre member explained:

'[The session on research techniques from history] led me to the <http://www.sigcis.org> email list, which influences my wider perspective.'

Table 8 provides a picture of research methods adoption and productivity in terms of research outputs according to the role groupings of the cadre members.

Table 8: Research methods adoption and outputs by cadre member role

Role	Number of techniques adopted (average)	Number of outputs (average)
Librarians	1.5	1.6
Academics and university researchers	3.3	5.6
PhD students	5.5	0.5
Others	4.0	-
Averages	3.6	1.9

It can be seen here that PhD students implemented the highest number of research techniques explored at the sessions, even though, on average, such practice resulted in few outputs. A possible explanation for this is that amongst those undertaking doctoral degrees, the primary focus is on PhD thesis production for the dissemination of research. In contrast, those from higher education in more senior positions than PhD students, i.e. academics and university researchers, benefited the most from technique adoption in terms of production of research outputs.

While the figures presented in Table 8 are low for the librarians, they are encouraging given that research is not normally considered an everyday activity of LIS practitioners in the UK, and reports indicate that their recent contributions to the literature have declined in numbers (Blecic *et al.*, 2017, p. 442; Marcella *et al.*, 2016, p. 373).

The lack of outputs from those in the ‘other’ category may be indicative of the type of roles in which their research is undertaken. For example, officers of professional bodies or independent consultants do not normally generate ‘traditional’ academic research outputs because the function of their research is for local applications, or the findings that they produce are commercially sensitive and are thus not made publicly available.

5.3 The impact of DREaM on opening up research opportunities for cadre members

As well as conducting and communicating their own research, three years after the conclusion of the DREaM Project the cadre members were engaged in a number of other research-related activities, as summarised in Table 9.

Table 9: Cadre member engagement in other research-related activities

Activity	Scope	No. of cadre members who participated in this activity	No. of cadre members who participated in this activity with another cadre member
Peer reviewing	Conference and journal papers	15	3
	Grant applications	3	1
Organising research-related events	Regional	9	2
	National	6	3
	International	5	3
Bidding for/winning external research funding	Contributing to writing of grant proposals	7	1
	Leading writing of grant proposals	7	-
	Winning research funding	6	2
Editing	Research-oriented journals or similar	4	1
	Books	2	1
Totals		64	17

Of note here is that 27% of the activities identified in Table 9 were executed as collaborations between cadre members. This indicates that the cadre members enjoyed research/career-related advantages due to their network membership. In their survey responses and at the focus groups they recognised that some opportunities opened up thanks to the relationships that they had established with one another over the course of the DREaM project. These included, for example, invitations to peer review conference and journal papers, or speak at events organised by fellow DREaM cadre peers. They also noted that some of these collaborations, such as one between an official of a professional body and another cadre member, would not have been initiated without DREaM.

The data on research communication outputs (summarised in Table 4) and research opportunity engagement in other research-related activities (summarised in Table 9) were examined to identify the cadre members who were involved in collaborations. This exercise revealed twelve cadre member collaborators at the core of the DREaM network. These twelve were also found to be the most productive cadre members in terms of the number of research outputs generated in the three year period, having been responsible for 52 of the 87 (60%) identified in the survey responses. This finding indicates that researchers who are engaged as collaborators are more likely to generate a higher number of research outputs than those who are not. This is perhaps not surprising given that collaboration represents shared effort: one librarian (academic) noted at a focus group 'If you're more connected, you're more

productive'. In the specific context of DREaM, it may also be claimed that a proportion of these research outputs may not have been generated at all had the collaborating cadre members not been brought together by the project.

5.4 *The impact of DREaM on personal professional development*

The DREaM Again study provided an opportunity for the cadre members to reflect on their personal professional development. The general value of the sessions was expressed by one of the librarian (health) participants:

'The themes presented continue to inform my thinking both in terms of my role as a health librarian, but also in my work in healthcare organisation as part of an information service which aims to close research-practice gaps in healthcare.'

