

Labelling the expertise of STEMM research communication advisors

Sylvia Mackie¹ and Julie Holden²

1. Office of Student Engagement, Swinburne University of Technology

2. Faculty of Information Technology, Monash University, Melbourne, Victoria, Australia

Email: smackie@swin.edu.au, julie.h.holden@monash.edu

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Research communication advisory roles are increasingly common in higher education, and they play an integral part in supporting, strengthening and augmenting the developmental work of academic supervisors in higher degree programs. Like many third space professional roles, however, the role is emergent and has not to date been well defined. This study sought to better articulate the role of a Research Communication Advisor (RCA), in particular for those working with higher degree by research (HDR) students in the disciplines of science, technology, engineering, mathematics and medicine (STEMM). Communication support provided for emerging STEMM researchers needs to take into account their varied entry pathways, their cultural and linguistic diversity, and their global mobility, along with different disciplinary expectations around the ways they communicate. STEMM HDR candidates are also facing increased pressure to publish during candidature, as well as meeting the usual final thesis writing requirements. To understand the ways that STEMM RCAs support this cohort, we surveyed practitioners in a range of Australian universities and profiled them in terms of the relationship between their professional expertise and their work. We identified three key areas of expertise – relational, pedagogical and contextual. Based on our analysis we recommend that STEMM RCAs' roles be enhanced by the establishment of a network of professional practitioners to formalise professional guidelines and standards. Further, by making explicit RCAs' professional practice, we highlight the value of investing in these roles as part of the strategic development of higher degree programs.

Key Words: STEMM research communication, researcher development, doctoral training, third space practitioners, academic writing, pedagogical content knowledge.

1. Introduction

Now, more than ever, 'third space' expert practitioners, who work between the academic and professional spheres of activity in higher education, are being called on to articulate what their roles involve, for the purposes of continuity or change management, to avoid talent waste, and for strategic alignment in university settings. However, many third space practitioners have 'portfolio' professional identities, encompassing a range of employment responsibilities and functions, which makes this articulation process difficult (Whitchurch, 2008). One such polymorphous role is that of Research Communication Advisors (RCAs), who usually work with higher degree by research (HDR) candidates and early career researchers. As a preliminary definition of *research communication*, we draw on and extend Carter and Paulus's definition (2010), taking it to mean

the transforming of complex research results into a language and form that the target audience can clearly understand. Research communication has emerged as a specific function in universities in recent decades (Cargill, 2004) and the ability to communicate research broadly and well has become a core attribute of knowledge workers in this arena – from emerging researchers to vice-chancellors. Because of this, various research communication roles have been created, following the rise of diverse third space and ‘unbundled’ academic roles more generally (Evans, Henderson & Ashton-Hay, 2019; Macfarlane, 2011; Whitchurch, 2013). In keeping with research aimed at better defining the work done in higher education and the knowledge held by practitioners (e.g., Halse & Malfroy, 2010; Evans et al., 2019; Malkin & Chanock, 2018), this Australian study sought to capture the professional dimensions of the RCA role in ways that could prove useful for practitioners in other academic advisory roles and the academic third space more widely.

In the past, the task of helping HDR candidates improve their communication output fell solely to their supervisors (Guerin et al., 2017; Morton, Storch, & Thompson, 2014). However, academic employment and changes to research supervisory practice, especially in STEMM fields, have meant that increasingly, universities provide further support in the form of research communication advisory staff (Cargill, 2004; Lee & Aitchison, 2009). These are not always given the title of RCA – indeed their title and position description may vary considerably, depending in part on how university leaders interpret the overarching goal of better research communication and what they perceive the needs of their emerging researchers to be.

In general, in the authors’ experience, RCAs can have academic, advisory or consultancy roles, in faculties, libraries or other central units, where they usually develop, teach and/or coordinate programs to help emerging researchers build their self-efficacy as communicators across the range of relevant research genres. RCAs also model and encourage excellence in research communication and make sure researchers receive guidance and high-quality instructive feedback on research reports, publications, presentations, theses, career promotion, funding applications, outreach and other research outputs (Lee & Aitchison, 2009). Because of the composite nature of RCAs’ backgrounds, their roles are sometimes combined with other academic or professional work; they can also be subsumed under the broader category of academic literacy, or, particularly in the UK, under the aegis of ‘researcher development’ (Daley, Guccione & Hutchinson, 2017).

RCAs’ roles can be designed to support and improve research communication in a generic sense, or they can take into account disciplinary groupings. We are investigating practitioners whose work has a STEMM focus because we think there is a need for better definition, support and professional development among this group. We think this is likely to also be the case in countries other than Australia, although we recognise that the nature of third space higher education work can vary in the global context, as can the structure and outputs of higher degrees themselves. For example, the PhD in Australia is centred solely on the writing of a thesis, without an oral defence as experienced in other academic settings, and particularly in STEMM fields there is an increased expectation that candidates will publish during their candidature (Mason, Merga, & Morris, 2020). In both international and local contexts, we know of general academic literacy networks (Malkin & Chanock, 2018) and special interest groups that bring together practitioners who provide generic doctoral writing support (Lee & Aitchison, 2009), but they usually have an implicit focus on Humanities and Social Sciences (HASS) disciplines and we are unaware of any professional networks specifically related to STEMM research communication. The significance of the STEMM field, however, is indicated by the fact that in Australia, the greater proportion of university research is in STEMM fields (Australian Government Department of Education and Training (DET), 2018) and, in addition, there is a high proportion of international STEMM doctoral candidates. This, along with the internationally collaborative nature of STEMM research endeavours more generally, has turned attention inevitably to cross-cultural and cross-linguistic factors affecting STEMM research communication in the global context (Luo & Hyland, 2019; Li, Flowerdew, & Cargill, 2018). Communication support provided for both local and international

STEMM HDR candidates therefore needs to take into account the cohort's cultural and linguistic complexity, as well as its diverse entry and employment pathways and the global mobility of emerging STEMM researchers.

