Journal of Research Administration

Volume 51, Number 2
Fall 2020

SRA INTERNATIONAL | SOCIETY OF RESEARCH ADMINISTRATORS INTERNATIONAL

Quality research has never been more important. Take your career to the next level.

LevelUP

SRA INTERNATIONAL LEVELUP

LevelUP helps busy professionals fit continuing education into their schedules. Modules are designed to take 3-5 hours in total, and can be completed at your own pace, so you can tailor your education to fit your needs.

SRA International offers affordable training options for individuals, groups and organizations.

Get started today at
srainternational.org/LevelUP

Journal of Research Administration

Journal of Research Administration

Society of Research Administrators International

Published by the Society of Research Administrators International

The Journal of Research Administration

The Journal of Research Administration is published by the Society of Research Administrators International, Arlington, Virginia 22209 USA. Founded in 1967, the Society of Research Administrators International is dedicated to the education and the professional development of research administrators and to enhance public understanding of research and its administration. Representing all disciplines and sectors in research administration, it serves as the international society to promote quality and innovation in research administration. USPS No. 008245. ISSN No. 2573-7104 (online).

Correspondence

Manuscripts are to be submitted to the Editor. Submission of a manuscript is considered to be a representation that it is not copyrighted, previously published, or concurrently under consideration for publishing in print or electronic form. Consult the *Journal* web page (www.srainternational.org/journal) for specific information for authors, templates, and new material. The preferred communication route is through email at journal@srainternational.org, Attention: JRA Editor.

SRA INTERNATIONAL

2020 Journal Editorial Board

The Society of Research Administrators International Board of Directors

Prepared by SRA International
1560 Wilson Blvd., Suite 310, Arlington, Virginia 22209
www.srainternational.org

Table of Contents

FROM THE EDITOR'S DESK

Please send manuscripts to journal@srainternational.org

From the Editor's Desk

Jennifer E. Taylor
Tennessee Tech University

The Spring 2020 issue was not only the first issue of a new decade but ushered in the second half century (51st year) of the publication of the Journal of Research Administration as the leading scholarly journal for disseminating education, training, and scholarship related to the field of research administration and management. Since our last issue, research administrators have faced the new challenges associated with an unforeseen pandemic—working together to support our investigators and institutions from home or in other socially-distanced ways while continuing to deal with the ever-growing complexities of our field and the need for ongoing development of skills and more effective processes to address them.

In this issue we are publishing a set of articles that provide important guidance for addressing these challenges and for enhancing the capabilities of those involved in research administration and grant writing. They present a useful and adaptable approach to creating clear and objective pathways for career advancement. Relatedly, they supply a framework and examples for developing better understandings and processes for addressing the complex interpersonal dynamics that may emerge among the various partners involved in developing, submitting, and managing sponsored work.

Our first article is entitled, "Professional Development for Clinical Research Professionals: Implementation of a Competency-Based Assessment Model," by Christine Deeter and a large team of colleagues from the Duke University School of Medicine and other units there. They offer a detailed discussion of the process of developing, testing, and continuously improving an extensive, tiered and points-based system for career advancement of clinical research professionals. They describe some of the impacts of the process thus far, important refinements, extensions (e.g., review groups), and resulting lessons, and provide important documentation that will enable those in other settings to adapt the materials and processes to their own institutions. Indeed, the group tells us of at least one other major medical setting they are working with to utilize the lessons and materials from this effort.

In "Beyond Boundaries: Developing Grant Writing Skills Across Higher Education Institutions," Kay Cunningham from the University of Sheffield provides an extensive review of literature to identify key grant writing skills necessary to improve the quality of grant applications and to advance the recognition of grant writers as third space professionals. She goes on to analyze current pathways to gaining grant writing skills and the ways that their acquisition is supported or hindered by institutional and professional bodies. Taking a somewhat different approach to the issue of development of grant writing skills, Nims, Liggett, and their colleagues at Eastern Michigan University provide us with the description and results of an active, eight-year effort to develop and evaluate the effectiveness and impact of grant writing workshops aimed at helping faculty attendees develop the skills to be more effective in seeking internal research grants.

Importantly, the authors include details for adapting and/or building on their efforts at other institutions along with copies of measures they used to evaluate their impact and success.

The final two articles in this issue shift the focus to critical processes at the interpersonal and institutional levels, respectively, that impact the efficacy of organizations to develop, submit, and manage efforts to conduct sponsored research. In her article, "Escaping the Drama Triangle: Strategies for Successful Research Administration from the Psychology of Codependence" Deborah Clark of Central Michigan University draws on Karpman's Drama Triangle (1968) formulation to provide an analysis of the interpersonal, and often problematic, stress-inducing dynamics that may arise between research administrators and those they are attempting to support (e.g., principal investigators). She goes on to offer some potentially useful strategies for engaging with principal investigators in more effective and less stressful ways.

Finally, Marcus Johnson, Jean Bolt, Timothy Veldman and Lynn Sutton from the Duke University School of Medicine and Durham VA Health Care System discuss "Establishing a Project Management Community of Practice in a Large Academic Health System." This article focuses on enhancing the collective capacity of a large organization to execute initiatives in a timely, organized manner that helps to realize their mission. They describe an effort to create a shared platform and related resources for project managers to collaboratively share ideas, best practices, and opportunities for professional development and coordination of efforts.

As always, this issue has required not only the efforts of our authors but the leadership of the journal including our Editor, Nathan Vanderford, our Associate Editor, Holly Zink, and the entire editorial board. We also thank our publisher, SRAI, and specifically, SRAI staff Dilyana Williams and Jim Mitchell for their support of the Journal and their efforts in facilitating the publishing 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

Re-thinking Online Meetings During COVID-19 Pandemic and Moving Forward

Kumutha Krisnan
Office of Education Research
National Institute of Education
Nanyang Technological University

Ng Qiu Ting Yvonne
Office of Education Research
National Institute of Education
Nanyang Technological University

Rita Elaine Silver
Office of Education Research
National Institute of Education
Nanyang Technological University

For this Voice of Experience, we draw on the experience of our research grants management unit in harnessing online platforms to hold various types of meetings during the recent local and international COVID-19 lockdown. Even as we return to some face-to-face meetings, we note the value and convenience of online meetings (e.g. with international collaborators or local colleagues in different offices, to avoid travel time). Thus, we expect to continue regular online meetings as one of our options for efficient research management. While standard meeting rules still apply (e.g. have a meeting agenda), the backdrop of COVID-19 forced us to consider the different requirements of online versus face-to-face meetings. We share experiences which we have found to be effective in order to support others who are also planning and hosting online meetings now and going forward.

Background

The National Institute of Education, Nanyang Technological University (NTU) is Singapore's national teacher education institute. Our office (Office of Education Research) oversees research grants management for the Education Research Funding Programme. We regularly work with Principal Investigators (PIs) on pre to post grants matters. We also interact with administrators at our institute and affiliated university (NTU), with our funder, and with faculty and research staff in other departments. We organize numerous panel and committee meetings, including institutional, local, and international members. In the normal course of events, these meetings and panels are held face-to-face, planned well in advance, using procedures we have developed and tested over time. As the COVID-19 situation evolved early in 2020, scenarios changed rapidly, often day to day. Our careful meeting planning quickly devolved into disarray. As we shifted to online meetings, we had to re-examine how to make these meetings effective.

We address these overarching questions: What are some of the challenges of setting up online meetings, and how do we manage those challenges? With the increase in online communications, how can we adapt for effective communication to take place? Is there a general approach (regardless of the specific online platform) that might be helpful for hosting better meetings for our research management work?

Question: Online meetings come with their own set of challenges. What are some pitfalls in hosting online meetings, and how can we manage these?

A key limitation in online meetings is the lack of visual information—it can be difficult to determine the degree of member fatigue, to see how comments are interpreted to signal that discussion must end. It is important to support a sense of inclusivity and engagement. Video can help, but it presents an incomplete view. In addition, overuse of video can feel intrusive or lead to technical difficulties such as lagging connections.

On a simple level, we use a set agenda with stated time points and 'bell' to note when to move on—standard meeting protocols. Most platforms also provide options to engage via chat which is very useful for back channel communication, immediate feedback, and notetaking. For example, if video is off during a presentation, backchannel comments such as 'Good point', help the speaker know that the audience is still engaged. Feedback such as 'Please slow down' or 'Can you show the graph on slide 3?' help the speaker be responsive. Necessary follow-up actions can be noted, and these notes can be seen immediately rather than waiting for meeting minutes to be sent. Meeting hosts can initially model this sort of commenting to let members know it is good practice. If speakers find the chat too distracting, they can set specific points in the presentation to check chat—the online equivalent of "Any questions so far?" but with the added benefit of a written record that all can see.

Beyond these basics, we have developed a few other practices to improve our online meetings, including planning for different 'meeting types', ensuring we trial each meeting, recapping ground rules, and including different types of meeting facilitators.

Question: What do you mean by 'meeting type' and why does that matter?

Meetings are not 'one size fits all'—Prepare differently for different meeting types

We realized that we have different meeting types involving different membership (e.g., assisting a PI in submitting a proposal, the funder asking questions related to grant accountability, research committees deliberating proposals). Members also come with different individual experiences and familiarity with online meetings. Sometimes there are restrictions on which platforms/tools they can access. Our experience shows that online meetings must be "packaged" for an optimal experience.

The least successful of all our efforts were 'split team' meetings with Group A in room 1 and Group B in room 2, connected via the internet. This set up might make members feel they are part of a group. Unfortunately, we found that visuals were spotty (e.g. the camera didn't capture everyone) and turn-taking was difficult because visual cues were missed. Technical difficulties were likely, with shifting visuals from presentations (showing slides) to discussion (showing members). Crucially, most meeting rooms simply don't have the necessary acoustics: voices drift, sound is garbled, repetitions are frequent and frustrating.

Given the issues with 'split teams', our experience recommends meeting online with each person in their own physical space and individual device. One example was a research grant review panel in which five international panelists logged in from different regions. The purpose was to summarize the strengths and weaknesses of projects as well as make recommendations on revisions and funding; the video function was crucial for supporting interactive discussion. However, in a larger meeting with 20+ people making final decisions on funding, a different structure was needed. Video was confusing, each individual needed to state an opinion on every decision, and decisions needed to be publicly tracked. This discussion was supported with slides shared on screen, a chat line and minimal video. In addition, we set up an individual 'channel' (in MS Teams) for each topic/decision. Moving from channel to channel made it easy to organize relevant information and keep everyone on topic. This can be done in Zoom using chat mentions as topic channels. Other meeting platforms might have other ways of doing this. Our key takeaway was that meetings which need high interactivity work best with video support and less textual information; larger meetings, especially those which make final decisions, are best managed via live, textual tracking (e.g. in chat or similar).

Some meetings can be conducted using typed chat exclusively. We refer to these as 'textual meetings.' Taking out the audio and video cuts down on bandwidth problems as well as the sense of overwhelming input by multiple members. Textual meetings leave a clear trail of discussion while allowing members to work at their own pace. These are also useful for soliciting input from usually quiet meeting members. Such meetings work best when the agenda has delineated items that require short discussions (e.g. multiple choice options), rather than extended or freewheeling discussion. Each agenda item has its own chat, and members can move back and forth across the different chats to read and add comments as desired.

A final meeting type involves the traditional presentation followed by Q&A format. These 'presentational meetings' (Person A presenting, the rest listening) are sometimes useful. However, they quickly become tiring with intensive listening by the audience and the speaker wondering, 'Is anybody there?' For these meetings we have a simple change: include additional, 5-minute 'stretch' breaks; everyone stays online with video and mics muted for easy re-starts.

Question: Running a meeting trial is useful for newbies, but we don't need them after that, do we?

Always trial the meeting—yes, always

As we were new to the many online meeting platform options, we trialed various platforms (MS Teams, Zoom, Webex), keeping in mind that we also had to cater to a different membership. Whatever the platform, we discovered that trials are needed for each meeting, even after online meetings and platform functions become familiar.

When trying out a new platform, we trial it within our unit to be sure of the functionalities and how they support the meeting type. Then we do trial runs with representative members of the upcoming meeting to confirm the platform is accessible to all (e.g., are there security walls which make one platform easier or more difficult than another?) and not too unwieldy (from the members' perspective). This is standard practice. However, for every meeting, we also do trial runs with meeting members to ensure attendees are familiar with the platform prior to the actual meeting. In some cases, trial runs are done with small groups; in other case, we run the trial with individuals—depending on member availability. With experience, we can now conduct individual trial runs in about 15 minutes, and group trials last less than 30 minutes. The time is well-spent as these trials help members avoid common login and navigation issues for the actual meeting. Trial runs are also crucial for meetings on confidential matters which require some individuals to enter/exit at different time points. Trouble with entering/exiting can bring meetings to an untimely halt and cause frustration for all.

Meeting trials are not only about the specific software or platform but can also include details such as which speakers/microphones to use and a check of visual elements (e.g. in presentation slides) which will be displayed via individual monitors rather than meeting room screens. Miniscule fonts and unclear graphics are endemic to any meeting but with online members on different devices, the difficulties can be compounded. A trial can help highlight these issues in advance and allow time for correction.

Is it necessary to keep doing trial runs? At two recent meetings, months after we have hosted many online meetings with the same members who could be expected to be familiar with the processes, some members still weren't sure how to join, how to leave, how to share screens; they found their microphone didn't work as expected or the visuals prepared for sharing on large meeting room screens didn't show well on individual laptops—all the initial problems specific to online meetings reappeared as soon as we stopped having trials. The first 10 minutes of planned 'short' meetings were taken over by matters that could have been resolved with quick trials. The meetings lost momentum; participation flagged.

Question: We all know the basics. Why recap ground rules?

Recapping ground rules helps focus members, reminds people of what they already know, and allows those who are not in the know to smoothly join

We found that our online meetings, of all types, need explicit ground rules. Some of the ground rules have to do with basic online etiquette, e.g., turn off your mic when not speaking, turn off your video when not presenting, and join the meeting 10 minutes early to ensure there are no technical issues. Just as trials are repeated for each new meeting, ground rules bear repeating. Why? People forget. In a recent meeting with an external agency, after months of online meetings, no ground rules were set or recapped. During the meeting, there were errant microphones causing noise and feedback, video images distractingly flashing on and off, and members who weren't sure whether to raise hands, speak up, or write in the chat.

A standard preamble slide sent to members in advance and flashed at the beginning of the meeting takes 2-3 minutes, saving much time and irritation. We also include information on how the meeting will be run based on the meeting type: how to use the online chat for textual meetings; how to enter the conversation for longer, oral discussions (e.g., raise a hand? turn on video and wave?). This is a quick, easy and effective way to set expectations and pre-empt problems.

Question: If the meeting chair manages the meeting, what does a facilitator do?

Include facilitators to support the meeting Chair

While most formal meetings have a person to chair the meeting and often have someone to take notes, we found that the additional administrative work of online meetings required some re-thinking. We include a Facilitator (Administrative) (FA) who welcomes everyone to the online site prior to the meeting start, provides the ground rules briefing and comments on any useful features of the platform. The FA controls the flow of individuals in and out of the meeting, keeps time, and helps individuals with technical issues (via another channel, if necessary). A Co-FA is sometimes needed. For example, in large groups, more than one person might need technical assistance at the same time. The Co-FA can also signal to the Chair if someone has a hand up but has not been called, if someone has not participated, as well as tracking votes and posting live updates on the chat. In brief, the FA and Co-FA support inclusivity in meetings by liaising between individuals and the meeting Chair. The Chair is free to focus on managing the discussion.