Similarly another participant ('other') noted that DREaM encouraged the widening of research perspectives in respect of informing consultancy work. With reference to one particular session, he/she said that 'It highlighted a number of issues, and prompted me to research further'. These comments are significant given that a key goal of the project was to build capacity and capability in the development and implementation of innovative methods and techniques in undertaking LIS research (DREaM Project to support, 2010). More notable, perhaps, is the evidence that participants embarked on new initiatives, including committing to the completion of higher degrees:

'[DREaM] started off my first collaborative research project and enabled me to become more research-focussed' (librarian - health).

'Meeting the PhD students at the DREaM events contributed to my decision to do a PhD' (academic/university researcher).

The most commonly expressed opinion on the application of learning from the sessions, however, related to changed practices for bridging the research-practice gap in LIS. Having completed the programme the participants were now keen to pave a way for research findings to be disseminated more effectively to maximise the chances that their research efforts would deliver real impact. For example, a PhD student said that he/she looked for opportunities to publish in outlets with wider readership than academic journals, such as *The Conversation* and practitioner-orientated publications. Cadre members had also strengthened their visibility online, and paid more attention to the means by which they communicated their research, as illustrated in the quotations from two librarians below:

'It helped in terms of professional visibility at conferences, facilitation, and contribution to events, including on social media.'

'I [now] maintain an online presence and have joined several networks in order to bring my work into... other spheres of influence.'

Several participants in the DREaM Again study referred to the impact of DREaM on their levels of professional confidence. For example, some noted that with increased knowledge of a fuller range of research techniques, they felt more confident to converse with others about them. Another PhD student cadre member explained that participation in DREaM served to legitimise his/her identity as an LIS researcher, and act upon this:

‘Involvement in the project helped me develop confidence as an LIS researcher to go on to write successful bids and be an active part of the LIS research community.’

The comments on repertory grids and webometrics quoted above in respect of Table 7 also indicate increased confidence in skills of critical evaluation in respect of methodological choice.

More significantly in career terms, DREaM contributed to confidence building that resulted in applications for more senior job posts, as illustrated in the comments below:

‘[DREaM] gave me the confidence to go for more senior roles, and gave me a more thorough background in research’ (librarian - public).

‘DREaM contributed to the development of my research capability and profile, and has influenced my decision to seek a stronger academic role’ (academic/researcher).

One academic/researcher had no doubt that DREaM had a strong impact on his/her professional development:

‘I have been promoted... This required a considerable research portfolio and DREaM has contributed to this. Furthermore [two cadre members] provided references.’

Indeed 16 cadre members had successfully changed roles in the period since the end of the DREaM project. In 10 of these cases, they claimed, DREaM was a clear factor in this career success. Increased networking opportunities offered by DREaM and associated career advantages (as identified by Mowbray *et al.*, 2018), and the programme’s part in inspiring participants to disseminate the findings of their research more widely, are likely to have been contributory factors in these job role changes. This conclusion is drawn on the basis that these 10 cadre members enjoyed a higher than average number of continuing social and work-related network ties with other members of the cadre (Hall *et al.*, 2018, p. 860), and had produced a greater number of research outputs on average than their peers: 5.1 as opposed to 1.3 - nearly double the average of all cadre members of 2.8 as noted above.

5.5 *The impact of DREaM beyond the cadre*

Having considered the impact of DREaM Project on the research activity and outputs of the members of the cadre, and their professional development, it is worth reviewing the extent to which their involvement in DREaM contributed *beyond* the cadre participants.