At present though, there is a scarcity of shared documentation of STEMM RCAs' work. As far as we know, in Australia, no professional organisation takes a specific interest in it, although the authors have made early efforts to establish a network and the results of this paper represent a stage in its development. In establishing this network, we found we lacked an account of the role's function, especially in terms of its scope, the professional status of its practitioners, and its pedagogical approaches. We needed to act on Edwards's (2010, p.1) insight that third space practitioners are being called on to define their own practice, standards and identities, and they therefore have to "*label their own expertise*, recognise, draw on and contribute to the funds of expertise available and demonstrate a strong sense of their own identities as practitioners whose actions can make a difference in the world" [italics added]. We use our findings here to describe, discuss and clarify the STEMM RCA role's function. We provide insights that reflect and reinforce RCAs' identity as an integral part of researcher development, and argue for the establishment of a professional organisation.

2. Theoretical framework

The emergent 'third space', as theorised by Whitchurch (2008), can be defined as "new and emerging, or re-invented forms of university activities that transcend traditional academic and professional portfolio binaries ... creating new work engagements between academic and professional staff" (Veles, Boon, & Carter, 2017). Correspondences between definitions in the literature (Whitchurch, Locke, & Marini, 2019) and self-description in this study attest to STEMM RCAs being 'third space' practitioners.

Edwards and colleagues have debated how to characterise this emergent kind of work in more detail – how can it be defined and what criteria can be used to describe it? Edwards (2010, p. 1) has explored the notion of agency and the kinds of 'relational' expertise needed when practitioners "work increasingly across professional boundaries on complex problems with other practitioners and with clients". For Edwards (2010, p. 4), this defining and 'labelling' is an essential part of improving practice and demonstrating its value. Furthermore, as she notes, in emerging roles, standards are established by articulating previously tacit elements of what practitioners do. This involves making their professional values explicit.

We also refer in this study to Manoharan's (2020) concept of the third space 'polymath', where Manoharan links third space professional identity with the notion of the polymathic skill set, noting "The defining feature of polymathy is the ability to have proficiency and expertise across multiple fields". Manoharan (2020) argues that this body of expertise in the third space is 'key-shaped' (see also Bridgstock, 2015), in that individual practitioners may draw on different skills and experiences and may, crucially, possess expertise at different depths. Manoharan (2020) also cites Whitchurch (2008) in noting that "... the unbounded nature of their polymathic approach enables third space professionals to 'enter messy (...) space (...) working with, rather than being challenged by, ambiguous conditions'". However, as we found in our study, this 'unboundedness' can present its own challenges for RCAs.

More generally, this study draws on research on workplace activity, by Engeström and other activity theory researchers (Engeström, 2009; Yamagata-Lynch, 2010), who maintain that analyses of workplace and work-related activities must be contextualised in their institutional settings, to help researchers understand underlying systemic relations (and tensions). This is especially the case in settings where the work context is highly complex, such as universities and other research institutions.

3. Method

To establish the current state of STEM RAs working in higher education in Australia, we conducted the study in three stages: an online search of university websites; contact with the Association for Academic Language and Learning (AALL), which is the professional association for tertiary academic language and learning educators in Australia, and others with an active interest in the field; and consolidation of the data from the first two stages to recruit participants for the third stage, an online survey. The study was granted ethics approval in line with the home universities of both authors.

The first stage of the study was a web search of university websites across Australia to determine how the role of an RA was presented. The web search strategy was conducted in May to June 2019 and included using the site search function and different key words for the role reflecting Higher Degree by Research academic and communication support, including but not exclusive to research communication, STEM, academic language and HDR. We also explored University HDR pages for information about STEM HDR support. The search was restricted by what was publicly viewable on the University website (six universities of 40 in total were found to have publicly visible instances of these roles). We also found that while few RA roles were publicly visible on University websites, in some universities, there were multiple RA roles across different faculties. University intranets may hold further details of these roles, but our access was limited; hence, to broaden the search we invoked a second stage by making contact with the Association for Academic Language and Learning (AALL). This association holds a database of language and learning advisors who work in higher and further education institutions. AALL provided support by sending an email to all members, seeking practitioners working in the field of STEM HDR research communication advisory work and asking them to make contact. Contact details of educators working in STEM HDR RA positions were gathered from both sources and used to recruit participants for the final stage of the study, which was the online survey. For the purposes of this study, potential survey participants were defined as individuals who work in research communication with HDR students in Australian universities. In addition, we were particularly interested in the experiences of practitioners working exclusively with STEM research candidates.

A survey was designed to identify what kind of work STEM RAs do and what their areas of expertise are. To contextualise these questions, we further sought to capture the challenges this work presents, along with relevant aspects of RAs' training and professional experience. The survey was grouped into the following parts:

1. Questions about the role (seven questions)
2. Questions about relevant work relationships (five questions)
3. Questions about particulars of the work itself and its challenges (five questions)
4. Questions about training and professional development (eleven questions).

Most of the survey questions were binary, scale-based or selection-based; however, three invited a text-based response, particularly where we invited respondents to elaborate on 'challenges' (see the Appendix for details). A pilot survey was shared with two academics experienced in survey methods and we applied their feedback to further strengthen the questions.

The survey was disseminated using Qualtrics software and the online questionnaire was administered in late 2019 and early 2020. Potential participants were emailed an outline of the project and invited to take part. They were also invited to share the survey link with other RA educators in this area, enabling a snowball approach to further identify practitioners working in this area. We collected completed surveys with both quantitative data and qualitative data from 14 of 24 participants invited to respond. Despite the appearance of being a small sample size, the sample is proportional as the target population is a small specialist area. Because of this and the fact that many RAs in Australia are likely to know each other, we did not ask participants to identify

their place of work. We believe our choice of an anonymous survey as a method of data collection suited the target population, yet did not intentionally exclude any participation.

