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FROM THE EDITOR'S DESK

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From the Editor's Desk

Nathan L. Vanderford
University of Kentucky

As we usher in a new decade, I am excited that the *Journal of Research Administration* is entering into its 51st year of being the premier scholarly journal for disseminating education, training, and scholarship related to the field of research administration and management. In this issue, in particular, we celebrate the international nature of our field and the possibilities of strengthening our discipline through our international collaborations and interactions. We live and work in a complex global economy in the broadest sense, and, as research administrators, we work to manage a research enterprise that continues to become more internationally connected and complex. It is vitally important that we work to share our best practices with colleagues from around the globe.

As always, we are publishing important, informative, timely and highly relevant content in this issue. In the article titled *Scaling up Professionalization of Research Management in Southern Africa*, Charmaine Williamson from the University of South Africa and her colleagues describe the Southern African Research and Innovation Management Association's efforts in sitting up a Professional Competency Framework for research management and the authors consider how this could influence professionalization of research administration in South Africa. In her article, *Success? Learning to Navigate the Grant Funding Genre System*, Lynn McAlpine describes how eight researchers from four European institutions obtained grant funding through their experiences learning about and navigating their funding systems. In *Measuring the Startup Journey and Academic Productivity of New Research Faculty through Systems Engagement, Project Efficiency, and Scientific Publication*, Holly Zink and Jack Curran describe a tracking and reporting methods for following the productivity of researchers who are new to an academic environment. In their article titled *Creation of a Structured Performance-Based Assessment Tool in a Clinical Research Center Setting*, Marcus Johnson and A. Jasmine Bullard describe results from a pilot study in which they create an assessment tool that allows for objective and well-articulated evaluation of staff performance.

In this issue, we are also republishing an article that first appeared in the Journal in 2011. In *Conscious Efforts to End Unconscious Bias: Why Women Leave Academic Research*, Debra Easterly and Cynthia Ricard explore the topic of gender discrimination in academia and offer possible solutions to overcome this injustice. Eight years later, this article remains one of JRA's most frequently accessed articles. In this issue, Deputy Editor Jennifer Taylor has added a brief new commentary to the article related to the status of this important topic today relative to the time of the authors' initial writing in 2011. Diversity and inclusivity of all types are important to increase institutions' talent pool and is critical to ensure that we are representing all perspectives. This, rightfully so, is as popular of a topic today as it was in 2011; it is a critically important issue in general and it is fundamentally important to improving research and our field of research administration on a global scale. I hope that by including this article, we, as research

administrators, can continue to work to do our part in improving diversity and inclusivity in our workplaces. I hope this article will provoke thought and action among us all.

As always, I thank the Journal's leadership for their service that has facilitated the publication of this and every issue. In particular, I thank the Journal's Deputy Director, Jennifer Taylor; Associate Editor, Holly Zink; and the entire editorial board for all their hard work. I also thank our publisher, the Society of Research Administrators International (SRAI), and specifically, SRAI staff members Dilyana Williams and Jim Mitchell for their support of the Journal and their outstanding work that has led to the publication of this and every issue.

Finally, if you are a non-SRAI member and wish to have the Journal delivered to you via email, please sign up through the online system at http://www.journalra.org.

ARTICLES

Success? Learning to Navigate the Grant Funding Genre System

Lynn McAlpine
University of Oxford, UK

Abstract: *An award as principal investigator (PI) is an aspiration for many post-PhD researchers. However, we know little of the actual journey from PhD graduation to achieving this goal. Using a qualitative narrative approach, this study explored how eight science, technology, engineering, mathematics and medicine post-PhD researchers (on contracts and fellowships) achieved PI-ship, specifically, how they learned to use and navigate the funding systems within their working contexts to achieve grant success. They were in two European Union (EU) universities, one in the UK and the other in the Netherlands. The analysis draws principally on their high and low grant-funding experiences. The results show the interaction between individual goals and intentions and the social and structuring elements of their local and extended workspaces—institutional, national and EU. For instance, the funding systems on offer were designed to invest in promising early career researchers, so while these awards provided a research career structure, this was only for a limited number of post-PhD researchers. While the eight were ultimately successful in this competitive environment, their journeys were still challenging. They succeeded by using failure in positive ways, that is, investing in specific learning in respect to different failures. There was a chronology of learning, with immediate past experiences influencing where they invested their learning efforts in order to navigate the funding system successfully. The implications for institutional support are explored.*

Keywords: *Research Grant Funding System; Post-PhD Researcher; Workplace Learning.*

Context

The postdoctoral period is viewed as a time in which individuals develop their scholarly profiles and research independence (Laudel & Glaser, 2008). Becoming a principal investigator (PI) and managing a team is often a key aspiration and sign of success—as is gaining a tenure-track (or in the UK permanent) position (for which a grant as well as publications are seen as powerful). However, little is known of the actual journey to PI-ship in an environment that is viewed as a rejection culture (Baruch & Hall, 2004). This paper explores this developmental journey through the eyes of eight science, technology, engineering, mathematics and medicine (STEMM) scientists who achieved both grant and academic job success. They were in two research universities, one in England and the other in the Netherlands. Given the data were collected in 2014 and the eight graduated 2005-07, they navigated their journeys in a research climate of continuing drops in university infrastructure and funding council budgets due to the global economic crisis.

The study takes a developmental workplace learning perspective in which individuals learn key elements of practice through observation, trial and error experience, and interaction with others. However, individuals are agentive and can choose how they participate, including modifying or refusing to participate (Billett, 2006). Further, the workplace consists of both social and structural elements. The social is constituted in the relationships and networks that individuals participate in within their institutions and beyond. The structural elements, within both host university and relevant funding agencies, offer affordances (e.g., specialized equipment) and constraints (e.g., meeting institutional deadlines) that create a much larger tacit, often unrecognized, workplace learning environment.

As regards research award success, post-PhD researchers need to learn to negotiate successfully the different funding systems on offer (Laudel, 2006)—in this study, national and European Union (EU) ones. They must sustain motivation despite extremely low funding rates, below the 30% that Bazeley (2003) reported reduced the incentive to apply. And they need to do this while building a research profile (publishing in well-recognized journals) as well as continuously seeking their next post-PhD contract and/or a tenure-track position (applying for jobs). In other words, their ultimate success depends on their ability to skillfully negotiate a range of research-related genre systems—grant proposals, peer-reviewed research papers, and job applications (both tenure-track and post-PhD contract).

This study focuses on the first, the grant funding genre system, referred to hereafter as the funding system. It asks: How do STEMM early career researchers (ECRs) develop their understanding of the funding systems on offer and navigate them to success?

Learning to Write Research

Writing and Emotion

Positive emotion, intertwined with motivation, intention, and intellectual thought (Nardi, 2005) has long been viewed as underlying sustained commitment to academic work (Neumann, 2006). Academic work is traditionally identified as behaviour associated with writing research proposals, participating in research projects, and publishing research results, with the increasingly competitive environment around these activities seriously hindering new researchers (Cole, 2007). Therefore, sustaining commitment to such work is not straightforward, with newer academics turning away from research and academia as a result of negative emotion (O'Meara et al., 2014).

As regards writing specifically, the journey can be emotionally challenging. Multiple studies have documented the development process during the postgraduate journey (e.g., Vos, 2013) as well as in the immediate post-PhD period (e.g., Castelló et al., 2017), showing individuals' emotional relationship to writing plays an important role in whether they achieve writing success. This may explain why even more experienced academics are often not productive writers. For instance, Lee and Boud (2003) noted that writing generated fear and anxiety for a significant number of academics, which limited their capacity to publish. Similarly, McGrail et al. (2006), in a review of writing interventions for academics, reported individuals may not be productive due to emotional barriers such as lack of confidence, fear of rejection, belief their writing is not good

enough. They may also not be productive due to a limited understanding of both the writing process and publishing practices, or in this study, the funding system, and the web of connections within which the funding proposal is embedded.

Grant Writing

What exactly are the elements that make up the funding system? While it is clear that mastering the written genre of the research funding proposal is crucial, more than this is required since writing a proposal is not an isolated experience. Tardy (2003) notes applicants must develop knowledge of the funding system—that is, how the creation of the proposal is related to many other documents (e.g., funding call, university requirements) as well as individuals with the crucial procedural knowledge of how the system operates and how best to navigate it. Even with a brilliant idea, not knowing the rules can prohibit success. And, of course, as in any workplace, political and social aspects of the funding system can play a role.

In other words, to achieve the rhetorical goal of obtaining funding, people must go beyond producing writing to considering the differing motivations of multiple readers, alongside addressing the multiple conventions and contextual factors (Ding, 2008). Following submission, the process continues to be interactional, given different meanings of excellence among reviewers (Lamont, 2009), the splitting of hairs in panel meetings when all proposals are good (Porter, 2005) and individuals applying different standards of excellence at various points in the process (van Arensburgen & van den Besselaar, 2012). The result is most frequently rejection (sometimes with no reviewer comments), with subsequent negative emotional response, and then a decision whether or not to invest the time to revise and resubmit.

There has been some research into enhancing the funding experiences of more experienced academics. Shuman (2019) noted the importance of informal workplace learning as well as formal learning, and Wiebe and Maticka-Tyndale (2017) reported the value of an eight-month grant-writing group, and a semi-structured form of workplace learning. However, there has been less research into the workplace experiences and learning needs of researchers in their earlier careers—post-PhD researchers who face additional challenges to those in tenure-track posts, including the lack of an institutional home as well as frequent institutional and international mobility.

So, what new learning is involved in this high stakes activity for post-PhD researchers? Most importantly, grant writing is a new skill even if one is well published (Porter, 2007). Thus, PhD graduates who have experienced success in publishing peer-reviewed papers cannot necessarily transfer such knowledge directly to grant writing since the two are distinct genres in their purpose and structure. That is, the latter is an expository report on what has been achieved written for a specialized group of readers so "jargon" can be used. The former is a form of promissory note, needing accessible language to persuade readers from a range of specializations that investing financially in the plan is worthwhile.

Recognizing the learning demands of the differences in genres may be why some universities (e.g., University of Washington, Emory University, and Ludwig Maximilian University) are starting to

offer final-year PhDs training on writing post-PhD grant proposals. It is unclear if such training includes learning the genre system or focuses only on writing. If training is directed to learning the system, PhDs gain greater ability to bend the rules, and to evaluate whether they can apply the rules from one system to another (Cheng [2014] on PhD, not post-PhD funding).

Conceptual Framework: Individual Development within Nested Contexts

Adopting an identity-trajectory perspective (McAlpine & Amundsen, 2018), learning is conceived as integrating both life and work experiences through time—with work experiences in three nested contexts: macro-, meso-, and micro-. In other words, there is interaction between individuals' intentions and the social and structuring elements in which they each are embedded.

As well, learning is cumulative over time with agency playing an important role in learning and development; that is, the extent to which individuals articulate and progress towards personal and work intentions and goals while navigating supporting and constraining structures (McAlpine & Amundsen, 2018)—and in doing so, develop and draw on the support of extended and local networks. (While the focus here is funding success, individual's personal lives played a role in their journeys.) Of special interest in the post-PhD context is an individual's efforts to demonstrate independence. This means building a record of being "first" in different contexts, e.g., a unique intellectual profile, and having experiences in the best universities, thus enhancing potential collaborations while maximizing publications that demonstrate innovation (Felt et al., 2012).

As regards the macro- and meso-contexts, PhD numbers are growing so there is increasing competition for the reduced numbers of secure research-teaching positions resulting from the shift towards more teaching-only and research-only posts. In other words, the path to a traditional academic career is no longer short nor assured (Van der Weijden et al., 2015), the post-PhD contract period is lengthening (Cantwell, 2011), and post-PhD researchers must find a way to develop a unique and attractive profile—one in which PI-ship can be helpful.

Study Macro- and Meso-Contexts

What are the macro- and meso-contexts for the ECR in this study? In the Netherlands, around 30% of PhD graduates continue in academia, usually in their own university. Notably, 85% of these are not in tenure-track posts but in positions as researchers or teachers. Later, only 13% transfer into academic positions in the same institution and 7% to other universities.

The picture is similar in the UK. Only three or four in every hundred PhD students will find a permanent academic position (Nature Editors, 2017). Another study notes that seven to nine years after graduation only 26% are employed on a permanent or open-ended contract in higher education, with a greater percentage of social scientists than STEMM scientists achieving this status (CFE Research, 2014).

In this context, international experience, while potentially important for all researchers, may for those from non-English-speaking countries, be particularly useful in integrating into international

scholarly networks and ultimately advancing their publication record (Horta, 2009). Within the macro-European context, there is a consistent pattern of in-flow of international researchers to the UK (Cantwell, 2011), with many academics from EU countries later drawn home by their national granting systems.

In the EU, mobility is particularly valued and supported through Erasmus financial support for short-term mobility of student, administrative and academic visits. Also. individual countries have their own mobility schemes (e.g., the Dutch Rubicon program). Further, EU policies ensure easy movement across countries to take up different posts, so individuals can look beyond the country they are in when seeking advancement. For instance, in the Netherlands, the proportion of foreign academics is growing, and many Dutch academics work abroad (de Goede et al., 2013).

As for the macro-level funding systems pertinent to this study, post-PhD researchers can consider the general funding opportunities provided through the European Research Council and their national funding providers. In addition, given the desire to support post-PhD researchers to develop their research potential, there are a number of funding schemes designed particularly for them. At the time when the data for this study were collected, post-PhD researchers in any EU country, in addition to grants open to all researchers, could apply for:

1. Starting grants: for those between five and seven years since graduation, with the host university either where the post-PhD researcher applied or elsewhere.
2. Marie Skłodowska-Curie actions: for applicants with a PhD or four years' research experience; and for career development and training in all disciplines through international and inter-sectoral mobility.

In the Netherlands, the Netherlands Research Council offered three grants geared specifically to different stages in an ECR's development, with the aim to encourage talented researchers to remain committed to an academic career:

1. Veni grants: for (young) talented researchers who have recently completed their PhD, to allow them to continue to develop their ideas.
2. Vidi grants: for researchers who want to develop their own innovative line of research and appoint one or more researchers.
3. Vici grants: for senior researchers to form their own research group.

Notably, at the research-intensive Dutch university where four individuals in this study were located, the percentage of awards against applications was consistently lower than 15% for both Dutch and EU grants. (The success rate gives a sense of the probability of being funded.)

Within the UK, there was a more diverse structure of funding than the Netherlands, thus it was more confusing to navigate. Such differences in national research funding systems have been shown to lead to different application strategies (Laudel, 2006). In this case, early career funding is offered through both disciplinary funding councils, in the case of STEMM researchers, engineering and physical sciences, medical sciences and biotechnology and biological sciences—as well as trusts which are more open as to discipline, for example:

1. Leverhulme Early Career Fellowship: for researchers within five years of graduation; with a research record, but not yet a permanent academic post; designed to allow the researcher to undertake a significant piece of publishable work.
2. Royal Society University Research Fellowship: for researchers with three to eight years of post-graduation with the potential to become leaders in their field; focused on the chance to build an independent research career.
3. Wellcome Trust Early New Postdoctoral Fellowship: for those with no or initial postdoctoral experience; designed for the researcher to undertake guided research with an aim to go on to lead their own independent research.

Similar to the Dutch university, the success rate across grant schemes in the research-intensive UK university was low; in fact, it was closer to 10% than 15%.

At the meso-level, institutional processes and behaviours can hinder or facilitate research success (Cole, 2007). This has led to calls for universities to invest in building research capacity (Debowski, 2012)—though such support may not be directly for post-PhD researchers. However, both universities in this study are research-intensive and offer relatively good resources, though in some cases resources may only be available to academics. For instance, the UK university has a well-recognized support program for post-PhD researchers, including for grant applications, as well as junior research fellowships for those in the institution within six years of PhD graduation. In the Dutch university, while there is not a distinct post-PhD researcher center, there are support services for post-PhD researcher career planning and a separate unit that offers support for research grants.

Research Question

How do eight STEMM ECR develop their understanding of the funding systems within their working contexts and navigate them to success?

Research Approach and Design

This study draws on data from a larger study carried out principally in 2014. It took a qualitative interpretive narrative approach (Riessman, 2008), one in which, in the first instance, the focus was on analyzing each individual's data to create an account that preserved the meaning that the individual brought to his or her life experiences. Using these accounts, the next step in analysis was looking across-case to seek patterns. The validity of this approach is assessed in terms of its coherence, credibility and the extent to which it provides a solid base for application (Creswell, 2007). Given the nested contexts perspective, a) a purposive sample was created from the 60 participants and b) pertinent websites and databases were searched to provide the information included in "Study Macro- and Meso-Contexts" above. (For earlier reports from this research, see McAlpine et al. [2017; 2016]; McAlpine [2016]; and Mitra & McAlpine [2017]).

Participants: Process of Creating a Purposive Sample

Ethical consent was secured, and an email was sent within three universities in the UK and one in the Netherlands inviting participation. It sought individuals who self-defined as meeting the following criteria: a) awarded own grant funding for the first time in the past five years; b) supervising others; and c) overall responsibility for the intellectual leadership and management of the research project. The email generated responses from 60 individuals representing all fields; all were accepted to participate in the larger study, so a non-purposive sample. (See Figure 1.)

The following criteria were used to create a purposive sample: a) in the same disciplinary cluster to help avoid differences in grant funding and job opportunities between STEMM and social sciences; b) from the Dutch university and just one of the three English universities to vary macro-level national context but reduce variation at the meso-level institutional context to two rather than four; c) awarded first PI grant within six years of graduation since six years was the mid-point for time to grant success for the 60 participants (time varied from one to 11 years) so a measure of success; and d) in a tenure-track position, an additional measure of success.

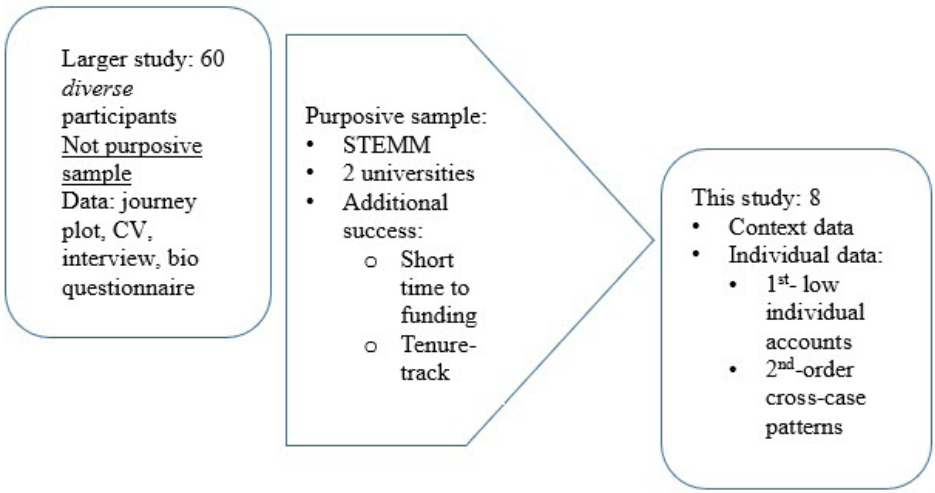
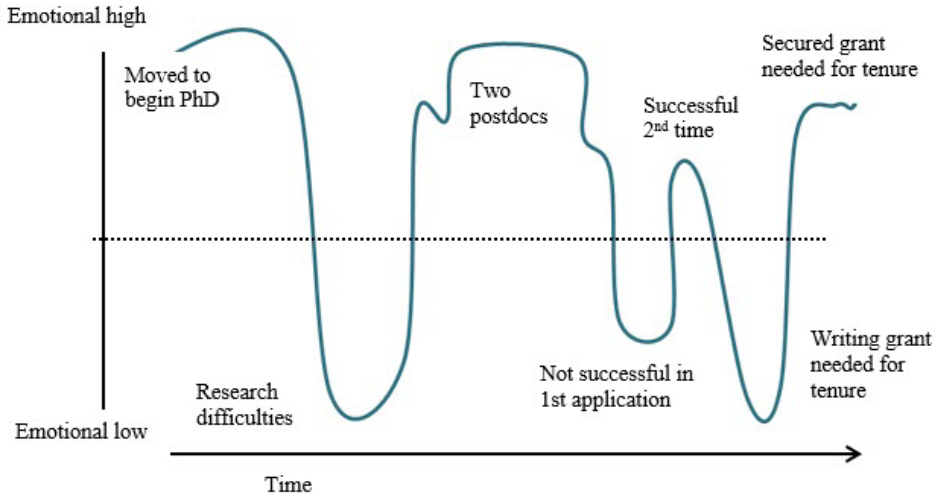


Figure 1. Research Process.

Individual Data Sources

Each participant provided a CV, completed a short biographical questionnaire and participated in an interview that began with a journey plot capturing the highs and lows of the journey from the PhD to first grant award.