The cadre members claimed impact for a total of 40 of their research outputs created in the period 2012-2015. The analysis of their survey responses show that they believed that:

- 20 of the 40 outputs had influenced policy
- 23 of the 40 outputs had determined services provision
- 15 of the 40 outputs had developed the LIS research agenda

Some of these claims were substantiated by examples. For instance, one librarian (academic) explained that research that he/she had completed following participation in the DREaM project had led to modifications of the physical layout of the library in which he/she worked, and had thus changed the way in which library services were delivered. Similarly, the decision to introduce Named Entity Recognition to a major digital resource on the basis of research by one of the PhD student cadre members, that had been inspired by the content of the one of the DREaM workshop sessions, was also claimed as returning impact. This was because the change led to improved user experience of the system. The extent to which such impacts can be considered a direct consequence of participation in the DREaM project, however, cannot be determined on the basis of data collected for this study. While it is likely that the 40 'impactful' outputs identified are amongst those represented in the third column of Table 5, only with more detailed survey responses would it be possible to confirm this.

Other examples provided by the cadre members in their survey responses were more convincing in demonstrating the consequences of their participation in the DREaM project and wider communities. For example, one noted that his/her institution had used Social Network Analysis to conduct a bibliometric study of co-authorship, and had encouraged students to use webometric techniques in their work after he/she had learnt about these techniques in the DREaM sessions. Similarly an academic/researcher highlighted how his/her work since DREaM participation had brought public library practitioners into debates around information literacy. One cadre member also highlighted that 'the impact of DREaM has been beyond LIS. There is use of DREaM in non-LIS work'. Here attention was drawn to a collaboration in which one member of the cadre invited another to join a group to help members of a local community to learn about social media.

In such cases it may be more appropriate to class the DREaM cadre members as research methods champions or evangelists, mediating between the DREaM programme and wider communities, rather than to make claims for these examples as genuine research impact. Nevertheless, however categorised, these examples still illustrate that even where this is no tangible research output from

participation in DREaM that can be attributed to a cadre member (such as a documented change in policy or a conference paper), its influence can be felt in the wider communities of services users, LIS colleagues, and beyond.

Finally it is worth noting the impact of DREaM in the format of events in which cadre members had played programme committee roles. The impact here was not generated by the research methods sessions, but by the way in which the DREaM events were delivered. DREaM cadre members copied and propagated some of the presentation techniques encountered on the DREaM programme, such as 'One Minute Madness' at the DREaM launch and concluding conferences, in their own delivery of events, and had also replicated the structured approach to event amplification. A librarian (academic) also pointed out that the decision had been taken at a major conference in which he/she was involved to reduce the number of lecture sessions in favour of more interactive workshop slots.

6 Discussion

The main findings of the study were generated from the analysis of data that was collected to address five research questions in total. Here they are discussed further with specific reference to RQs 1-4, and their relationship to the extant literature as analysed in Section 2.

6.1 Innovation, services provision, and end-user communities

RQ1 sought to establish whether the DREaM workshop participants had innovated in the workplace since 2012. There is evidence to show that this is the case, as noted in Section 5.5. However, it would be an exaggeration to claim this as a sole, direct consequence of cadre membership. Similarly, it is also difficult to ascertain the extent to which the changes in services provision reported by the LIS practitioner cadre members (RQ2) might be considered as resulting from DREaM participation.

There is perhaps a stronger case to be argued in respect of the cadre members' role in supporting the development of *people* (rather than services), for example in the encouragement of the use of Social Network Analysis and webometric techniques, as noted above. This finding is also important to RQ3 in that the most marked evidence of the cadre members' impact on end-user communities is as research methods champions or evangelists. A further finding of relevance here is the evident growth of confidence amongst the cadre members in their own knowledge and skills as researchers. It might be expected that this will lead to an emboldened approach to innovation in the future.

An unanticipated impact of DREaM Again is the extent to which the cadre participants innovated in the delivery of professional events by drawing on the techniques deployed by the DREaM project team. This may be classed as a form of service provision for their own communities of LIS researchers and practitioners.