Overall, we conducted a mixed methods crossover analysis of the survey results (Onwuegbuzie & Hitchcock, 2015), aiming to capture similarities and differences in areas of professional expertise. The number of respondents meant that a statistical analysis would not be possible. However, even though all participants responded to the full set of questions, the data was manageable enough to undertake individual profile formation based on comparisons of answers and to group them in terms of features of RCAs' work and expertise. Our first pass therefore involved visual analysis of tabular and chart-based data, doing cross-comparisons of responses and looking for patterns across the range of participant response sets. Visualization techniques then allowed us to make star chart 'snapshots', and to sort them, based on how the responses clustered together (Yau, 2013). Interpretive analysis of the 'clusterings' suggested a re-categorisation of the question/response categories (which eventually became the 'sub-categories' and 'categories' of the analysis). Further analysis of the respondents' text-based responses allowed for triangulation of our interpretations to some extent, although participants responses were not often lengthy. We made three final profile sets (see Figures 1-3, below) which we characterised as the participants' main areas of expertise – 'relational', 'pedagogical' and 'contextual'. These are described below along with a discussion of the main commonalities and divergences. Overall, the crossover analysis was quantitative-qualitative and profile based, in that we used quantitative methods to reduce, display, correlate, compare and integrate the data into participant profiles, and we used qualitative methods to interpret, re-categorise and further compare and integrate components of the data, and finally to assert the main categorical correspondences discussed below (Hitchcock & Onwuegbuzie, 2020, p. 71).

4. Key findings and discussion

As Engeström (2007) states, "Each historical type of work generates and requires a certain type of knowledge and learning". In RCAs' work, however, this knowledge and learning has not been clearly described, perhaps because the nature of the role is still emerging, and perhaps because, like many third space practitioners, RCAs tend to have '[different] areas of disciplinary capability at different degrees of depth' (Bridgstock, 2015). Despite these issues, our analysis allowed us to capture and group similarities in the diversity and extent of our respondents' capabilities and we were able to extract three different kinds of knowledge germane to STEMM RCAs' practice and provide an 'expertise categorisation'. These different types were: 1) relational agency, 2) pedagogical-content knowledge, and 3) knowledge of context – institutional and regulatory (see Table 1). They are unpacked and discussed below in terms of their contribution to an understanding of research communication advisory work in STEMM fields.

Table 1. Research Communication Advisor expertise categories.

Expertise categories	Sub-categories
Relational agency	Collaboration
	Self-direction
Pedagogical content knowledge	Individual intervention
	Cohort development
Knowledge of institutional and regulatory contexts	Depth
	Breadth

4.1. Relational agency of STEMM RCAs

We saw *relational agency* in the RCAs in our study on the basis of their responses to a number of survey questions and this was the category where the clearest similarities were found among the respondents, with two groups of eight and five having identical patterns of ‘relational agency’ features (see Figure 1). The main sub-categories that we derived from the full set of survey responses were ‘collaboration’ and ‘self-direction’. We mapped these relationships as the first set of respondents’ profiles. For the ‘collaboration’ sub-category, the salient features were teamwork, diverse clients, a wide referral network, and collaboration with faculty research supervisors. For ‘self-direction’, the salient features were self-directed work, self-directed strategic direction in the role, autonomy in the role, and finding their own professional development.

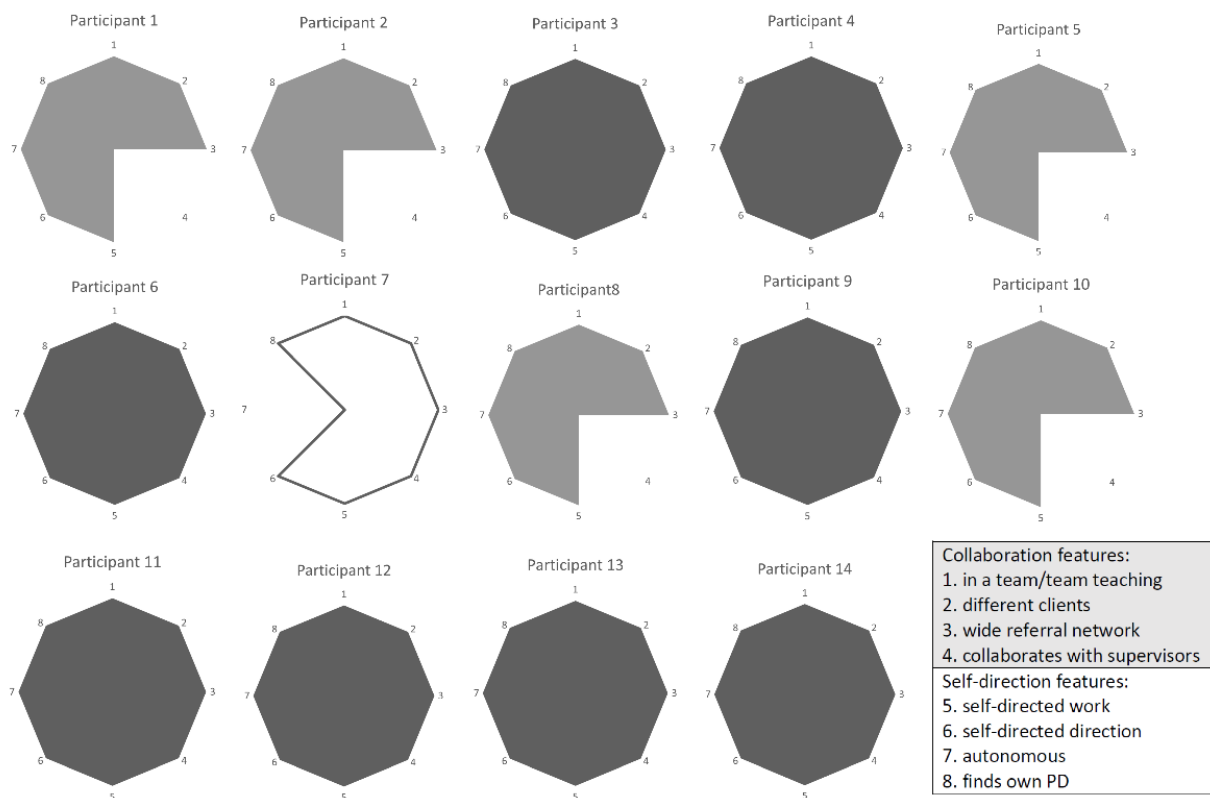


Figure 1. Patterns of Relational Agency in participant profiles. Sub-categorised expertise features listed in the legend go in clockwise order from the top of the radar charts. The two main patterns of commonality between the participants are indicated by the filled-in shading.