Journey plots are a visual data collection method that capture emotion, agency and motivation through time in an open, less-inhibited manner than just an interview (Miller & Brimicombe, 2003). The journey plot template was designed to capture the chronology of experiences over time on the horizontal axis, and related emotion from high to low on the vertical axis—with the mid-point marked (see Figure 2 for Romeo's journey plot). Individuals mapped the emotional highs and lows of their experiences from the PhD to their first PI grants. Then, they were asked to reconstruct the journey verbally explaining the emotional high and low experiences. They were not directly asked to describe how they navigated the funding system, but rather to describe their experiences in a relatively undirected way, with probing to expand on information they provided. It is this part of the interview was the focus of the study. In the remainder of the interview, they described their experience of being a PI and finally, any advice they would offer individuals starting on a similar journey.



Note. Adapted from original to exclude personal details.

Figure 2. Romeo's Journey Plot.

Analysis

To ensure anonymity, participants chose or were given pseudonyms. Further, their CVs and biographical questionnaires were summarized in a highly structured manner to preserve the information but with identifying information removed. Then, all the data for each of the eight cases (interview, journey plot, summarized CV and biographical data) were imported in MaxQDA. Taking a narrative approach (Reissman, 2008), the first step was to create a brief low-inference case summary for each individual to capture the uniqueness of each life experience.

This primary analysis preserved the accounts provided by the research participants while providing a starting point for a secondary thematic analysis of their positive and negative reported experiences related to the funding system. This was done as follows for each individual in the context of the individual's case summary: 1) all the experiences from the journey plot were noted and characterized as to their focus; 2) those not related to the funding system were set aside; 3) then, the interview was examined to find the excerpts related to the experiences about the funding system; 4) these were extracted in chronological order for each individual; and 5) then were analysed as to how individuals negotiated the funding system. Finally, a cross-case analysis was done.

Results

Who the Participants Were

The eight individuals, six males and two females, with four in each university, represented six STEMM fields. All had a language other than English as their home language, and graduated within a three-year period of each other. Only three at time of interview were in their home country, the Netherlands (see Table 1 for characteristics).

Table 1. Participant Characteristics (anonymized)

Name	Discipline	Gender	University	Home language	Prefer	In home country (at interview)
Cathy	Materials	F	England	Not Eng.	2006	No
Dan	Biotechnology	M	Netherlands	Not Eng.	2005	Yes
Fabien	Biotechnology	M	Netherlands	Not Eng.	2006	Yes
Frances	Materials	F	England	Not Eng.	2007	No
Geoff	Neurosciences	M	England	Not Eng.	2006	No
Mike	Engineering	M	England	Not Eng.	2006	No
Romeo	Maths	M	Netherlands	Not Eng.	2005	Yes
Sam	Chemistry	M	Netherlands	Not Eng.	2005	No

Their High and Low Experiences

Experiences reported by each individual varied from 3-7 with an average of 5.5 over roughly a decade. Perhaps not surprisingly, the most frequent experiences (high and low) were about grants (40.1%), with all reporting at least one experience related to this theme. Smaller numbers of experiences referred to efforts to publish, and secure jobs, with the remaining a range, for instance, running a large research group, family relationships, undergraduate and postgraduate experiences. In describing the results, Sam's and Dan's experiences are explored in detail as Sam had four and Dan three funding system experiences—with reference to the others' experiences as appropriate.

Two Cameos

Sam and Dan both graduated in the same year, and were at time of interview in the same Dutch university but different fields. Sam is international and Dan is Dutch. Their cameos provide a sense of the a) uniqueness of each journey, and b) the interaction between the social and structural elements of the funding system and individual's efforts to navigate these successfully. (To ease reading the cameos, I have limited the use of ellipsis in editing quotes.)

> Dan, in his late 30's, left his home in the Netherlands for England in 2005 after completing his PhD. He was already well-published. His supervisor had suggested he go abroad, so he emailed a PI in an English lab he had heard was doing interesting work and was invited to visit. Dan had no funding, so offered to apply for some. But, the PI said "I'll pay for the first year or whatever it takes to get your own money." So, he applied the first year and secured a one-year EU Conference Fellowship in his field, and then a two-year Marie Curie Fellowship – following his supervisor to another English university in 2006. The grants 'didn't really feel like a high' though they achieved what his supervisor wanted which was to 'just write a cool story.'
>
> Then, he met his PhD supervisor at a conference and the supervisor offered him a job as a post-PhD researcher on a grant he had: 'You can come [back] and do your own research.' So, he returned to his PhD university in 2008, and won a Marie Curie Reintegration Grant to support his research (available only for those with Marie Curie Fellowships), but still wanted a tenure-track position. One came up, but he was not successful. This was a real low; he began to have doubts: 'How many years do I play this game of being a postdoc ...you have to think of an alternative, at some stage.' He actually applied for a clinical chemist post, but was not successful. But then, in late 2009, a mentor directed him to a tenure-track position in another university. He applied and moved there in 2010 – with five years to prove himself: 'All these people saying ... we ...think you will get this big grant, which we also expect of you.' Thus, although he had already received awards, he needed to ramp up to more competitive grants. He applied and was 'really hammered,' coming in the bottom quartile. Despite being warned his proposal was likely too fundamental for the competition, 'I was quite...surprised I didn't go through the first round' (being sent out for review) since 'I'm typically quite high' in ranking. He even questioned if he was suited for this work.

After much discussion with colleagues and considerable reflection, he applied the following year (only two applications are allowed). Many colleagues had suggested he switch to another source of funding, given the fundamental nature of his plan. But, one colleague convinced him that he should try again from the perspective that 'they [the panel] really want to see how you're going to use this knowledge.' Further, he said: 'You're too good to let this opportunity go, so ...you're going to focus one complete year on getting this.' 'So, what made me believe him? ... Well ...this guy has a lot of experience with this council ...and he's really great.'

Early on in that year, he had an 'ah-ha' experience at a meeting when he saw the kind of competition he was up against – a researcher describing research with economic and social value – 'the first learning lesson.' So, he invested in better understanding what the funding council found important. He also did research to gain more proof of principle to show 'what I want to do ...is actually useful for industry.' He contacted industries who were enthusiastic and wrote support letters. He also obtained feedback on his ideas using colleagues and university resources. As a result, he wrote a totally different proposal, one he felt would be competitive. This time, it went out for review, 'the first barrier,' and he was called for interview. He rehearsed two times with critical friends outside his field so he learned to withstand harsh questions and respond politely. He also continued to draw on institutional support, e.g., how to give a good talk, body language. And, 'I ended first in the competition ...that was pretty high!'

Sam, in his late 30's, graduated in 2005 in his home country with some publications. He had applied for a Marie Curie Fellowship in a host university in the Netherlands (not his home country), but wasn't awarded it. He was told: '"your CV is not big enough" ...so you don't get the grants.' As a result, he took a post-PhD researcher contract at another Dutch university.

Over the three years from graduation, he had four different contracts. 'It was a hard time ...being a postdoc ...a bad situation. I was thinking, at that time...what the [!!!] is going on...why do we need to prove the quality over and over and over and over again?' Still, he preferred to stay since the career structure in his home country made it more difficult than in the Netherlands for researchers to gain visibility. There, 'you will work for the one who ... hired you for at least 10 or 15 years before you can get your own group, and [can] apply in your own name' for grants. Here, 'I'm already visible.' On the other hand, he had to rethink his research approach. In his home country, you 'can do really pure research, and you don't necessarily need to claim an application.' But in his new country, 'they do not accept the idea of doing research that has no purpose.'

He strategically presented at conferences noting: 'You should ...go ...when you have a big paper because you have more chance of showing what you have just done, whereas if it was a three year old paper, then the response was "this is the general kind of thing he's doing ...but what did he do this year?!"' Then he changed universities on another contract and applied for a VENI grant but didn't succeed. He applied the following year feeling his recent 'big paper' made it 'a good time.' 'If I would have resubmitted a year after ... your big paper starts to be a bit older, so the question is always: 'well, what did you do recently?"' He sought

advice from a senior colleague that he often cited and secured university help to draft a good budget: for him something that was 'real tough' yet 'very important.' In the end, 'I had re-written so ...the project had become better [and] there is a difference between a very good and less good project.' But, in the rebuttal session, 'I had the feeling my answer was not really good ...but ...I got [it] so they are testing you on your ability to answer difficult questions.' He also wondered about 'how much time [the panel] have to look at these rebuttals ...and that's very tricky.'

Obtaining the grant was 'the most important step ...out of the postdoc time, where you have to beg for contracts to big bosses ...so, in terms of visibility, it's really not your research.' Further, 'four contracts in three years is quite a lot, and then suddenly you have three years ... an infinity!' But, it also meant moving back to the first university, the host. From this time, his publication record increased and he then applied for a VIDI grant and was successful, again on the second try. He strongly believed 'building your own research line is really starting when you can publish on your own.'

He also applied for an ERC grant around that time. When he finally heard back, the response was in the grey zone: 'it's fundable but we don't have enough money,' so he had no expectation that he would secure funding. He was even told by grant panellists he met later that his CV hadn't been strong enough. But, then three months later, shortly after receiving the VIDI grant, he learned that he was funded. 'That's really the best you can...have at my level ...So, it was like an enormous amount of money that was coming to my hands, so that was really ...quite special!'

Dan's and Sam's stories were chosen to demonstrate the variation within the group. You may note that Dan a) was relatively well published on graduation; b) returned to the Netherlands, his home country, after a period post-PhD in England; c) experienced doubts he would succeed as an academic and applied for a non-academic job; d) was mostly successful on his first application for each scheme; e) decided to ignore the majority opinion about how to proceed upon receiving a major grant rejection; and f) used the new proposal process to re-think his research direction. Sam, on the other hand, a) was less well published than Dan on graduating; b) moved from his home country after his PhD and did not want to return there; c) had a large number of contracts in a short period of time, before obtaining some funding; d) doubted his future when his applications for tenure-track posts were not successful; e) generally only succeeded on his second attempt for each of the grant schemes he applied for; and e) felt his publications played a crucial role in his success and failure. Still, they both experienced doubt as to their ability to succeed. As well, both were mobile, won national and EU funding, and focused on understanding the aspects of the funding system where they experienced difficulty. In this regard, they are largely representative of the eight. I now turn to the themes that emerged in the analysis of the eight individuals' experiences of learning to navigate funding systems.

Learning the Funding System

The key themes that emerged from the analysis of the 19 high and low funding system experiences are the following: a) differences in the nature and quality of the two types of experience; b) the link between an individual's intentions and actions; c) the chronology of each individual's learning of the funding system; d) the influence of the different nested contexts; and e) the aspects of the funding system that received the most learning attention.

High and low experiences: The likely outcome of many academic efforts is lack of success. For instance, peer-reviewed paper acceptance rates in the sciences are higher than in the social sciences and humanities but still average about 50% with 4/5 of these provisional acceptance after revision; no figures were provided as to final acceptance (Ware & Monkman, 2008). While this is challenging enough, grant success rates, as noted earlier, can be as low as 10%. Grant submission requires a large time investment against the small chance of success, yet an award creates security to move forward professionally and intellectually. Thus, while lack of success could generate doubts about an academic future (cases: Dan, Sam, Romeo), these upsets generally led to profound learning: work to integrate, reorient thinking and actions, and create alternatives (Maitlis et al., 2013). In the process, individuals developed resilience. That is, they learned to think of success as unlikely yet value the deep research thinking that is inherent to the process—to view resubmission as par for the course, and accept the many things beyond their control. Invoking luck to explain outcomes beyond one's control is a useful strategy in this regard (Day & Maltby, 2005), which four did (cases: Geoff, Sam, Romeo, Fabien).

Positive emotions, in Neumann's (2006) words 'passionate thought,' served an alternate and important function. Positives reinforce the notion that all the effort, including responding positively to rejections, is worthwhile. Their role in learning is to sustain our commitment; recall Sam's words when he won the grant: 'that's really the best you can have at my level ... quite special.'

Link between intentions and actions: Inherent in the theme described above is the notion of agency, i.e., efforts to achieve a goal. These eight individuals articulated clear intentions related to the funding system activities they engaged in; these were often related to where they were in their career development. Recall Dan, in a tenure-track position, saw achieving the 'big' grant as ensuring permanence as well as meeting collegial expectations; or Sam, while still on contract, seeing his fellowship as providing security so he had independence in developing his career as he wished. Other examples include:

1. Fabien experiencing difficulty in advancing in his PhD field, so changing disciplinary direction after his PhD to become more competitive.
2. Frances, immediately after graduating, applying for a fellowship—not because she expected success but to go through the experience to better understand it (she was successful the second time).
3. Romeo going for even brief research stays to what he considered the best teams to advance his thinking.

4. Geoff applying for minor grants as a researcher, not for the money, but to help him learn what kind of information should go in and be left out in later larger grants.
5. Mike moving to England and investing in learning the new funding system.
6. Cathy, knowing she would shortly be starting a tenure-track post, seeking a particular kind of fellowship in order to have practice leading a team and being a PI.

Such examples make clear the influence of macro- as well as meso- and micro-workplace contexts in learning (Billett, 2006); individuals were learning the funding system practices and possibilities, and how to use them effectively, in all these contexts.

Individual chronology of learning: Further, there was an individual chronology of focused learning on different parts of the funding system. That is, as individuals experienced challenges in particular aspects of the system, these became the focus of their learning. To make this process more concrete, here is first Sam's, then Dan's chronology.

Sam:

1. Moving countries led to learning about the new funding system.
2. Then, not gaining a Marie Curie grant and receiving feedback on his CV made him focus on publishing successfully and speaking at every opportunity.
3. Then he applied for funding nationally and failed—again with feedback about his CV. The next year he decided to apply again because he had a recent 'big' paper. But he also sought advice from a respected colleague and help from the university about the budget, and re-wrote to create a 'better proposal.'
4. This time he went as far as the rebuttal phase, his first experience of this, and felt he hadn't done well. Nevertheless he was awarded the grant and learned that in the rebuttal: 'they are testing you ...on your ability to answer difficult questions' about your proposed research. He also saw a connection between the demands that are made on panellists and his own minimal experience of review.

Dan:

1. Experiencing doubt about his future as an academic led him to explore and then apply for a non-academic job.
2. Coming in the lowest quartile in a competition—not even going for review—after relatively constant success led him over the following year to seriously assess his research approach. He sought guidance from a trusted mentor; experienced his 'first learning lesson' as to how to change his proposal in listening to another researcher present; did a research pilot for proof of concept; engaged with industry partners; drew on institutional and personal resources for help, including rehearsal for the rebuttal.

Dan's and Sam's experiences exemplify the cumulative nature of the learning process, particularly the relationship between immediate past experience on intentions for the present and the future (McAlpine & Amundsen, 2018). The result was that Sam and Dan changed their research thinking and actions and developed more sophisticated understandings of the funding systems within their unique nested contexts.

The influence of the different contexts: Interaction between individuals' intentions and the contexts in which they were working were sometimes positive and other times negative. At the macro-level, moving countries involved not just the demands of a physical relocation, but also learning the ways in which the national funding systems and career structures differed from their previous locations, for instance:

1. Sam's needing to develop a broader view of career structures, particularly as regards funding systems; while there were similarities in the overall system, there were differences in the specificities which could be demanding.
2. Dan needing to learn and choose from a more complex set of funding systems in his new country than the one he had known, or Sam's need to make his research less intellectual as a result of moving countries.
3. Romeo realizing his (overly) confident stance in the rebuttal, learned during his stay in North America, 'just didn't work ...at the interview, it went wrong.'

At the meso- and micro-contexts, even moving within the same country involved learning the new set of university resources for gaining funding as well as local work climates, which could be supportive or not, for instance:

1. Romeo's experience of plentiful support from the PI and Head of Department and colleagues who helped with a mock interview.
2. Geoff's 'workaholic' environment and tensions with the PI's wife, also in the lab, leading to seeking another post.

Funding system and focus of learning: The key areas where individuals focused their learning when they experienced a lack of success (or saw others whose work was similar) are noted below. The citations refer to previous research. Ten refer to the funding genre system and the learning of more experienced researchers, with only three about ECR: Cheng (2014) and Ding (2008) about PhDs and Felt et al. (2012) postdocs.

1. Decision-making about the possible funding systems (Laudel, 2006; Tardy, 2003) when moving to a new country or choosing whether to seek fundamental research grants or strategic ones.
2. Writing a persuasive proposal (Porter, 2007) including demonstrating one's own record through self-citation (Cheng, 2014).
3. Dealing with negative emotion to writing (Lee & Boud, 2003) and rejection (Ware & Monkman, 2008) to establish an effective publishing record that leads to an excellent CV given its role in convincing panellists that the work can indeed be accomplished (Felt et al., 2012).

4. Drawing on more senior colleagues for advice as to how to interpret feedback or how to proceed (Ding, 2008).
5. Recognizing the important role of the rebuttal (Porter, 2005) and how to navigate this.
6. Understanding the political and social aspects of the process (Lamont, 2009), such as variability in reviewer responses (van Arensburgen & van den Besselaar, 2012).
7. The importance of institutional resources on offer throughout the process (Cole, 2007).

This summary highlights the little that is known about the learning that ECRs engage in as they develop their funding system expertise. Noted here are the aspects of the system that need more attention: choosing the funding system, publishing effectively, and dealing with the rebuttal process. Generally, the evidence shows that individuals understood that submitting persuasive proposals, while essential, was not sufficient. They recognized they needed an excellent and unique research idea, visibility in their network, and a competitive CV. They each drew on their own experiences to make decisions as to where to invest their learning.

To this end, they engaged in multiple concurrent activities alongside grant writing to both become more competitive and build their knowledge about the funding system. They continued to apply for post-PhD researcher contracts that would either further their research direction or stretch their thinking in other ways (e.g., Romeo submitted 40-50 applications for researcher posts as he completed his PhD and sought even short-term visits to key thinkers); to make presentations (e.g., Sam, for greater visibility as an individual beyond his publishing record); and to network to build collaborations and trusted colleagues (e.g., Dan in deciding how to proceed after being 'hammered') —alongside seeking tenure-track positions. Overall, individuals through their varied work experiences built their own more robust understanding of the multiple interconnected aspects of the funding system—so not a complete vision but one honed to the challenges they had experienced. Notably, none made reference to the fact that they were operating with English, a language not their own.

Debowski (2012) reported that the university leaders she interviewed identified the following elements as critical to research success and thus skills to focus on in building research capacity. Individuals need to be able to 1) write papers published in top-tier journals; 2) seek and obtain research funding to support their research and build their university's reputation; 3) engage with industry partners; 4) build inter-disciplinary and cross-institutional collaborations; and 5) translate research into the community to broaden its impact. The results across the eight participants in the study clearly demonstrated the first two, but only Dan reported the third and fifth. While this may be due to the nature of the study, the list is a reminder of the range of funding system learning that post-PhD researchers need to engage in if they are to be well-prepared to advance their careers.

Discussion

The contribution of this study is threefold. First, it addresses the learning associated with the whole research grant funding system, not just proposal writing (a traditional research focus). Second, it focuses on the learning experiences of ECR, individuals who are just starting out, who have not yet found an institutional home, and are dealing with the need for both institutional and international mobility.

Third, it expands our understanding of the informal workplace learning that ECRs engage in as they develop their funding system expertise, especially the evidence on how particular past experiences influenced present learning investment in developing expertise in the funding system. This phenomenon, which I have characterized as the chronology of the learning experience, deserves more research attention which could then be used to inform institutional learning support.

The study reported on the funding system stories of those who were ultimately successful in an environment where roughly nine out of ten applications do not succeed. Yet, these individuals still experienced challenges and engaged in much learning. While this analysis focused on those related to the funding system, individuals also reported a range of others related to publishing, finding a job, and problems supervising a PhD student—in other words, they had more general career development challenges.

The importance of emotion in their learning and in sustaining motivation was clear; negative experiences particularly prompted new learning, and positive emotion provided an intermittent reward for their hard work. In fact, the eight participants in the study invariably re-applied as long as they were able to, given the funding system constraints.

The eight also decided what to learn more about and when in relation to their previous negative experiences (McAlpine & Amundsen, 2018) in the funding scheme. In other words, the results speak to the need for more attention to individuals' focused learning intentions. These individuals were learning key elements of funding system practices on the basis of their own trial and error and interaction with others (Billett, 2006). To do this, they engaged in both the social and structural elements of the workplace at micro-, meso- and macro-levels. Thus a further implication is that the workplace needs to be understood as global—not just their department and institution and those within them, but also colleagues and networks elsewhere as well the national and EU funding schemes on offer. This notion of workplace learning could be useful in framing institutional support.

Other aspects of the funding system not referred to in previous studies also emerged, for instance, the rebuttal process; conceptualizing research differently (fundamental through applied); and the important role played by more senior colleagues as mentors, both financially and intellectually. So, though these individuals were agentive and generally sustained their motivation, support from others who showed a belief in them was also important. As significant, they structured their learning, for instance, understood and used earlier simpler, less competitive applications to prepare themselves for the more demanding and competitive ones ahead as they moved from ECR to mid-career and the scope of grants changed.

Notably, these individuals were in institutions that provided multiple forms of support, internal grants, research offices, and ECR development offices, even to the level of receiving feedback on posture and stance during rebuttal interviews. As well, quite a number were offered jobs in these same institutions, which leaves one to wonder if such support is envisioned as part of a long-term institutional investment related to academic hiring.