Overall, we find that standard advice on hosting effective meetings (prepare, set a goal, stay with the timeline, create a clear action plan) holds true online. However, we share these experiences and ideas, to address some specific challenges and situations that others might also face with the increasing use of online meetings.

Professional Development for Clinical Research Professionals: Implementation of a Competency-Based Assessment Model

Christine Deeter
Duke University School of Medicine, Duke Office of Clinical Research

Deborah Hannah
Duke University School of Medicine, Department of Dermatology

Camila Reyes
Duke University School of Medicine, Duke Office of Clinical Research

Michelle E. Mack
Duke University School of Medicine, Duke Office of Clinical Research

Marissa Stroo
Duke University School of Medicine, Duke Office of Clinical Research

Stephanie A. Freel
Duke University School of Medicine, Duke Office of Clinical Research

Rebecca J. Namenek Brouwer
Duke University

Heather E. Gaudaur
Duke University and Duke University Health System

Andrea L. Doughty
Duke University

Denise C. Snyder
Duke University School of Medicine, Duke Office of Clinical Research

Abstract: *Aligning job descriptions at Duke University Schools of Medicine and Nursing with the Joint Task Force for Clinical Trial Competencies (JTFCTC) spurred additional related activities—namely, establishing professional pathways and career ladders for clinical research professional (CRP) positions. CRPs leave Academic Medical Centers for many reasons, but lack of career advancement opportunities is one of the top observations. Duke developed a competency-based tiering system for CRP job classifications. This process of Tier Advancement allows CRPs to advance their tier through demonstration of knowledge, skills, and abilities in a variety of clinical research competencies. Tier Advancement is point-based*

and permits CRPs to advance within a single job classification, removing the need for onerous reclassification. The point-based nature of the system allows flexibility, in that CRPs can advance by demonstrating a limited set of in-depth specialized competencies or a breadth of responsibilities across a wide array of competencies. Tier Advancement has provided benefit to individual employees by offering an opportunity for self-driven career development. It has also benefited the institution by increasing CRP retention rates and allowed Duke to better understand current competency levels of its workforce.

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

Background/Problem Statement

Clinical research careers have changed significantly concurrent with the increasing complexity of the research environment across all industries, including Academic Medical Center (AMC) sites (Califf, 2009). For clinical research professionals (CRPs) within academic research sites, the conduct of clinical research often involves a heavy regulatory burden, adoption of tools for study management and health system connections, data collection and sharing, and integrating internal and external processes (Gwede et al., 2005). Thus, the job of the clinical research professional has morphed, diversified, and in many cases specialized over time. While typical teams may include clinical research coordinators, research nurses, regulatory coordinators, and data coordinators or managers, there is significant variability of responsibilities and roles from program to program (Baer et al., 2011). This variability in jobs, and likely the background and credentials that are needed to fill those positions, has made it difficult to build an engaged workforce pipeline or promote clinical research as a profession. To address this challenge, Duke and others have worked toward the standardization of job descriptions and clinical research competencies for professionals (Sonstein et al., 2014). At Duke, existing clinical research staff were mapped into a defined, competency-based framework of positions (Brouwer et al., 2017). This institutionally-driven process of position mapping was successful in harmonizing clinical research competencies across a wide scope of clinical research units.

Standardizing job roles was only a first step toward clinical research workforce innovation. Skill development takes time, and true expertise in clinical research competencies can take even longer. In recent years, coordinators have opted to stay in jobs because they enjoy the interaction with participants; however, they are looking for opportunities for upward mobility (Getz, 2018). The clinical research coordinator (CRC) is at the center of patient care, safety, and research. The importance of having well-trained clinical research professionals is imperative to conducting rigorous, reproducible, quality research (Brandt et al., 2011). If institutions do not take notice, there is a great risk of loss of institutional knowledge should clinical research professionals leave for other opportunities. Employee turnover is known to be incredibly costly. It is suspected to be a minimum of $25K per employee (see Table 1 for formula). This formula was developed out of conversations with subject matter experts in the clinical research field and based on estimates of labor and cost of time. As with any profession, turnover of CRPs is costly to the institution, holds the workforce at a constant state of underdevelopment, and creates risk at the study level

through participant retention (relationship with a CRC may drive participants back to study visits [Abshire et al., 2017]) and enrollment with protocol handoff (gaps in work or protocol suspension until replacement staff are identified). Along with salary and burnout, a primary reason CRPs leave their position is the perceived lack of career advancement opportunities (Center Watch Staff, 2015; Owens Pickle et al., 2017; Speicher et al., 2012). Retention of qualified staff depends on providing opportunities for career growth and empowering personnel to direct their own career advancement.

Table 1

Estimated Costs of Bringing on New CRPs

Onboarding and hiring a new staff member	*Cost*
Onboarding and training time for that individual *(3 months without ability to contribute to revenue generation)*	$13,750
HR costs associated with search and hiring process *(personnel time, drug testing, background check, credentialing)*	$2,000
Training costs *(estimated to involve 100 hours of senior staff/admin time @$100/hr)*	$10,000
Total Cost	**$25,750**

Note. The above is based on an average salary of $55,000 including total value of benefits for a starting, inexperienced Clinical Research Coordinator.

Historically at Duke University Schools of Medicine and Nursing, career advancement for CRPs often required "job hopping"—leaving one job in one part of Duke for another higher-level position in another part of Duke. Promotion decisions, while inclusive of the skill level of the employee, tended to weigh heavily on tenure, budgetary constraints, and existing needs for higher-level positions within departments or therapeutic areas. To the employee, career path opportunities were perceived to be limited to their own department, because there was not a uniform definition for CRP career advancement across the institution. These staff changes take a toll on research productivity, and such organizational turbulence leads to inequitable and subjective advancement. These inequities can compound across an organization, creating a workforce that is dissatisfied and unsettled, and encouraging internal competition due to lack of consistent definitions across departments (Breza et al., 2018). Ultimately, this culture can undermine employees' sense of value within the workplace. A more objective competency-based advancement system could improve employee satisfaction and expand promotional opportunities if implemented across an institution (Center Watch Staff, 2015). National conversations indicate that few opportunities exist for employees to demonstrate their level of skill across clinical research competency areas.

While competency-based clinical research certifications are offered by independent organizations, such as ACRP and SOCRA, these are perceived by some as costly and may not directly influence career advancement. That said, certification does support professional development and should be pursued as one tool that staff may consider as part of "building their toolbox." Due to a lack of an institution wide competency-based career advancement pathway, it was imperative to develop a track specific to clinical research professionals within the context of Duke's defined job classifications (Brouwer et al., 2017). Duke's Workforce Engagement and Resilience (WE-R) advancement initiative aimed to address the need for a clear, delineated career development pathway. This was satisfied by creating levels, or "tiers", within each job classification, thus giving way to the name, Tier Advancement. The clinical research competencies and domains associated with Tier Advancement were developed in conjunction with subject matter experts and are founded on those developed by the Joint Task Force (Sonstein et al., 2014). Described here is the development and implementation of the WE-R Tier Advancement process, including: 1) defining the model, 2) developing assessment processes and tools, 3) launching the process, and 4) describing the impact of implementation across the Duke Schools of Medicine and Nursing.

Methods/Observations

Tier Advancement, an employee-driven, competency-based, career advancement pathway for clinical research professionals, was developed over several critical stages, each of which are described below. The documents and assessments that comprise the process can be found on the Duke WE-R website (https://medschool.duke.edu/node/97565).

Engaging the Research and Administrative Communities

The WE-R initiative grew out of the Clinical Research Professionals Working Group that is described extensively in "Using Competencies to Transform Clinical Research Job Classifications" (Brouwer et al., 2017). As with previous elements of the Clinical Research Professionals Working Group initiative, early buy-in and engagement from the Duke research community and executive leadership was essential in developing the Tier Advancement process. Early on, it was identified that the professional pathway should be: 1) transparent and achievable by the research community, 2) manageable for supervisors who may have large teams of staff and little time dedicated to each staff member's development, and 3) understood and championed by those in leadership roles. To address these components, the WE-R initiative formed working groups composed of staff in the tiered roles, as well as in the roles that manage those classifications.

The working groups considered several elements important for an advancement model: relevance across the institution; fairness to employees; applicability of assessments; metrics of success; and burden on staff, managers, or others completing the central review. While the importance of a competency-based framework had been established, exactly how to measure competencies in clinical research had not (Sonstein et al., 2014). Therefore, working groups were tasked with defining a competency-based process for advancement. Workgroups considered several approaches to measure competencies, such as the use of study complexity scores, the number of studies, the role an individual held for each study, relevance of funding source and financial

responsibility, critical elements of leadership, the use of interviews or committee review, and the best modes to measure various competencies. While many approaches were discussed, only some of these were retained in a final advancement model. Once the working group had a strong proposed model for advancement, the WE-R team offered town hall presentations to the research community. Based on town hall feedback, the model was optimized.

Addressing the Heterogeneous Academic Research Environment

Another consideration of the Tier Advancement process was Duke's diverse research environment. Large academic medical centers conduct a variety of research, including Phase 1 trials, complex investigator-initiated research, community-based research, epidemiological studies, and retrospective chart reviews, among others. In order to support this array of research, individual CRPs need to have distinct skillsets, requiring strengths in a variety of competency domains. Initially, the WE-R Tier Advancement process aimed for a model with tremendous standardization, requiring a core set of competencies in which all staff, regardless of role, met at least a fundamental level. The difficulty with this model was that some CRP roles, such as that of the Regulatory Coordinator, require a depth of responsibilities across a limited, specialized set of competencies, whereas other roles require a breadth of responsibilities across a wide array of competencies. After recognizing that this model would seriously limit the opportunity for many staff to advance, the core-competency structure was eliminated. Instead, a point-based competency model was implemented. This standardized, yet flexible model provides all CRPs an opportunity to: 1) advance by gaining points in competencies with which they are experienced and 2) choose to grow professionally in competencies that more closely align with their research type and/or classification. Details of this point-based model are described below.

In addition to opting for a point-based model, based on a standard set of competencies, an 'other' competency was implemented. This 'other' allows for CRPs to demonstrate skills or knowledge in a competency that is not identified in any other existing assessments. To qualify for inclusion in the Tier Advancement process, this competency must significantly contribute to the science or the study team. The CRP submits a description of the competency and provides a short description of the value that the competency brings to the research team or group. The WE-R team monitors submission via an application process to ensure that the competency listed does not fit into one that is already part of the process.

Defining an Advancement Model

Contributions from the working groups and research community guided the WE-R team to develop a model that serves our diverse workforce. The model's key objectives were to: 1) create a series of standardized competency-based assessments that would enable CRPs to demonstrate skill across clinical research competencies relevant to their day-to-day job and 2) develop a way to measure and ascribe levels of skill within each competency that accurately distinguish degrees of capability, independence, and leadership.

Levels. Four levels for the competencies were defined: Fundamental, Skilled, Advanced, and Expert. Individuals performing at the Fundamental level require some coaching, assistance, or

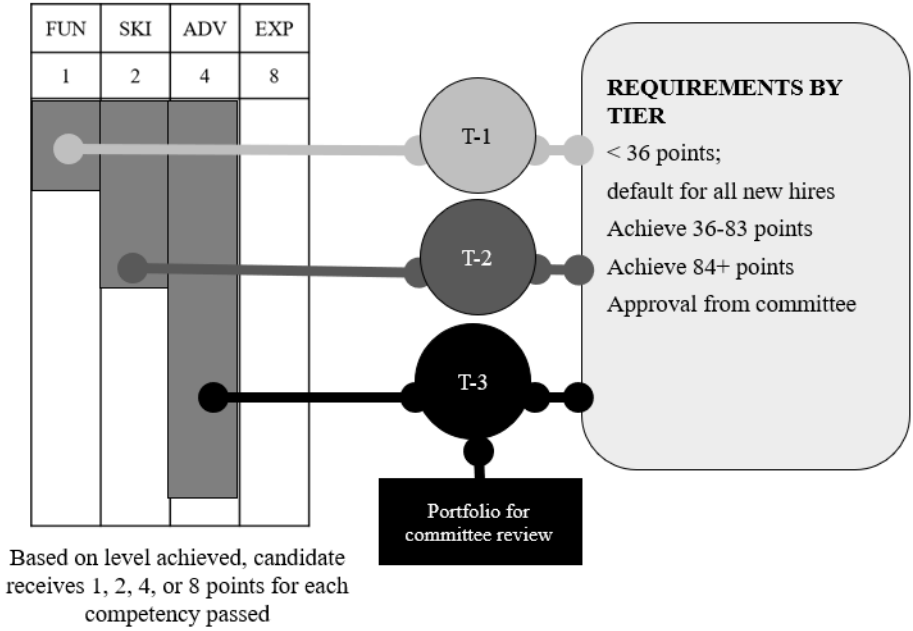
direct oversight. An example of a Fundamental level of the competency associated with participant-level documentation would be a CRP who maintains participant-level documentation for at least one complex study with some supervision. CRPs at the Skilled level are expected to complete tasks independently, accurately, and be able to find and use available resources. Advanced level employees demonstrate a high level of skill and knowledge, have the ability to teach, mentor, or lead, and consistently apply critical thinking and problem solving when demonstrating the competency. Employees are considered Expert level in a particular competency when they have achieved the Advanced level and demonstrate leadership in a variety of unit, department, or division-level initiatives; they may oversee the work of research staff outside of their immediate unit. Due to the higher expectations for achieving the Advanced and Expert levels, these assessments often require additional documentation. The leveling structures and definitions that WE-R used in this model were further explored using the JTF competencies and published in 2018 by Sonstein et al.

Points. A flexible point-based system to allow for advancement within a heterogeneous research environment (Figure 1) was developed. A total of 37 competencies across Duke's 5 clinical research competency domains (Research Operations, Safety and Ethics, Data, Scientific Concepts, and Site and Study Management) are available for assessment and point accumulation. The final assessments can be found on the WE-R website. Employees accumulate points to achieve each tier, and each tier above Tier 1 has an established threshold of minimum points (36 for Tier 2 and 84 for Tier 3). When employees demonstrate the Fundamental level within a specific competency, they accrue 1 point, demonstration of the Skilled level accrues 2 points, the Advanced level accrues 4 points, and the Expert level accrues 8 points.

Committee Review. In addition to accruing 84 points, successful advancement to the top level, Tier 3, requires a committee review of a submitted portfolio. Leadership and contribution are competencies that were not thought to be adequately captured within a standardized assessment. As these are both important pieces of higher-level professional development, a committee review was instituted to ensure these two concepts were applied fairly across all candidates seeking Tier 3. CRPs seeking Tier 3 were asked to provide documentation and letters of support that demonstrated leadership and contribution to the institution or research. These portfolios and collated assessments were reviewed by a committee.