Even though the participants in our study described their roles as ‘autonomous’, and even occasionally ‘isolated’, their responses also showed them to be frequently collaborating across organisational boundaries and/or working in teams. They also had developed strong ‘lateral relations’ (Whitchurch, 2008) and they had been able to cultivate and broker relationships across sub-disciplines. They had been routinely working with multiple client types and tapping into diverse referral networks. As Edwards and Darcy note (2004, pp. 149-150), relational agency is the curation of diverse networks for specialist requirements: “It is an ability to seek out and use others as resources for action and equally to be able to respond to the need for support from others”. Thus, RCAs inherently employ relational agency in creating a meaningful learning context.

Our survey participants also demonstrated relational agency and agility in ‘actively constructing’ their roles, as shown in their high self-reported levels of autonomy and self-directedness. In exploring this finding, we followed Whitchurch et al. (2019) in thinking about RCAs in terms of ‘traditional’, ‘portfolio’ and ‘niche’ types of third space practitioner. Whitchurch et al. (2019) contend that ‘portfolio’ practitioners demonstrate “greater self-determination in actively constructing their roles, rather than necessarily seeking to fit into a pre-determined career mould”, sometimes taking “multiple/mixed career paths” (p. 23). In their schema, portfolio approaches involve (p. 14):

- Communication across internal and external boundaries with colleagues, peers, academic and professional colleagues
- Translation/interpretation of working across disciplinary and institutional boundaries
- Ease of movement across boundaries
- Partnership and networking
- Negotiation skills.

Instances of these five criteria are characteristic of many of the responses in our study – for example, in responses to questions about teamwork, client type, referral networks and supervisor collaboration; hence it seems that our survey participants’ professional identities could be best described as ‘portfolio’.

The main divergence in our data in terms of the relational agency category was ‘collaboration with faculty HDR supervisors’, in that only around two thirds of respondents stated that they collaborated with HDR supervisors – and these were much more likely to be faculty-based practitioners. The need for interdisciplinary collaboration between communication specialists and content academics, and the benefits of such collaboration for emerging researchers, have previously been identified (Cargill, 2004; Li & O’Connor, 2019, p. 130). These benefits suggest to us that more should be done to facilitate such collaboration for RCAs who work in central units, external to faculties or schools. Indeed, one of these centrally located participants in our study noted that a key challenge for them was even, “*Letting supervisors know that we exist and can help*” (RCA survey participant).

The STEMM RCAs in our study also showed themselves to be highly self-directed and independent in determining their work direction to meet local institutional goals and policy. Engeström (2009) has discussed the ways that much knowledge work has moved beyond the traditional assumption that “the assignment for knowledge creation is unproblematically given from above ... and what is to be created and learned is a management decision that is outside the bounds of the local process” (p. 69). However, the converse side of RCAs’ independence in setting their own direction within institutional frameworks has been that, as one participant in the survey noted, the role lacks wider ‘*agreed-upon practices, standards and benchmarking*’. This lack suggests that RCAs need to work on developing a shared articulation of their practice and their professional goals by communicating and networking across the sector as a whole, rather than defining it solely from the perspective of their own autonomy and their local institution.

4.2. Pedagogical content knowledge of STEMM RCAs

Pedagogical content knowledge has been called a ‘special amalgam of content and pedagogy that is uniquely the province of teachers’ (Shulman, 1987, p. 8). In RCAs’ work, it involves knowledge germane to academic and research communication and, crucially, learning principles governing the development of research communication self-efficacy and the ways by which this self-efficacy develops in emerging researchers. Pedagogical content knowledge in research communication encompasses knowledge of research communication channels, genres, and text production processes. It takes into account different audiences and their expectations and includes feedback and evaluation processes. RCAs need to know how to scaffold the development of all these kinds of

awareness in emerging researchers. English for Specific Academic Purposes (ESAP) may also feature, given the global focus, reach and collaborative processes of contemporary STEMM research, along with linguistic text analysis and other ESAP training pedagogies. As with most pedagogies for developing or enhancing communication skills, a strong focus on needs analysis is called for. In addition, practitioners need a deep understanding of how communication skills development can integrate with and augment the pedagogies of HDR supervisory practice and the HDR curriculum more widely (Cargill & O'Connor, 2013; Mason et al., 2020; Lee & Aitchison, 2009). Knowledge of communication skills germane to STEMM researchers' career trajectories is also important for developing pedagogies for STEMM HDR candidates.

In seeking information about RCAs' pedagogical content knowledge, we drew on responses to the 'responsibilities' and 'credentials' questions in our survey. The main categories that we derived were 'individual intervention' and 'cohort development'. For 'individual intervention', the salient sub-categories were 1:1 consultation, EAL support, proof reading/editing and PhD coaching. For 'cohort development', the salient sub-categories were teaching classes, developing curriculum, creating resources and having formal education credentials. Although slightly more RCAs in our group were teaching classes than were providing 1:1 consultations, all participants checked responses related to both individual intervention and cohort development. In terms of the complete range of profiles, shown in Figure 2, there was an overall skew towards cohort development, and five identical profiles.