The goal of this study was to explore a previously unexamined phenomenon with the intention to generate results with implications for application elsewhere. So, what does this study suggest as to institutional support? In addition to the points raised above, it suggests that the needs of post-PhD researchers may be somewhat different from more established academics. It is a reminder when planning institutional support for grant writing, such support cannot be treated as a distinct activity but rather needs to be woven into a coherent plan for career progression. Further, the extent to which individuals focused on specific learning based on distinct personal experiences and drew on colleagues for support and advice suggests that faculty-level interventions, which build local community might be more productive than institution-wide activities.

While achieving its goal, the study has limitations and thus implications for future research. The sample is small though purposive, limited to STEMM participants and located in only two universities in two countries, thus there are many directions for future research. First of all, the study context could be broadened to similar studies in different nested contexts to better understand how STEMM ECRs respond to differences in national funding options and university resources. As well, studies could examine closely the less visible features of the genre system where these participants focused their learning, e.g., deciding which program to apply to, the role of the CV, and handling the rebuttal process. Further, studies of those who have been less successful might provide insight into other, perhaps qualitatively distinct, learning challenges. Additionally, studies could be conducted of social scientists and humanities researchers to seek disciplinary differences. The overall goal of such studies should be to broaden inquiries into research funding in order to explore the totality of the proposal genre system and then use the results to expand the nature and range of training activities for ECRs.

Conclusions

Overall, while the ECRs in this research study were successful, the journey was not easy. In other words, behind "success" lie many rejections, which require sustained commitment and learning. It is apparent that individuals demonstrated clear learning intentions and actively engaged in a range of activities—not just grant writing—to enhance success. They also drew on social networks and the structuring elements of the universities and funding agencies. The findings remind us that if we wish ECRs to develop success in the funding system, we must engage them in learning activities that look much beyond the proposal itself. Support needs to encompass the life-cycle of funding systems in order that ECRs understand how to set goals to navigate funding systems successfully—and to do this within a career development framework.

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Measuring the Startup Journey and Academic Productivity of New Research Faculty through Systems Engagement, Project Efficiency, and Scientific Publication

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Abstract: *Little is known about the process of tracking the activity and days-to-productivity of new research faculty in pediatric academic medical centers in the United States. The purpose of this study was to design a quantitative technique for measuring the startup journey and academic productivity of new research faculty at an established research academic medical center. Three measures, (1) engagement, (2) efficiency, and (3) publication, were used to identify the total number of days that it takes for a new research faculty member to move from the discovery phase (value-consumed) into the engagement phase (value-created) after accepting a new position. General findings were that the typical research faculty member hired from 2014 to 2018 at Children's Mercy was male, submitted his first research project within the first three months of employment and averaged one new research submission per year. He would collaborate on a publication as a co-author within the first six months of employment, his first primary author publication would be published near his first employment anniversary, and he would average 2.9 publications per year in the first few years. The current study hopes to fill a gap in existing literature regarding the best practices for tracking, reporting and comparing the startup journey and academic productivity of new research faculty in pediatric academic medical centers.*

Research faculty represent a core resource for research academic medical centers (AMCs). The intellectual capital incurred in education and research training, heightened reputation from sustained scholarship and impact of discovery, and the opportunities related to multidisciplinary activities and research are invaluable. Little is known about the process of tracking the activity and days-to-productivity of new research faculty. The onboarding process at each AMC is often a long-established tradition that combines elements from the faculty recruitment office, the academic department or division, and the central research office; but whether these traditional approaches are efficient, or if they achieve optimal results, is far from certain.

It is in this broader context that Children's Mercy (CM), wishing to facilitate the vitality and productivity of its research faculty members, conducted a study to measure the startup journey from the discovery phase (value-consumed) into the engagement phase (value-created) and

academic success of new research faculty in academic medicine. The purpose of this study was to design a quantitative technique for measuring the startup journey and academic productivity of new research faculty at an established AMC.

Contributions and Research Questions of the Present Study

Facilitating the success of promising new research faculty can have a significant effect on an institution's future. Nurturing new research faculty through organized faculty development may be necessary, but critically evaluating the benefits of an onboarding program is difficult because of the absence of well-defined methods for quantifying new faculty success for the variety of faculty research job descriptions in academic medicine.

There is a large volume of published studies describing the methods for measuring faculty research productivity (Bland et al., 2005; Bland et al., 2002; Creswell, 1985; Finkelstein, 1984; Teodorescu, 2000). The predominant methodology for research productivity among faculty in academic medical centers is quantitative in nature. There are several core productivity models presented in the literature. Among the first, Finkelsteinn (1984) presented seven variables to predict faculty productivity: faculty researchers having a research orientation, the highest terminal degree within a field, early publication habits, previous publication activity, communication with disciplinary colleagues, subscriptions to a large number of journals, and sufficient time allocated to research. Later, Creswell's (1985) model includes institutional factors in assessing faculty research productivity. Successful researchers hold a senior professorial rank, spend at least one-third of their time on research activities, publish early in their careers, receive positive feedback from peers for research efforts, and maintain regular and close contact with colleagues on and off campus who conduct research on similar topics.

Dundar and Lewis (1998) proposed a model where productivity is associated with individual attributes such as personal traits and environmental experiences, and institutional and departmental characteristics such as leadership, culture, structure, and policies. Just a few years later, Teodorescu (2000) proposed an international model where individual achievement variables and institutional characteristic variables predict faculty research productivity across national boundaries. A model by Brocato (2005) proposed that faculty research productivity is related primarily to factors of early research collaboration, personal demographic characteristics, and institutional research environmental factors.

Finally, Bland's (2002) model asserts that high research productivity is strongly associated with eight individual characteristics, fifteen institutional characteristics, and four leadership characteristics. Faculty research productivity is highest when a faculty member has specific individual qualities, works in an institution that is highly conducive to research and is led by someone who possesses essential leadership qualities and uses an assertive–participatory management approach. In 2005, Bland et al. noted that nothing substitutes for recruiting faculty with a passion for research, providing them with formal mentoring programs, facilitating their networks, and providing time for them to do research.

Traditionally, it has been argued that the impact and relevance of research output can be quantified using bibliometric data (Garfield, 2006; Hirsch, 2005; Hutchins et al., 2016); however, it has also been reported that publication productivity often declines during faculty transition (Bland et al., 2005; Lowenstein et al., 2007; Perry et al., 2000; Ries et al., 2012; Wingard et al., 2004). There has been little quantitative analysis of the research productivity of newly hired faculty using metrics beyond bibliographic data. Therefore, for this study, the additional metrics of research engagement (Katz & Martin, 1997; Lee & Bozeman, 2005; Ponomariov & Boardman, 2010), information technology and processes efficiency (Green & Gilbert, 1995; Lowe & Gonzalez-Brambila, 2007) were used to explore the subsurface of new faculty research productivity. This study used a quantitative research design to explore and observe the relationship between new research faculty and variables related to research productivity, namely: engagement, efficiency, and publication. Specifically, this study addressed three questions:

1. What is the average number of days between the employment start date and a research faculty member's first engagement with the research administration system?
2. What is the average number of new projects started per year for a new research faculty member?
3. What is the average number of days between the employment start date and research faculty member's first publication and the average number of publications per year for a new research faculty member?

Towards a Model of New Faculty Research Productivity

As described above, the data used in this study came from Children's Mercy (CM), a pediatric academic medical center located in Kansas City, Missouri. Beginning in the 1990s, CM invested primarily in stand-alone research programs; however, over the last ten years, research began to grow organically into subspecialties across the hospital. More departments and individual divisions were starting to recruit physicians with protected research time and research startup packages. A generational shift also made room for younger faculty that wanted to do a broad range of activities to achieve professional satisfaction.

Going back ten years, CM did not have a process in place to evaluate a research project. If a faculty member wanted to start a project, they would call the Institutional Review Board (IRB) or Institutional Biosafety Committee (IBC) for oversight and then begin the project once they received approval. In 2014, CM implemented a research administration system that operates as the "front door" for all research activities and starts with fundamental questions about the research project principal investigator (PI), participating staff, any expected external funds, and a project budget. Primarily, the system communicates what the project is and what resources the research faculty member will need to be successful to division administrators. The system also helps submit grant applications and research proposals to the sponsor.

One of the first things that the institution saw when the system was first implemented was that it provided all division directors full visibility into what was going on in their areas. The faculty leader

and all administrative leaders are informed when a project is first entered, allowing conversations about resources to take place early in the project planning process. The administrative system was a big step forward in transparency, efficiency, and communication regarding research administration processes. Now that it has been active for five years, it is possible to get a more accurate view of new research faculty efficiency from an information systems perspective, in addition to traditional bibliometric data.

Methods

Quantitative methods offer an effective way of evaluating the baseline metric to measure the startup journey and academic success of new research faculty. This retrospective study involved secondary data collection from eight different systems, including faculty information, research operations and projects, research integrity, research effort, and publications databases. The purposive convenience sampling included all CM employees with faculty appointments with an employment start date between January 1, 2014, and December 31, 2018, with evidence of planned and reported research participation in their first year of employment.

Specific guidelines were developed for reporting effort at CM to clarify the portion of effort that individual faculty members devote to administrative, research, teaching, and service activities. All duties are assigned by the Division Director and/or Section Chief. It is expected that each division or section implement equitable standard processes and expectations for individual assignments, depending on the specific needs of the division, the career development goals for the individual, and consideration of approved protected time for administrative, research, teaching, and service activities.

Expectations for research productivity are stratified according to the percent effort allocated for research in CM. The Department Chair and institutional policy established the guidelines for research effort and expected productivity. Those faculty with 0.01 to 0.05 FTE protected research time were required to demonstrate some research-related activity (e.g., participating in clinical trials, participating in an investigator-initiated study, mentoring research activity of trainee, coordinating division quality activity with the intent to publish, etc.). Those faculty with 0.06-0.20 FTE protected research time were expected to publish an average of one or more peer-reviewed manuscripts yearly over a three-year period. Individuals with 0.21-0.50 FTE protected research time were expected to publish an average of one or more peer-reviewed manuscripts yearly and receive one or more external grants over a three-year rolling time period. Finally, those individuals with >0.50 FTE protected research time were defined as a researcher being their primary role and hold the expectation of independence as a principal investigator. For established investigators, the research program was expected to be supported by external funding (federal grants, foundations, philanthropy, etc.). For new investigators, the research program would be largely self-supported by external funding after an agreed upon period of startup time (typically three years). Effort allocation and productivity are reviewed on an annual basis through the department's annual assessment form. In all cases, failure to meet expectations would require a reassessment of the amount of protected research time by the Division Director and the Department Chair.

Following the research expectations set forth by the institution, only faculty members with 20% or more research effort were included in this study to ensure that the expectation of both publications and external grant activity were present during the startup period. Therefore, a research faculty member was defined as faculty with planned and reported research effort of 20% or more in their first year of employment, with an employment start date between January 1, 2014, and December 31, 2018, who was hired under the assumption that research would be a regular part of their workload, and therefore, eventual research productivity was expected.

Data from multiple systems were pulled on December 31, 2018, and integrated into a single dataset with the following columns: faculty name, degree, division, department, birthdate, race, gender, employment start date, faculty rank at start date, research effort, assigned space (yes/no), startup total years, startup total award, first research project created date, total number of research projects since start date, first IRB protocol created date, total number of IRB since start date, IBC approval date, date of first publication since hire date, and total number of publications since start date.

Data was collected and combined from several databases to compile a complete dataset of faculty demographics, research effort, research project (IRB and IBC) applications, and publications. Reports pulled on December 31, 2018, from multiple faculty databases, provided a total of 1,070 faculty in the original database with start dates ranging from July 1, 1971, to September 30, 2019. This original report included ten departments across the hospital: Anesthesiology with 44 faculty, Dentistry with ten faculty, Graduate Medical Education with nine faculty, Heart Center with 44 faculty, OB/GYN/Fetal Health with four faculty, Pathology/Laboratory Medicine with 30 faculty, Pediatrics with 772 faculty, Pharmacy with one faculty, Radiology with 31 faculty, and Surgery with 125 faculty listed as of December 31, 2018. A total of 736 faculty with start dates before January 1, 2014, and after December 31, 2018, were removed from the dataset. At this time, 347 faculty remained with start dates between January 1, 2014, and December 31, 2018.

Measures

Three measures were used to identify the total number of days that it takes for a new research faculty member to move from the discovery phase (value-consumed) into the engagement phase (value-created). These three variables were engagement, efficiency, and publication. Additional variables, including faculty demographics, the receipt of startup research funding, and the assignment of research space, were also included in the final analysis.

All research projects (animal, human subjects, or non-human subjects) at CM must first submit a new project application in the research system. Therefore, the first measure, **engagement**, was defined as the day faculty created a new project application as the principal investigator in the research system. It is important to note that this research used the date the application was created within the project application system, not the date the project was submitted or approved. There are specific problems with the use of the submission or approval date when defining faculty engagement, mainly system-approval delays. It was decided that the first moment of faculty research engagement at CM was best represented in the research project application created date.

Any research project applications that were created during residency or previous non-faculty employment with CM were removed and not included in the analysis.

The second measure, **efficiency**, was defined as the average number of total projects that were submitted per year by the faculty member in the research systems. Engagement in multiple research projects at the same time, or planning for future research funding, is often a hallmark of a successful researcher. The efficiency measure helps to frame how many projects a new researcher proposes each year.

The third and final measure, **publication**, was defined as the publication date of the first research article published by the faculty member with research that was conducted primarily at CM. As it often takes several months for a publication to move through the peer-review process, it was essential to double-check all new publications to ensure that the research was conducted at CM for a valid measurement.

Results

The total population included 59 research faculty (n=59). The results from the preliminary analysis show that 36 respondents (61%) have an M.D., 18 respondents (31%) have a Ph.D., 4 respondents (7%) have both an M.D. and Ph.D., and one respondent (2%) registered other doctoral education. Most research faculty (44, 75%) are assigned within the Department of Pediatrics. This result is not surprising as the Research Institute is housed within the Department of Pediatrics. The average age of research faculty hired from 2014 to 2018 was 41 years, with the majority (34, 58%) of the population ranging between 30 to 39 years old. The youngest range, 30 to 34 years old, accounted for 29% (17 respondents) of the population, matched by the 35-39 range with 29% (17 respondents). The remainder were 40-44 at 10% (6 respondents), 45-49 at 16% (9 respondents), 55-59 at 10% (6 respondents) and 60+ at 2% (1 respondent). The research faculty population was primarily white at 66% (39 respondents), followed by Asian at 14% (8 respondents), Black/African American at 7% (4 respondents), Asian/Indian at 5% (3 respondents), Korean and Hispanic/Latino each at 3% (2 respondents each), and lastly Chinese/Filipino at 2% (1 respondent). Research faculty hired within the study period were predominately male (35, 59%), followed closely by female research faculty (24, 41%). Interestingly, further analysis showed that while male new hires increased on average over the study period, female new hires decreased (see Figure 1).

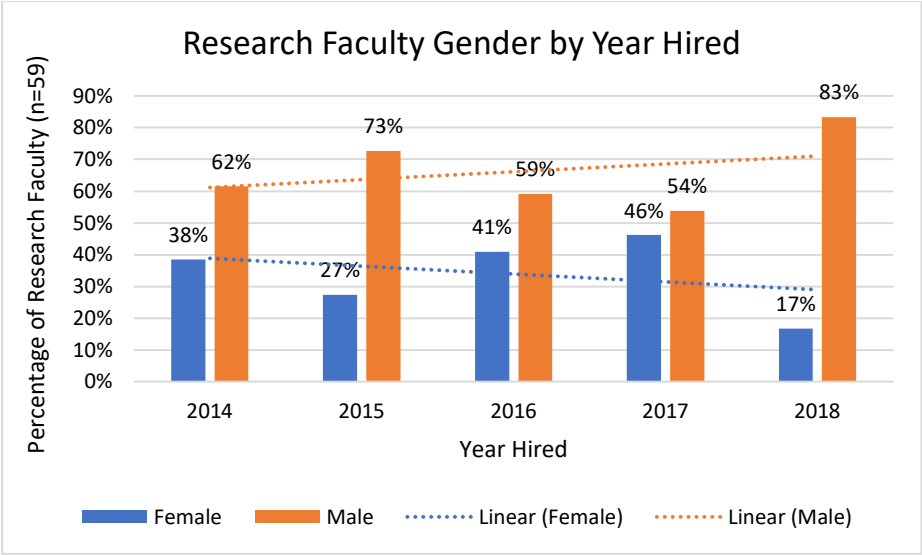

Figure 1

CM hired an average of 11.8 faculty members per year, with marked increased recruitment in 2016, accounting for 34% (20 respondents) of the total study population. In 2014, 2015, and 2017 each, CM hired 19% (11 respondents each) of the population. In 2016, there was a marked increase in hiring accounting for 34% (20 respondents) of the population. Lastly, in 2018, only 10% (6 respondents) of the research population was hired. The majority of academic faculty start employment in July (24, 41%) as it is the start of the organization's new fiscal year. Close behind the July month start date is September (9, 15%) and August (8, 14%), also corresponding with the academic year. Most research faculty are hired into the Assistant Professor (35, 59%) academic rank, followed most closely by Associate Professor (14, 24%) and finally Professor (10, 17%).

The first question in this study sought to determine the average time between the employment start date and a research faculty member's first engagement with the research administration system. Figure 2 is quite revealing in several ways. First, it shows that the majority of new research faculty are accessing the research systems within their first three months (17, 29%), with a significant portion (14, 24%) registering a new project within their first 30 days on campus. A total of 39 out of 59 new research faculty (67%) are likely to enter a new project within their first six months. Finally, it shows that 10% (6 respondents) of our research faculty have not entered a project into the system. Further analysis shows that those research faculty who have not entered a project into the research system were all provided with startup research funding.

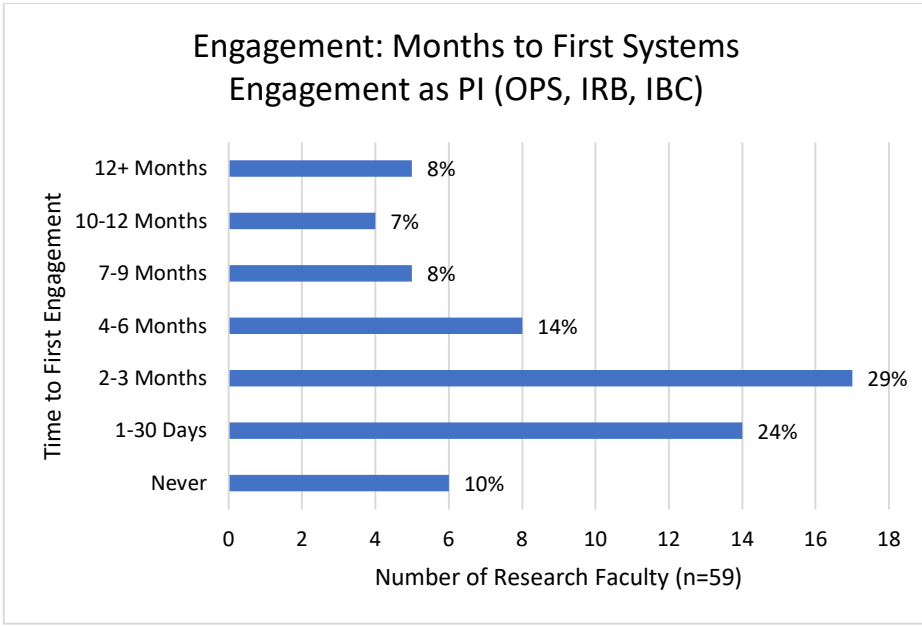

Figure 2

The second question in this study sought to determine the average number of new projects started per year for a new research faculty member. In Figure 3, it is apparent that the majority of research faculty (39 respondents, 66%) are creating more than one new research project per year.

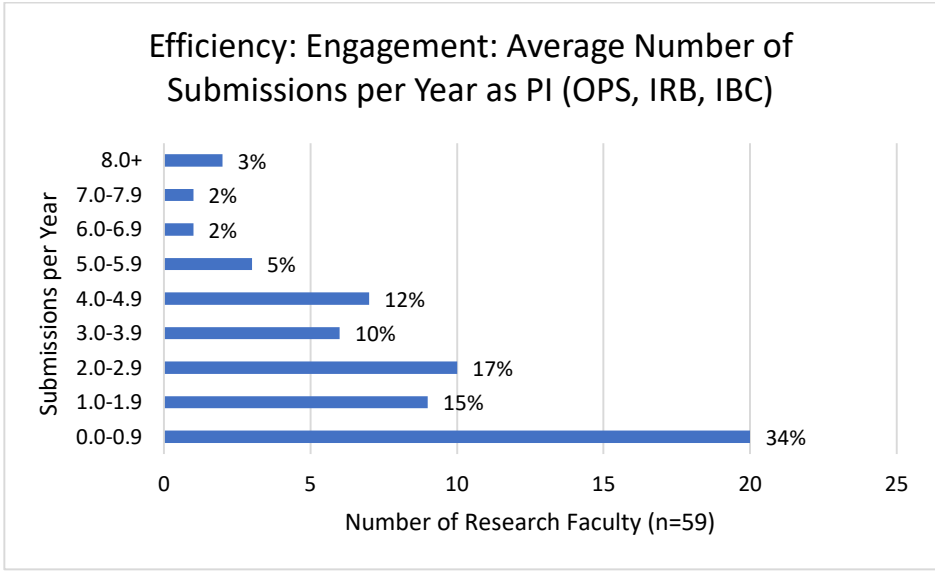

Figure 3

The third question in this study sought to determine both the average time between the employment start date and research faculty member's first publication and the average number of publications per year for a new research faculty member. From the data in Figure 4, it is apparent that the length of time between a research faculty member's employment start date and the first publication is often greater than one year. There was a significant portion of faculty who were able to produce a publication between 1 to 6 months after their employment start date (25, 36%). Further analysis revealed that most of these earlier publications were a co-author status and not as the primary principal investigator on the publication. Analysis of faculty publication rates showed that, on average, new research faculty produced 2.9 publications per year during the study period (see Figure 5).