6.2 *New opportunities for research and influencing the LIS research agenda*

The inclusion of RQ4 in the study allowed for an exploration of new research-related opportunities that had opened up to the cadre members due to engagement in DREaM, i.e. impacts related to capacity building that match the third category identified in the briefing noted in Section 2.1 (Scottish Parliament, 2018). Here it can be seen that DREaM had significant impact, particularly in the encouragement of research collaborations: around a quarter (27%) of research activities undertaken by the cadre members in the three years under scrutiny were executed collaboratively with at least one other DREaM cadre member. This is a notable finding given that few members knew one another at the start of the workshop series (for detail see Cooke and Hall, 2013, p. 796). It also bodes well for the future on the basis that partnerships between academics and research users are the most important factor that determines whether or not research is used by decision-makers (Wilkinson *et al.*, 2012, p. 314).

The extent of collaboration amongst cadre members had an impact on the publishing activity of the group members. There are strong indications that a substantial proportion of the research outputs identified in the study may not have been generated at all had the cadre members not been brought together by the project. That many of the *practitioner* members of the cadre were encouraged to publish as a result of their involvement in the DREaM programme is also noteworthy, especially given recent reports of declining publishing activity in the LIS journals amongst sectors of the librarian community (see Blečić *et al.*, 2017, p. 442; Marcella *et al.*, 2016, p. 373). This finding can be related to the reports of increased network centrality and stronger social ties of practitioner participants over time, as discussed in Hall *et al.* (2018).

A further impact of the levels of collaboration may also be related to RQ2. This is because closer relationships forged between LIS practitioners and researchers allows for the opening up of dialogue on research priorities as viewed from a practitioner perspective, as well acknowledgement of the research-practice gap and a commitment to close it. (These potential benefits were noted almost two decades ago by respondents in a study on research engagement of practitioner members of US-based LIS professional bodies (Powell *et al.* in 2002, p. 67)). Such findings have previously been evidenced in other practitioner domains. For example, in the social work literature Wilkinson *et al.* (2012) have argued that face-to-face and personal contacts may be essential to initiating and sustaining research (p. 316), and generating research-born opportunities for discussion and reflection (p. 318). Equally, writing in the domain of education, Cherney *et al.* (2012) note that 'research uptake is enhanced through mechanisms that improve the intensity of interactions between academics and end users... the dynamics of research collaborations have a significant bearing on research use' (p. 23). Here, within a discipline that has been criticised for its tendency towards fragmentation (Cooke and Hall, 2013, p. 789) and suffers from a research-practice gap (see Table 2), it has been shown that a planned initiative to bring researchers and practitioners together has been successful in bridging the gulf between the two communities.

Participation in the programme has also been shown to have had an impact on the execution of research undertaken by the cadre members in that (a) it influenced methodological choice and research design decisions in project work, and (b) learning from the workshops was applied in the majority of research outputs identified in the three-year period. That over half the cadre members were involved in peer reviewing of conference and journal papers, around a quarter in bidding for research funding, and just over a fifth had won research funding demonstrates that the cadre members took advantage of research-related opportunities open to them following completion of the DREaM.

The more marked evidence of impact in respect of RQ4 reflects the findings of earlier studies that have attempted to trace impact. For example, in the ESRC Future of Work programme it was easier to identify impacts related to the career development of those involved in research, than impacts related to policy changes (Klautzer *et al.*, 2011).

7 Practical implications of DREaM Again

There are a number of practical implications of this study that are worth recording. The first is that the analysis here proves that it is worthwhile to explore the impact of the activities of networks alongside consideration of the development of their topologies through social network analyses (as presented for DREaM in Hall *et al.* (2018)). This helps inform research councils and other funding bodies of the long-term value of funding networking grants as part of their portfolio, offering insight beyond simply answering question of whether or not a network endures beyond the funded period.

Similarly, the assessment of the relative value of different type of session at the DREaM workshops points to the merit of their inclusion in future initiatives of this nature. The findings here indicate that, in general, workshop sessions on wider topics (research practicalities and broad research approaches) are more useful than those on the more specific (particular quantitative and qualitative methods) (see Table 7).