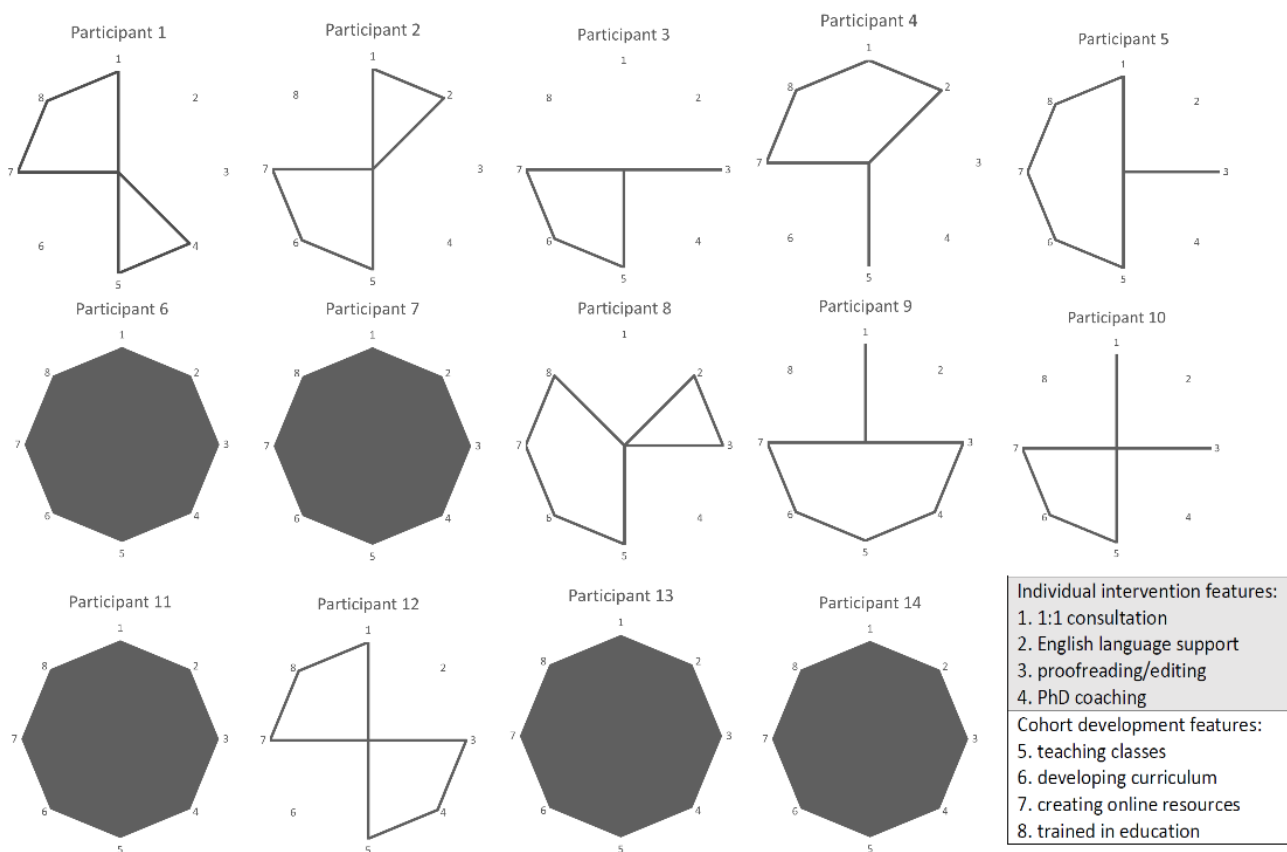


Figure 2. Patterns of Pedagogical Content Knowledge in participant profiles. Sub-categorised expertise features listed in the legend go in clockwise order from the top of the radar charts. The main pattern of commonality between the participants is indicated by the filled-in shading.

Individual intervention is a longstanding pedagogical feature of academic language and learning (ALL) advisory practice, of which RCAs' work is a historical offshoot. Indeed, most of the RCAs in our survey are members of the Association for Academic Language and Learning (AALL). Evans et al. (2019, p. 1129) have described the ALL advisory approach as "a preference towards constructivist learning in one-to-one student advising" (cf. Malkin & Chanock, 2018). In their study of broad, mostly undergraduate, ALL work, Evans et al. found that most practitioners were likely to have 'one-on-one teaching responsibilities' and slightly fewer were likely to have 'classroom teaching responsibilities' (26 vs 24) (p. 1126). Among our RCA survey respondents, however, this situation was somewhat reversed, in that everyone did classroom teaching and slightly fewer did 1:1 advising and English language support (14 vs 12).

Some of the reasons that the RCAs in our group were heavily engaged in class teaching and cohort development could relate to changes in supervisory practice associated with increasing numbers of HDR candidates and the subsequent need for pedagogies that can scale up (Wrigley, Wolifson, & Matthews, 2020). In recent decades, academic roles have become more intensely focused on goals related to both research and teaching metrics, causing some of the work that was once part of the academic portfolio to be reassigned. This has been a part of the general 'unbundling' of traditional university roles' (Macfarlane, 2011), which has also led to generic administrative positions becoming diversified and specialised in ways that require extensive training and deep experience, giving rise to other third space roles.

Research communication advisory work is an example of a new role arising from this 'unbundling', in that much of what RCAs now do for HDR candidates was in the past expected to be done by their academic supervisors (Aitchison, Kamler, & Lee, 2010; Lee & Aitchison, 2009). This trend has been intensified by the emergence of an 'audit culture' in research which has tied academics' supervisory loads to their research metrics and workload assignment, meaning that they may be under pressure to take on more research students (McWilliam & Singh, 2002; Metcalfe, Wheat, Munafò, & Parry, 2020; Wrigley et al., 2020). Another reason for this trend has been the rise of the 'transferable skills' agenda following increased anticipation that emerging STEMM researchers will find employment in industries other than education, and that they may therefore need different kinds of communication skills (Cargill, 2004; Nerad, 2014; Wrigley et al., 2020). All this has meant that the pedagogical work of developing research communication self-efficacy has increasingly fallen to RCAs, whose work has similarities with ALL advising but also overlaps with research supervision and takes into account its pedagogical functions, rhythms and output cycles (Lee & Aitchison, 2009). The role is increasingly a part of overall HDR training programs that look beyond the thesis as an artifact of a project and focus rather on the development of researchers themselves (Nerad, 2014).

These changes also seem a likely explanation as to why all our study respondents hold research degrees (see discussion below), and they give weight to the point made above about RCAs needing to collaborate closely with supervisors. They are reflected in our study participants' 'responsibilities' responses, which show that nearly all teach classes, develop curriculum and create online materials as part of an overall HDR program to support the development of researchers with multi-layered skills in communication. As one RCA in our study put it, [instead of individual advisory work], "*we design a program to help graduate students develop their disciplinary writing skills, rather than general language skills. We develop models and strategies to help students contextualise their research, design their study and tell their research story more effectively*" (RCA survey participant).

How have RCAs managed these shifts in their pedagogical practice? As Manoharan (2020) argues, as 'professional hybrids', third space practitioners are often called on to innovate in their practice by "borrowing from one area and applying it to a new context". Needs analysis is one such example from English language teaching that has been widely and successfully reconceptualised in the context of HDR training (West, 1994). In addition, one of the more demanding yet

little-recognised aspects of the STEM/RCA role has involved determining the level of transferability from other disciplines to their pedagogical practice. This has included assessing the appropriateness of teaching the generic communication skills that are more characteristic of HASS based approaches, and transforming them for use in STEM research communication contexts (Cargill & O'Connor, 2013). This kind of bespoke HDR program innovation is different from traditional ALL advisory roles and it is poorly understood in the literature. As one study participant put it, *“Our expertise and role in the formulation of PhD pedagogy have not been much recognised and appreciated”* (RCA survey participant).