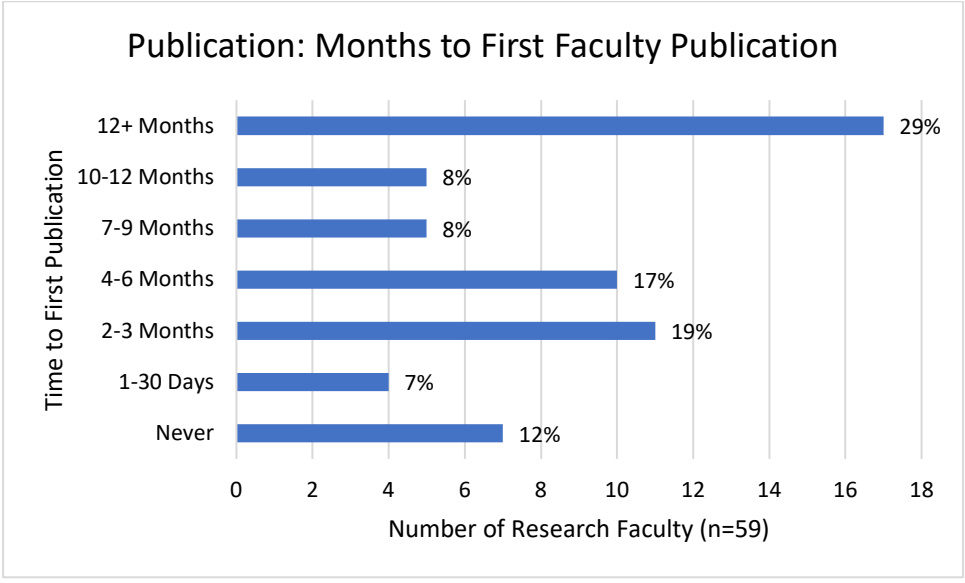

Figure 4

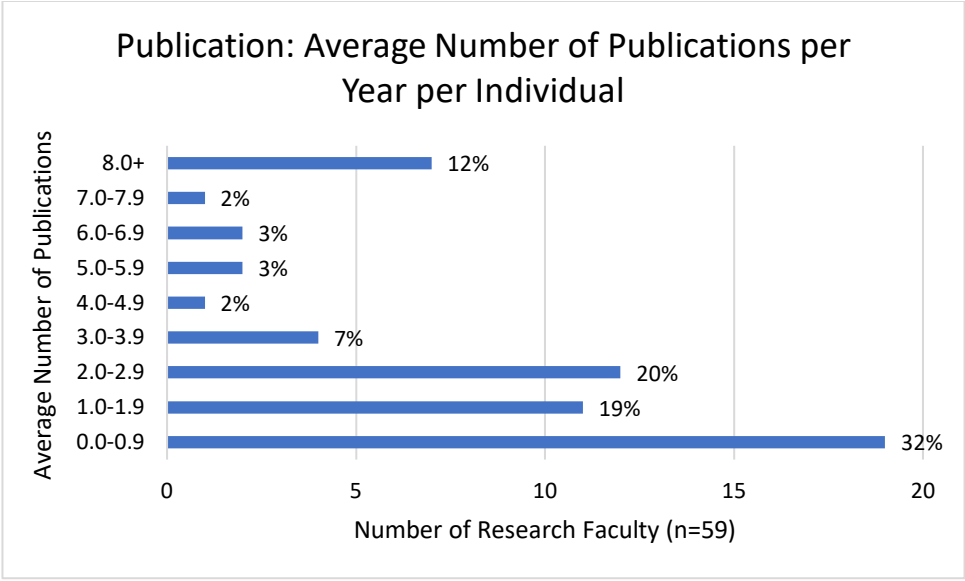

Figure 5

Discussion

The purpose of this study was to introduce a quantitative technique for measuring the startup journey and academic productivity of new research faculty at an established research academic medical center (AMC). Previous literature (Bland et al., 2005; Lowenstein et al., 2007; Perry et al., 2000; Ries et al., 2012; Wingard et al., 2004) has reported that academic productivity often declines during faculty transition; however, these studies were often based on publication productivity alone. The results of this study offer a more comprehensive approach to quantifying the research productivity of newly hired faculty beyond the use of bibliometric data.

By leveraging the data from the research administration systems, this study was able to measure the startup journey of new research faculty members from the last five years. General findings were that the typical research faculty member hired from 2014 to 2018 at CM was a 35-year-old white male with an M.D. hired in July into the Department of Pediatrics as an Assistant Professor. He submitted his first research project within the first three months of employment and averaged one new research submission per year. He would collaborate on a publication as a co-author within the first six months of employment, his first primary author publication would be published near his first employment anniversary, and he would average 2.9 publications per year in the first few years.

Overall results on new research faculty engagement were positive, showing that most new research faculty are entering a new research project into the system within the first 30 days to 3 months on

the job. However, further analysis showed that 10% (6 respondents) of research faculty had not entered a project into the research system even though all were provided with startup research funding. This suggests that new faculty members with readily available institutional funds to provide for all initial startup needs may not engage with the research administration systems as quickly as others without internal funds.

While the majority of research faculty (39 respondents, 66%) are creating more than one new research project per year, a large section of the population is still creating less than one new research project per year. There are several possibilities reflected here, and most are encouraging. First is the possibility of multi-year funded projects, which is the best possible scenario. In other words, a faculty member enters a new research project into the research system that is a 5-year fully-funded study. That faculty member then has little reason to start a new project in the research system for several years. Likewise, a faculty member who has received startup funds is also likely not to start multiple projects in the first few years. Faculty with less than one new research project per year were, on average, with CM for 2.3 years as of December 31, 2018. This finding might also provide some insight. Most faculty are given three years to achieve full external funding at CM and therefore may not feel pressured to find funding in their first year.

Findings suggest that a significant portion of faculty (25, 36%) were able to produce a publication between 1 to 6 months after their employment start date through a co-author status on the publication. This information is crucial because it shows collaboration and engagement with fellow research colleagues within the new organization and shows an active and welcoming research community.

Ethical Considerations

Research does not always involve data collection directly from the participants. The information used in this study was collected through routine management information systems and other administrative research activities. Existing data were analyzed to avoid repetition of research and survey fatigue of institutional research faculty members. However, specific ethical considerations of this study about secondary data analysis and data confidentiality were considered (Tripathy, 2013). This study was reviewed and approved by the IRB before execution, and it was determined that the proposed activity did not involve research as defined by U.S. Department of Health and Human Services regulations.

Limitations

Limits to the generalizability of the work include the personalized nature of the research system, faculty management data systems, research and faculty onboarding practices, and current research support located at CM. Factors that might have limited internal validity in the design, methods, or analysis include publications not currently indexed within the PubMed database or inaccuracies in self-reported data from the participating research faculty members. Additionally, this study was not able to collect publication information for a full five years on the entire population.

Additional analysis will need to be completed on the final question regarding the average number of publications per year for a new research faculty member. Efforts made to minimize and adjust for limitations include a rigorous cross-checking of data points across eight different data sets.

Conclusions

It can be challenging to track and monitor a new research faculty member's progress as they transition into a new role in a new organization. The current study hopes to fill a gap in existing literature regarding the best practices for tracking, reporting, and comparing the startup journey and academic productivity of new research faculty in pediatric AMCs. This research also provides a quantitative method to measure the entire startup journey from the discovery phase (value-consumed) into the engagement phase (value-created) and academic success of new research faculty in academic medicine. Most administrators and faculty members would agree that more rigorous and comprehensive benchmarks are necessary to track the startup journey of research faculty in pediatric AMCs. This research provides a framework to track the research onboarding experience through quantitative measures of engagement, efficiency, and publication. However, more research on this topic needs to be undertaken before the association of the engagement, efficiency, and publication measures, and the research startup journey, are more clearly understood.

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Scaling up Professionalization of Research Management in Southern Africa

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Abstract: *In the furtherance of knowledge, researchers and research are supported organizationally, but sometimes organically. Yet the research enterprise needs to be systemically managed. Research managers, however, are still striving to define their functions. Is research management part of the continuum of research itself? Is it an occupation? Is it a profession? Increasingly scholars are problematizing what the professionalization discourses mean for research management. Alongside other professionalization initiatives, the Southern Africa Research and Innovation Management Association (SARIMA) developed a Professional Competency Framework (PCF) for research management. The article addresses at a micro-to-meta level of analysis, the conceiving of the PCF, and then posits how the developmental journey towards a PCF may fit into a macro impetus towards professionalization. The findings extend theorising around competencies, professionalization and attendant methodologies.*

Keywords: *Research Management; Professional Competency Frameworks; Professionalization; Majority World; Organizing Reflection*.

Curnow & McGonigle (2006, p. 288) recognise that professions, generically, evolve from occupations undergoing diverse stages such as: formalising associations, providing professional development, inculcating a body of knowledge, as well as honing codes of ethics. Specifically, however, they may follow different trajectories. Appointees in research administration and/or management (hereafter management) may certainly identify with these stages and the common, yet differentiated, pathways that have grown the either nascent or mature research management profession. Atkinson et al. (2007) took up these concerns and postulated both a model for normative behaviour of research managers and normative influences on research management behaviour to theorise a model of research management as a public service profession. Yet, Derrick and Nickson (2014), while arguing for a "professional base," put forward the debate as to whether research management may even claim itself as a "distinct occupation group" (p. 26-27).

Professionalization developments have again been problematized as recently as the 50th Anniversary, in 2017, of the Society of Research Administrators International. In this commemorative issue of *The Journal of Research Administration* (Spring 2017), the currency, as well as the history of research management, were probed. Both Brandt and Porter's "Forwards" (p.17; p.15) to their retrospective articles argue that many of the research management issues of the past are still relevant today and continue to command onward examination.

This paper therefore responds to additional enquiry into the evolution of research management as a profession (Atkinson et al., 2007; Brandt; Porter; Linker, 2017). Research management stakeholders have energized to define their work more strategically, occupying as they do a particular space in a powerful continuum directed by academia. This is demonstrated by recent diagnostic and systematic studies (see Atkinson et al., 2007; Green & Langley, 2009; Derrick & Nickson, 2014; Jowi & Mbwette, 2017), as well as professional frameworks (Derrick & Nickson, 2014). Saks (2012), arguing from a professionalization perspective, also highlights the requirements for "delineating professional boundaries" while conserving "flex" [and] "flux" (pp. 5-6).

Research Context

Practitioners in research management in Southern Africa, or who occupy what Alam (2008) describes as part of the Majority world, may be said to identify with the concerns expressed globally. On the side of Southern Africa, many of these concerns are exacerbated by geo-political inequalities. Stakeholder groupings signal that research management, and the persons who fulfil these roles, lack a slate of collectively accepted definitions and empowering architectures which would have convening power (Derrick & Nickson, 2014; Freidson, 1986). There are ongoing questions as to what is normative for these roles, situated as they are with expertise, but often lacking resource, informational or referent power to fulfil all the requirements of their mandates (Raven, 2008). Within the literatures of "normalisation" (Rabinow & Rose, 1994; Taylor, 2009), this debate might well be familiar in that research management is nested within a broader space of power and groupings, that of university management, external collaborators and academia. Therefore, existing "adjacent" (Lester, 2016, p. 1) to such a long-standing demarcated and defended space, such as the academic tradition, it is not surprising that research management seeks to accelerate its claim to professional identity. Owing to such embedded power concerns (Freidson, 1986; Raven, 2008), research management seems to be asserting credentials, while, awkwardly, at the same time establishing exactly what competencies set it apart as a distinct profession. This ambiguous pathway is evident when, from within the work of research management, the nebulous concept of "third space" (Whitchurch, 2008 pp. 377; 384) was used to capture the dilemmas faced by the both the functions and the functionaries of research management. Pressures emerged from both within and without research management to create what amounts to a research management taxonomy (Wilensky, 1964). (See Green & Langley, 2009). This was to cement research management beyond the association stage found in the process model of professionalization (Curnow & McGonigle, 2006, p. 288). Kerridge (2012, p. 6) states such concerns when he reflects that although there is much activity in support of

Research Management Associations (RMAs) around the world, this in itself is not sufficient to cement the moniker of "profession" to its practitioners.

Given this posited direction, there has been the emergence of professionalization frameworks (See Association of Research Managers and Administrators [ARMA] and Southern African Research and Innovation Management Association [SARIMA] as well as European-wide and North American accreditation of levels of professionalization). Accreditations and frameworks respond to the need for additional professionalization security, yet could be argued to be counterintuitive to the responsiveness required across the broad range of socio-political processes inherent within disciplines and multi-inter-trans-disciplinary work (Saks, 2012) for which academia stands, an issue alluded to in different instances of this article.

Based, however, on taxonomic definitional needs, SARIMA draws members and stakeholders from 15 Southern African states and works collaboratively with global counterparts and/or RIMAs or Research and Innovation Management Associations as they are known. There are many known by their acronyms, such as ARMA, EARIMA, CARIMA, CabRIMA, WARIMA, NCURA, EARMA, SRA, et al)[1]. In response to globally caucused expert viewpoints and requests from members, SARIMA arrived at a strategy from 2010/11 onwards to professionalize research management. This strategy paved the way for the development of a Professional Competency Framework (PCF) (Dyason, 2016). This is consistent with the call from Derrick and Nickson (2014, p. 11), who motivate for more efficient research management strategies as a means to achieve competitive research strengths. Parallel to the PCF, SARIMA undertook a meta-view of the process and posed the following research question:

> "How does SARIMA accomplish a regionally relevant, yet globally applicable, Professional Competency Framework?

Given the stated metacognition of this initiative, the research is theoretically located within the collective and organizing of reflection, hitherto not necessarily directly articulated with the sociology of professionalization literatures. Reynolds and Vince (2004) describe this as spaces for concerted and collective deliberations. Furthermore, the applicability of this theoretical base is underlined when Reynolds and Vince (2004) question how such reflection may bestir established practices, as well as challenge and expand on opportunities for practitioner learning. Within professionalization literature, organizing reflection acts in response to the neo-Weberian calls around professionalizing, which argue for reflecting on thoughtful meta-level ("holistic") perspectives beyond pragmatic practice-lenses (Saks, 2012, p. 6). For research management, Campbell (2010) advocates for the ongoing need to explore theory to universalise the knowledge frames, given that there are different approaches for different modes of research management.

[1]ARMA: Association of Research Managers and Administrators; EARIMA: Eastern Africa Research and Innovation Management Association; CARIMA: Central Africa Research and Innovation Management Association; CabRIMA: Caribbean Research and Innovation Management Association; WARIMA: West African Research and Innovation Management Association; NCURA: National Council of University Research Administrators; EARMA: European Association of Research Managers and Administrators; SRA: Society of Research Administrators International.

This paper, then, extends the scholarship through the case of writing up of the development of a professionalization initiative, within a Majority world context. This is achieved specifically, through the knowledge generation and reflective work of mainly Southern African stakeholders. It also responds to calls for more specific, yet studious, means to operationalize cases of professionalization, beyond reified policy or being influenced by dominant professionalization exemplars (Derrick & Nickson, 2014; Lester, 2016). This is made alongside the need for investigation of research management practice and theory (Poli & Toom, 2013; Trindade & Agostinho, 2014).

The outcome of SARIMA's research was an approved PCF for the public sector's research management, which SARIMA is now taking forward through both regional and international partnerships. The narratives of reflective learning and organizing, as well as the processes to attain a PCF, are offered in this article to respond to the research apertures hereby introduced. While the case does centre on research management, extrapolations might be made to other professions. This is in consideration that, as with research management, more and more work has to span professional and disciplinary boundaries. Research management is well versed in navigating these blurred boundaries (Whitchurch, 2008; Trindade & Agostinho, 2014). The article covers two central facets: at a micro-to-meta level, the development of the PCF. This is followed by a discussion, at a macro level, of how the PCF fits into an unfolding trajectory of the professionalization of research management in the Southern African context.

Background

SARIMA is a stakeholder organization that formed in 2002 to a felt need by Southern African academics, research management practitioners and their institutions to associate around common research and innovation management concerns. SARIMA began, and has contributed, to research management and innovation through encouraging practice and knowledge bases that include, but are not limited solely to: advocacy; leadership, policy and knowledge platforms; working within respective national and regional systems of innovation; facilitating inception and development activities of other RIMAs; an annual international conference, capacity development programmes, study exchanges, mentorship. Based on the patterns of three professionalization models as argued by Curnow & McGonigle, (2006, p. 289), SARIMA reached a juncture where 1) defining the shift from occupation-to-profession and 2) specifying such professional "skills sets" using explicit criteria could well be visibly amplified in support of the burgeoning of research management from occupational to professional orientation. As such, it would produce a first of its kind for Africa (SARIMA, 2016).

The 2010/11 strategy for professionalization was therefore adopted and attracted funding from two central conduits, soon to be followed by additional partnerships (2015 onwards).

SARIMA was able to set the project in motion, albeit through volunteer leadership and only one part-time project manager, whose portfolio extended across most of SARIMA's activities. In the light of familiar resource constraints, research management professionalization approaches and frameworks were explored so as not to "reinvent the wheel" and leverage economies of scale.

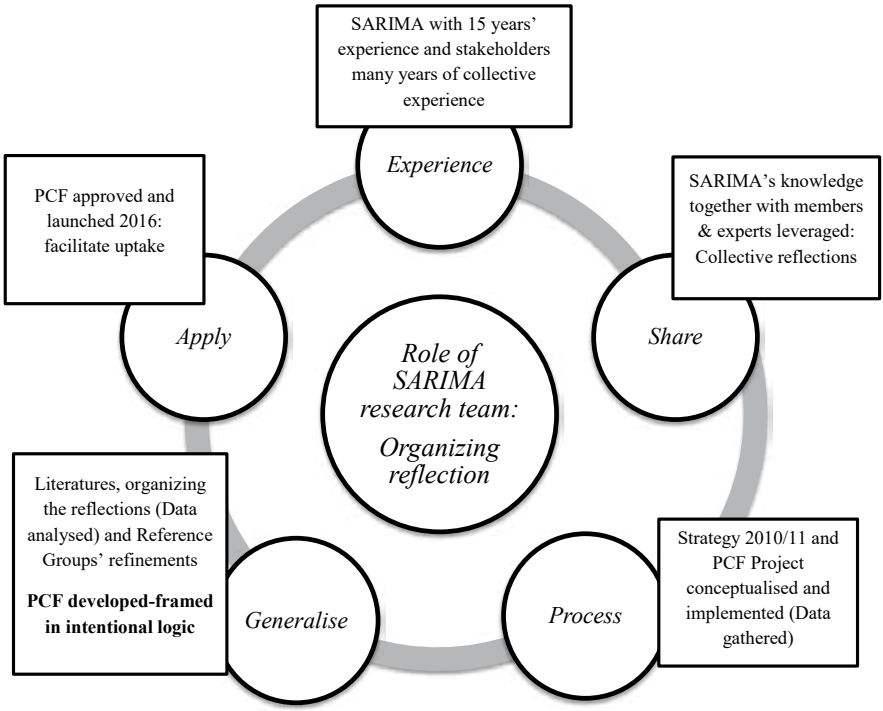
Upon the collective reflection (Reynolds & Vince, 2004) of the SARIMA membership as they began implementation of the strategic decision, the members decided not to "cut and paste" any existing framework, but instead to use such knowledge as a benchmark. The way forward was therefore to enter the professionalization cycle (Curnow & McGonigle, 2006) and to embark on self-regulation (Lester, 2016) through working collaboratively and co-creating an indigenous framework that could reflect, what some deem, as a global South or Majority World view (Alam, 2008). The project inception included setting up a strongly regional Project Advisory Committee (PAC) as the governance structure, and Project Working Group (PWG), respectively that entailed drawing both from members of SARIMA and external role-players. A methodology was conceptualised within open-ended responsive parameters.

The initial groundwork for the development of the PCF thus took place between 2010 and 2014 and incorporated surveys that allowed SARIMA to get a better understanding of the capacity needs and professionalization preferences of the Southern African research management community. In 2015, SARIMA initiated, as a first phase of its professionalization impetus, a consultative project to design the PCF for research managers and administrators in Southern Africa.