Figure 1

Point Based Tier Advancement Structure



Determining Assessment Mode

The working group of volunteer subject matter experts aimed to determine the best modes for assessing skill level within each competency area. They considered several important factors: the applicability and practicality of measurement modalities; the time investment on the part of the employees and their managers; and the feasibility of standardizing for regular and equitable assessment cycles. The working group believed the most applicable mode of assessment would be something that mimicked direct observation in a natural setting by an impartial expert. However, this would require a significant investment of time by many expert assessors, is incredibly difficult to standardize, and was deemed largely impractical. The least applicable, but most easily standardized mode, was a knowledge test that would assess employees' understanding of a competency via a proctored exam. Knowledge tests require few central resources but do not assess application in the field and impose an increased time burden to employees. Further, it was recognized that managers are best able to assess their employees' demonstration of competencies; however, creating an assessment that is both standardized and objective for managers to employ consistently is difficult.

Based on feedback from the working group, the WE-R team selected an assessment mode for

each competency that would balance applicability, objectivity, standardization, and time burden for all parties. While most competencies required a single assessment to achieve the Advanced designation, others required a secondary assessment. This was particularly true for competencies assessed only with the knowledge tests, as these were felt to be the least representative of "real world" implementation of the competency.

A total of five modes were implemented across the 37 competencies:

1. Knowledge tests contained approximately 20 multiple-choice questions.
2. Case studies required that the candidate review scenarios of varying complexity and answer questions via free-text response.
3. Self-report assessments asked employees to describe their level of responsibility with specific tasks associated with a competency, and provide free-text examples. Managers reviewed that description to attest to its accuracy and used predefined, competency-level criteria to determine the employee's level for the competency (Fundamental, Skilled, Advanced). Clear scoring guides were embedded as part of the assessment.
4. Direct observation assessments involved a manager watching an employee execute a particular skill and completing a checklist of objective measures.
5. Centralized review involved a subject matter expert reviewing information submitted by the employee to an institutional application (e.g., electronic IRB submissions).

The above modes were used for testing employees seeking a Fundamental, Skilled, or Advanced designation. Achieving the Expert designation required an assessment that is somewhat different from the three lower levels. Any employee testing at the Expert level was required to first meet the Advanced criteria and then provide evidence of how they met four specific attributes of a given competency. The attributes are: 1) creating and overseeing unit-level systems related to the competency; 2) training others on this competency unit-wide and/or outside the immediate unit; 3) serving as unit or institutional expert for the competency; and 4) presenting as a go-to resource for multiple groups/staff. The manager and an independent third party must attest to the accuracy of the employee's responses to the four attributes. All Expert competency submissions are reviewed by two subject matter experts to ensure equity across all units. Note, each employee could be assessed at the Expert level in no more than 3 competencies. This avoids the scenario in which a CRP could advance without demonstrating at least a Fundamental level in multiple competencies, which can create a too-narrow skillset. It also avoids overlap between high level tiers and the separate Senior job classifications (e.g., CRC, Sr), which are distinct job titles.

A great deal of early discussion centered on tiers for new employees, recognizing that employees may be hired with a broad range of prior experience. Ultimately, with significant input from HR, the decision was to assign all new employees to Tier 1. Differences in experience and education were analyzed against the classification salary range upon hire. New employees were then eligible for the next Tier Advancement cycle following completion of their 90-day new hire evaluation period. Employees would then receive the standard percentage salary increase if they successfully advanced to a new tier. This process allowed for equitable salary placement while maintaining

advancement based on the demonstration of competencies. Employees, whether new hires or mapped, were not restricted from attempting advancement directly from Tier 1 to Tier 3. This was important to address new employees who were entering Duke with extensive experience and already had a strong competency portfolio.

Process

Piloting the Tiering Process and Assessments

The Tier Advancement process and assessments were piloted prior to the initial cycle, by testing the process and assessments with 33 employees and 29 managers. These staff members were from a variety of research units across the AMC. Duke's clinical research structure is divided by therapeutic area. The WE-R group attempted to utilize participants from each clinical research therapeutic area to promote generalizability to all types of research. Managers and employees were asked to complete four assessments each. Leadership within the research unit ensured that participants were testing a variety of competencies.

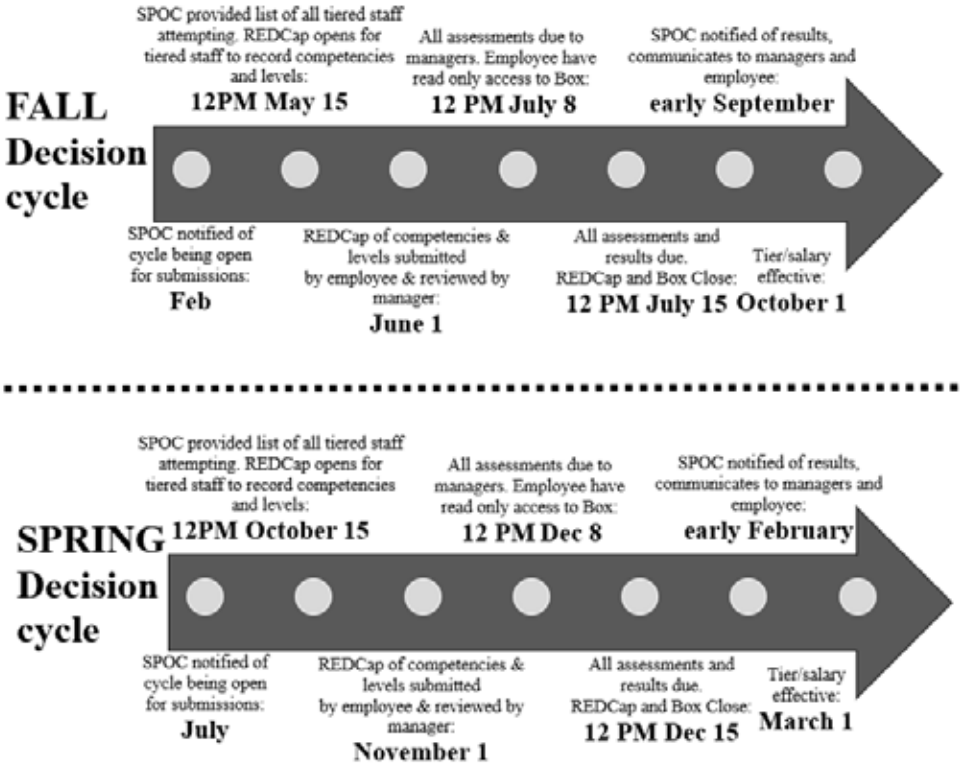
Following completion of the assessments, staff were asked to fill out a brief survey about the process. The surveys collected data on: 1) who participated, 2) their perception of the comprehensiveness, fairness, and quality of assessment(s), 3) the competency level tested, 4) time burden, and 5) how the assessment affected employee confidence when considering electing for Tier Advancement. Feedback indicated that approximately 85% of participants thought the assessments were easy to understand, fair, and did not contain any critical mistakes. The WE-R team also evaluated each assessment and shortened those that were considered to be too time consuming. Unless significant changes were made to the assessment, employees were permitted to retain the assessments they completed during the pilot process in an official Tier Advancement cycle.

Preparing for and Tracking the Tier Advancement Process

Tier Advancement was launched in October 2017, and two cycles per year were offered to employees (Figure 2). Any changes in tier and salary based on achievement in the first cycle would go into effect in March 2018.

Figure 2

Tier Advancement Opportunities



At the beginning of the first cycle, employees and managers were provided with an early prototype of what was later named the "Readiness Tool." This tool was designed to guide conversations between employees and managers about whether employees were ready, or at an appropriate point in their career, for Tier Advancement. Employees and managers would complete this tool together by reading the summary expectations for each level of each competency. They would then mark whether each competency was part of the employee's job and what level they believed the employee to be at. By tallying up the points at the end of the tool, the manager and employee could determine the employee's readiness for Tier Advancement. This tool was further refined throughout the process and is shown in Figure 3.

Figure 3

Tier Advancement Readiness Tool

AM I READY? Although you will be tested using the competency assessments, you and your manager should use the tool below to estimate whether you feel you will be successful. Read the summary of expectations for each level and mark the points you could receive in the right column. Total your points on the last page to see if you meet the point minimums. If you are applying for Tier 3, review the committee guidelines and leadership assessments; committee approval is required for advancement.

RESEARCH OPERATIONS					
Competency	**Fundamental (1)**	**Skilled (2)**	**Advanced (4)**	**My manager and I think I am….**	**Estimated points**
Contracts and Agreements *Case Study*	Recognizes when typical agreements (MTAs, CTAs, CDAs, DUAs, DTAs, etc.) are necessary and can identify collaborative office(s).	Recognizes when agreements (MTAs, CTAs, CDAs, DUAs, DTAs, etc.) are necessary, and the procedures to follow.	For complicated scenarios, recognizes when all types of agreements (MTAs, CTAs, CDAs, DUAs, DTAs, etc.) are necessary and which procedures to follow, including special terms that may need to be included.	☐ Fundamental (1) ☐ Skilled (2) ☐ Advanced (4)	Enter 1, 2, or 4 points
FDA Regulatory Submissions *Self-Report*	Assists with the preparation or maintenance of FDA regulatory submissions on at least one PI-initiated study overseen by the FDA.	Prepares and maintains FDA regulatory submissions independently on at least one PI-initiated study overseen by the FDA.	Prepares and maintains FDA regulatory submissions on more than one PI-initiated study overseen by the FDA. Handles complex situations and/or potential hold issues directly with the FDA, in collaboration with the PI.	☐ Fundamental (1) ☐ Skilled (2) ☐ Advanced (4)	Enter 1, 2, or 4 points
Institutional Regulatory Policies and Processes *Knowledge*	Scores at least 60% on knowledge test - see associated objectives.	Scores at least 80% on knowledge test - see associated objectives.	Advanced understanding of institutional regulatory policies and processes, as evidenced by at least 90% correct on knowledge test.	☐ Fundamental (1) ☐ Skilled (2) ☐ Advanced (4)	Enter 1, 2, or 4 points

On the WE-R website, a section for Tier Advancement was created and is publicly accessible so employees and managers can identify and obtain items needed for the Tier Advancement process, such as the Readiness Tool, Assessments, and Scoring Guides. Most assessments are available in their entirety in Microsoft Word format so they can be completed electronically or on paper. Scoring Guides were provided for most assessments to ensure transparency of assessment criteria to employees and managers. For knowledge tests, scoring guides were not available—instead, 5-10 knowledge objectives were published. The knowledge objectives describe what would be covered by each test with the intention that employees clearly understand expectations at each competency level. Assessments and associated scoring guides can be viewed on the Duke WE-R website (https://medschool.duke.edu/node/97565).

Prior to the Tier Advancement cycle, a single point of contact (SPOC) was designated by leadership within each clinical research unit (CRU), which is the staffing organization for all CRPs at Duke. The SPOC is responsible for: 1) ensuring staff are eligible for advancement, 2) submitting the staff's information to WE-R when they are ready for Tier Advancement, 3) disseminating Tier Advancement assessment results to individual employees and their managers, 4) educating newly

hired staff on the Tier Advancement process, and 5) ensuring that communication regarding changes and updates to the Tier Advancement process is shared within the unit. Regionalizing contacts within each unit allowed for appropriate assignment of assessments and streamlined communications about the cycles and process.

The WE-R team used a web-based data collection tool, REDCap (Research Electronic Data Capture [Harris et al., 2009]), for managing data related to the Tier Advancement process. Initially, the database housed data regarding results and assessments for managers and employees. Later, the information expanded to include the collection of nominations for Tier Advancement, dissemination of centrally scored assessments, and administration of proctored testing. The use of REDCap also assisted in streamlining notifications to managers and employees via automatic emails that could be disseminated based on programming within the system. It reminded employees and managers when assessments were due, included links to surveys that needed to be completed for data collection purposes, and allowed attachments of completed forms for employee and manager records.

Employee Testing and Manager Scoring

Once an employee officially entered into the Tier Advancement process, they and their manager were given a deadline by which all assessments must be completed, scored (if appropriate), and uploaded. Employees completed the self-report assessments and returned the information to their managers for scoring and determining competency level (Fundamental, Skilled, Advanced). Employees scheduled time with their manager to complete the appropriate direct observations of their competency demonstration. Assessments that were scored or handled centrally (proctored knowledge test, proctored case studies, and centralized review) had earlier deadline dates, as the WE-R team had to assemble experts for scoring. At the close of the cycle, managers electronically recorded the level achieved for each competency, and uploaded a single file of all assessments and scoring sheets into REDCap. A WE-R team member entered the level achieved for each centrally-scored assessment. Scores in REDCap were audited by the WE-R team to ensure they accurately reflected the documentation submitted.

Committee Review for Advanced Tiers

As mentioned previously, advancement to Tier 3 required an additional step—portfolio review by committee. In earlier cycles of the Tier Advancement process, WE-R requested portfolios without giving much guidance beyond asking for items that demonstrated leadership and contribution. Later, WE-R provided the employees with standardized guidelines for their portfolio packet submission. These guidelines were developed out of conversations with the committees about what content would best enable them to review information and make effective advancement decisions. The current portfolio guidelines require a standardized narrative template, an updated CV, full submission of any competency assessments, additional documentation that describes their contributions to their unit, division, department, or institution, and at least two letters of recommendation for advancement.

Portfolios packets were sent to committee members ten business days in advance of the committee meeting date. Committees were comprised of senior employees in clinical research across the Duke Schools of Medicine and Nursing. A WE-R team member attended to ensure the criteria for Tier Advancement was applied consistently and assist with interpretation of the criteria and the process. An HR representative attended to ensure that inappropriate considerations were not included in the discussion, such as performance ratings and informal character assessments. Each employee's portfolio was assigned a primary reviewer, who reviewed the candidate's portfolio and assessments in-depth, and made a verbal recommendation to the committee. The reviewer was typically assigned based on: a) being from a unit different from the candidate, b) having a role somewhat congruent with the candidate (e.g., Regulatory Coordinator Senior reviewing a potential Regulatory Coordinator, Tier 3 candidate), and c) having a research portfolio similar to the candidate. After presenting an overview of the candidate and recommending advancement (or not), the committee was able to ask questions and ultimately vote. If a candidate received a majority of favorable votes, they would advance to the tier they applied for. HR and WE-R members did not vote, unless one of the committee members had to recuse themselves due to a bias. If a candidate was not advanced to Tier 3, the committee worked together to provide constructive feedback as to how this employee might build a more competitive portfolio to be considered at a later date. This feedback was shared with the manager when results were disseminated.

Note that if employees did not meet the required 84-point threshold for Tier 3 applications, their portfolio packet was not reviewed by the committee during that cycle. However, it could be reviewed in future cycles after the point threshold was achieved.

Much debate has occurred within the communities involved on whether an appeals process should be created for those who did not successfully advance. To minimize the involvement of WE-R in performance issues, appeals have been placed entirely within the domain of HR and outside of WE-R or committee determination.

Collecting Feedback

After each cycle of Tier Advancement, but prior to sharing individual employee results of the process, WE-R collected feedback from managers and employees. After receiving survey responses, WE-R conducted focus groups to obtain feedback on how the process and assessments might be improved in future cycles.

Disseminating Results

Results were shared with each unit's SPOC. For each candidate, SPOCs were provided with the outcome tier and a summary report indicating the resulting level (Fundamental, Skilled, Advanced, Expert) for each competency assessment. A depiction of the summary report can be seen below in Figure 4. If an employee did not advance to the desired tier, a WE-R team member had a one-on-one conversation with the manager prior to the dissemination of results. During this discussion, the manager was provided with talking points and was given an opportunity to ask questions related to the employee's unsuccessful attempt. The School of Medicine Human

Resources collaborated with central Compensation and Payroll to calculate and implement any salary changes due to the advancement, and communicated to business and departmental HR managers, who then disseminated information to managers and employees as appropriate.