4.3. Contextual knowledge of STEM/RCA

All educational practice is mediated by its operational setting (Yamagata-Lynch, 2010). Contextual knowledge is therefore an important type of knowledge for RCAs, pertaining not only to the research institution (usually but not always a university), but also its broader regulatory and legislative environment. However, contextual knowledge is difficult to distil and label, possibly because much of it is acquired ‘on the job’ (Halse & Malfroy, 2010). In activity theory approaches to knowledge in organisations, features of context include the ‘rules’, ‘community’ and ‘division-of-labour’ of an activity in its work setting (Engeström, 2009). In the case of RCA work in the Australasian context, the ‘rules’ relate to legislation governing research training as it is enacted by both higher education and government research bodies. The ‘community’ represents not only the particular educational setting, but also the STEM research culture and research training culture of the institution. Indeed, a considered contextualisation of the role is likely to go even deeper than this, depending on the degree of specialisation of individual RCA roles, as STEM research cultures can vary considerably (Cetina, 1999). The ‘division-of-labour’ reflects the way RCAs’ work is shared and distributed within its community.

Our labelling of our study participants’ contextual knowledge drew on their responses to a range of survey questions. The main sub-categories that we derived related to the ‘depth’ and ‘breadth’ of their knowledge of context. In terms of ‘depth of knowledge’, the salient emergent sub-categories were being in a faculty, spending a long time in the current role, having a STEM background, and conducting their own research. For ‘breadth of knowledge’, on the other hand, the salient sub-categories were being in a central unit, having diverse/other kinds of relevant work experience, having a broad social sciences background, and having experience with a wide student remit (i.e. not just HDR students). Nearly all (13/14) respondents demonstrated a knowledge of context that was both deep and broad with a tendency toward depth in most (10/14); however, perhaps unsurprisingly given the ‘portfolio’ characteristics of practitioners, there was more variety in this category than in the other two, although there were four identical profiles, as can be seen in the visual patterns in Figure 3.

As noted, RCA practitioners’ deep contextual knowledge is likely to include such areas as 1) policy ‘rules’ governing STEM research training at institutional and governmental levels, 2) local and international STEM research cultures and communities, and 3) local and international STEM researcher career trajectories. Given the complexity of this mix of areas and its effect on communication genres, there is a clear need to make RCAs’ tacit knowledge about research cultures and contexts more explicit, and to acknowledge it as both an aspect of their expertise and a component of their professional development.

Working as a STEM/RCA also demands deep enculturation into the specific disciplinary expectations around communication genres and practices in STEM research communities. It seems from our survey that RCAs can attain this enculturation in different ways; in our data it was reflected most directly in the length of time in the role. Indeed, the outcomes for ‘time in the role’ surprised us somewhat, because the study by Evans et al. (2019) suggested that ALL advisors with a PhD “don’t stay in the job for long”. However, our survey showed that 11 out of the 14 respondents had been in their specific RCA role for more than three years, and half the group had been in it for more than five years. In addition, ten participants held ongoing positions, with

seven in full time roles; the remaining four were employed on a fixed term contract at the time of the survey.

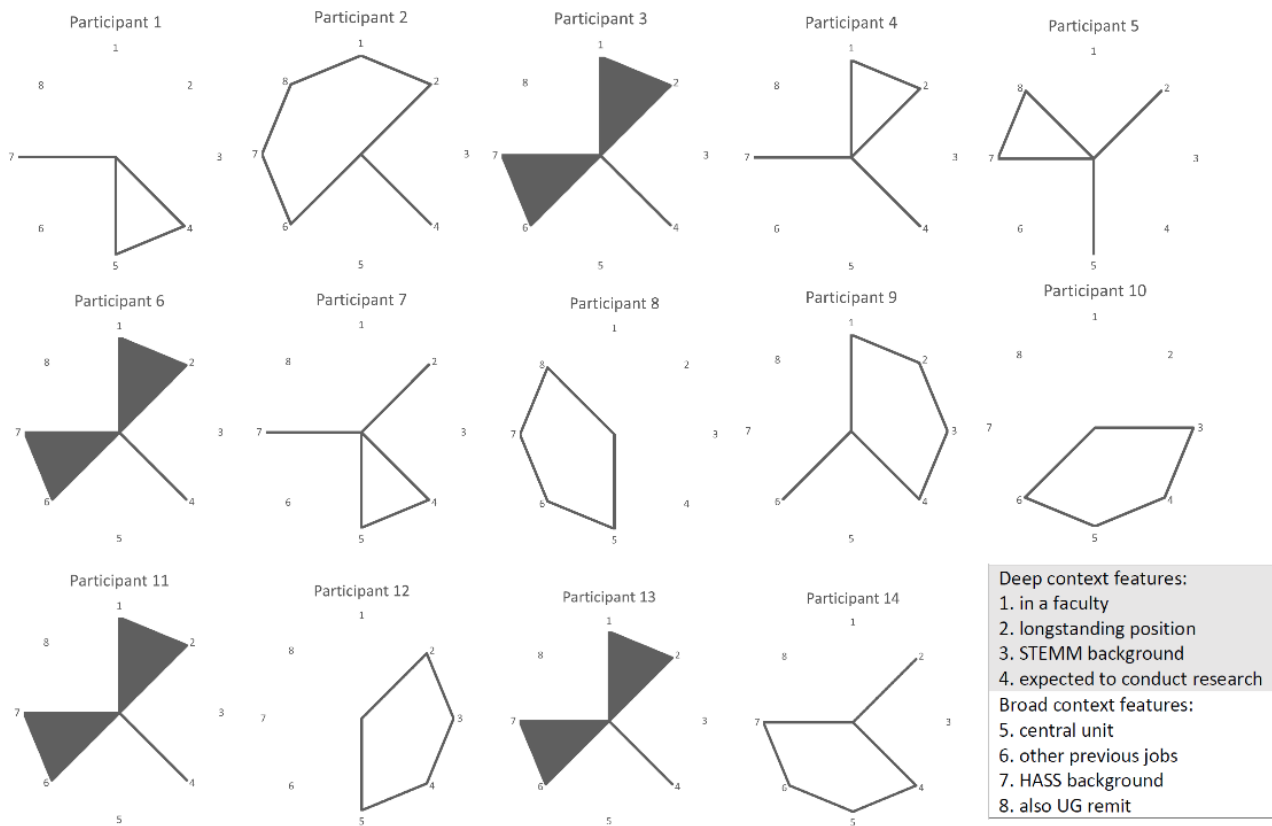


Figure 3. Patterns of Contextual Knowledge in participant profiles. Sub-categorised expertise features listed in the legend go in clockwise order from the top of the radar charts. The main pattern of commonality between the participants is indicated by the filled-in shading.