Conceptual Framing of the PCF

The notion of competencies which match distinctive skills to achieving professional and organizational success was coined by Selznick in 1957 and was taken up by various professions within a deliberate and intentional logic. Chomsky, in 1968, inculcated it within educational trends with educational approaches going through stages of competency-based progressions (Butova, 2015), yet with little change in the rational goal-oriented underpinnings. The specificity and deliberateness of the logics for framework development were deliberated on and seen to be conceptually integral to the formation of SARIMA's regional framework.

On the basis of SARIMA's own core rationale as a stakeholder organisation, a further concept, to inform the project, was stakeholder reflection. The research team specifically saw their role as surfacing the deep, yet often conflicted (Whitchurch, 2008), expertise that is embedded in the research management field and then enabling discussions that entailed experiential reflection on research management practitioners' roles, contributions and challenges. The research team took these participants' rich data and organized the reflections into a defined, yet flexibly-oriented outcome. The concept of "organising reflection" (Reynolds & Vince, 2004, p. 6) is built on Schön's (1983) thesis around: "on-the-spot surfacing, criticizing, restructuring, and testing of intuitive understanding of experienced phenomena…[taking] the form of a reflective conversation with the situation" (pp. 241-242). This was complemented by the experiential learning model of Pfeiffer and Jones, (1983). At an operational level, the conceptual framework that guided the workings of the research may be depicted as follows:



Note: Adapted from Reynolds and Vince, (2004), "organizing reflection" and Pfeiffer and Jones's, (1983) "experiential learning framework".

Figure 1. Conceptual Framework for PCF Research.

Literature and Situational Review

The project filled both an applied and theoretical gap in research management. On an applied level, there was no PCF that was in existence for Africa, let alone Southern Africa. SARIMA has relationships and enjoys the counter-part support of other professional associations for research management. While similar associations have different accrediting frameworks or arrangements (See ARMA: Olsson & Meek, 2013, p. 54), these are bespoke to their needs, including their support of their membership. The importation of a developed framework, while pragmatic, would be intricate on a number of levels; two considerations of proximate relevance are cost and the impetus to locate the PCF in more localised experiences. Stakeholders of SARIMA, at each of SARIMA's international conferences, are recorded as requiring of a more deliberate framework to guide their current and future strategies and to strengthen professionalization of their work. The delegates indicated that they want to benchmark their work, performance, expertise, power and/or status in the organization. Reports from participants, who work across the Continent, spoke

to the unevenness of research management across Africa. This included the lack of understanding of what research management may potentially and actually achieve, minimal resources set aside for the specifics of research management, and the dearth of skilled human resources who both understood and could practice the craft of research management. Others reflected on the constant negotiation that their offices had to engage in to demonstrate their roles, relevance and the strategic value they add to research outputs. Hence SARIMA adopted the development of the PCF going forward with the main thrust of formalised conceptualisation taking place from 2015-2016.

Theoretically, a systematic review of research management (Derrick & Nickson, 2014) confirmed that role-players outside of the profession were not clear on what research management actually is, what benefits it brings and how it can deliver within research contexts. This concern holds resonance across a number of boundary spanning and "nascent" worlds of work (Whitchurch, 2008; Lester, 2016, p. 3). Derrick and Nickson (2014) conclude with a bid for future research into "characteristics of successful research management" which SARIMA translated into understanding the competencies, as at least (or most) a starting point.

The concept of research management as a profession has also been problematized. Practitioners have asked how does one define the fluidity and multiplicity of the work of research management, amidst consideration of the tighter lines of (self-) regulation that are asked of within professions themselves (Whitchurch, 2008; Saks, 2012; Lester, 2016)? This question is indeed not only relevant to research management, but increasingly to multi-sectoral occupations/professions that have adapted or emerged based on globalisation and more complex work conditions (Faulconbridge & Muzio, 2011).

In other views, research managers are reflected as being "occupational groups" "shaping a new profession" (Poli et al., 2014, pp. 55; 54). The concept of "third space", as described by Whitchurch (2008), is postulated as being the future environment for the incubating profession (Langley, 2012). Trindade and Agostinho (2014) indicate that more explicit framing and a more defined conception of research management is needed for the career structure and progression of research managers so as to deliver ultimate benefits for research itself. Lester's (2016) prism states that novel lessons are opened through looking at the experiences of less mainstream occupations-to-professionalization trajectories.

McIntyre-Hite (2016) further states that there has been considerable variance in research on competency-based development itself. Few studies have been undertaken in terms of a broader programme basis. The same author indicates that the various investigations across multiple disciplinary fields are in agreement that multiple stakeholder perspectives are important—a central area that underpins SARIMA's membership-informed approach.

Given these views, and that there is little scholarship published on research management within a Southern African context, SARIMA took on a convoking role hereto. Kirkland, as early as 2005, made two central points: how "developing countries" are in "urgent need" of enhanced research management networks and systems. He argues specifically about how SARIMA, as a niche Association, is well-placed to be responsive to such need (Kirkland, 2005, p. 65).

Given these clear directives for emboldening the agenda of research management, the project unfolded using dual lenses: 1) providing a defined professional and practical competency framework as well as 2) tracing the meta narrative of the project to build the bodies of knowledge on professionalization; methodology of framework development and organizing reflection, with research management, in particular, being the unit of analysis.

Methodology

The devising of a PCF within a Southern African setting entailed methodological decision-making that balanced rigorous research norming with coverage of multi-national contexts. Given the above considerations and that competencies in themselves are content-rich, a qualitative, socially-constructed study following an action research design, provided a dialogical line of inquiry that was philosophically justifiable. An initial exploration of extant competency frameworks provided a schedule which was explored and refined through a pilot. This entailed that the research team went into the subsequent focus groups with pre-existing scaffolds that would be further co-constructed through localised insights.

Using pilot data and literature, the specifics of nine key competency areas (for example, "research planning, strategy and policy" [see Annex A] and "managing funded research"), and three levels of competencies (administrative/operational; management; leadership/strategic) provided resource efficiencies for both the data gathering methods and analysis. Therefore, semi-structured schedules (targeted prompts) guided the focus groups. Focus groups' outcomes were a combination of small and plenary groups' discussions recorded on the schedules, facilitator's notes and news sheets. The participants delved into the textured meanings of research management following the lines of inquiry as suggested by Poli et al. (2014, pp. 54-55) with commitment to shaping the lines of this "new profession".

To gain the insights of "employers" of research management staff, a specific group interview formed a sub-section of one of the focus groups with the addition of two further meetings of Deans, Directors and Senior Managers of research management (Focus Groups [FGs] 5, 6, 10).

Both the literature and the data were collated and uploaded into ATLAS.ti, a qualitative data analysis software that provides an integrated project management base while also systemising and tracking data meaning-making. ATLAS.ti was seen to be valuable for its ability to cluster coded text as well as for its visualisation of grouped and conceptual networks (Smit, 2014). Using the nine key competency areas across three levels, the knowledge bases of the participants (their data) were deductively coded, using prefix coding (Friese, 2014). Each of the nine areas and the three levels were intensively populated with the findings of the focus groups' contributions. Principles of the research team for the analysis were that: the participants must be able to "see their thinking and words in the PCF", yet also the voluminous data must be rationalised to achieve a user-friendly and contextually-sensitive framework. The literatures were also themed against the nine competency areas and an interweaving of the empirical data and secondary data applied to each competency area.

Empirical demographic fields, useful to gain an understanding of participant profiles, were quantified and are reported herein including sex-disaggregation and number of participants (Table 1).

In addition to the deductive approach, patterns of localised reflections around research management competencies were inductively traced, capturing the breadth of the knowledge of Southern African research management stakeholders. The literatures were also invoked for these looser pronounced areas to build a more scholarly "template".

Organized reflection (Reynolds & Vince, 2004, p. 6) formed the bedrock beneath the more formulaic research processes. The collective years of experience of the reference group and the two main researchers were harvested for participant observation actualities. Instances of organized reflection were: doing word counts; questioning logics; playing devil's advocate; imaginative exercises of what would one do, for instance, if one was the strategic leader, or the administrator; mulling over details, seeking commonalities as well as distinctions; differentiating the data across the nine areas and three levels; balancing the data with the literatures; seeking appropriate verbs and words; reframing and summarising. Aside from the methodology producing a defensible and collaborative framework, we believe a modest claim may be made of how to invoke thoughtfulness, articulated experience and technology to create a robust process logic that may be used in resource-limited contexts.

This alternative logic was in line with the PCF's ambitions: to develop a framework that is "pragmatically-oriented [within]...everyday [research managers] arguments" (Rich, 2013, p. 5). This entailed, as Rich (2013, p. 5) indeed argues, "techniques for translating a messy reality" into competency-based theoretical thinking and "language", which, in turn, should be translated back into that same messy actuality of the same "everyday" manager.

The methodology for the project is depicted in Figure 2.

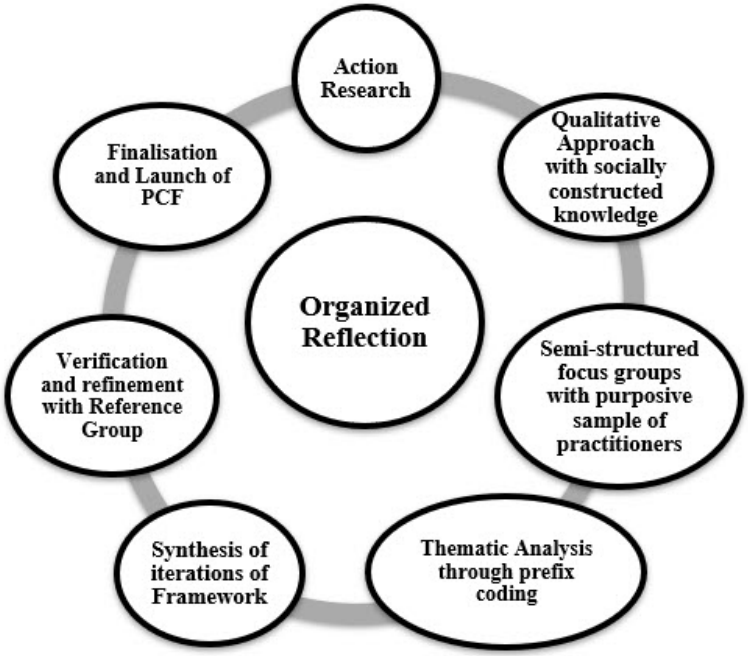


Figure 2. Methodology for the PCF.

Following this methodology, SARIMA worked with purposively sampled participants to co-construct the output of the SARIMA PCF. The participants' profile is provided along a number of quantified and qualitative dimensions.

Firstly, the qualification profile was as follows: 45% PhD; 31% Masters; 8% Honours; 9% National Diplomas; 5% Bachelors; and 2% Grade 12 qualifications.

Secondly, additional demographic and explanatory details of the focus groups are summarised in Table 1. Mindful of the thesis of Poli (2014), SARIMA also ensured that sex disaggregated data were recorded for the initial phase. Within the substance of the project and the PCF, SARIMA advocates for gender considerations and gender mainstreaming to be considered for the adoptions of the PCF.

Table 1. Demographic and Explanatory Details of Focus, Reference and Governance Consultations

No.	Centralised site (site chosen for pragmatic reasons in terms of centralised travel point and coupled with other key SARIMA meetings)	Number of Participants	Explanatory Details
1	Pretoria, South Africa	16	Pilot: Representatives from PWG and PAC. Representatives from research fields
2	Gaberone, Botswana	16	Southern African (outside of South Africa) SARIMA's three levels for research management (operational, management, leadership)
3	Bulawayo, Zimbabwe	13	Southern African (outside of South Africa) SARIMA's three levels for research management (operational, management, leadership)
4	Blantyre, Malawi	17	Southern African (outside of South Africa) SARIMA's three levels for research management (operational, management, leadership)
5	Durban, South Africa	40	Deans, Directors and Senior Managers of research management
6	Cape Town	20	Senior research management representative. Representatives from Central African and Eastern Africa Research and Innovation Management Associations (RIMAs)
7	Stellenbosch	15	SARIMA's three levels for research management (operational, management, leadership)
8	Port Elizabeth	12	Combination of focus group and early verification exercise
Initial data gathering completed		**149**	**62% women and 38% men**
9	Melbourne, Australia (including 3 members of the governance structure)	36	INORMS Conference Representatives from LMICs (18 different countries)
10	Cape Town	31	Post-approval verifications exercise
11	Johannesburg, South Africa	21	Post-approval verification exercise

12	Pretoria, South Africa	15	PAC inputs and approval
13	Full Report was sent to Project Advisory Committee for review. The report plus the details of one or more specific key competency areas were sent to focus area participants and other individuals based on their respective areas of specialisation. People from countries, other than those involved in focus groups, were incorporated to broaden the inputs from the region. In particular the SARIMA SADC Focal points were asked for their review.	No indicative number (Focal points referred onward in universities)	Reference group - focus group participants, the project advisory group members and other selected individuals who are practitioners in the different competency areas

Data and what the data do: Narrative 1: Micro-to-Meta: Arriving at an Approved PCF

SARIMA commenced the discussions by positing seven distinct competency areas. As the consultations proceeded, "Ethics and Integrity" were confirmed as such an important dimension of research management that SARIMA was advised to make it a separate key competency, after the pilot group. It was also agreed that "Partnerships and Collaboration" should be a stand-alone area. Participants suggested that too much would be lost from research management focus if these two areas were mainstreamed. Thereafter, interestingly, the focus groups, while shaping terminologies, reached consensus on the nine key competency areas. Without changing the orientation of the nine areas, participants provided instead information-rich sub-competencies under the nine headings.

The collective drew on their daily experiences of "going beyond the familiar working spaces shared with academics and [exploring what it was like for them to] occupy new and unexplored spaces in today's research" (Poli et al., 2014, pp. 54-55). Qualitative data shows respective research management offices set up with business enterprise architectures, to a mere two computers to support the research management functions of a large university (FG 6). Most focus group discussions represented a continuum between "dreaming the dream" of an ideal research management function: "This is the ideal" (FG11); the demanding realities of constantly "plugging up holes" (FG 6); and being "all things to many people": "Chief Cook and Bottle-washer" (FG 11). The emphasis on soft and cross cutting talents (see discussion that follows) were not therefore a surprise and these dimensions form a strong inclusion in the PCF. Most tellingly is one remark, made by a participant, at a well-resourced university: "We are so glad SARIMA is doing this, I feel valued; what we do matters" (FG 11).

Given the notions of "blurring" and "blending" (Whitchurch, 2008, pp. 377; 388) in research

management and entertaining "wider vistas" (Saks, 2012, p. 7) for defining a profession, numerous similar and overlapping sub-competencies had to be interrogated for their meanings. The researchers, using literatures, experiential knowledge and interpreting and re-interpreting the articulated discourses, selected the best possible framing of a sub competency, often through combining a number of ideas. This included also paring out the cross cutting skills and grouping them in the levels as well as generically. Redundancies were extracted from the working PCF, but various versions of the PCF were kept so that "original thinking was not lost".

This process was constantly framed in the light of Vince and Reynold's (2004, pp. 5-6) "organized reflection" and sought to attach "importance to experience and of situating reflection as integral to working and learning"...considering the "social, cultural and organizational nature" of the data presented. As such, the PCF, as a whole, went through various iterations bringing together the collective insights and verification of the multi-disciplinary, gendered and regionally-informed project working group, the advisory group, and reference groups.

The researchers found two interesting dimensions as the data were worked. A first dimension was that each key competency area and its definition (first layer of logic) could include distinct sub areas (second layer of logic). Following on the sub areas, the researchers then listed the numerous competencies (third layer of logic), across the three different organizational levels which, in time, were decided as Level 1: administrative/operational; Level 2: management; Level 3: leadership/ strategic. A composite exemplar of these logics is provided in Annex A. "Key Competency Area 2: Research planning, strategy and policy development". The aggregated nine competency areas with their main sub competencies are described in Table 2.

Table 2. Nine Key competency area with high level descriptions including the sub-areas

Key competency area	High-level description of the area inclusive of sub areas
1. Organization and delivery of a research management service	Organize, structure, manage, monitor and review a research support function
2. Research planning, strategy and policy development	Facilitate and support the development, implementation, monitoring and evaluation of research policy and strategy across the competency areas
3. Researcher development	Support postgraduate student and researcher development across the research pipeline within different organizational settings
4. Partnerships and collaboration	Facilitate and manage national, regional, international partnerships and collaborations to advance research including with research organizations, funders, industry, government and society
5. Research funding	Identify and disseminate funding opportunities; develop and implement funding optimisation strategies; support the writing of funding proposals, including alignment with stakeholder requirements, budgeting, costing and review; coordination of approvals and submissions (usually associated with pre-award activities)
6. Research ethics and integrity	Promote, foster and support research ethics and integrity, compliance and responsible research conduct
7. Managing funded research	Research contracts negotiation and management; research financial management; funder/sponsor engagement and liaison; research project management (usually associated with post-award activities)
8. Research data and research information management	Develop research data management plans and support systems; databases and information systems; research data management; reporting
9. Research uptake, utilisation and impact	Dissemination and communication of research; knowledge transfer; business development; measuring and demonstrating research impact

The data provided rich description around a second dimension. Participants repeatedly identified and communicated transferable or so called 'soft skills' under each of the nine areas. Every participant/group provided views on soft skills and transferable competencies that cut across task domains. Again, the team oriented towards reflecting on how to do justice to such crucial data. Initially the transferable skills were collated and reviewed holistically. As the PCF took shape, however, the transferable skills were organized as follows: transferable competencies that were differentiated, specifically, between each of the three levels of work: leadership/strategic; management; administrative/operational, in relation to the nine competency areas.

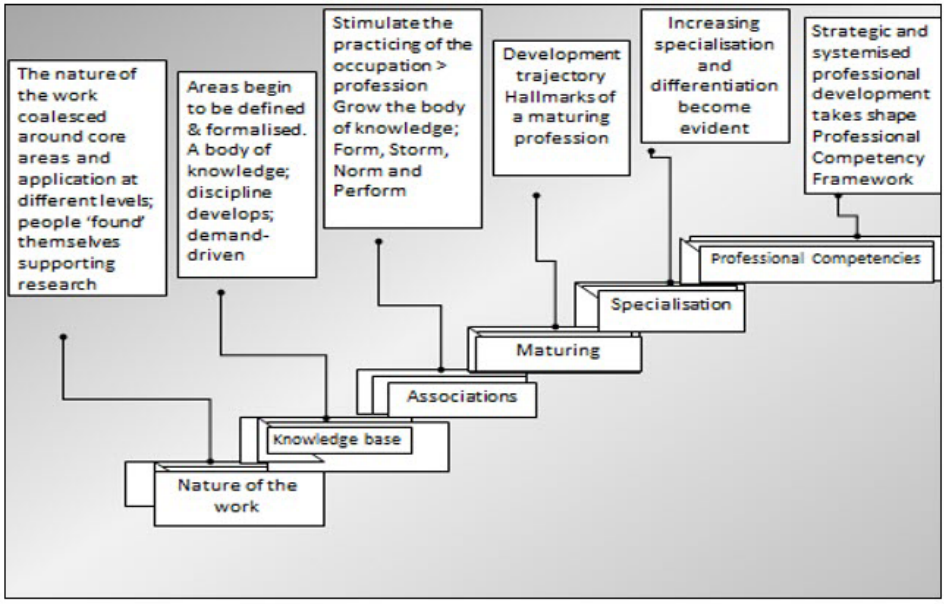
The PCF was then firmed up using several feedback sessions from the governance structure and additional consultations (see Table 1). At the approval stage of the PCF, an analytically sound flow of competencies was tabled for each of the key areas. The exponential nature of progress from Level 1's competencies (administration/operational), evolving through experience, learning/qualification and career progression, to Level 2 (management) and 3's (leadership) competencies also found traction both regionally and internationally.

While this rendering of the process appears on paper as linear and neat, it belies many hours of to-ing and fro-ing between messy data, various interpretations and questioning of interpretations, cross-referencing with other frameworks and mining the literatures intensely for contrary and confirming points of view. The framing point of departure that reflections must happen, yet should be organized (Reynolds & Vince, 2004) provided a grounding touch-point for the team's work.

This confirms the contentions of Curnow and McGonigle (2006, pp. 289) and Saks (2012, p. 5) who, at the more aggregate level of professionalization, indicate that such processes are not necessarily "linear" and that, in the processing of professionalization definitions, "shifts" and "on-going flux" occurs (Saks, 2012, p. 6). Lester (2016) highlights this as the benefits of being able to pursue self- regulation.

Data and what the data do: Narrative 2: Macro: Theorising around Macro Fit

Following upon this more aggregate logic, SARIMA acknowledged that the development of the PCF is but one constituent feature of the evolving professionalization of research management. Therefore, while the stakeholders of SARIMA considered the PCF as a valuable contribution to the emerging profession, their standpoints did not end there. Using the lens of "organising reflection" (Reynolds & Vince, 2004, p. 6), the self-identified narratives shared over and above the focus groups' targeted schedule (directed questions and probes) were used to inform a broader structural arena. The research team, therefore also theorised around a macro view of where the PCF and its processes fit into a professional perspective (Lester, 2014). The models of Curnow and McGonigle (2006, p. 290) anchored the thinking.