Figure 4

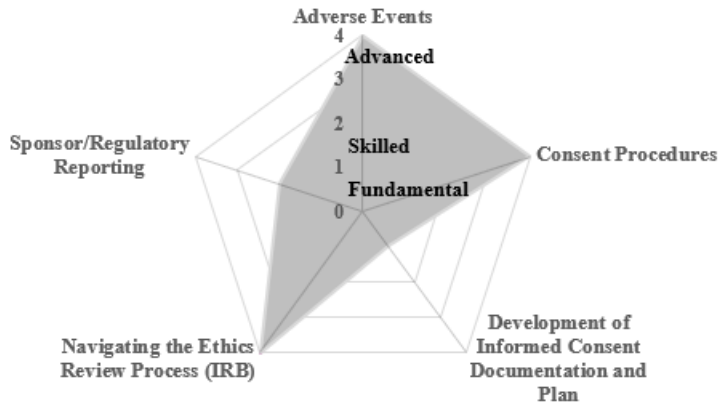
Tier Advancement Results Sample

Results of Tier Advancement

Employee Information
Name: John Smith
Unit/Department: Medicine
Division: Pulmonary
Current Title: Clinical Research Coordinator, Tier 2
Target Tier: Tier 3
Point total: 89
Final Tier Decision: Tier 3

Results of Assessment
Research Operations
Contracts and Agreements: Fundamental
FDA Regulatory Submissions:
Institutional Regulatory Policies and Processes: Advanced
International Regulatory Documentation:
Investigational Products Overall: Fundamental

SAFETY & ETHICS



Support and Communication

WE-R recognized that providing tools and navigation throughout the Tier Advancement process would be important for employees and managers. To that end, several opportunities were offered for employees and managers to ask questions, receive guidance, and discuss challenges. Examples include a step-by-step "welcome to the process" packet, weekly in-person office hours, and a central e-mailbox. In addition, WE-R offered relevant training sessions for managers and employees (e.g., "difficult conversations") in cases where the manager may not feel the employee is ready for advancement.

To facilitate communication and transparency, an easily accessible website was created where managers and staff could access materials relevant to the process. A series of town halls was conducted to discuss the implementation of this process and allow for questions. Both of these components, as well as the implementation of a unit situated SPOC, have been critical in keeping the research community engaged and informed during this process.

Outcomes

Participation

Duke's CRP workforce typically encompasses over 800 staff, with more than half of those staff in tiered positions. As of August 2019, four Tier Advancement cycles had been completed. During those cycles, SPOCs submitted 193 staff in CRC, Clinical Research Nurse Coordinator, or Regulatory Coordinator positions for participation in Tier Advancement. Of those, 149 CRPs completed Tier Advancement and 44 withdrew from the process. Table 2 indicates the number of employees in each position who completed Tier Advancement and notes what their target tier was.

Table 2

Tier Advancement Participation Rates

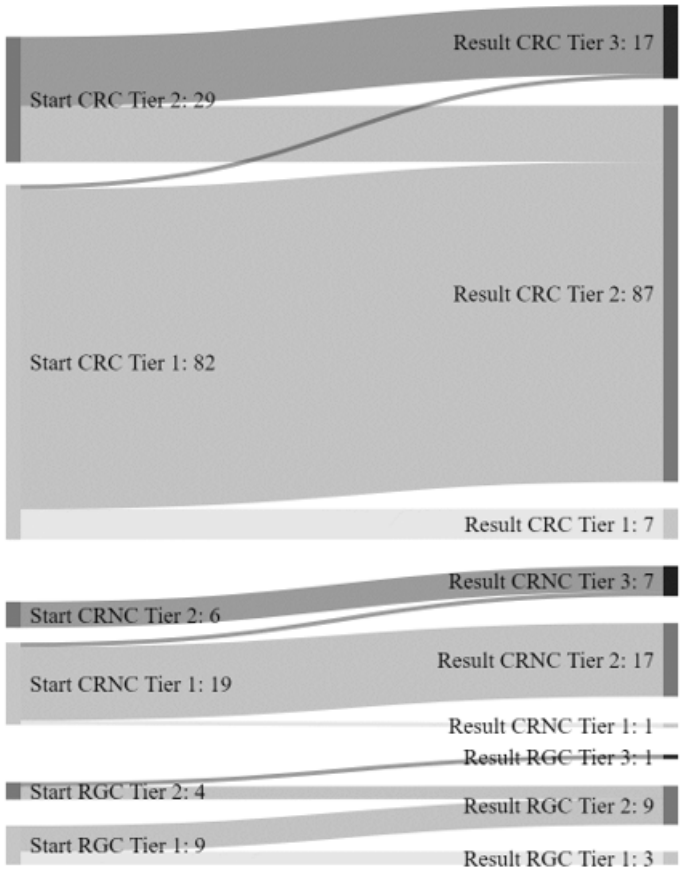
Tiered Position	*Goal Tier 2*	*Goal Tier 3*
Clinical Research Nurse Coordinator (CRNC)	18	7
Regulatory Coordinator (RGC)	9	4
Total Participation	**109**	**40**

Success Rates

As shown in Figure 5, 82% of Tier Advancement participants advanced at least one tier. One staff member in the CRNC job classification advanced from Tier 1 to Tier 3. Almost all with a target tier of 2 (89%) succeeded in achieving Tier 2 with a mean point total of 47 for all participants. Of those attempting Tier 3, 28 (70%) met the 84-point threshold with a mean point total of 86 for all participants and advanced to committee review of their portfolio; of those reviewed by committee, 63% advanced to Tier 3.

Figure 5

Tier Advancement Outcomes by Position

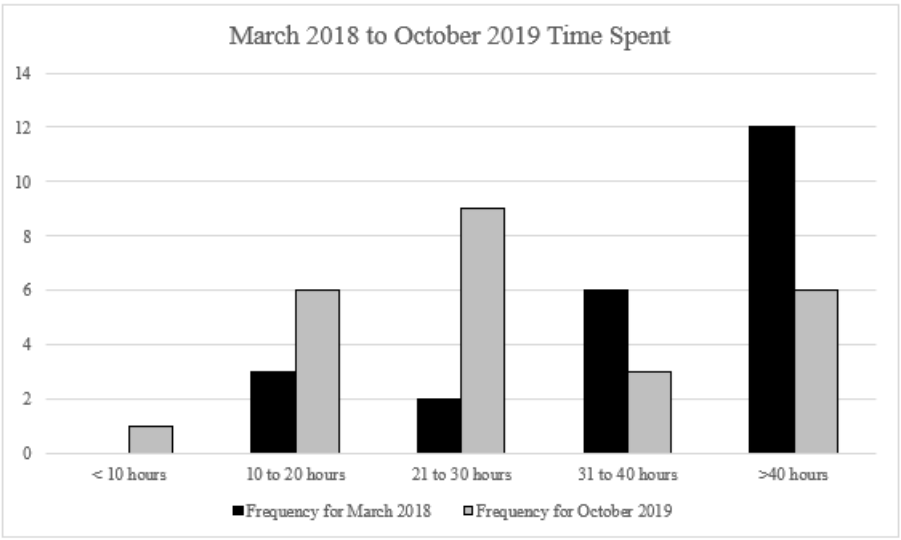


Revising Assessments and Processes in Response to Feedback

Following each cycle, feedback was gathered about the process via surveys and focus groups. In the survey, managers and employees who completed the Tier Advancement process were asked whether the process allowed them to exhibit their (or their employee's) competence as a research professional using a rating scale of 1 (no confidence) to 10 (complete confidence). After the first cycle, employees demonstrated moderate levels of confidence (mean = 5.2) and managers expressed moderately high levels of confidence (mean = 6.1). After the most recent cycle, confidence levels for both groups increased slightly; employees' mean confidence score increased to 5.4 and managers' mean score increased to 6.8. Further process improvements showed a decrease in the average time spent by each employee completing assessments, as shown in Figure 6.

Figure 6

Tier Advancement Time Spent on Process by Tiered Employees



Participant feedback encouraged several changes, such as moving to shared cloud-based folders for managing assessments, scoring guides, and portfolios, creating online training modules about the Tier Advancement process, combining assessments and scoring guides into a single form to reduce unnecessary document management, and moving proctored testing administration into REDCap versus the Learning Management System. Due to a lack of attendance and the mobile nature of the coordinator job, office hours were changed from in-person to virtual, which allowed for greater accessibility and easier scheduling. Welcome Packets for managers and employees were made available via the website. These packets provide additional information on the

process, responsibilities, scoring, and timelines for Tier Advancement. They were developed in response to feedback from managers and employees regarding a limited understanding of the Tier Advancement process steps.

By cycle four, the process was well-established and few new opportunities for optimization were presented. Optimizations made during the first three cycles included: 1) limiting each assessment to a single mode, except for a few Advanced and Expert-level assessments, 2) streamlining data collection and communication processes, and 3) harmonizing length for knowledge assessment tests.

As indicated previously, guidance regarding the portfolio has changed over time. These written guidelines, which better articulate the institution's view of leadership and professionalism, have launched a series of professional development sessions hosted by the Research Professionals Network at Duke. The series covers strategies for portfolio development, mentorship, and career development.

Conclusions/Reflections/Future Steps

The design and implementation of a broad competency-based career advancement model was a lengthy, multilayered, dynamic process involving numerous stakeholders, from clinical research professionals to human resources. Without the involvement of these stakeholders from day one, this process would not have been successful.

Timing is Important

The Tier Advancement process was developed while still in the process of mapping Duke's clinical research workforce into a standardized set of well-defined, tiered job classifications. Completing the job mapping prior to launching the Tier Advancement process was critical for two reasons. First, the concept of clinical research competency domains being used to define the aspects of CRP jobs needed to be socialized among the research community. Second, by mapping staff into appropriate classifications, each employee would proceed through advancement from a common baseline. Likewise, implementing a structured and objective advancement process after mapping was important to replace outdated seniority or familiarity-based advancement norms. While not all employees were satisfied with their mapped positions, the opportunity to drive their own advancement, shortly following mapping, ameliorated some of that dissatisfaction. Early in the process, two advancement cycles were offered each year to allow ample opportunities for all employees to attempt advancement. This has shifted to an annual cycle in 2020 to reduce the administrative burden on the WE-R team, managers, HR, and business managers. An annual cycle should also provide a more realistic pace for employees to complete assessments while still maintaining a frequency that allows sufficient opportunity to advance.

Culture Change Requires Significant Proactive Planning and Change Management

An employee-driven system of advancement based on structured demonstration of competency is entirely different from any system that had previously been in place within Duke University. Historically, advancement was determined by very individual factors within specific groups,

based on education, seniority, budget, relationships, and local leadership opportunities. While investigators and leadership across the institution fundamentally understood the importance of equity and growth opportunities within the workforce, the specific impacts of these various advancement modalities in undermining equity and quality were not universally recognized. Therefore, it was crucial to have early and frequent conversations with staff, managers, and research leadership about movement and progression. Multiple town halls were held throughout the process, both during development and implementation of Tier Advancement. Planning committees included faculty, staff, and administration, all with unique viewpoints that proved critical in developing the process and in generating buy-in across these stakeholder communities.

Difficult Conversations and Manager Support are Needed

It is common for managers to struggle with having difficult conversations with employees. In the context of this project, managers struggled to address readiness for advancement. HR was engaged to provide regular difficult conversation training with managers during each cycle. The Readiness Tool allows managers to objectively walk employees through advancement expectations, which alleviates some of the anxiety related to having these difficult conversations. A training module was created, and is available to all managers, to assist in standardized scoring of self-report assessments. Lastly, individual conversations are held with each manager when an employee does not meet the requirements for advancement before general results are released. All of these tools provide managers opportunities to build skills and ask questions that may assist them in having these conversations. The continued development of manager-facing training sessions on specific aspects of the process are crucial to help them navigate discussions with their employees and more easily address their assessment requirements.

Performance and Education are Separate from Demonstration of Competency

The idea of "competencies" is not a new concept but has not been widely used among the clinical research workforce prior to the release of the Joint Task Force recommendations in 2014 (Sonstein et al., 2014). While competency-based clinical research certifications, conferences, and presentations are a consideration, they may not have direct impact on competency demonstration. There is a fine balance between attendance and takeaway. Staff are encouraged to not only attend professional development courses but take the knowledge and apply it to the research being conducted, thus demonstrating competence. However, the recognition of time and effort that goes into earning and maintaining a directly applicable professional certification has been added as a part of the currently operating Tier Advancement process.

The WE-R team struggled with the perceived conflation of "doing my job well" through performance and demonstration of specific competencies. While work has been done to socialize the ideas of competency domains through town halls and inclusion of resources on the WE-R webpage, the distinctions between job performance, educational pursuit, and competency demonstration continues to be a challenge. Moreover, the idea that one can be performing their job extremely well, yet still not be performing work commensurate with a high tier level is another confounding factor that can lead to dissatisfaction with results. Limits have been set on the advancement process so that employees who are struggling with performance, as indicated by

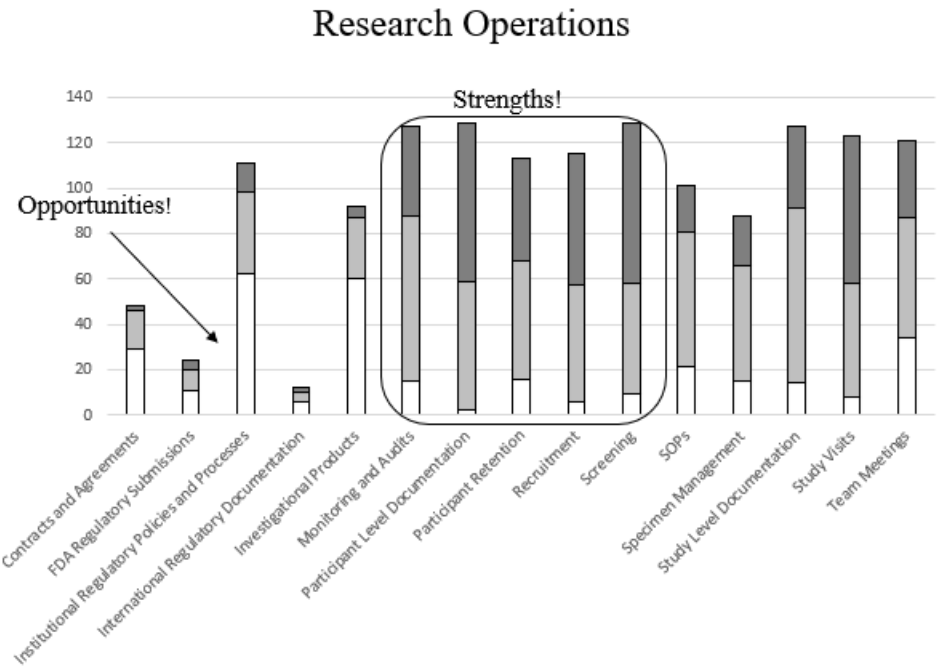
a "needs improvement" during their most recent performance evaluation, are not eligible for Tier Advancement until these performance issues have been resolved. Managers are encouraged to discuss Tier Advancement during their annual performance conversations and use the Readiness Tool to guide goal setting. The goal is to make competency evaluations as clear and objective as possible so that the process is not used to address performance issues.