A further practical implication pertinent to network development amongst researchers and practitioners relates to bridging of research-practice gaps. At the very least, the bringing together of researchers and practitioners in DREaM raised the awareness of individuals of the drawbacks of the research-practice gap and seeded efforts to break down barriers between the two camps. In many cases this was achieved within three years of the project end through collaborations across the group (see Table 4 and Table 9) (and beyond.⁶) While Kloda *et al.* identified in 2014 that the provision of research reports in practitioner publications was the only proven strategy for narrowing the LIS research-practice gap, it is now clear that there exist a second: to create researcher-practitioner networks.

⁶ For example, five of the nine UK members of the International Programme Committee for 10th International Evidence Based Library and Information Practice Conference (EBLIP10), which takes place in Glasgow in June 2019, are cadre members.

The study also adds to the debate on means of identifying and measuring impact. It does so through reporting the stages undertaken to generate a meaningful overview of the cadre's application of learning from the workshops to practice, e.g. in the production of research outputs. This is achieved against a discussion of the difficulties of identifying and measuring impact as reported in the extant literature, and the limitations of this particular implementation. As such, it responds to calls such as that of Marcella *et al.*, (2016, p. 382):

'... for LIS as a whole there is a debate to be had as to how the discipline can maximize impact and perceived value in order to build a successful future for the discipline in the context of tightening resources' (Marcella *et al.*, 2016, p. 382).

8 Conclusions and further work

Despite the difficulties associated with identifying and translating impact (as noted, for example, by Marcella *et al.*, 2016, p. 378), the findings presented here demonstrate the value of the DREaM project in encouraging the application of learning about research methods to practice. In the first study of this kind into the outcomes of a UK research council networking grant investment, it has been shown that in the three years after participation in the DREaM programme, the network members innovated in the workplace, and made changes to services provision that have been felt at the level of end-users of library and information services. In addition, given that this analysis was limited to data supplied only those at the core of the network (see Section 4.3), it is not unreasonable to argue that a more extensive study would reveal the impact of DREaM to be greater than is reported here.

The strongest messages from this rigorous analysis, however, relate to the research-related opportunities that opened up for the cadre through active participation at the core of DREaM. As a novel contribution to knowledge on the relationship between LIS research and practice, it has been demonstrated that a network grant of this nature can bridge two associated communities to the benefit of each party, and to those that they serve. This finding is significant because, to date, only one other strategy for narrowing the LIS research-practice gap has been proven empirically to be effective (i.e. the dissemination of evidence summaries, as noted in Section 7). In broader terms, the strong messages presented here about the benefits of collaborative interactions between academic researchers and practitioners are likely to be applicable across a range of subject domains and geographies, and are worthy of further investigation.

The findings presented here could be extended with the analysis of additional data to explore in detail other related themes. For example, the co-authoring activities of the cadre members in academic-practitioner partnerships - both in the period covered here and beyond - would add to the extant literature on practising librarians as authors in general (e.g. Blecic *et al.*, 2017; Folk, 2014;

Penta and McKenzie, 2005) and as co-authors with academics (as introduced by Borrego *et al.*, 2018).

In 2019 a new collaborative network of LIS researchers and library and information professionals will be established in Scotland, supported by a Royal Society of Edinburgh network grant. Four knowledge-exchange network events on the theme of maximising the value and impact of LIS research will be held for around 30 participants between July 2019 and July 2020, under the auspices of the Research Impact Value and LIS (RIVAL) project. At the same time an extensive online presence for the project will be created to allow remote participants to benefit from its activities and outputs. This new project will address further the issues associated with the research-practice gap in LIS. It will offer additional opportunities for the learning from the DREaM project discussed here, as well as draw on the recommendations for strong network development noted in Hall *et al.* (2018, pp. 857-858): to build social capital amongst the membership through the facilitation of social interactions unrelated to work; to deploy social media as a form of network infrastructure; to nurture core network members for long-term network sustainability. This will be applied for the benefit of both the LIS professionals (both academic and practitioner) and the end users that they serve.

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