Note. Adapted from Curnow & McGonigle, 2006, p. 288

Figure 3. Macro Theorising of The PCF within a Trajectory of Forming a Profession.

The macro and structural angle in Figure 3 therefore show a mapping of the PCF against the models of Curnow and McGonigle (2006, p. 290). In so doing, SARIMA tables its fifteen years of memory around the growth of research management and how a defining project, such as the PCF, could be inculcated at the level of structure as well as micro agency.

As acknowledged by Kirkland (2005, p. 65), SARIMA does provide a centralized point of reference for stakeholders, especially within Southern Africa. SARIMA facilitated therefore its convening role. The Association populated and shaped the PCF, from the focus groups, but was also there to hear the narratives of how people coalesced around functions. The notions of Figure 3 (drawing from the figure of Curnow and McGonigle, 2006, p. 288) took shape and each stage is detailed in the vignettes below.

Nature of Work

"What do we do; what is 'normal' in our daily routine?" Phrases such as these are common. Additionally participants indicate that they "just found" themselves or almost "fell into" supporting research functions in respective sectors. The discourses of the focus group showed a range of capabilities required or suggested: such as fulfilling servant leadership (Krauser, 2003; Vargas & Hanlon, 2007), partners (Hockey & Allen-Collinson, 2009), and part of being the competitive forces of research (Kirkland, 2008). Certainly, participants dwelled on the blurring

between two main domains (research itself and providing support for research-and the power plays that characterise their ambiguous platforms), and how they are straddling responsibilities with the universities requiring a range of expertise and acumen (Whitchurch, 2008). This elasticity of roles is described by Curnow and McGonigle (2006, p. 290) within the initial stage of a profession. The research team therefore recast this coalescence as 'the nature of the work' in research management.

Knowledge Base

Attendant to this daily work, the "guises of the research manager" (Derrick & Nickson, 2014, p. 16) were debated in an evolving knowledge base. In Southern Africa, a Master qualification focusing on many research management components is in existence and one of the focus groups happened close to the home of the qualification. Participants shared their experiences of this qualification, conferences, meetings and training sessions, many of which provide impetus to SARIMA to develop the PCF. All focus groups demonstrated knowledgeable people speaking eloquently and with authority around research management. Yet after each group, the facilitators walked away with the sense of yearning "for more -and more defined career pathing" resonating in their impressions of the sessions.

Associations

SARIMA and counterpart Associations/equivalents were, and are, acknowledged throughout the process. Representatives of the counterpart Associations added credibility to the PCF development. In fact, other Associations, in particular those in the rest of Africa, requested SARIMA to proceed and "proceed quickly" (FG 6) with the PCF so that other RIMAs may employ its benefits.

Maturing

During the years from the initial strategy decision of 2010/11 to the approved PCF in 2016, SARIMA and the stakeholders of the focus groups bear witness to the burgeoning of a profession. However, the focus groups also bear witness to inequities and inequality. The profession appears to be maturing, but "leaving behind" some Offices struggling with resource constraints, lack of infrastructure and competence, massification of higher education and lack of enabling technologies. Even a very well-resourced university's group reflected that it would be useful to have criteria (such as could be provided through the PCF) to find out how mature their research management functions actually are and how much they depict professionalization (FG 11).

Specialisation

During the data gather, there were constant reflections of how some Research Offices are specialised and differentiated (with one Research Office undertaking a "business process re-engineering project that automates much of the administration/bureaucracy of research management"). Juxtaposed to this, other Research Offices bemoan under-capacitated Offices where the research Office has to be "one size fits all". The team recorded stories of how only a few staff members, for

any number of large universities, cover all nine areas and are called on to be the expert on all areas of management/administration/leadership of research.

Yet, somewhat ironically, the work of research management teams (leaders, managers and administrators) is often described as an intense spanning of two domains (Whitchurch, 2008). In the one domain, the incumbent offers one set of expertise that has to do with organizational, programme and project work, essentially working within strategic and logical frameworks of management in support of research. In the other world, the research management team is invited to be immersed in conceptualisation, theorising and building the body of scholarship, using different insights that set out to extend or originate knowledge itself.

Professional Competencies

In the awareness of these situational and often discordant realities, SARIMA embarked on the PCF as both a strategic and pragmatic means to put African research management on the map. At the time of the approval of the PCF, SARIMA secured additional funding for two global projects. Both these projects have the premise of an approved PCF being a pivotal foundation into broader projects that will contribute sizeable research management capabilities and infrastructure to Africa.

Given the storied threads accompanying the posited figure (Figure 3), the authors offer that the PCF, while micro-to-meta in configuration, fits into the scheme of moving the evolving profession (Langley, 2012) forward to a more macro structure, especially in a Southern African context.

One piece of analytical evidence for this is when the researchers overlaid the initial and postulated conceptual framework of the PCF (Figure 1) with the macro theorising model of the fit of the PCF into moving a profession forward (Figure 3). This overlaying heuristic corroborated the micro with the macro. The adjacent equivalents are mapped below in Table 3.

Table 3. Equivalence Between Micro Processes of PCF Against Macro Theorising Towards Moving a Profession Forward

Figure 1: Conceptual Framework for PCF	**Figure 3: Macro theorising of fit of PCF into moving a profession forward**
Experience	Nature of work
Share	Knowledge base and Association
Process	Maturing with acknowledged differentiated levels of specialisation
Generalise	Professional Competencies-PCF
Apply	Professional Competencies; Maturing and evolving levels of specialisation as the PCF informs the career progression and qualifications routes for Southern African research management

Regional Relevance and Global Applicability

In response to the research question, therefore, the evidence must be judged as to whether SARIMA accomplished a regionally relevant, yet globally applicable, Professional Competency Framework.

Certainly, through a bold process of self-determination (Lester, 2016), SARIMA put professionalization discourses clearly on the map for the Majority World constituents of Africa (Aldridge & Evetts, 2003). Through a prosaic framework, the budding profession has normalized some dimensions of a blurred world of work (Taylor, 2009). There is substantiation that SARIMA elicited expert views from regional representatives, purposively sampled. The voices of the participants are translated into the text of the PCF. Parallel to the drafting, concatenated analytical and referee processes took place to develop a consolidated, consultative framework that may be used with ease. It is still publicly accepted that the PCF is not closed and may be adjusted through further inputs and changing dynamics.

The PCF, while built on the global scholarship and other best practice frameworks, is still uniquely the outcome of a mainly Southern African process and done within conservative resource means, using methodologies that could leverage extant knowledge. Other African RIMAs wishing to originate or adapt the PCF will have the framework itself and can collaborate with SARIMA for the learning processes. This consciousness and documenting fed into the conceptual marrying of the micro- to meta- level, on one hand, with the macro inquiry into the stages of professionalization of research management, on the other.

For professionalization as a disciplinary field, the research project went some way towards defining an increasingly important world of work. In addition to the framework itself, there was a conscious commitment to trace the stages of PCF development at the level of a meta- and methodological process—and this expands the case to other professionalization considerations, as Lester (2016) calls up in his article for novel means to seek self-regulation. Certainly it would seem that Associations, such as the RIMAs, and other counterparts may now more easily follow such a lead in professionalizing in a self-regulatory manner (Lester, 2016). This situation opposes the view that government interventions prescribe research management practices within the public sector. Universities do guard their highly autonomous structures, while still operating within the legal frameworks in terms of ethics, intellectual property, grant financing, and higher education, to name but a few. Research management raises interesting dilemmas around self-regulation, given that ethics and intellectual property are at the core of how it is situated and, therefore, regulated, yet with other functions more loosely and broadly stretched over the independence of research and researchers. Herein lies a fruitful area to explore the balancing between the law and research autonomies.

For the professionalization body of knowledge, research management represents a strong test case of an occupation that occupied an awkward position of spanning multiple power bases and needing to feed into different knowledge domains and interpreting a myriad of disciplines. As a situational reality, such research management experiences demonstrate a wider globalisation and changing nature of work debates (Faulconbridge & Muzio, 2011) and posit whether frameworks

could have the ability to facilitate fuzzy work spaces.

The authors put forward a tentative "yes", that the project team responded to the research question. A research question, is, however, always forward looking and the criteria of relevance and applicability may really only be fully claimed in the implementation and evaluation stages of the PCF. The public sector institutions need to take up the PCF. This will include, but is not limited to: establishing routes of qualification/competence, adapting it to individualised contexts, experimenting with its usage within organizational settings, benchmarking its outcomes and impact in terms of research management, and reflecting on the pragmatic and abstracted benefits and/or drawbacks of Southern Africa's first PCF.

Concerns at the time of the writing of this article were that stakeholders were not yet running with the PCF and were receiving the PCF with the expectation that SARIMA could energise the usage phase. SARIMA's ongoing work is to emphasise that this is not a SARIMA-one-size-fits-all. The PCF must be contextually appropriated within scenarios of best fit to localised conditions. The ideal, for the next phase, is to extend the PCF into other sectors such as Science Councils and private sector research management. It is also for individual universities within the different nations of (Southern) Africa, and even, globally, to take the PCF and apply it to differing and respective contexts. Translated into organizational contexts, the PCF amounts to "already completed research and development (R and D) into research management" (FG 11) and potentially saves the organizations that uptake it much intellectual energy, funding and time.

The limitations of the research were realised within the noted resource constraints which did not open up the sample as widely as the ideal, nor allow for broader piloting and refinements. While continental and global voices did contribute to the PCF, the regional stakeholders were the main custodians; this was deliberate, yet could also be seen as problematic in that wider experiences and contexts should always deepen the thinking.

The choice of a qualitative action research project for development purposes was coherent. Yet, mixed methods research incorporating updated quantitative findings would have added methodological norms of validity, reliability and analytical generalizability. While SARIMA did draw on previous survey data that established the needs assessment for the PCF, an updated survey always adds value.

Conclusion

This article is offered within the conceptual framing of linear frameworks of the PCF and its development with the professionalization debate, inclusive of the reflective methods of organizing reflection. Other lenses, clearly, would shed other lights.

Evident from this write up of the project and its scholarship is that the study always begets additional studies. Future studies of how a "bespoke" PCF first speaks to different professional settings and evolves when it is implemented would provide universal value. The lapse of time since its adoption benefits such research directions. How will the gendered or intersectional context issues be applied? What the PCF's precise and layered details mean for research management

itself—and other inexact, changeable work—is also worthy of investigation. A comparative study of research management and innovation management competency frameworks, and the implications of their professionalization pathways, would provide a more joined-up picture for role players.

Deepening the theoretical confluences of the conceptual models of this article against the existing data, using different 'cuts' of the evidence, clearly would advance this early attempt to bring together organizing reflection, elements of competency development and the disciplines of professionalizing work and research management itself.

This study set out to address several loops of logic: the "product" of the PCF itself, the development of the PCF within a mindful methodology, the threads that link professional competencies to the overall profession as well as the strategy to start a regionally-anchored framework almost from scratch.

In December 2016, SARIMA adopted the PCF and it has since been taken up for its variety of uses across Southern Africa. Examples include a sample of Higher Education institutions that are using the PCF in collaboration with their Human Resources departments to formulate job descriptions. Additionally, the PCF has been used for the pilot rounds of SARIMA's professional recognition programme for research administrators and managers, which followed upon the development of the PCF. The PCF is an endorsement of the view that it is through genuine and comprehensive engagements that a profession may reinforce its unique identity and steer its progress. The PCF is both an impetus and an inspiration for such a journey.

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Annex A. Key Competency Area 2: Research Planning, Strategy and Policy Development

Facilitate and support the development, implementation, monitoring and evaluation of research policy and strategy across the competency areas		
Sub-Area - Facilitate and support the development and implementation of research policy and strategy		
Level 1 - Administrative/ Operational	Level 2 – Management	Level 3 – Leadership/Strategic
• Understand the research process • Contribute to team efforts in a proactive manner • Familiar with the project management cycle • Collect and examine (mine) data for research management intelligence • Recognise/identify thematic and sectoral stakeholders • Apply organizational research management governance • Administration of research incentives, benchmarks and initiatives	• Demonstrate knowledge of the full research cycle • Interpret and translate policy for research management • Apply knowledge of the full programme and project management cycle (including operational plans and implementation, budgeting for strategy implementation and monitoring, evaluation and reporting back into improving and enhancing the project management cycle) • Plan for differentiated stakeholder groups (thematic and sectoral) • Identify best practice for policy, legislative, strategic and sectoral frameworks • Interpret, translate and adapt research management governance frameworks and practices • Convince organizational stakeholder of strategic objective and invite action • Apply and manage research incentives, benchmarks and initiatives • Demonstrate knowledge of systems and processes within the research and innovation value chain • Contribute to planning for and oversight of research facilities and infrastructure	• Translate requirements for the full research cycle • Scan the environment to assess the impact of trends in the research environment • Interpret and translate policy in the research and innovation sector • Respond to differentiated thematic and sectoral stakeholder interests • Develop strategies and policies to maximise the organization's research portfolio and its ability to exploit research outcomes • Foster a public and international profile of organizational research • Lead on strategic research management governance • Exercise influence on agenda setting for policy development (national, perhaps regional and international) • Make strategic decisions within research planning, strategy and policy • Initiate research incentives, benchmarks and initiatives

Sub-Area - Monitoring and evaluation of research policy and strategy		
Level 1 - Administrative/ Operational	Level 2 – Management	Level 3 – Leadership/Strategic
• Aligns with desired outcome of organizational research strategy • Operate processes and systems to collect data for monitoring and evaluation • Familiar with bibliometrics and other evaluation measures	• Manage quality assurance and benchmarking • Apply knowledge of the full programme and project management cycle (include operational plans and implementation, budgeting for strategy implementation and review) • Interpret data, including metrics for research management intelligence • Monitor progress towards goal achievements, and acts decisively as required • Develop processes or systems for the collection of data for monitoring and evaluation • Demonstrate knowledge of and apply bibliometrics and other impact measures	• Identify and assess risks and ensure mitigation/proactive approaches • Interpret and lead for the full programme and project management cycle • Lead on quality assurance and benchmarking • Assess the impact of external factors on research policy and strategy and lead on the organizational response • Decide on appropriate action based on research management intelligence and impact measures

Source: SARIMA, 2016

Creation of a Structured Performance-Based Assessment Tool in a Clinical Research Center Setting

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Abbreviations

CSP	*Cooperative Studies Program*
ORD	*Office of Research and Development*
VA	*Department of Veterans Affairs*
VAMCs	*VA Medical Centers*
SMART	*Specific, Measurable, Attainable, Realistic, Time-Bound*
PEP	*Performance Evaluation Process*
PRP	*Performance Review Period*
PEG	*Performance Element Category*
ELT	*Executive Leadership and Administration Team*

Abstract: *Employee performance is a critical factor in the success, or failure, of any organization. Therefore, it is paramount that the leadership and/or management team in an organization establishes and implements an approach that can effectively assess and evaluate the performance of its employees in an objective manner. Research administrators are often involved with the performance evaluation process at their respective institutions. However, there is a limited amount of publicly available information on the use of work performance and assessment methods in research settings. The primary aim of this pilot project was to establish a structured performance-based assessment tool that would allow for an objective and clearly articulated evaluation of staff performance at our clinical research*

center. The secondary aim was to determine if a structured performance-based assessment tool would improve staff satisfaction with the Center's overall performance evaluation process (PEP). A baseline survey was conducted to examine employee perspectives of and satisfaction with the current performance evaluation process. A follow-up survey was conducted after the mid-year performance review period and implementation of the new PEP, including goals templates and performance evaluation guidance documents. The results of the baseline survey showed that staff had mixed reviews of the overall performance evaluation process (somewhat satisfied-33%, very dissatisfied, dissatisfied, neutral, satisfied -all 16%) and all thought the evaluation criteria could be improved (100%). The results of the follow-up survey showed that staff reviews of the overall mid-year performance evaluation process had improved (63% satisfied, 12% very satisfied, 25% somewhat satisfied) and that 50% of respondents were satisfied with the ease of use and clarity of the templates that were used to record their progress towards achieving their goals. Staff shared additional suggestions for strengthening and better aligning the templates with Center-specific roles and activities. Overall, the leadership/management team at our research Center was successful in creating a performance-based assessment approach that facilitated a more objective and clearly articulated evaluation of staff performance. There are numerous challenges to effectively evaluating staff performance in both research and non-research organizations. As a result, the strategies outlined here may be transferable to other types of work settings.

Keywords: *Management; Performance; Clinical Research; VA; CSP*

Background

Employee performance is a critical factor in the success, or failure, of any organization and the level of productivity has been demonstrated as being the single most important determinant of a country's standard of living (Economic Policy Institute, 2000; Fauth et al., 2009; Nielsen & Randall, 2012). Therefore, it is paramount that the senior leadership and/or management team in an organization establishes and implements an approach that can effectively assess and evaluate the productivity and performance of its employees in an objective manner. Preferably, an organization's employee performance assessment plan should involve its staff as key stakeholders during the process. Their participation should be encouraged by senior leadership since doing so provides an opportunity for them to become more engaged in decisions related to the determination of what their overall value is to the organization. Research administrators are often involved in hiring, management, and the performance evaluation process at their respective institutions (Kaplan, 1959; Tauginiene, 2009). Furthermore, many research positions have varying levels of complexity in their roles due to a variety of considerations, e.g. navigation of intricate study protocols, required knowledge of compliance and regulatory considerations, existing nuances between human subjects and basic science research, varying levels of leadership and/or management roles, etc. (Merry et al., 2010; Mentz & Peterson, 2017; Antes et al., 2016; Baer et al., 2011a). These and other factors legitimize the need for a structured, objective, performance

evaluation tool that research administrators can use to adequately assess their staff's performance. Employee engagement benefits organizations and has been demonstrated as having a positive impact on employee health and wellness, productivity, and retention (Burton et al., 2017; Harter et al., 2010; Tullar et al., 2016). There is a significant amount of literature on work performance and assessment methods (Amerine et al., 2017; Byrne et al., 2016; Shanafelt & Swensen, 2017; Wu et al., 2016) but there is a limited amount of publicly available information on their use in research settings.

The Department of Veterans Affairs (VA) is the United States' largest integrated healthcare system and provides comprehensive care to more than 8.9 million Veterans each year (2017). The Cooperative Studies Program (CSP), a division of the Department of Veterans Affairs (VA) Office of Research and Development (ORD), was established as a clinical research infrastructure to provide coordination and enable cooperation on multi-site clinical trials and epidemiological studies that fall within the purview of VA (2018a). The Cooperative Studies Program Epidemiology Center – Durham (CSPEC-Durham) is one of several epidemiology centers established by the Cooperative Studies Program (CSP) and serve as national resources for epidemiologic research and training in the U.S. Department of Veterans Affairs (VA) (2014, 2018b). The Center is comprised of three functional areas (Core groups) as follows: Project Management Core, Computational Sciences Core, and the Executive Leadership and Administration Core (ELT). Its workforce consists of research investigators, project managers, statisticians, programmers, research assistants, data managers, medical residents/fellows, and graduate student trainees. The CSPEC-Durham's current study portfolio consists of 17 active studies, and its primary areas of focus are cancer outcomes and Gulf War research.

The primary aim of this pilot project was to establish a structured performance-based assessment tool that would allow for an objective, and clearly articulated evaluation of staff performance at our clinical research center. The secondary aim was to determine if a structured performance-based assessment tool would improve staff satisfaction with the Center's overall performance evaluation process. The findings may inform individuals or groups in research administration and leadership roles seeking to improve their current staff performance evaluation process.

Methods

Identification of Areas for Improvement in Employee Performance Evaluation Process

Over the course of several months, prior to the start of the VA Fiscal Year 2018 (FY18) performance review period (10/1/2017-9/30/2018), the Center's Executive Leadership and Administration Core (ELT) met periodically to review and assess the Center's performance evaluation process. This review was initially conducted based on informal feedback from Center staff that they were not satisfied with the performance evaluation process (PEP) as it was performed at that time. As part of the Center's effort to create a culture of continuous process improvement, the ELT engaged in efforts to identify the weaknesses and potential areas of improvement in the Center's PEP. The review identified a major weakness in the Center's PEP in that its format led to a more subjective determination of what staff performance was, rather than the evaluation being based

on clear, agreed-upon expectations between the ELT and each respective staff member regarding what their level of work performance should have resembled. For example, one of the Center's positions had Performance Element Categories (PEGs) such as "Supports CSPEC and CSP Programs" and "Collaborates, Mentors, and Supports Center Mission." Both criteria are vague and ambiguous in nature, and neither of these examples contain enough substantive information for a management team to be able to objectively assess an employee's performance in that particular position.