Tracking Results Can Lead to Better Training and Resources

In the past, clinical research training has been focused primarily on the principal investigator (Calvin-Naylor et al., 2017). Now, the Tier Advancement process has provided a wealth of information that can be utilized to continually improve Duke's workforce and create effective training opportunities that advance competency among our clinical research staff (Association of Clinical Research Professionals, 2018). There is now transparency into strengths and weaknesses across competency areas, as demonstrated by Figure 7. The figure displays all staff members who tested for a specific competency within the Research Operations domain, submitted the assessment, and scored either Fundamental, Skilled, or Advanced. By continually evaluating assessment results, new educational opportunities, experiences, and training to address weak areas within the workforce can be created. Competency profiles across divisions and therapeutic areas can be tracked and shared with leadership in those groups to both share strengths or address weaknesses before large problems develop. It is too early to measure the effect of this targeted training on the clinical research community. Future plans to measure how these trainings have affected site quality, such as enrollment rates, avoidable protocol deviations, and audit findings, are in development.

Figure 7

Tier Advancement Outcomes by Competency for the Research Operations Domain

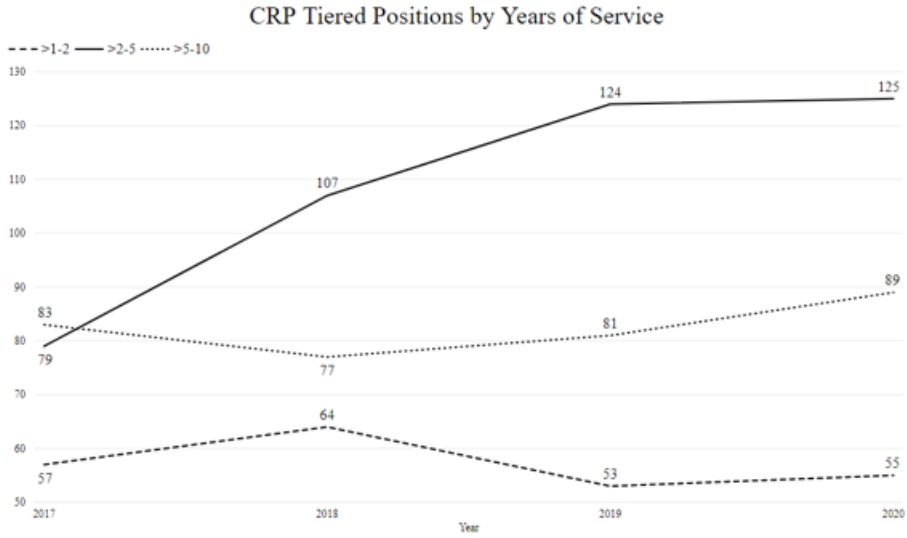


Tier Advancement Has Empowered the Research Workforce

Early data suggests that the Tier Advancement process has positively impacted retention among CRPs at Duke (Stroo et al., 2020). As demonstrated in Figure 8, there is an upward trend of CRPs remaining at Duke for more than two years. The workforce response has been incredibly positive about the experience. Clinical research professionals at Duke are pleased that they can now grow their careers through competency development and appreciate the creation of an objective professional pathway where one did not previously exist. Ultimately, this advancement process provides an opportunity for managers and employees to jointly develop a transparent plan for career advancement. Staff have the opportunity to carve a professional pathway for themselves and envision a long-term career at Duke.

Figure 8

Years of Service at Duke for Tiered Positions



Paving the Way for Career Advancement at Academic Medical Centers

Much of the competency alignment and career advancement work that has been done by well-known clinical research associations, such as ACRP and SOCRA, is focused on industry based clinical research professionals, which does not always translate directly to the CRPs within an academic medical center. In an effort to promote adaptation, rather than re-invention, all of the work developed on Tier Advancement and the mapping of clinical research staff into competency based positions (Brouwer et al., 2017) has been published to the Duke WE-R website (https://medschool.duke.edu/node/97565). Duke has created strong partnerships with the University of Alabama Birmingham as they have utilized our framework to move their clinical research staff into competency-based job classifications under their Clinical Research Career Ladder. Many other academic medical institutions (including Johns Hopkins University, Medical University of South Carolina, MD Anderson Cancer Center, Ohio State University, University of Michigan, Boston University) have called upon the WE-R team to assist in implementing portions of the competency framework. This initiative is just the beginning of creating a larger workforce change for clinical research professionals at academic medical centers.

Duke recognizes both the opportunities and challenges associated with launching an overhaul of clinical research professional job classifications with an accompanying annual commitment for Tier Advancement. This project is more than reworking job descriptions and professional advancement. WE-R is a commitment for clinical research managers and institution

administration to work together with clinical research staff in supporting competency and job growth amongst the clinical research workforce at Duke. This partnership, trust, and engagement with clinical research staff is necessary to produce the highest quality research. The clinical research infrastructure owes it to the participants, investigators, sponsors and Duke to employ a committed, high-quality clinical research workforce. Clinical research changes health care—without it, there is only standard of care. There is a need to work together to support the development of the workforce responsible for advancing clinical research efficiently and safely. WE-R (and other competency-based framework adoption) is an important step in understanding how clinical research is advanced to benefit everyone.

Authors' Note

The authors would like to acknowledge funding for this initiative from Duke's CTSA grants UL1TR002553 and UL1TR001117, as well as contribution and leadership from the following individuals: Billy Newton, Betsy Hames, Mark Stacy, David Smithwick, Adrian Hernandez, Donna Crabtree, Bryan Feger, Research Practice Managers and Directors of Clinical Research Units, and the countless research professionals and faculty that contributed to this work.

Data were collected and managed using REDCap electronic data capture tools hosted at Duke University School of Medicine (Harris et al., 2009). REDCap (Research Electronic Data Capture) is a secure, web-based software platform designed to support data capture for research studies, providing: 1) an intuitive interface for validated data capture; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for data integration and interoperability with external sources.

Christine Deeter
Project Planner I
Duke University School of Medicine, Duke Office of Clinical Research
2200 West Main St. Box 21
Durham, NC, 27705, United States
(919) 681-0922
christine.deeter@duke.edu

Deborah Hannah
Research Practice Manager
Duke University School of Medicine, Department of Dermatology

Camila Reyes
Analyst Programmer I
Duke University School of Medicine, Duke Office of Clinical Research

Michelle E. Mack, PhD
Associate Director for Research Operations - Outreach
Duke University School of Medicine, Duke Office of Clinical Research

Marissa Stroo
Director, Clinical Research Operations - Data
Duke University School of Medicine, Duke Office of Clinical Research

Stephanie A. Freel
Director, Clinical Research Education and Outreach
Duke University School of Medicine, Duke Office of Clinical Research

Rebecca J. Namenek Brouwer
Director, Research Initiatives
Duke University

Heather E. Gaudaur
Project Manager, Rewards and Recognition
Duke University and Duke University Health System

Andrea L. Doughty
Assistant Director, Compensation
Duke University
Duke University School of Medicine, Duke Office of Clinical Research

Correspondence concerning this article should be addressed to Christine Deeter and Denise Snyder, Duke University School of Medicine, Duke Office of Clinical Research, 2200 West Main St. Box 21, Durham, NC, 27705, United States.

References

Abshire, M., Dinglas, V. D., Cajita, M. I. A., Eakin, M. N., Needham, D. M., & Himmelfarb, C. D. (2017). Participant retention practices in longitudinal clinical research studies with high retention rates. *BMC Medical Research Methodology, 17*(1), 30. https://dx.doi.org/10.1186/s12874-017-0310-z

Association of Clinical Research Professionals. (2018, June 11). 5 clinical research trends emerge at ACRP 2018 [Blog post]. https://acrpnet.org/2018/06/11/5-clinical-research-trends-emerge-at-acrp-2018/

Baer, A. R., Zon, R., Devine, S., & Lyss, A. P. (2011). The clinical research team. *Journal of Oncology Practice, 7*(3), 188-192. https://doi.org/10.1200/JOP.2011.000276

Brandt, D. S., Bosch, M., Bayless, M., Sinkey, C. A., Bodeker, K., Sprenger, K., Johnson, K., & Gilmore, J. M. (2011). A CTSA-sponsored program for clinical research coordination: Networking, education, and mentoring. *Clinical and Translational Science, 4*(1), 42-47. https://doi.org/10.1111/j.1752-8062.2011.00259.x

Breza, E., Kaur, S., & Shamdasani, Y. (2018). The morale effects of pay inequality. *The Quarterly Journal of Economics, 133*(2), 611-663. https://doi.org/10.1093/qje/qjx041

Brouwer, R. N., Deeter, C., Hannah, D., Ainsworth, T., Mullen, C., Hames, B., Gaudaur, H., McKellar, T., & Snyder, D. C. (2017). Using competencies to transform clinical research job classifications. *Journal of Research Administration, 48*(2), 11-25.

Califf, R. M. (2009). Clinical research sites—the underappreciated component of the clinical research system. *JAMA, 302*(18), 2025-2027. https://doi.org/10.1001/jama. 2009.1655

Calvin-Naylor, N. A., Jones, C. T., Wartak, M. M., Blackwell, K., Davis, J. M., Divecha, R., . . . Luzuriaga, K. (2017). Education and training of clinical and translational study investigators and research coordinators: A competency-based approach. *Journal of Clinical and Translational Science, 1*(1), 16-25. https://doi.org/10.1017/cts.2016.2

Center Watch Staff. (2015, May 1). Job satisfaction mixed as workload increases. *The CenterWatch Monthly, 22*(5). https://www.centerwatch.com/articles/16686#:~:text=Yet%20one%2Dthird%20of%20respondents,and%20nearly%2020%25%20expressed%20dissatisfaction.&text=Nearly%20three%2Dquarters%20of%20respondents,past%20three%20to%20five%20years.

Getz, K. (2018, June 7). Has the study coordinator landscape reached a tipping point? https://forteresearch.com/news/study-coordinator-landscape/

Gwede, C. K., Johnson, D. J., Roberts, C., & Cantor, A. B. (2005). Burnout in clinical research coordinators in the United States. *Oncology Nursing Forum 32*(6). https://doi.org/10.1188/05.ONF.1123-1130

Harris, P. A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., & Conde, J. G. (2009). Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of Biomedical Informatics, 42*(2), 377-381. https://doi.org/10.1016/j.jbi.2008.08.010

Owens Pickle, E. E., Borgerson, D., Espirito-Santo, A., Wigginton, S., Devine, S., & Stork, S. (2017). The Clinical Research Associate Retention Study: A report from the Children's Oncology Group. *Journal of Pediatric Oncology Nursing, 34*(6), 414-421. https://doi.org/10.1177/1043454217723861

Sonstein, S. A., Namenek Brower, R. J., Gluck, W., Kolb, H. R., Aldinger, C., Bierer, B. E., & Jones, C. T. (2018). Leveling the joint task force core competencies for clinical research professionals. *Therapeutic Innovation & Regulatory Science, 54*(1), 1-20. https://doi.org/10.1007/s43441-019-00024-2

Sonstein, S. A., Seltzer, J., Li, R., Silva, H., Jones, C. T., & Daemen, E. (2014, June). Moving from compliance to competency: A harmonized core competency framework for the clinical research professional. *Clinical Researcher, 28*(3), 17-23. https://doi.org/10.14524/CR-14-00002R1.1

Speicher, L. A., Fromell, G., Avery, S., Brassil, D., Carlson, L., Stevens, E., & Toms, M. (2012). The critical need for academic health centers to assess the training, support, and career development requirements of clinical research coordinators: Recommendations from the Clinical and Translational Science Award Research Coordinator Taskforce. *Clinical and Translational Science, 5(*6), 470-475. https://doi.org/10.1111/j.1752-8062.2012.00423.x

Stroo, M., Asfaw, K., Deeter, C., Freel, S. A., Brouwer, R. J., Hames, B., & Snyder, D. C. (2020). Impact of implementing a competency-based job framework for clinical research professionals on employee turnover. *Journal of Clinical and Translational Science*, 1-5. https://doi.org/10.1017/cts.2020.22

Beyond Boundaries: Developing Grant Writing Skills across Higher Education Institutions

Kay Cunningham
Advanced Manufacturing Research Centre, The University of Sheffield

Abstract: *Much of the literature on grant writing does not explicitly identify the skills needed to be an accomplished grant writer, or how these skills are acquired. This paper reviews literature on grant writing and argues the need to identify key grant writing skills to improve the quality of grant applications. The ability to persuade, to weave a clear and compelling narrative, to structure and edit text and to be empathic to researchers, are all key grant writing skills. Effective grant writers also need to understand the funding landscape, individual sponsor requirements, and how to transform a research idea into a project. This paper examines these skills in more detail, drawing on existing research and provision to identify knowledge gaps and potential areas for further development.*

The paper also considers how UK higher education institutions in particular can develop a stronger grant writing culture. It explores the existing pathways for developing grant writing skills, arguing that the often-bifurcated nature of these pathways results in only partial attainment of the knowledge, skills and experience required to become an effective grant writer. In so doing, the paper argues the need for a more strategic, flexible and responsive approach that recognises and embeds grant writing skills into organisations through a structured development program.

Keywords: *Grant writing, research management, blended professionals, third space professionals, skills development, training, external funding, researcher development, professional practice.*

Introduction

Good writing skills are essential for researchers and academics to communicate the importance of their research, whether for scholarly publications or grant proposals (Johnson & Rulo, 2019). Yet how do researchers learn to write grants? Do they know what sponsors expect of them, or the quality thresholds they need to meet? From experience the answer to these questions are: trial and error, no, and no. The same is true for the research professional dealing with grant applications, who may be an experienced research manager, but who has little or no formal training in grant writing.

These deficiencies are reflected in the literature of both researchers and research sponsors. Researchers acknowledge the time wasted by both academics and funding bodies involved in writing and reviewing the thousands of applications submitted each year that are rejected (Day-

Peters, 2003). The reasons for rejection are varied but include: applications that do not fit the funding programme remit and are therefore deemed out of scope; applications that do not follow the guidance and are deemed ineligible; and those that do not clearly and fully answer the questions, subsequently scoring too low to be considered for funding. This is a gross waste of time and money for all concerned.

Recognising issues of proposal quality and the related cost and time burdens these create for sponsors and reviewers, UK funding bodies in recent years introduced restrictions or demand management measures on higher education institutions (HEIs). The Economic and Social Research Council (ESRC) for example, introduced measures in 2011 mandating HEIs to improve the quality of submissions (ESRC, 2016). These measures place the responsibility on HEIs to reduce the number of poor-quality applications being submitted. Similarly, in a bid to drive up the quality of submissions, the Engineering and Physical Sciences Research Council (EPSRC) brought into effect a "repeatedly unsuccessful applicant" policy in 2010 (EPSRC, 2010). The policy placed restrictions on individual researchers for repeatedly submitting low quality applications. This was determined on the basis of personal success rates and proposal rankings.