Turning to the contextual ‘community’ and the ‘division-of-labour’ affecting STEMM RCAs, we found this could vary, depending on the way the RCA role has been construed and where it was situated with respect to the institution as a whole – for example as part of the library services, within a particular faculty, teaching an accredited HDR training program, advising within a separate writing centre, and so on. In contrast with the ALL advisors in the Evans et al. (2019) study, half our respondents were embedded in a faculty, rather than a central unit, which possibly affords more opportunity for enculturation through collaboration, as noted above. RCAs who are not embedded in faculties, on the other hand, need to gain deep knowledge of disciplinary expectations and context in other ways. A small number of respondents (three) in our group could likely draw on their own STEMM research backgrounds; however, although we cannot generalise on this basis of this study, we found that the STEMM RCAs who responded to our survey were much more likely to have a background in the social sciences. This suggests to us that more structured guidance should be given to those starting out in the arena of STEMM research communication advisory work, who are likely to encounter a ‘steep learning curve’ in familiarising themselves with STEMM research cultural expectations and communication conventions in their local context. On the other hand, RCAs with a background in STEMM fields could perhaps benefit from

professional development in some of the language-related pedagogical content knowledge areas mentioned above.

All the STEMM RCAs who responded to our survey held research credentials, in 73% of cases a PhD, and all but one noted that they were expected to conduct research. This is once again different from standard ALL advisory roles, where, as Evans et al. (2019) note, a PhD is ‘seldom required’ for the position. In keeping with typical features of the third space, as a group our respondents could not be given either an ‘academic’ or a ‘professional’ label even though their work was very similar, or even indistinguishable, and many belonged to the same professional organisations. Their positions were an equal mix of academic roles (levels A-C – mostly C) and professional roles (HEW 7 and 8 – mostly 8). On the basis of this study, then, it would seem that even STEMM RCAs in non-academic roles are expected to have had research training and to conduct research as part of their role. Despite these implicit requirements, however, most participants in our group noted that they had little time allocated to them for research purposes – only one level C Academic and one level B Academic had explicitly designated research workload in their job descriptions.

As well as a deep awareness of disciplinary expectations, third space educators need a *broad* knowledge of their institutional context, to establish or efficiently navigate referral networks across universities and to broker the relationships and manage the ‘division-of-labour’ necessary for the kinds of bespoke programs described above. As noted, Manorahan (2019) claims that trans-disciplinary innovation is an important aspect of third space polymathy and that practitioners’ broad backgrounds can be a strength rather than a liability when it comes to this. We found that many of our respondents had had academic and professional experiences which may not have seemed to lead directly to their RCA roles, but which contributed to their skill sets in ways that have proved useful. It seems likely that their knowledge of broader dimensions of communication informed the programs they devised to build the kinds of inter-personal and intra-personal skills needed by graduates whose professional futures might require them to move among a variety of research workplaces. When asked what previous experiences had prepared them for their current role, survey participants pointed to diverse experiences, including, teaching and research in higher education, TESOL, research supervision, curriculum development, academic management, business development, editing, sales and marketing.

One of the contextual challenges our RCA survey respondents described was a lack of strategic and medium to long-term program evaluation, one noting that “*no one assesses [the program’s success]*”, another citing the lack of ‘benchmarking’ noted above. In traditional higher education roles, professional growth and expertise in program evaluation can be provided via a community of practice which offers a naturally occurring locus for collaborative research and shared evaluative practice. However, the emergent nature of STEMM RCAs’ work, their lack of time for research, their characteristically portfolio identities and the different research cultures they are embedded in mean that there has been no obvious developmental community for STEMM RCAs. Although communities of practice are natural outshoots from *traditional* higher education disciplines, we wonder whether they may be difficult to operationalise in the third space more generally, owing to the polymorphic and cross-boundary nature of so many third space roles. This suggests to us that alternative ways of defining practice, standards and identities will need to be found that take into account the complex interdependencies of the higher education research context. The lack of a stable mono-disciplinary identity for RCAs also means that traditional vertical pathways for career advancement in higher education may be denied to them, despite their credentials, their extensive research expertise, and their length of time in the role.

Since third space ‘polymaths’ are capable of solving complex organisational problems (Manorahan, 2020), STEMM RCAs should have the wherewithal to engage with such challenges – but it seems to us that they may need a more discipline-specific professional support model to do it in. STEMM RCAs now need to make their tacit values explicit, not only in their local institutional

context, but also across the profession as a whole. We suggest therefore that they establish organised ways to share pedagogies, articulate professional values, develop and codify professional standards, and develop expertise in program evaluation – for strategic, as well as pedagogical, purposes.

5. Conclusion

STEMM RCAs occupy a ‘third space’ in higher degree settings, but their non-traditional role has been poorly understood. Our study is, we believe, the first to identify common areas of expertise held by STEMM RCAs as a step towards better role definition. Analysis of survey responses showed that our participants have ‘polymathic’ skill sets; however, by creating visual respondent profiles, we further showed that they tend to draw on three main categories of professional expertise – relational, pedagogical and contextual – in designing and delivering their programs. Creating respondent profiles also revealed where some participant RCAs’ work experience or professional development might be lacking; for example, STEMM RCAs in central units need opportunities to collaborate with supervisors/discipline advisors, and RCAs starting out in STEMM areas need opportunities to learn the cultural expectations and research communication conventions of their local context. All the respondents to our survey were highly credentialled and most had been in the role for many years. However, key challenges they noted were a lack of understanding and recognition of the role by others; insufficient time to conduct research; a lack of evaluation to guide the strategic direction of the role; uncertainty of standards and agreed upon practice; and unclear career trajectory. We suggest, therefore, that STEMM RCAs need better institutional support and networks for sharing practice and developing standards – for program evaluation and for benchmarking.