Performance Evaluation Guide and Supplemental Document Development

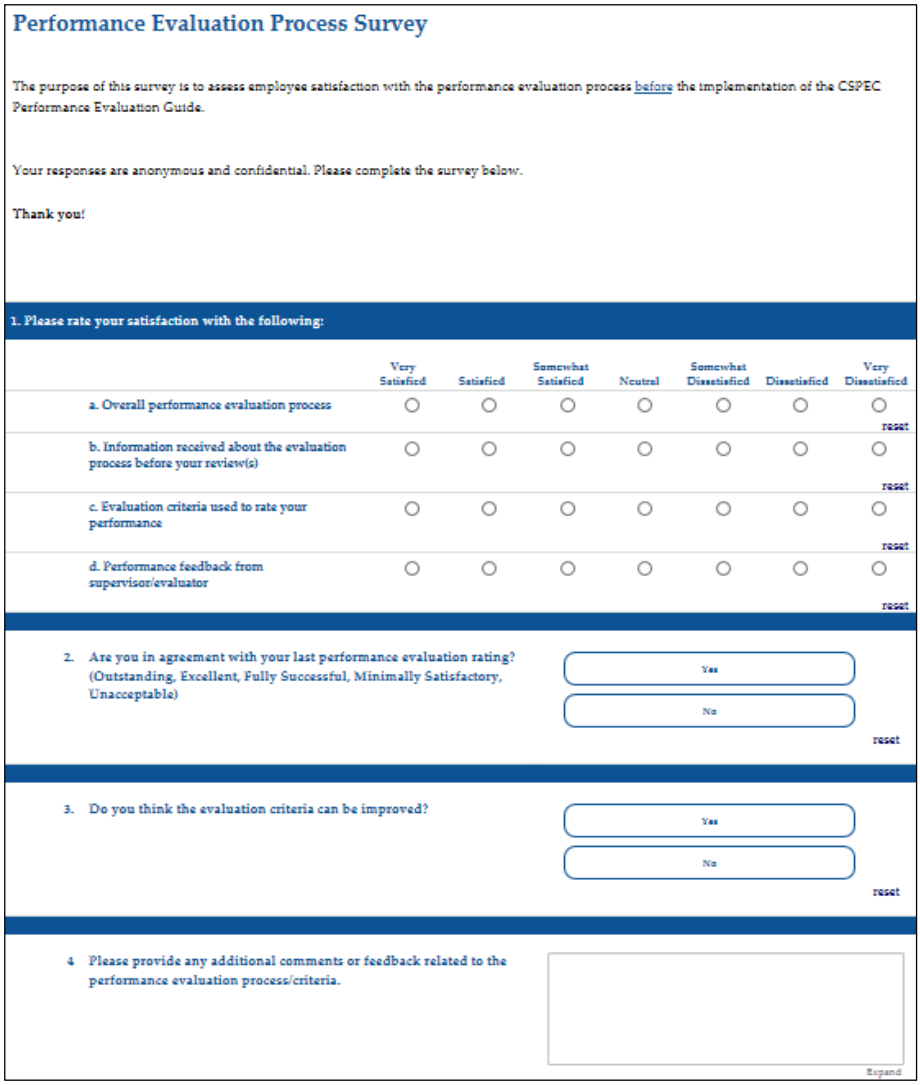
Based on the findings of the Center's PEP review, the ELT initiated a pilot project to develop a performance evaluation guide that could be employed to assess staff performance in a structured and more objective manner. Of note, this project was constructed as an operational quality improvement initiative and not a research project. Development of the performance evaluation guide (Appendix A) occurred over several months and was designed with the intent that it would be used to assess the performance of Center staff based on their achievement of pre-defined performance goals. Center employees were asked by the ELT to deliberate on what they wanted to accomplish over the course of the performance review period (PRP) and to create SMART goals that aligned with those expectations. Goals were to be specific, measurable, attainable, realistic, and time-bound (SMART) (Bjerke & Renger, 2017; Bovend'Eerdt et al., 2009; Tichelaar et al., 2016). To facilitate their efforts, Center management provided staff with two supplemental templates (one used to capture their goals for the upcoming PRP and the other used to track their progress/achievement of those goals for review during their mid-year performance assessment) and examples of acceptable SMART goals that were identified online via various websites. Some staff members developed their goals subsequent to their initial review of the supplemental templates and goal examples, while others requested additional information and guidance on how best to develop their SMART goals. Additional clarification was provided to this subset of staff members either via email or in one-on-one in-person meetings with a member of the ELT.

The performance evaluation guide was distributed to Center staff prior to a scheduled staff meeting, at which ELT discussed the evaluation guide's purpose and its use for the upcoming FY18 PRP. During the staff meeting, employees had the opportunity to ask preliminary questions about the evaluation guide and to give initial feedback on the tool. Staff members provided several suggested revisions to the tool after their review and the ELT then incorporated this feedback into a subsequent version of the document prior to utilizing it for the upcoming PRP. Staff were also informed that Center management would work with each employee individually to ensure that their determined goals were aligned with the needs of the Center, and to come to a consensus on what the staff member's goals would be for the upcoming PRP.

Implementation, Evaluation, and Feedback

An anonymous baseline survey (Figure 1) was conducted to examine employee perspectives of and satisfaction with the Center's current performance evaluation process. After the mid-year performance review and utilization of the guidance documents, an anonymous follow-up survey (Figure 2) was used to evaluate if employee perspectives and satisfaction had changed subsequent

to what was reported in the baseline survey. The surveys were administered through REDCap, an online data capture application for research studies and operations (Harris et al., 2009). Surveys were designed to be quick and convenient for staff to complete and included both multiple choice and open-ended question/comment fields.



Performance Evaluation Process Survey

The purpose of this survey is to assess employee satisfaction with the performance evaluation process before the implementation of the CSPEC Performance Evaluation Guide.

Your responses are anonymous and confidential. Please complete the survey below.

Thank you!

1. Please rate your satisfaction with the following:

	Very Satisfied	Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Dissatisfied	Very Dissatisfied
a. Overall performance evaluation process	○	○	○	○	○	○	○
b. Information received about the evaluation process before your review(s)	○	○	○	○	○	○	○
c. Evaluation criteria used to rate your performance	○	○	○	○	○	○	○
d. Performance feedback from supervisor/evaluator	○	○	○	○	○	○	○

reset

2. Are you in agreement with your last performance evaluation rating? (Outstanding, Excellent, Fully Successful, Minimally Satisfactory, Unacceptable)

Yes

No

reset

3. Do you think the evaluation criteria can be improved?

Yes

No

reset

4 Please provide any additional comments or feedback related to the performance evaluation process/criteria.

Expand

Figure 1. Baseline Survey Questions.

A total of six baseline surveys were completed and returned (n=6/11) for a 55% response rate, and a total of eight follow-up surveys (n=8/8) were completed and returned for a 100% response rate. This outcome constituted an overall survey response rate of 74% (n=14/19). New employees that were within their 90-day probation/trial period, supervisors/performance evaluators (ELT), volunteers, and contract employees did not participate in the survey.

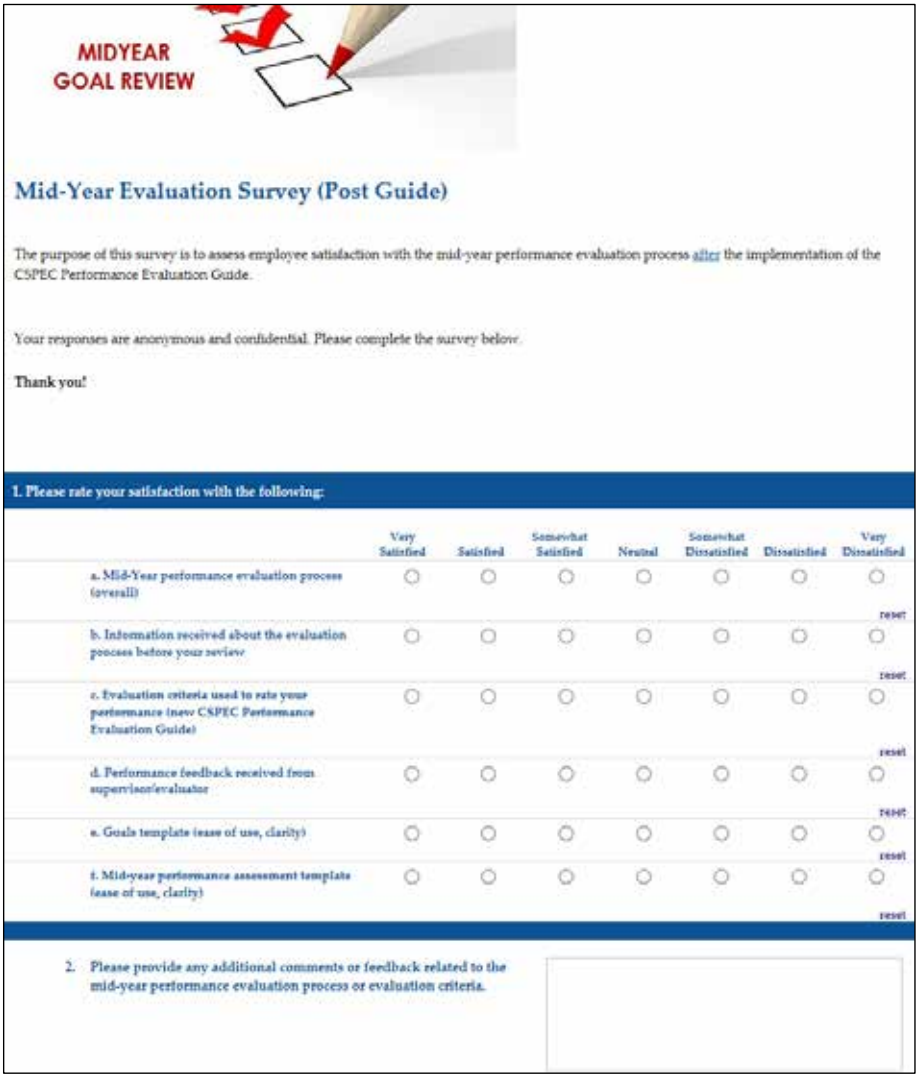


Figure 2. Follow-Up Survey Questions.

Results

Baseline Survey

The response rate for the baseline survey was 55% (n=6/11). The results of the baseline survey showed that staff had mixed reviews of the overall performance evaluation process (somewhat satisfied - 33%, very dissatisfied, dissatisfied, neutral, satisfied - all 16%) (Table 1). Most were either very dissatisfied (33%) or somewhat dissatisfied (33%) with information received about the evaluation process before their review. Staff also had mixed reviews about the evaluation criteria, or lack thereof, used to rate their performance (dissatisfied, somewhat satisfied - both 33%) and performance feedback from their supervisor/evaluator (somewhat satisfied - 50%). Most respondents agreed with their last performance evaluation rating (83%) and all thought the evaluation criteria could be improved (100%). The use of SMART goals was encouraged by ELT prior to this pilot project but had not been mandated, and respondents expressed that the evaluation process was mysterious, with no concrete examples of Center-specific SMART goals. Staff also expressed frustration that there was not a dedicated training effort provided on how to write SMART goals, or a standard reference provided to learn about them. Furthermore, the survey results showed that there was a desire from staff to receive suggestions from the ELT on how to get a higher performance rating, and they also revealed staff members' desire for additional one-on-one assistance with crafting their SMART goals.

Table 1. Baseline and Follow-Up Survey Results

Satisfaction Indicator	Baseline Survey (N=6)	Follow-up/Mid-Year Survey (N=8)
Overall performance evaluation process	VD-1, D-1, N-1, SS-2, S-1	SS-1, S-5, VS-2
Information received about the evaluation process before review	VD-2, SD-2, SS-1, S-1	SS-1, S-4, VS-3
Evaluation criteria used to rate performance	D-2, N-1, SS-2, S-1	N-2, SS-2, S-2, VS-2
Performance feedback received from supervisor/evaluator	D-1, SS-3, S-2	S-3, VS-5
Goals template (ease of use, clarity)	N/A	SD-3, SS-1, S-4
Mid-Year performance assessment template (ease of use, clarity)	N/A	SD-1, N-1, SS-2, S-4

Follow-Up Survey

The response rate for the follow-up survey was 100% (n=8/8). The results of the follow-up survey showed that staff reviews of the overall mid-year performance evaluation process had improved (satisfied - 63%, very satisfied - 12%, somewhat satisfied - 25%). Most staff were either satisfied (50%) or very satisfied (38%) with information received about the evaluation process before their review. Staff still had mixed reviews about the new evaluation criteria, but none were dissatisfied (neutral, somewhat satisfied, satisfied, very satisfied - all 25%). All respondents were either very satisfied (63%) or satisfied (37%) with performance feedback from their supervisor/evaluator. The survey also revealed that the two templates developed by the ELT could still benefit from additional revisions, but half (50%) of respondents were satisfied with their ease of use and clarity. Staff shared that the templates could be better aligned with Center-specific roles and activities.

Overall, the Center was successful in developing and implementing a structured, performance evaluation guide that outlined what level (%) of goals were necessary to achieve one of three levels of achievement: Exceptional, Fully Successful, or Unacceptable, for each of an employee's PEGs. For context, each employee has 4-5 PEGs in their performance appraisal plan that encompass a broader theme of service, e.g. Supports CSPEC and CSP Programs, Customer Service, Program Planning and Management, etc. and are weighted as either "Critical" or "non-Critical". Each Center employee created SMART goals that were relevant to each of the PEGs listed in their performance appraisal plan. It is important to note that these levels of achievement were then used to assign a final performance rating (Outstanding, Excellent, Fully Successful, Minimally Satisfactory, and Unacceptable) based on the collective levels of achievement for their PEGs (Table 2).

Table 2. Final Performance Rating Table

Outstanding	Achievement Levels for <u>all</u> elements are designated as Exceptional.
Excellent	Achievement Levels for all critical elements are disgnated as Exceptional. Achievement Levels for non-critical elements are designated as at least Fully Successful. Some, but not all, non-critical elements may be designated as Exceptional.
Fully Successful	The achievement level for at least one critical element is designated as Fully Successful. Achievement Levels for other critical and non-critical elements are designated as at least Fully Successful or higher.
Minimally Satisfactory	Achievement Levels for all critical elements are designated as at least Fully Successful. However, the achievement level(s) for one (or more) non-critical elements(s) is (are) designated as Unacceptable.
Unacceptable	The achievement level(s) for one (or more) critical element(s) is (are) designated as Unacceptable.

These performance ratings were then able to be clearly aligned to rating-based performance award recommendations. This approach yielded a more objective employee rating than the Center's previous PEP format because the evaluation was based on clear, agreed-upon expectations between the ELT and each respective staff member regarding what their level of work performance should have resembled. To rate an employee's performance, the ELT only had to measure the employee's achievement (or non-achievement) of clearly outlined goals, as opposed to subjectively rating their performance on position responsibilities that may not have been clearly described to the employee and/or not be specific to the position due to the generalized and ambiguous nature of the previous performance evaluation criteria.

Discussion

Organizations are only as successful as their employees, and their contributions to an institution's missions, goals, and objectives, as measured through their performance and productivity, are critical for leadership and management teams to be able to assess (Mankins, 2017; Vali et al., 2015; Loeppke et al., 2009). Research administrators are often tasked with the responsibility of evaluating staff performance, in conjunction with other management duties (Kaplan, 1959; Tauginiene, 2009), and being able to utilize a tactic that facilitates an objective, unbiased, performance appraisal process would most likely be advantageous to them. Considering that many research positions have varying levels of complexity in their roles due to a variety of factors, e.g. navigation of intricate study protocols, required knowledge of compliance and regulatory considerations, situations in which research staff work across multiple studies due to limited or delayed research funding, varying levels of leadership and/or management roles, etc. (Purdom et al., 2017; Baer et al., 2011b; Larkin et al., 2012), research administrators would also likely benefit from a structured approach that alleviates some of the challenges associated with evaluating the performance of staff in complex roles. Our efforts demonstrated that the creation of a structured performance-based assessment tool that allowed for an objective and clearly articulated evaluation of staff performance was feasible in a clinical research center setting. The use of this strategy was also effective in improving staff satisfaction with the overall performance evaluation process in this setting.

Performance evaluation tools have been developed to assess the performance of research institutions (Rajan et al., 2012; Schapper et al., 2012) but the amount of publicly available literature on their use to assess individual research staff performance is limited (Ekeroma et al., 2016). Ekeroma, Shulruf, McCowan, Hill, and Kenealy (2016) described their efforts to "develop a research performance-appropriate tool for clinicians working in low-resource settings such as those in the Pacific Islands" (p. 2). Their work was significantly different than ours in that their performance tool was targeted specifically to assess the research productivity of clinicians (physicians, midwives/nurses) in low-resource countries. Furthermore, their development process included "a modified Delphi technique that established a consensus among identified research experts for the most appropriate research indicators for the Pacific Islands" (Ekeroma, 2016, p. 2). Our performance-based assessment tool is not limited to a specific type of research position, nor is it intended for use in a specific type of research setting, e.g. clinical, biomedical, epidemiologic, etc. One of its primary strengths is that the foundation of the tool is based on pre-

defined SMART goals that both the individual employee and our Center management agreed on prior to the start of the performance evaluation process. Therefore, each staff member's goals are inherently tailored to their specific role and this allows the approach to be seamlessly utilized across any type of position in a research setting. Additionally, since this work was conducted in a clinical research setting, the SMART goals that were created were generally predisposed to be research-specific, but this approach should be adaptable to other settings. Lastly, the stakeholders that were involved in the development of our tool were our Center's ELT and staff members, as opposed to involving a panel of research experts that would be used in a Delphi method approach (Humphrey-Murto et al., 2017; Diamond et al., 2014).

We believe that the primary reason for the success of this pilot project, in terms of both the development of the performance-based assessment tool and the improvement of staff satisfaction with the Center's overall performance evaluation process, is related to the involvement of Center staff in the development process for the tool. A stakeholder can be defined as a person, group, or organization involved in or affected by a course of action, while stakeholder engagement refers to the process by which an organization involves people who may be affected by the decisions it makes or who can influence the implementation of decisions (Lemke & Harris-Wai, 2015). Substantial evidence has now been provided that stakeholder involvement is essential for management effectiveness in clinical research, and feedback from stakeholders has critical value for research managers inasmuch as it alerts them to the social, environmental, and ethical implications of research activities (Pandi-Perumal et al., 2015). The Center's staff served as both stakeholders and active participants during the development of the performance evaluation guide, as well as during the development of their respective SMART goals that outlined what they wanted to accomplish over the course of the PRP. Furthermore, the ELT initially decided to review the Center's performance evaluation process to identify its weaknesses and potential areas of improvement based on informal feedback from Center staff that they were not satisfied with the PEP as it had been performed previously. Therefore, our staff's participation with this undertaking was critical in ensuring both its initial success and will also be important for the sustainment of our efforts to continuously improve our Center's performance evaluation process.

There are two significant limitations of our work that should be further discussed due to their potential impact on our findings and the possibility that they may present challenges to its implementation in other settings. The first is related to the sample size of staff that participated in the survey component of our evaluation process for this initiative. New employees that were within their 90-day probation/trial period, supervisors/performance evaluators (ELT), volunteers, and contract employees did not participate in the survey and because of these exclusion criteria, the number of employees that were eligible to take the survey decreased. At the time that the baseline survey was distributed, there were 23 total employees at the CSPEC-Durham and after excluding the aforementioned employee types, only 11 employees were eligible to take the baseline survey. Furthermore, there were 21 total employees working for the Center at the time that the follow-up survey was disseminated, and after excluding employees that met the criteria listed above, only 8 employees were eligible to take the follow-up survey. These figures represent a decrease of 10% in the number of employees that were eligible to take the baseline survey (48%) and follow-up survey (38%), respectively. The changes in the composition of staff

between the baseline and follow-up survey was also significant. Although the number of ELT members that served as supervisors/performance evaluators remained the same during the time between the two surveys (n=2), there were slightly less new, contract, and volunteer employees at the time when the baseline survey was administered (n=10) than when the follow-up survey was administered (n=11). The differences in the composition of Center staff between the two surveys may have had an impact on the results of the survey.

Furthermore, it is possible that the exclusion of new employees undergoing a 90-day performance evaluation, supervisors/performance evaluators (ELT), volunteers, and contract employees in this process yielded results that might have been different had these types of employees been considered eligible to participate in this effort. The rationale behind the exclusion of new employees from taking the baseline and follow-up surveys was that their performance would not be evaluated to the same extent as more established employees given that they were within their 90-day probation/trial period, still learning the nuances of their position, and gaining familiarity with the Center, CSP, and the larger VA. Supervisors/performance evaluators (ELT) receive their performance evaluations from CSP leadership and were not included in this effort as survey participants since the individuals that perform their evaluations were not initially included as stakeholders in this initiative. Contract employees at our Center often receive salary funding from multiple departments, perform work across various areas, and have multiple supervisors. We made the decision to not include our contract workers in this pilot given the complexity of their roles and reporting structures. Lastly, volunteers also receive a different type of performance evaluation than full-time, paid staff and were excluded from participating in this effort given their unique roles and contributions to the Center as unpaid staff with an interest in contributing to improving the overall health and well-being of our nation's Veterans.