Recent figures from the ESRC suggest these measures have had limited success (ESRC, 2016; 2017). Following implementation of the new policy in 2011, there was a reduction in the volume of unfundable submissions from over 75% to 50%. More recent figures, however, suggest the effectiveness of these measures have worn off. The 2016 demand management report showed that the volume of grant applications had increased, but so had the proportion of submissions identified as being of low quality (ESRC, 2016). Hence, whilst the number of fundable applications had increased, the ESRC were still receiving a high number of low-quality applications. These were applications deemed to be unfundable by a grant assessment panel or that were rejected, at either the submission or post-peer review stages. Similarly, the EPRSC identified an average of 36 people constrained by the repeatedly unsuccessful policy following the year it was first introduced in 2011. This figure tracks the scores of individual researchers who apply to the main EPSRC open funding streams and notifies those who consistently score poorly that they are at risk of being constrained. The number of researchers at risk of being constrained initially dropped to 11 in 2012-13 but this figure has risen to an average of 17 in subsequent years, with the number of people close to being constrained increasing since 2011 from 101 following the first year of implementing the policy, to 147 in 2018 (EPSRC, 2018).

These figures suggest that punitive measures have had a limited effect on the quality of grant applications. The time wasted and the cost to sponsors, researchers and HEIs remain. This paper argues that one possible reason for this is that grant writing skills are not formally embedded into the communities that would benefit from them.

The literature on developing grant writing skills demonstrates this gap. Most of the recent literature on grant writing is predominantly found either in American journals aimed at research administrators and grant writing professionals (e.g., the Journal of Research Administration, the Journal of the Grant Professionals Association or the Journal of the National Council of University

Research Administrators); or in monographs published by academic researchers (Gitlin & Lyons, 2014; Day-Peters, 2003). To date, little UK-based research has been done to examine the craft of grant writing, or to define the skills required to improve the quality of grant applications from HEIs. One reason for this perhaps is that grant writing is a new and developing profession. A second, that it is a profession either seen as a subset of the still developing research management and administration profession, and hence a small part of the research administrator's role; or at the other extreme, it is seen primarily as part of an academic's role.

This is evident from the literature on grant writing, which has approached grant writing from either an academic, or an administrative perspective, showing little consideration for the interface between these two areas. Day-Peters (2003) approached the topic of winning grants as an academic. Her book, written as a researcher targeting researchers, mostly covered background information on the importance of research funding and the funding landscape and focused on project development from the researcher's perspective (it examined cultivating partnerships, sponsor requirements, the assessment process, the difference between an outcome and an output and publication planning). Literature directed at the research manager had a different focus, concerned predominantly with the technical support requirements for the application process. The grant writer, however, often falls between this divide, needing elements of both skill sets to write effective grant applications.

Despite support for the submission of grant applications within main research departments, academic researchers still need to engage with the broader submission and assessment process, to understand both the strategic directives of the sponsor and how to write a compelling grant application. Research professionals, likewise, need to understand these aspects in order to advise on them. This paper arises from the author's experience of working for many years at this intersection. It applies the 'professional knowing' of the research practitioner as its focus (Schön, 1999). To this end, findings are based on the reflective experience of the author over the past twenty-five years spent as a research administrator, manager and grant writer. They offer a reflective space, to consider the tacit skills of the grant writer and to question whether HEIs could do more to instil grant writing skills into their core training and development programmes, for both researchers and research professionals, to support the grant application process.

Third Space Professionals

The skills base for research professionals is often constrained by institutional and professional divides. Recent literature on these divides has looked closely at the informal and often uncharted aspects of these artificial divisions. Findings suggest a shift in recent years from the more traditional academic/administrative divide to a work environment where "third space professionals" have developed informally, often working across institutionally imposed structures. "Third space professionals" to use Whitchurch's recent definition, exist "between professional and academic spheres" (Whitchurch, 2012; p. xii).

Whitchurch (2012) explores the rise of third space professionals in detail. Drawing on studies conducted in Australia, the UK and the USA, she examines the developing space between the

academic and administrative spheres within universities that have led to new forms of management and leadership. Many of these tend to be 'under the radar' and not fully realised (p. iv). The idea of the third space is used by Whitchurch as a way of exploring the "knowledges, relationships, legitimacies and languages" characteristic of people in these roles, to demonstrate what she sees as the gradual move towards a "middle ground". Drawing on Gibbons et al. (1994) and the Dearing report (1997), Whitchurch charts a course through the emergence of this new professional space, referring to the prediction of Coaldrake and Steadman:

> The actual and potential blurring of roles...will continue to grow in significance as universities move into more flexible modes of delivery of teaching and learning and as they seek to support and reward staff for their skills, performance and potential rather than on the basis of job classifications. (2012, p. 15)

This paper will advance the findings of the grant writer as a third space professional. It will:

- Review the knowledge and skills needed to be an effective grant writer, with a particular focus on UK universities;
- Explore current pathways to gaining grant writing skills; looking in particular at the ways this is supported or hindered by institutional and professional bodies.

In so doing, this paper argues that HEIs need to adopt a more flexible, collaborative and cross-cutting approach in order to develop and maintain grant writing skills. It develops the line of thought through Coaldrake and Steadman (1999) to Whitchurch's more recent findings, to look beyond the artificial divide of job classification.

The Developing Profession of Research Management and Administration

Advances in the research management and administration profession have shown that globally, a large percent of research managers and administrators (RMAs) are now educated to masters or doctoral level (Kerridge & Scott, 2018). Many have been, or continue to be, researchers whilst also working as RMAs. Grant writers, whether their role falls predominantly under an academic or an administrative job description, are an example of a third space professional, requiring skills that transgress institutional and historically rigid professional boundaries. The knowledge and skills required of the grant writer exist in the hinterland between the academic and administrative worlds, requiring input from both to produce high quality grant applications.

Current Education Systems for Developing Writing Skills

The skills associated with grant writing are often assumed to be acquired by researchers and RMAs as they progress through their careers. The evidence suggests otherwise. A number of reports and articles, both from the USA and the UK found that not only proficiency with technical aspects of grammar and spelling, but the more complex writing skills, such as building and sustaining an argument have seen a decline with the recent expansion in higher education (see for example, The National Commission on Writing in America's Schools and Colleges, 2003, or the Royal

Commission report on the teaching of academic writing in UK higher education, Ganobcsik-Williams, 2004).

Whilst the UK education system expects all pupils to be educated to General Certificate of Secondary Education (GCSE) level in English language as a mandatory requirement (comparable by age to the US 10th grade), it is quite possible beyond this point for a large proportion of students to have no active engagement in language or in how to develop their language skills. Despite these findings, there is no formal education pathway to develop writing skills beyond the age of 16 in the UK or the USA for disciplines where these skills are not the primary focus. For those who go on to academic careers in the UK, there is also little support beyond supervision meetings and mentoring sessions where practical issues of the craft are picked up. Where these do occur, the focus for many is academic writing, which as will be shown, bears little relation to the skills needed for grant writing.

Career guidance provided by the UK's Universities and College Admissions Service (UCAS) suggests grant writers need 'to have at least Advanced (A) levels, especially English' (UCAS, 2019). A levels are usually taken between the ages of 16-19, roughly equating to grades 11-12 in the US education system. The reason for suggesting that grant writers have A level English language is because students who have studied English at this level or above will have engaged extensively with language, providing them with the skills to analyse texts and reflect critically on their own work. A UK education board AQA, for example, requires A level English language students to analyse, structure and organise a wide variety of texts. It also requires students to produce original writing that is engaging, persuasive and accurate (AQA, 2019). This is a good starting base for a grant writer. These skills need development and application, however, to be of real value in the academic world.

The Craft of Grant Writing

In her chapter on artisanal habits, Sword (2012, p. 63) asked the question "How, where and when did you learn to write in your discipline?" She concludes that many of the academics interviewed for her book admitted that they had never received any formal training in the craft of writing. This is, as Sword points out, a key academic skill, but it is also a key skill that every grant writer needs to develop.

Much of the literature touches on this skill without examining what it involves in detail. Day-Peters for example, listed amongst her top ten tips the need for "concise writing" (2003, p. 3); Dopke and Crawley referred to the "ins and outs" of the grant writer (2013, p. 51); while Monahan identified the need for "well-written" proposals (1993, p. 22). These articles all identified key grant writing skills but offered no support or guidance on what these covered or how they could be attained.

Where these skills were explored in more detail in relation to grant writing, the literature clearly identified what was needed to help researchers develop effective grant writing skills. Porter (2007) continues to be cited extensively by the research administration profession. His article

provided clear guidance on the skills required for a grant writer to be successful, several of which touch upon the need for highly developed language skills. In particular, Porter examined the considerable differences between academic and grant writing prose, identifying the following skills of a successful grant writer. These core grant writing skills are reproduced below in summary form:

Sponsor goals	Adopting a service attitude. Make sure your project goals meet those of the sponsor.
Future oriented	Focusing on work that should be done, not the findings of research that has been done.
Project centred	Addressing clear objectives with a well-defined programme of work. Grant writers 'Draw us into the world of action', as opposed to the more academic realm of ideas.
Persuasive rhetoric	'Selling' oneself to the reader. The language of the grant writer has to sell the project. Its aim is to win over the reviewer.
Personal tone	Conveying excitement to the reader, not maintaining the objective prose used for journal articles.
Team focused	Grant writing needs feedback from those experienced in the pursuit and submission of grants.
Strict length constraints	Most sponsors demand brevity and have strict word limits.
Accessible language	All disciplines have specialised terminology but there reaches a point where this becomes needlessly complex and loses the reader. Complex text must be reworked until it is easy to read and understand, even for the general reader.

Porter argued that the way in which a grant application is constructed, will either improve or impede its chances of success. Of particular interest here is Porter's claim of the need for persuasive rhetoric and accessible, concise language. Whilst Porter goes some way to explaining how to attain this in his discussion of the difference between academic and grant writing, there is a fundamental question that first needs to be asked. What knowledge and skills do we need to have, or learn, in order to write persuasively? I suggest that the following are crucial.

Learning to Narrate

At its core, persuasive, concise, and clear prose is produced when a writer has control of the narrative. The narrative elements of storytelling are effectively the steering mechanism. This requires an awareness of the reader, an understanding of how to retain a reader's interest and a clearly defined plot. In the case of the grant writer, this translates to understanding the reason for the project, the sequence of events necessary for the project to achieve its objectives, its intended outputs and potential impacts. These requirements often fall victim to internalised knowledge and academic training. Pinker refers to this as "the curse of knowledge", describing it as the "difficulty in imagining what it is like for someone else not to know something that you know" (2014, p. 59). This internalised knowledge needs to be expressed as part of a coherent narrative or story, but this is not something that is taught as part of the academic experience, nor is it a skill academics necessarily feel they are responsible, or well equipped, to develop in their students (McVey, 2008). This is despite research showing that reproducing scientific information in narrative fashion makes it more interesting and memorable to the reader (see for example, Ma et al., 2012; Krzywinski & Cairo, 2013; Dahlstrom, 2014; Olson, 2015). Three key narrative elements contribute to persuasive, clear and engaging prose. These are: connecting with the reader, maintaining momentum, and a strong plot.

Connecting with the Reader

Pollock and Bono refer to the importance of the "human face" in engaging the reader, claiming that too often, academic writing is focused on the scholarly elements, not on what these can, or potentially could mean, for advancing science and society (2013, p. 629). A research sponsor will always take the latter focus. For example, the Wellcome Trust, a UK charitable sponsor that funds academic research, describes itself as an organisation that improves health and "believes in the power of ideas to improve health" (Wellcome Trust, 2019). It has a broad range of research funding streams that cover biomedical sciences, humanities, social sciences and creative industries. Throughout all these funding streams, the organisation has one key focus: "improving health by helping great ideas to thrive". It has never lost sight of the human face as a founding principle.

Similarly, the main UK Government funding stream for research development, the recently formed UK Research and Innovation (UKRI) also maintains this human focus. It describes itself as a partnership focussed on "helping to connect the best researchers and innovators with customers, users and the public". This is consistent with the now firmly established impact agenda that came into being in the 2014 Research Excellence Framework, asking that HEIs demonstrate the impact of their research by submitting case studies (Higher Education Funding Council for England, 2014). These now account for 25% of an HEIs selective allocation for research funding and the focus is not on academic impact, but impact beyond academia. The policy suggests HEIs should be doing more to train their researchers on how to apply their findings to real world solutions.

Whilst not undermining the importance of the science, the need for scholars to develop a human face without sacrificing theoretical focus or analytical content is key to developing a successful

proposal. The remit of the major UK funding bodies demands a real-world application of research, one that applies research to the potential impact and influence it might have in the world. A skilled grant writer understands that the application they submit is as much about the sponsor as it is the research. They will address the sponsor's requirements and show how the proposed research meets those requirements.

Maintaining Momentum

In The Science of Storytelling, Storr talks extensively about "moments of unexpected change" (2019, p. 11). This is one of the most compelling and persuasive tools the writer brings to any writing, and whilst change may not be as dramatic or unexpected in a grant application, it can be just as effective in maintaining the reader's interest. Storr quotes neuroscientist, Sophie Scott, "Our perceptual systems don't work unless there are changes to detect" (2019, p. 11). The grant writer needs to learn how to take advantage of this, how to draw the reader in with the why and how of their application. Porter touches on this when he identifies the key differences between academic and grant writing (Porter, 2007). The grant writer needs to sell the project, not describe what they have done. Knowledge of what has gone before needs to be subsumed within the story of why what has gone before has led to where they are now. It should explain any new developments in technology, perception or approach that will be used to advance current knowledge, or to take the research in an entirely new direction. The narrative needs to move forwards, combining information with action. In order to do so, the writer needs to remove any information that impedes a forward direction. Jargon, superfluous words, acronyms and laboured descriptions kill the importance of the argument. Stating the who, why, how, where, and when of a project is a simple skill in principle, but when are researchers given the chance to develop this skill? What mentoring or training is available to researchers or research managers to develop and nurture storytelling?

A Strong Plot

Every story needs a strong plot, as does every grant application. The momentum described above needs stories constructed of who, why, how, where, when, and what. One thing always leads to another. The "who" always refers back to the point already made about connecting with the reader, the human face. The rest, in grant writing terms, is all about project need, design and delivery. It is the backbone of the story. Returning to Porter's (2007) findings, this requires a project centred approach. Training in project design, delivery and management is not something offered to researchers or research professionals, but it is a skill integral to developing a strong grant application. It helps to maintain momentum, to cut through the technical language and pull out the relevant details to drive the plot. Thinking of a grant application the way a writer thinks of a novel can help with this process. Roughly, these can be broken down into the following:

The who: Every novel needs a person the reader can relate to and believe in. Most grant sponsors ask, "Why you"? Key to a successful application is being able to answer why the researcher, or the consortium, is the most appropriate and skilled to carry out the project. What makes the sponsor

believe this? What are the research team's strengths and weaknesses and how have they addressed these in the application? The grant writer needs to identify and incorporate this information into the narrative.

The why: Plot is "not just a bunch of stuff that happens" (Newman & Mittlemark, 2008, p. 1). It is a bunch of stuff that happens for a reason. The evidence provided by the writer should clearly show why the project is needed. The proposal must explain how the research team has come to where it is, and what needs to be done to advance or solve the current issues these give rise to. What are the challenges to be faced, how will these be overcome and what effect will they have?

The how: This is all about project design and delivery. How is the work going to be achieved? For individual researchers, this is often about identifying and applying the most appropriate methodologies. For industry-focused consortiums, it is often about identifying the approach, in particular how a project will improve on the current state of the art and offer practical, market-driven solutions. Importantly, for a grant writer, the how is not just about how to approach the project. It is how to articulate it. Whilst technical content is an essential component of a research application, the quickest way to lose the reviewer is to flex learnèd wings unnecessarily. The how should also anticipate any risks involved in delivering the project. A good proposal will show it has considered and mitigated potential risks as part of the project's design and delivery.