As Edwards (2010) discusses, labelling expertise is just a start on the path to developing a professional identity as a practitioner. We think that capturing common areas of expertise through profiling could provide the basis for a future framework for professional development and paths to promotion, which our respondents claim are lacking for STEMM RCAs. We further suggest that making STEMM RCAs’ expertise explicit could provide a better understanding of the role for the purposes of RCA work management and recruitment.

Like many third space professionals whose roles have emerged in higher education in recent times, STEMM RCAs are faced with the need to define their own practice so that it can be evaluated and improved, so that it can be better understood by those in more traditional roles, and so that its strategic direction can be determined. We see the potential for this process to help universities improve their HDR programs, provide better staff support and recruit more effectively. Profiling current RCAs to understand the work better and improve role definition offers a significant step in this direction.

Appendix: Survey for STEMM Research Communication Advisors

Section 1: ROLE - seven questions

Q1.1 Which title best reflects your current role? (Please choose one or use the *other* section if your title is not represented)

- Academic language and learning advisor
- Research communication advisor
- Researcher development advisor
- Writing advisor
- Academic language and learning lecturer
- Research communication lecturer
- Researcher development lecturer
- Writing lecturer
- Academic language specialist
- Research communication specialist
- Researcher development specialist
- Writing specialist
- Other

Q1.2 What field/s of research does your work cater to? (You can check more than one)

- Science (please state field)
- Engineering (please state field)
- Information Technology (please state field)
- Mathematics (please state field)
- Other

Q1.3 Do you have additional roles? (If so, please state)

- No
- Yes (please describe)

Q1.4 Is your role academic or professional? If so please indicate level. If not please select 'other'

Q1.5 Is your role sessional / contract / ongoing? (please indicate increment or EFT fraction)

- Contract/Part time (please indicate EFT fraction)
- Contract/Full time
- Contract/Casual (please indicate EFT fraction)
- Ongoing/Part time (please indicate EFT fraction)
- Ongoing/Full time
- Currently unemployed
- Other

Q1.6 Does your role have a research workload expectation?

- Expected, with an explicit time allocation
- Expected but no time allocation
- No

Q1.7 Approximately for how long have you held this current role?

- 1-2 years
- 3-5 years
- 5 years

Section 2: WORKING RELATIONSHIPS - five questions

Q2.1 Who are your clients? (You can check more than one)

- Masters by research students
- PhD students
- Supervisors
- Early Career Researchers (ECR)

- Mid-Career Researchers (MCR)
- Others

Q2.2 Are you part of a team or unit?

- No
- Team
- Unit
- Other

Q2.3 Where does your role sit within the university?

- In a faculty
- In a library
- In a central unit
- In its own separate unit
- Other

Q2.4 Does your work involve collaboration with PhD supervisors?

- Frequently
- Somewhat frequently
- Sometimes
- Rarely
- Not at all

Q2.5 Please indicate what student referrals to other university services you use?

- ethics
- health and well-being
- library
- IP
- data management
- others

Section 3: WORK - five questions

Q3.1 Who makes strategic decisions about your work? (you may select more than one and if possible, please nominate a percentage)

- Self-directed
- In consultation with team
- Supervisor allocated
- Other

Q3.2 How is your work is allocated? (you may select more than one, and if possible, please nominate a percentage)

- Self-directed
- In consultation with team
- Supervisor allocated
- Other

Q3.3 Would you agree that your role is autonomous?

- Strongly agree
- Agree
- Disagree
- Strongly disagree

Q3.4 What are your responsibilities? (you can check more than one)

- Teaching classes
- Team teaching classes
- Delivering workshops
- Teaching individuals 1:1

- Academic development
- Advising faculty
- Advising supervisors
- Developing resources
- Developing online resources
- Developing curriculum
- Developing online curriculum
- Grant writing
- Grant writing support
- Supervising
- Managing / leading
- Consulting
- English language support
- Proofreading
- PhD coaching
- Media communications
- Science journalism
- Outreach support
- Research reporting
- Impact reporting
- Research librarianship
- Editing
- Other

Q3.5 What work challenges does your current role present? (open-ended)

Section 4: TRAINING AND PD - seven questions

Q4.1 What credentials do you hold for your current position?

- None
- Diploma / Certificate (please state type and field)
- Bachelors degree (please state field)
- Masters degree (please state field)
- PhD (please state field)
- Other (please state)

Q4.2 Have you undertaken specific training outside of your formal credentials for your current role? (if yes, please describe.)

- No
- Yes (please describe)

Q4.3 What previous experience has prepared you for your current role? (e.g. teaching, ESL/EFL training, editing) please describe

Q4.4 What kind/s of professional development have you undertaken in your current role? (you may select more than one)

- Conferences (please state)
- Special interest group / community of practice (please state)
- Workplace training / professional development (please state)
- Training / support offered by professional organisation/s (please state))
- Training / support offered by other universities (please state)
- Others (please state)

Q4.5 Do you belong to any professional organisations? (If so, please state.)

- Yes (please state)
- No

Q4.6 What professional challenges does your current role present? (open ended)Please also indicate what could help you to meet those challenges?

Q4.7 Are you interested in being contacted to be a part of a network? If yes, please provide email details.

- Yes
- No

Q4.8 Are you interested in being part of a focus group to further discuss these topics? If yes, please provide email details.

- Yes
- No

Q4.9 If a Research Communication Advisors (RCA) network existed, which of the following would be of benefit to you?

- online forum
- blog
- symposia
- online synchronous events
- informal events
- informal online asynchronous discussion
- community of practice
- professional advocacy
- committee work
- membership database
- other/s

Q4.10 If a RCA network existed, which of the following would time in your workload assist in facilitating?

- online forum
- blog
- symposia
- online synchronous events
- informal events
- informal online asynchronous discussion
- community of practice
- professional advocacy
- committee work
- membership database
- no time to assist

Q4.11 Do you know of others who would be interested in this survey? (If yes, please provide them with our details)

- Yes
- No

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