Secondly, the setting in which this pilot project was conducted may have had a potential influence on our results. From an organizational perspective, the CSPEC-Durham is housed in a clinical research program within a large, integrated healthcare system that is managed by the United States federal government. Therefore, neither Center staff nor members of the leadership team were unduly influenced by financial considerations in their decision-making efforts. This point is noteworthy because of its potential impact on the transferability of this strategy to other settings such as for-profit clinical research organizations or healthcare systems. In these types of settings, a greater emphasis could be placed by a supervisor or leadership team on employee goals in the context of their potential to increase revenue for the organization. For example, a supervisor might request that an employee either increase their number of targeted goals or take on specific goals that would generate additional revenue for the organization. The additional stress of having to develop and agree upon goals in the context of revenue or other financial implications could potentially alter the collaborative process that should exist between the supervisor and employee as they work together to develop the employee's goals. The likelihood of developing goals that are important to both the organization and the employee may be decreased if the organization's "bottom-line" ends up being a constant theme during this process and as a result, a higher number of goals that are of no interest to the employee may be selected by the employer. The importance of receiving stakeholder buy-in and the need for employees to be involved in decision-making as it relates to their positions and work areas, has been demonstrated as key factors in employee

engagement, and were critical aspects of our approach (Amerine et al., 2017; Hung et al., 2006). Having buy-in from both parties (employer and employee) is paramount not only to the success of this type of effort, but also to its potential to be sustained over time.

Lastly, the survey results that we received may have been different if the timepoints that were used to distribute the baseline and follow-up survey were altered. The baseline survey was conducted in December 2017 and the follow-up survey was distributed to staff after their mid-year performance reviews were held (June 2018). It is possible that conducting the follow-up survey after completion of the fiscal year, i.e. post-September 2018 as opposed to the mid-year, may have resulted in the receipt of different responses. Furthermore, the follow-up survey was not distributed until late June 2018, while the mid-year performance evaluations were held in April 2018. It is possible that the survey results were subject to recall bias due to the two-month time period between the mid-year evaluations and distribution of the follow-up survey.

Our project demonstrated several notable strengths considering the aforementioned limitations.

To date, the amount of publicly available literature on the use of performance evaluation tools to assess individual research staff performance is limited. This approach was novel in that regard and our work establishes that a structured, performance-based assessment tool can be developed in a collaborative process involving both the employer and employee in a clinical research center setting. It also provides evidence that this type of tool is conducive to increasing staff satisfaction with the overall performance evaluation process in this setting. The collaborative nature of the development process for the performance evaluation guide and the evaluation process itself, were also notable strengths. It is imperative that staff feel involved in the decision-making process for determining the metrics that will be used to assess their performance, and the increase in staff satisfaction with the overall evaluation process served as a reminder of the benefit of this strategy. The diversity of perspectives and experiences of all parties involved undoubtedly strengthened the performance evaluation guide and the overall evaluation process.

In conclusion, the utilization of a performance-based assessment tool was an effective approach to objectively assess staff performance in a clinical research center setting. The tool was also successful in improving staff satisfaction with the overall performance evaluation process in this setting. Additional work is needed to determine the effectiveness of this strategy in other research institutions, and other organizations in general. Future iterations of this approach at our Center may likely include the employee types that were excluded from this initial pilot as their perspective and experience would likely benefit the overall process. The implementation of a "balanced scorecard" approach within the performance-based assessment tool will also likely be explored due to its potential benefit to strengthen the alignment between our organization's strategy and mission statements with Center employees' goals and the overall PEP (Kaplan & Norton, 1992; Inamdar et al., 2002). Assessing staff performance in a clinical research setting is complex due to a myriad of factors associated with the nature of research positions and as a result, the identification of strategies that can be employed to reduce the burden and challenges associated with the performance evaluation process are valuable to research administrators who are involved with this process at their respective organizations.

Disclaimer

The views expressed in this article are those of the authors and do not necessarily represent the views of the Department of Veterans Affairs or the government of the United States.

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Reprint 2011: Conscious Efforts to End Unconscious Bias: Why Women Leave Academic Research

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Foreward

After re-reading the article by Easterly and Ricard on reducing unconscious bias to retain women in academic research I find myself having mixed feelings with regard to the progress we have made the publication of this important work. On the negative side, this article is, unfortunately, as timely and relevant as it was when it was published. The representation of women faculty in institutions of higher education has remained alarmingly low, with some disciplines in STEM fields showing even less progress. With regard to positive feelings it is clear, in retrospect, that this article and the issues raised, were among a small group of critically important works that helped to shine a spotlight on the need to address the complex factors that, beyond gender stereotypes, contributed to creating and maintaining the continuing loss of women faculty. Collectively, these ground breaking efforts served to galvanize institutions and federal agencies to increase their efforts to address these difficult issues. Illustratively, NSF, through its ADVANCE initiative, has awarded more than $270 million across over a hundred institutions to address the recruitment, retention, and advancement of women faculty, particularly in STEM areas since 2001. More recently, the National Science Foundation has launched the Aspire Alliance, a related initiative to enhance diversity with regard to gender and under-represented groups, particularly in STEM fields. It is our hope that highlighting the important article by Easterly and Ricard will contribute to the work of those initiatives and, particularly, underscore the important role of research administrators in efforts at achieving gender equity among faculty in higher education.

– Jennifer E. Taylor, JRA Deputy Editor

Abstract: *EIssues surrounding gender discrimination have been addressed over the past 40 years with various pieces of legislation and federal policies that have made such discrimination illegal. The number of women in higher education as students and faculty has steadily increased since the 1950s, though only in certain disciplines and in the lower faculty ranks, especially in many of the STEM disciplines (defined by the National Science Foundation as Biological Sciences; Computer and Information Science and Engineering; Engineering; Geosciences; Mathematics and Physical Sciences; Social, Behavioral and Economic Sciences; and Education and Human Resources). Why is this? This article reviews the literature*

regarding one possible reason for this exception: unconscious bias or gender schemas. Possible solutions are presented that can help overcome the bias experienced and perceived by female faculty in institutions of higher education in the United States.

Keywords: *female faculty, higher education, unconscious bias, gender discrimination*

Introduction

> ... As profound as the transformation of America's consciousness has been during the past 150 years, hidden assumptions about sex and gender remain embedded in cultural discourses, social institutions, and individual psyches that invisibly and systemically reproduce male power in generation after generation. I call these assumptions the lenses of gender. Not only do these lenses shape how people perceive, conceive, and discuss social reality, but because they are embedded in social institutions, they also shape the more material things - like unequal pay and inadequate day care - that constitute social reality itself. The purpose of this book is to render those lenses visible rather than invisible, to enable us to look at the culture's gender lenses rather than through them...
>
> Sandra L Bem (1993). *The lenses of gender: Transforming the debate on sexual inequality*. New Haven: Yale University Press.

> The education and empowerment of women throughout the world cannot fail to result in a more caring, tolerant, just and peaceful life for all.
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> Aung San Suu Kyi, Burmese-Myanmarese dissident and politician; Leader of National League for Democracy, Nobel Peace Prize laureate.

Despite many years of work to minimize gender bias in the workplace, women researchers often "disappear" after about a decade in academia. This phenomenon continues to occur despite near parity of applicants, matriculating students and graduates in American medical schools (AAMC, 2008), and (beginning in 2000) nearly equal numbers of men and women earning science and engineering bachelor's degrees (NSF, 2007). This disappearance happens despite the fact that in 2006 women earned almost half (45%) the doctorates in the science and engineering fields (NSF 2009), and nearly the same as men in the natural sciences (Handelsman et al., 2005). This increase has continued since 2006 and is true today (NSF, 2010). The increased number of female students and doctoral recipients directly correlates with the number of women who serve as faculty in institutions of higher education, albeit at certain ranks and at certain types of institutions. Although the number of female assistant professors -- and, in some disciplines, associate professors -- is becoming equal to that of men, women are not attaining full professorships or upper administrative positions as often as men (Touchton, 2008). Why is this happening? This paper will review women's departure from academia and offer ways to re-attract them.

The Problem

Women are Leaving Academic Research

According to a recent report from the National Science Foundation, "growth in the number of female doctorate recipients (6.9%) was greater than growth in male doctorate recipients (6.2%)" (Falkenheim & Fiegener, 2008). Between 1979 and 2005, the percentage of master's degrees earned by women increased from 49% to 59%; during the same time period, the percentage of doctoral degrees awarded rose from 30% to 49% (NCES, 2007). In 2008-09 women for the first time were awarded a greater percentage of doctoral degrees (50.4%) than men (Bell, 2010).

The National Study of Postsecondary Faculty (NCES, 2007) found that in 2004, 57.5% of the faculty and instructional staff were male and 42.5% were female. Males accounted for 13.6% of full professors, 8.6% of associate professors, and 8.1% of assistant professors; figures for females were 4.4%, 4.9%, and 6.6% , respectively (remaining percentages were divided among instructors, lecturers, and those with no rank). According to the National Center for Education Statistics (NCES, 2000), in 1997 16% of female faculty at degree-granting institutions had attained the rank of professor, a number that by 2005 had decreased to 15%. White (2005) examined the status and ranks of women at several research universities and confirmed that the number of female professors had not increased from 2000 to 2005. White observed that "Real progress in creating gender equity in the future will require acknowledging the gendered state of our current workplace" (p. 22). Institutions of higher education today remain gendered institutions, with males holding the majority of professorships and upper administrative positions, such as president and provost.

While more women are attending college and earning terminal degrees, statistics reveal that women are not advancing or continuing in academia at the same rate as men (West & Curtis, 2006; InterAcademy Council, 2006; Xu, 2007). It is important to comprehend how this fact affects universities and what can be done to halt this departure from academia.

Why should a research administrator (RA) be concerned? It is important to understand the issues that faculty in higher education face as researchers and instructors. Pogatshnik (2008) and Robinson (2008) linked the RA's knowledge of faculty needs with the ability to help them attain the goals of successful research programs.

A successful RA is concerned with more than just compliance with the most recent policies from NSF, changes on grants.gov, or modifications to Office of Management and Budget Circular A-21 (Cost Principles for Educational Institutions). Being a good RA means possessing the people skills to work effectively with researchers, administrators, and sponsor staff. In its mission statement, the Society of Research Administrators International (SRA, 2009) cites a dedication "to the education and professional development of research administrators working in varied organizational settings." SRA's emphasis on human interaction is echoed by the National Council of University Research Administrators (NCURA, 2009), which acknowledges that "Individuals involved in sponsored projects administration are faced with a multitude of challenges: becoming knowledgeable about federal regulations and individual agency requirements, *providing assistance*

to faculty (authors' emphasis), gathering information, administration of awards, and many other tasks."

A major function of the RA is assisting faculty with grant proposal development and securing funding for research. Professional RA organizations such as SRA and NCURA support these efforts by providing the necessary tools. For example, a recent NCURA book review addressed successful grant writing strategies (Gitlin & Lyons, 2008), while SRA routinely provides information about grant-seeking publications (SRA, 2009). Both SRA and NCURA annual meetings feature association and federal representatives instructing RAs in ways to help faculty enhance their careers through the preparation of successful proposals and participation in sponsored activities.

But RAs must also understand the issues faculty face and the obstacles that can stand in their way of applying for funding and conducting research. This paper examines one of these issues: unconscious gender bias. This issue is a concern for all administrators in higher education, from academic affairs to research administration to financial services.

Does Gender Bias Still Exist in the Ivory Tower?

While there has been an increase in the number of women receiving doctorates, there has not been a corresponding increase in the number of women achieving the rank of professor or positions such as president. Could this be a result of discrimination?

Beginning in the 1960s, legislation such as the Civil Rights Act of 1964 and Title IX, was passed, and policies and practices implemented meant to correct discrimination (Wasserman, 2003). But discrimination persists. In its report on the status of women in science, MIT noted in 1999 that "the campus was slow to recognize other, more subtle forms of discrimination; it did not look like what we thought discrimination looked like" (¶ 25). This discrimination has been discussed in the literature under a variety of terms, such as unconscious bias, implicit bias, and gender schemas. Bem (1981) introduced the gender schema theory to explain how an individual's core sex identity is integral to the culture in which one is reared. Whatever term is used, these ideas often hinder women from advancing in many areas of society.

Valian (1998) described those gender beliefs that are held by all people and limit understanding of what women should, could, and can accomplish. While everyone employs gender schemas to categorize life, using them to limit women or minorities makes them problematic. When schemas turn into prescriptive roles, sexism and discrimination occur. Valian (2005) provided an example of an often-seen schema concerning women in work. Many people hold the belief that women are less concerned than males about earning a high salary. Women who behave contrary to this plan, who desire a high salary, often meet with disapproval.

Meyerson and Fletcher (2000) suggested that gender discrimination has not disappeared, it "has just gone underground. Today discrimination against women lingers in a plethora of work practices and cultural norms that only appear unbiased" (p. 128). They stated that many everyday practices in society create situations that are biased, but because they are accepted as conventions,

no one questions their inherent injustice.

Babcock and Laschever (2007) described several studies that revealed that people -- even women themselves -- still hold stereotypes about women. Their research proved that women under-value the work they perform. For example, when offered a specified dollar amount for a particular task, women more often than men accepted the amount offered. Men, on the other hand, were more likely to ask for additional money. Although the level of success was the same for women and men, women did not feel they deserved more.

Fernandez and Sosa (2005) conducted research on gendered roles in call centers. Evidence suggested that female job seekers, and the people hiring them, employed gendered notions that females are better than males at customer service jobs, resulting in a larger pool of female applicants and employees in that area. Their research attributed gender segregation to several points, including the unconscious idea that women are better suited for some jobs than men.

Examples of unconscious bias and gender schemas in academia are plentiful. An examination of letters of recommendation, essential for new jobs and for promotion and tenure, revealed gender bias (Trix & Psenka, 2003). Women were two and a half times more likely than men to receive short letters of minimal assurance; these letters were twice as likely to contain "doubt raisers" such as negative language, faint praise, or irrelevancies, and more likely to include references to personal life. Attention to training and teaching was more common in letters for women, whereas research, skills and abilities, and career received more attention in letters for men. Recommenders unknowingly stereotyped on the basis of gender when writing the letters (Trix & Psenka, 2003).

Phelan, Moss-Racusin, and Rudman (2008) found that a double standard in interviewing often exists for women. Communal applicants, or those who smiled more and presented themselves as team players, were evaluated as less competent whether they were male or female. Ironically, ambitious, self-reliant women were viewed as competent but were disqualified for being socially deficient.

Publishing is at the center of an academic's career and is crucial for a researcher. Tenure and promotion decisions are often based on the number of papers published in peer reviewed journals (Vesilind, 2000). Research has shown that bias toward women exists in review of manuscripts. A researcher's project and future support depend on publishing. Budden, Tregenza, Aarssen, Koricheva, Leimu, and Lortie (2007) found that in a double blind review of manuscripts, representation of female first authors increased by 33%, indicating that a double blind review process is more beneficial for women.

Spelke and Grace (2007) found that when a dossier was associated with a male name, 70% of the reviewers (both men and women) recommended tenure, but when it was attributed to a female, only 45% recommended tenure. Spelke and Grace noted that biases such as these can result in fewer women researchers working in higher education.

Towers (2008) found that women were one-third as likely as their male peers to be chosen as presenters at conferences, despite producing more internal papers per year and performing 40% more maintenance work than their male counterparts. The selection of researchers to give a

conference presentation occurred in a closed-door meeting. Towers attributed this inconsistency to unconscious gender bias.

Valian (2005) discussed differences in teaching responsibilities for new faculty. She cited the example of a male faculty member teaching the same introductory course in his specialty every term, whereas a woman was expected to teach many different introductory courses. Thus, the man could focus time on his research, whereas the woman was constantly spending time developing another course.

Why the Disparities?

Valian (2005) wrote that gender disparities are sometimes attributed to an acculturation problem, with women not socialized to play by men's rules. In some respects this is true. Historically, academia in the United States was an institution created by men to serve men. Even today, many male-oriented practices remain. Being an academician means working more than a 40- hour week (Helfat, 2002). In the past, professors, who were usually men, had wives or mothers at home to tend to life issues (Hamilton, 2002). Today, female professors find they must work the 40-hour-plus week and tend to life issues, theirs and those of their families. The tenure system is built on an expectation that faculty will spend the first five to seven years of their faculty life working to achieve tenure. This time often coincides with the childbearing years of women, putting women at a disadvantage if they try to attain tenure and have children. As stated by Beaman-Smith and Placier (1996), "Women in academe are initiates who wandered into a ritual designed for men" (p. 3).

Tenure-track faculty positions are often at a premium, which means competition can be the game of the day, but women often shy away from competition. Niederle and Vesterlund (2007) discovered that when men and women correctly solved the same number of mathematics problems, men were twice as likely to choose a winner-take-all tournament incentive scheme. Babcock and Laschever (2007) described research confirming that women tend to be less competitive than men.

Examples of this distaste for competitiveness can be found in many places. mTwice, in 1995 and in 2008, National Academy of Science membership was turned down by women because their husbands, with whom they collaborated, were not also invited to membership (Bhattacharjee, 2008). Nancy Jenkins could not separate her contributions from her husband Neal Copeland's, "as we did everything together on an equal basis." (Bhattacharjee, p. 259).

Possible Solutions

How can RAs use this knowledge and the following suggested solutions to assist faculty? While some solutions can be implemented by mid-level RAs and their staff, many must be the concern of upper administrators, such as vice presidents for research, who can interact with their peers to effect changes at the university level.

Overcoming the Bias

One way to overcome gender bias (Easterly, 2002) is through enforcement of laws such as Title IX, which states that "no person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance" (Title 20 U.S.C. Sections 1681-1688). Following on the heels of the Civil Rights Movement of the 1960s, women began to demand equal rights in all aspects of life, including education. Originally, supporters of equal rights for women planned to amend Title VI of the Civil Rights Act to add sex to the list of characteristics (race, color, and national origin) against which employers could not discriminate. Because civil rights leaders felt this would weaken the focus on race in the Civil Rights Act, Title IX was born. A series of court cases since 1972 has helped define and limit the effectiveness and reach of Title IX. While Title IX affects all aspects of education, it is most notably and successfully applied to athletics. For example, today more than 100,000 women participate in intercollegiate athletics, a four-fold increase from 1971. That same year, 300,000 women (7.5%) were high school athletes; in 1996, that figure had increased to 2.4 million (39%). Enactment and enforcement of title IX has also benefited women in academics. According to the National Center for Educational Statistics (NCES, 2007), between 1979 and 2005, the percentage of bachelor's degrees earned by women increased from 49 to 57 %. Between 1980 and 2005, the percentage of master's degrees earned by women increased from 49% to 59%. Women earned just under half the doctoral degrees awarded in 2005 (49%), an increase from the 30% awarded to them in 1980.

As seen above, women are not becoming full professors and administrators as often as one might think, considering the rise in females in education at all other levels. Federal funding agencies, such as the National Science Foundation (NSF), the National Aeronautics and Space Administration (NASA), and the Department of Energy (DOE), are being called upon to ensure that all grantees meet the terms of Title IX. Grantees must ensure that they are complying with Title IX requirements to receive funds (Government Accounting Office, 2004).

Other solutions lie within the university structure itself. Solutions to subconscious bias may be as simple as using initials for first name to mask gender in letters of support and curricula vitae when this material is reviewed for tenure, promotion, or other advancement and award opportunities. As Budden et al. (2007) proved, when manuscripts were judged under a double blind review, the number of women who were published increased.

Modifying the promotion and tenure track process can be a solution. An action as simple as clearly defining the requirements for tenure and promotion and then regularly distributing those requirements to all can improve women's chances at receiving tenure and promotion (Marschke, Laursen, Nielsen, & Rankin, 2007).

Along with defining the requirements for tenure, it is important to define merit and success for each department. Uhlmann and Cohen (2005) demonstrated that merit and success are often defined differently for men and women within the same discipline. By giving merit realistic, consistent definitions, all will know what is expected of them.

University of Wisconsin-Madison established the Women in Science and Engineering program (WISE), with excellent results (Friedrich & Burstyn, 2005). The University of Montana, through an NSF ADVANCE grant, holds Women In Science Lunches and Breakfasts "designed to help build collaboration and a sense of community among women science faculty" (UM, 2009). Facilitating the development of such networks will give women a community of support and a way to "be in the know."

Educating faculty, chairs, deans, and administration that unconscious gender bias exists may be one of the most effective methods of ending it. Holding workshops, such as new chair training, or providing this information in orientation sessions are ways to get the word out (Stout, Staiger, & Jennings, 2007).

Providing evidence of the discrepancies in the numbers of female and male faculty at all ranks and in various disciplines will also help (Morrisey & Schmidt, 2008). Maintaining quantitative data is key to this effort (Marschke, Laursen, Nielsen, & Rankin, 2007).

Conclusion

Research shows that gender bias does exist, not overtly as in the past, but through gender schemas or unconscious bias. Unconscious bias occurs in every part of life, but when it plays a part in deciding whom to hire or to whom money is awarded, it must be dealt with. Being aware that such biases exist and making a conscious effort to overcome them will benefit women and the institutions at which they work.

RAs need to be aware that unconscious bias exists, and can appear in every-day activities such as awarding internal grants for research or even through a simple personal interaction. Perhaps, when everyone working in the academic research community is conscious of these concerns, it will become a welcoming place for both women and men.

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