The where: Where are you going to carry out the research and what physical resources do you need to deliver the project? Do you need specialist machinery or equipment? Does the project need to be delivered in a certain way or at a certain location? Grounding your project geographically, be that regionally, nationally or internationally will inform the costs, practical aspects of delivery, and in many cases contribute directly to understanding the potential economic, environmental and social impacts of the project.

The when: What is the timescale? Just as a novel has a narrative arc, a project will need to clearly define what is going to happen at each stage of the project, who is going to lead on each stage, and what the end results will be.

The what: When a reader picks up a book, they don't know exactly what they are going to get, but they have some expectation depending on their chosen genre. Whilst grant applications will be subject to an expert peer review process, this does not necessarily mean that the peer reviewer will automatically understand all the issues in an applicant's research area, particularly if that research is disruptive or reliant on a multi-disciplinary approach. Be clear about what the project is going to do, in terms of the activities, outputs and intended impacts of the project. Consider what is needed, what it will cost, what the end results will be. What will the project contribute to advance research knowledge or to demonstrate impact in the wider world?

In summary, developing a strong project proposal requires the need to develop a strong plot with a strong narrative. The writer needs to move past technical jargon, to eliminate unnecessary description, to consciously apply structure and to deploy an engaging style with confidence.

Empathy Sans Frontière

In addition to the narrative elements covered above, the grant writer needs a fourth skill: empathy.

Daniel Goleman, an expert on the psychology of emotion, describes emotional intelligence as "the capacity for recognising our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships" (1998, p. 317). Empathy is identified by Goleman as one of the five basic emotional and social competencies that fall within his definition of emotional intelligence. It is key to reading and understanding the feelings of others, and to understanding another person's issues or concerns. Good grant writers require an understanding of the differing needs and perspectives of all parties involved in the submission process. They often need to negotiate, advise, mobilise and persuade project partners to ensure the proposal submitted has the greatest chance of success. As Goleman et al. notes, "Being empathic at the team level doesn't just mean being nice... it means figuring out what the whole system really needs and going after it in a way that makes all involved more successful and satisfied with the outcomes" (2002, p. 61). In particular, Goleman notes that empathy between organisational boundaries is a powerful driver of efficiency. It follows then, that creating opportunities for academics and research professionals to work closely together would bring an understanding of the concerns, needs, self-awareness and empathy for all involved, ultimately leading to high functioning, collaborative teams that are not restricted or limited by artificial boundaries.

Grant writing communities seem to suffer from a lack of empathy. There is no official recognition that researchers or RMAs need to be taught these skills, despite findings to the contrary (Kleinfelder et al., 2003; Porter, 2007), and no consensus in the literature about the best way to do so. This is made more difficult due to the artificial borders that exist between academic and administrative realms. Consequently, conversations and training about grant writing; what it involves and what is needed, is happening in two places. Gibson (2015) and Porter (2007) for example, argue the importance of research professionals mentoring junior faculty members. In reality, most junior faculty members take feedback on their grant applications from their academic mentors, who as McVey (2008) noted are often concerned primarily with the academic content, not with checking whether the proposal is written clearly or adheres to the sponsor's technical specifications. Academic mentors, however, are often peer reviewers for grant awarding bodies, giving them valuable insight into the peer review process. How much more effective would it be then, to have expertise from both worlds integrated into one coordinated training course?

Current Resources for Grant Writers and Researchers

These skills appear simple, yet at present, throughout the world there is limited training and very little research on the craft of grant writing that incorporates all the elements identified above. There are even fewer pathways that develop these skills. This in part, is due to the issues already raised about the still developing grant writing profession and the siloed nature of HEIs. Porter's article is evidence of this, as indeed this article will be. These papers will not be picked up by half the grant writing communities who would benefit from them. His 2007 paper was awarded best paper of the year, being re-printed in the 2017 edition of the Journal of Research Administration (JRA).

The JRA note the paper is still regularly cited by the research administration profession. Due to the publication's target audience, however, it is unlikely to reach a wider academic audience, many of whom would greatly benefit from Porter's advice. Similarly, but from an academic perspective, Sword's book on academic writing (2012) examines the habits of the successful writer. Her advice is applicable to those involved in grant writing more generally, but given the academic focus, it is likely to remain solely within the spheres of an academic readership, despite having much of value to offer the research professional.

As the following section demonstrates, existing pathways and provisions exist for grant writing, but they too have grown from these artificial divides. What is needed is to understand current provision and to examine ways of integrating, standardising and improving existing provision to bring them in line with the changing face of HEIs.

Existing Pathways for Developing Grant Writing Skills

The University and College Admissions Service (UCAS) careers page identifies the grant writer as a career in its own right (UCAS, 2019). This is of particular interest, because there are few grant writing posts to be found in HEIs, despite the fact that HEIs gain prestige from, and are often reliant upon, external funding to develop their research. The UCAS page directs potential grant writers to the Association of Proposal Management Professionals (APMP, n.d.). This is a professional body, established in the USA in 1989 with 28 branches (termed "chapters") all over the world, including one based in the UK.

The APMP's mission is to "promote the professional growth of its members by advancing the arts, sciences and technologies of winning business...through proposals, bids, tenders and presentations" (APMP, 2019). It claims membership from "commercial, federal, municipal and academic areas" working in any aspect of the grant writing process. Resources include webinars, bid and proposal writing conferences and a professional certification programme. The programme uses a mixture of examinations and competency-based assessments to provide professional accreditation. The accreditation takes a business approach to grant writing, covering planning, delivery and management of grants and awards that include, amongst others, sections on proposal development, partner finding, managing information and persuasive writing. These courses and accreditations, however, do not focus on UK funding streams and they are costly, precluding them from being of use to most HEIs.

Nine years after the APMP, the Grant Professionals Association (GPA) was established. This currently has over 2,800 members internationally and claims to be the first organisation to focus on the advancement of grant writing as a profession (GPA, 2019). Like the APMP, the GPA holds an annual conference dedicated to the craft of grant writing as well as a journal, published annually, that offers articles and reviews on the profession. These events and resources offer members the opportunity to look in depth at key national funding schemes, to develop and enhance professional skills and to network with other grant writers. As with the APMP, the focus for these associations is predominantly on the requirements for American funding streams.

Both the APMP and the GPA however, do include training and development that acknowledge the more generic skills base of the grant writer. Sessions for the 2019 GPA's annual conference for example, included the craft of grant writing, grant architecture and storytelling, writing refreshers, navigating bureaucracies and egos, avoiding common grammatical errors and well written narratives. They also identified the competencies these topics covered—key areas for the focus of this article being proposal development and communication strategies.

As well as the two bodies already mentioned, chapters of the Society of Research Administrators International (SRAI) hold workshops on grant writing and amongst their training courses deal with the role of the research administrator in coordinating the work of multiple authors and providing editorial assistance on large scale proposals. More broadly, many American universities offer grant writing programmes. For instance, Concordia University Chicago offers an eight-week online Masters in Grant Writing, the University of Massachusetts, a Grant Writing Certificate, San Diego State University a Professional Certificate in Grant Writing. Some universities, such as Maryland for example, offer credit-bearing courses on Grant and Proposal Writing for their students.

Most existing formal pathways for grant writing however, are American either in origin or focus, and do not directly translate to the needs of the UK higher education system. UK HEIs in contrast, do not have formal accredited, standardised grant writing courses or professional grant writing bodies. This is not to suggest that UK universities are not already doing a great deal to support the development of their early career academics. Most UK universities will have an academic skills development unit that develops and runs courses for their research and teaching staff. The University of Sheffield for example, run a 'Think Ahead' programme, specifically designed for early career researchers, which includes short workshops on how to apply for funding. Similarly, King's College London run courses that focus on writing and publishing for early career researchers, including a course on how to write a good research grant application. The University of Kent run a 'Grants Factory' for early career researchers, and the University of Strathclyde offer their staff a six-month course on grant writing. Other universities buy in training for this kind of development support. Companies such as Scriptoria, offer specialist courses in grant writing, to teach research staff the skills needed to strengthen their proposals. Amongst their current clients, Scriptoria regularly provide one day grant writing training for a number of universities. These again, however, are predominantly researcher-focused, researcher-led short courses, often targeting early career researchers.

In contrast, within the higher education research and administration profession, grant writing largely falls under the banner of 'pre-award support' and at most, training offers standard guidance on how administrators can support the grant writing process. This approach is echoed in the type and focus of professional support for grant applications offered by the UK's professional body for research management and administration, the Association of Research Managers and Administrators (ARMA). Currently, ARMA offers one day courses that focus on supporting research proposals and on raising the quality of research proposals respectively. These go some way to providing guidance on how to support research applications but again, the question remains as to whether this is the same as developing the skills required for effective grant writers

and grant writing communities. The fact that the focus of these courses is on 'supporting' the academic process, with a primary focus on the administrative requirements of the submission process, i.e., identifying funding sources, costing projects, research ethics and enhancing research impact, is not an oversight on behalf of ARMA, it is a reflection of the siloed nature of pre-award support as sub-sets of the skills and proficiencies needed to support grant applications.

This approach contrasts considerably with the professional development opportunities offered by the APMP, the GPA and the SRAI. Yet in terms of the UK, their business, or geographical focus, does not necessarily make them the most appropriate bodies to go through for those working in HEIs. Whilst there is a great deal that UK higher education organisations can learn from the grant writing provisions in place in the USA, the UK would benefit greatly from directing more time and attention towards developing grant writing skills and communities through establishing more formal pathways that are both attuned to HEI funding streams and that work across institutional divides.

Recommendations

Given the above findings, there are a number of things that would help to improve existing grant writing provision within the UK:

- To bring together academic and administrative communities on grant writing courses;
- To include grant writing modules on doctoral training programmes;
- To engage research councils and sponsors in developing grant writing skills and examples of best practice; and
- To encourage universities and professional research management organisations to develop professional grant writing training courses based on best practice findings that exist in the US and UK.

Conclusions

An effective grant writer needs to develop persuasive, reader-focused writing skills. This requires an understanding of how to translate academic writing into a strong narrative, clearly plotted, to achieve an overarching goal. At present however, the formal pathways for developing grant writing skills within UK HEIs exist as part of an artificially imposed either/or framework, that is, grant writing is seen from either the academic, or the research management viewpoint. Where these areas do come together, this space is becoming increasingly inhabited by third space professionals—professionals who work across these boundaries, but do so informally, with little acknowledgement of, or reflection on, the skills that they are using whilst they inhabit this space. How much more powerful would it be to realise and inhabit this space fully, formally? To develop grant writing skills in our researchers and research managers that transcend these artificial boundaries and develop pathways that encompass and transfer the skills, knowledge and abilities of both? Removing artificial boundaries, building more formal grant writing pathways and developing an understanding of what grant writing involves, would engender these abilities in future cohorts of both academic researchers and research professionals.

Author's Note

Kay Cunningham is a grant writer for The University of Sheffield's Advanced Manufacturing Research Centre (AMRC). She has spent over 25 years in research administration and management, working predominantly on pre-award and Research Excellence Framework (REF) administration. .

Kay Cunningham
Grant Writer
The University of Sheffield, Advanced Manufacturing Research Centre (AMRC)
Advanced Manufacturing Park
Wallis Way, Catcliffe, Rotherham, S60 5TZ.
Work: (0)114 215 8132, Mob: (0)7733 455 964
k.cunningham@amrc.co.uk
k.m.cunningham@sheffield.ac.uk

Acknowledgements

The writing of this paper was supported by the Journal of Research Administration's Author Fellowship scheme. The author would like to thank Cliff Studman, the mentor appointed under this scheme, who was extremely supportive and who provided clear and helpful feedback on draft applications. Thanks also to Pete Osbourne and Rosemary Gault for their helpful comments on the final draft of this paper.

References

AQA. (2019). English language (8700): Scheme of Assessment. Retrieved May 29, 2019 from https://www.aqa.org.uk/subjects/english/gcse/english-language-8700/scheme-of-assessment

Association of Proposal Management Professionals. (n.d.). Retrieved May 29, 2019 from https://www.apmp.org/page/AboutAPMP

Boyer, P., & Cockriel, I. (2001). Grant performance of junior faculty across disciplines: Motivators and barriers. *Journal of Research Administration, 2*(1), 19-23.

Coaldrake, O. P., & Steadman, I. (1999). *Academic work in the twenty-first century: Changing roles and policies*. Department of Education, Training and Youth Affairs, Occasional Paper 99H. https://www.voced.edu.au/content/ngv%3A21859

Dahlstrom, M. F. (2014). Using narratives and storytelling to communicate science with nonexpert audiences. *Proceedings of the National Academy of Sciences, 111*(Suppl. 4), 13614-13620.

Day-Peters, A. (2003). *Winning research funding*. Gower.

Dearing, R. (1997). *The Dearing Report: Higher education in the learning society*. Retrieved April 21, 2020 from http://www.educationengland.org.uk/documents/dearing1997/dearing1997.html

Dopke, L., & Crawley, W. (2013). Strategies for increasing the efficacy of collaborative grant writing groups in preparing federal proposals. *Journal of Research Administration, 44*(1), 36-61.

Engineering and Physical Science Council. (2010). Repeatedly unsuccessful applicants policy. Retrieved November 26, 2019 from https://epsrc.ukri.org/funding/application process/basics/resubpol/rua/

Engineering and Physical Science Council. (2018). Research proposal funding rates 2017-2018. Retrieved April 5, 2020 from https://epsrc.ukri.org/newsevents/pubs/research-proposal-funding-rates-2017-18/

Ganobcsik-Williams, L. (2004). *A report on the teaching of academic writing in UK higher education*. Royal Literary Fund.

Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., & Trow, M. (1994). *The new production of knowledge: The dynamics of science and research in contemporary societies.* SAGE.

Gibson, N. A. (2015). The importance of mentoring junior faculty. *Journal of the Grant Professionals Association, 13*(1), 89-94.

Gitlin, L., & Lyons, K. J. (2014). *Successful grant writing: Strategies for health and human service professionals* (4th ed.). Springer.

Goleman, D. (1998). *Working with emotional intelligence*. Bloomsbury.

Goleman, D., Boyatzis, R., & McKee, A. (2002). The emotional reality of teams. Journal of Organizational Excellence, 21(2), 55-65. https://doi.org/10.1002/npr.10020

Grant Professionals Association. (2019). About GPA. Retrieved May 29, 2019 from https://www.grantprofessionals.org/about

Higher Education Funding Council for England. (2014). Research Excellence Framework guidance. Retrieved May 29, 2019 from https://www.ref.ac.uk/2014/

Johnson, J., & Rulo, K. (2019). Problem in the profession: How and why writing skills in nursing must be improved. *Journal of Professional Nursing, 35*(1), 57-64. https://doi.org/10.1016/j.profnurs.2018.05.005

Kerridge, S., & Scott, S. F. (2018). Research administration around the world. *Research Management Review, 23*(1), 1-34.

Kleinfelder, J., Price, J., & Dake, J. (2003). Grant writing: Practice and preparation of university health educators. *American Journal of Health Education, 34*(1), 47-53. https://doi.org/10.1080/19325037.2003.10603525

Krzywinski, M., & Cairo, A. (2013). Points of view: Storytelling. *Nature Methods, 10*(8), 687. https://doi.org/10.1038/nmeth.2571

Ma, K-L., Liao, I., Frazier, J., Hauser, H., & Kostis, H-N. (2012). Scientific storytelling using visualization. *IEEE Computer Graphics and Applications, 32*(1), 12-19. https://doi.org/10.1109/MCG.2012.24

McVey, D. (2008). Why all writing is creative writing. *Innovations in Education and Teaching International, 45*(3), 289-294. https://doi.org/10.1080/14703290802176204

Monahan, T. (1993). Barriers and inducements to grant-related activity by New Jersey State College faculty. *Journal of the Society of Research Administrators, 24*(4), 9-26.

Newman, S., & Mittlemark, H. (2008). *How not to write a novel*. Penguin.

Olson, R. (2015). *Houston, we have a narrative: Why science needs story*. The University of Chicago Press.

Pinker, S. (2014). *The sense of style: The thinking person's guide to writing in the 21st century*. Penguin.

Pollock, T. G., & Bono, J. E. (2013). Being Scheherazade: The importance of storytelling in academic writing. *Academy of Management Journal, 56*(3), 629-634. https://doi.org/10.5465/amj.2013.4003

Porter, R. (2007). Why academics have a hard time writing good grant proposals. *Journal of Research Administration, 38*(2), 37-43.

Research England. (2014). Research Excellence Framework. Retrieved April 21, 2020 from https://www.ref.ac.uk/about/what-is-the-ref/

Schön, D. (1999). *The reflective practitioner: How professionals think in action*. Ashgate.

Storr, W. (2019). *The science of storytelling*. William Collins.

Sword, H. (2012). *Stylish academic writing*. Harvard University Press.

Sword, H. (2017). *Air & light & time & space: How successful academics write*. Harvard University Press.

Universities and Colleges Admissions Service. (2019). Bid writer. Retrieved November 26, 2019 from https://www.ucas.com/ucas/after-gcses/find-career-ideas/explore-jobs/job-profile/bid-writer

Wellcome Trust. (2019). About us. Retrieved May 29, 2019 from https://wellcome.ac.uk/about-us

Whitchurch, C. (2012). *Reconstructing identities in higher education : The rise of 'third space' professionals*. Taylor & Francis.

Determining the Impact of Grant Writing Workshops on Faculty Learning

Samantha Glowacki
Student Staff Member, Faculty Development Center, Eastern Michigan University

Julia K. Nims
Scholarly Communications Librarian, Eastern Michigan University

Peggy Liggit
Director of the Faculty Development Center, Eastern Michigan University

Abstract: *This paper describes an eight-year study evaluating the effectiveness and impact of grant writing workshops on the ability of faculty attendees to apply learning to secure internal research grants. Longitudinal tracking of all grant awardees (N=485) was conducted four years prior to the creation of the workshops and four years after the workshops were implemented. Direct and indirect measures of assessment for faculty grant success, feedback on workshops, and a faculty survey were collected. Names of grant recipients and demographic data about awardees were collected and verified through archived documents and data warehousing. As a result of attending the grant writing workshops, on average 80% of the workshop attendees (N=173) were awarded internal grants, and the quality of the workshops received feedback ratings of 3.52 or higher on Likert-style questions with a 1 - 4 rating scale (4 being highest). After the workshops became available, the awardee pool shifted, showing greater diversity of successful grant writers in regard to faculty rank, race, gender, and discipline. Additionally, a subpopulation of faculty received a grant award only after attending a writing workshop where in the previous four years this population received no grant awards. Applications of how key findings from this study could be implemented at other institutions are discussed.*

Keywords: *Grant Writing; Professional Development; Evaluation; Assessment; Faculty*

Background

Academic writing is different from grant writing. The two genres are so dissimilar that authors who normally succeed in publishing scholarly works may fail miserably as novice grant writers. Porter (2007/2017, p. 37) helps us "look at the difference" by offering contrasting perspectives between these two writing styles. Authors need to learn and apply a new set of writing skills if obtaining grants is a necessary component for completing work that feeds their scholarship. Current literature provides a variety of examples of professional development workshops to support faculty writing, yet these studies lack direct evidence of faculty learning and application of new

writing skills. The published studies have limitations in three areas: in the number of participants, in the type of data collected about faculty performance after professional development training, and in the length of time the study was conducted.

To identify recent literature about the evaluation of writing workshops for faculty, three databases were searched—Education Resources Information Center (ERIC), ProQuest's Education Database, and EBSCO's Education Source. Searches included the keyword terms "faculty," with both "writing," and "workshops," and either "evaluation" or "assessment" or "effectiveness," and were limited to peer-reviewed articles from 2011 or later. The searches identified 136 articles of interest. Once duplicate results were eliminated, 113 articles remained. One hundred of these publications were deemed irrelevant to this study because they focused on topics other than writing or professional development, were review articles, or focused on graduate students or K-12 teachers. Thirteen articles matched our search constraints. Twelve articles described evaluating professional development experiences using data collected through satisfaction surveys (Dankoski et al., 2012; Farrell et al., 2019; Kapp et al., 2011; Kulage & Larson, 2016; Macleod et al., 2012; Murray & Cunningham, 2011; Noone & Young, 2019; Singh, 2012; Turner et al., 2014; Wheaton & Moore, 2019; Wiebe & Maticka-Tyndale, 2017), or through focus groups and structured interviews (Roberts & Weston, 2014). The participant number was small in most of these studies, ranging from 10 to 32 people, although Kapp et al. (2011) had 73 and 121 respondents in two follow-up surveys, Baker et al. (2014) surveyed 135 participants, and Dankoski et al. (2012) collected survey results from 155 respondents. Kempenaar and Murray (2019) evaluated a faculty writing retreat using a series of two skills quizzes and a count of the number of words written during the event. Five of the studies asked faculty to self-report their success in receiving grants or published research (Dankoski, 2012; Kulage & Larson, 2016; Murray & Cunningham, 2011; Wheaton & Moore, 2019; Wiebe & Maticka-Tyndale, 2017). Wiebe and Maticka-Tyndale (2017) conducted the only study verifying information that faculty self-reported by using university data on grant submissions by the participants, which showed the number of submissions as well as success rates resulting from participating in professional development.

The purpose of this article is to contribute to the literature on professional development workshops by describing how to create an effective writing workshop structure and implement a robust assessment plan that uses verifiable data and direct measures of successful grant writing as evidence of faculty learning. The workshop structure, as well as key findings and recommendations, can serve as a model for other institutions. Compared to other cited works, this study stands out in four distinct ways: 1) the workshop analyses included both direct measures (evidence-based and verifiable performance data) and indirect measures (satisfaction feedback and self-reported data) for assessing faculty learning and application; 2) the time period for evaluation spanned eight years, four years before and four years after writing workshops were implemented, which allowed for contrastive analysis; 3) the study included a large subject population (N=485 for all grant awardees); and 4) participants were individually and longitudinally tracked over an eight-year period by faculty rank, race, gender, and college affiliation to determine impacts on underrepresented populations of faculty.

Introduction

Internal Awards Program

Eastern Michigan University is a mid-western public university of 18,000 students studying arts, sciences and professions with 650 tenure-track and tenured faculty. The university has an Internal Awards program providing approximately $1,750,000 annually toward faculty research support in the forms of released time from teaching and service, or of summer salary. This is a competitive grant program inviting tenure-track and tenured faculty to submit written proposals outlining their research agenda in order to receive an award. Eligible faculty can apply for three award types: the Summer Research Award (SRA), which provides a $12,000 stipend in lieu of summer teaching; the Faculty Research Fellowship (FRF), which provides up to 100% release from teaching for one semester; and the sabbatical, which provides 100% pay and 100% release from teaching and service for one semester or 100% release for two semesters with half pay.

There are several university policies concerning eligibility, restrictions, and awarding bonus points to these internal awards. All tenure-track and tenured faculty are eligible to apply for the SRA, and eight bonus points are awarded to new faculty (first three years at the university), zero-four bonus points for longer-termed faculty proposing new areas of scholarly/creative activity, and four bonus points if longer-termed faculty did not receive the SRA in the previous year. For the FRF, all tenure-track and tenured faculty are eligible with four bonus points awarded to applicants who did not receive the FRF or sabbatical award in the previous eight semesters. Only faculty who have served the equivalent of twelve or more semesters of full-time employment as faculty at the university are eligible for the sabbatical award, and no bonus points are awarded.

A faculty committee comprised of ten college representatives, the University Research and Sabbatical Leave Committee, evaluates and ranks the proposals. The Associate Vice President for Graduate Studies and Research oversees the administration of the Internal Awards program and uses the University Research and Sabbatical Leave Committee ranking list to make the final decision regarding which applicants receive a research grant. As a contractual agreement between the university's administration and the faculty union, Eastern Michigan University-American Association of University Professors (EMU-AAUP), at least forty SRA awards and fifty-five Faculty Research Fellowships are given each year. There is not a set number for one-semester and two-semester sabbatical awards mentioned in the most current AAUP contract; however, historical records show that an average of approximately thirteen one-semester awards and nine two-semester awards are granted each year. The SRA, FRF, and sabbaticals are approved by the university's Board of Regents, and a list of grant awardee names are publicized through board meeting minutes.

Internal Research Award Writing Workshops Structure

In 2013, the university's Faculty Development Center created a series of workshops, called the Internal Research Award Writing Workshops (from here on the term "writing workshops" will be used), to address concerns expressed by University Research and Sabbatical Leave Committee members. The chief complaint was that many proposals were so difficult to read and understand

that the quality and clarity of the research plan could not be determined. Another concern was the lack of diversity among the awardee pool; skilled grant writers continued receiving these awards year after year while less skilled grant writers missed out even if their research plan was worthy of support. Committee reviewers believed that poor grant writing hindered the evaluation of research quality. Therefore, the writing workshops were designed to address these issues.

The objectives of the writing workshops were 1) to compare and contrast academic writing with grant writing; 2) to provide tips for writing successful proposals from the perspective of a reviewer; 3) to answer questions about the grant awards, guidelines, and the evaluation process; 4) to provide examples of award-winning proposals from a variety of disciplines; and 5) to facilitate peer-review sessions where applicants could give and receive feedback on proposal drafts.

The co-facilitators of the workshops were the same two people throughout the entire study period—a member of the University Research and Sabbatical Leave Committee and the Director of the Faculty Development Center. The committee member was a full professor with nine years of experience on the committee. The Director of the Faculty Development Center was an administrator/full professor with eleven years of experience as a faculty member, three years of experience as Director of Academic Assessment, and eight years as Director of the Faculty Development Center.

The training room used for the workshops connects to the Faculty Development Center and accommodates up to twenty people. The room was equipped with presentation technology and doors that could be closed to provide for privacy and confidential conversations away from other center activities.

The writing workshops were offered throughout the fall semester in two-day increments for a time period of one and a half hours each day. There were between eight and ten workshop pairs offered each year (Day One and Day Two), which were scheduled on various days of the week and at various times in order to accommodate the variety of faculty teaching and meeting schedules.

Two weeks prior to attending a workshop, faculty were emailed two articles to read: "Why academics have a hard time writing good grant proposals" (Porter, 2007, reprinted 2017) and "Crafting a sales pitch for your grant proposal" (Porter, 2011) along with website links to the proposal guidelines and proposal evaluation forms found on the university's research support website. This two-week lead time was provided to accommodate for the different learning needs and preferences of workshop attendees. The Day One session began with an activity to review and discuss the contrasting perspectives between academic writing and skilled grant writing using the first Porter article (2007, Table 1, p. 38). Next, information about any recent changes to proposal guidelines was presented, along with opportunities for questions to be answered regarding the submission and review process. Attendees were then given an award-winning proposal to analyze as an example of how the author followed the proposal guidelines and applied skilled grant writing techniques outlined in Porter's article. The last activity included attendees' constructing their own sales pitch following Porter's three paragraph strategy from his second article (2011, Table 1, p. 80). At the conclusion of the Day One session, workshop attendees were encouraged to take a copy of any of the twenty-three example proposals provided from faculty peers. Many

past grant awardees gave permission to use their successful proposals as models to hand out to workshop attendees. For example, of the 102 faculty who received a grant award in 2018, 53 (or 52%) willingly allowed the use of their proposal. Faculty take pride in having their proposals exhibited as a model in these workshops and agree to keep their name visible.

On Day Two, the Director of the Faculty Development Center hosted a peer-review session. Attendees were instructed to bring at least two copies of their proposal. The Director placed faculty into groups and provided directions for exchange and peer-review according to the proposal evaluation form. The ideal group consisted of three people from different departments and colleges so that each person could review two proposals and receive feedback from two people outside of their academic discipline all within the one-and-a-half-hour time period. The door to the training room was kept closed during peer-review, and faculty were encouraged to keep review conversations confidential.

Research Question

It was important to determine how well the workshop structure addressed the stated concerns. This need for verification led to the following research question: To what extent are Internal Research Award Writing Workshops effective as evidenced by direct and indirect measures of faculty application of successful learning?

Methodology: Evaluation of the Writing Workshops

The effectiveness of the writing workshops was assessed in three ways: 1) through direct measures of faculty learning including longitudinal tracking of workshop attendees who received grant awards; 2) by analyzing workshop feedback forms completed by workshop attendees; and 3) by surveying university faculty regarding their participation with the writing workshops and the Internal Awards program between the years of 2010 and 2018.

Maki's direct method of assessment (2010, p. 158) was used to determine the level to which faculty were able to demonstrate "successful learning" as a result of attending a writing workshop. We determined "successful learning" by tracking which faculty submitted a proposal that was ranked high enough by the University Research and Sabbatical Leave Committee to be awarded an SRA, FRF, or sabbatical. Data on faculty performance was longitudinally tracked using lists of internal research grant awardees announced from the published Board of Regents meeting minutes, faculty demographic data (hire date, college, rank, race, and gender) between the years 2010 and 2018 obtained by the office of Institutional Research and Information Management (IRIM), and workshop attendee data collected by the Faculty Development Center within the same time frame. White, Black, and Asian are descriptors of race used in this study, and the terms come directly from IRIM reports. Longitudinal tracking involved comparing all internal research awardees to both the general faculty population and faculty who attended at least one writing workshop between 2014 and 2018. Further, all grant awardees who were employed and eligible for research awards between 2010 and 2018 were identified and their performance on receiving an internal grant award before and after the workshops were established was compared.

In addition to creating the faculty performance and demographic dataset, an analysis of workshop feedback forms was conducted (see Appendix A for feedback questions). Writing workshop attendees completed Likert-style survey questions (with 1-4 ratings; 4 being highest) to give feedback about the workshop materials and the presenters. Open-ended questions were also included on the feedback forms asking participants to explain which aspects of the workshop provided the greatest impact on their learning and to describe improvements that could be made for future workshops.

In September 2018, the Faculty Development Center distributed an electronic questionnaire to all tenure-track and tenured faculty via email regarding the SRAs, FRFs, and sabbatical awards (see Appendix B for survey questions). In this survey, respondents were asked a series of questions about the Internal Award program process between 2010 and 2018 and whether or not they received an award during that time. Faculty were also asked if they participated in any writing workshops, and to what extent they found them effective. Open-ended questions were included to prompt suggestions on how the Faculty Development Center could further support faculty in their research and scholarly endeavors.

Results

Evaluation of the Workshops by Longitudinal Tracking of Grant Awardees

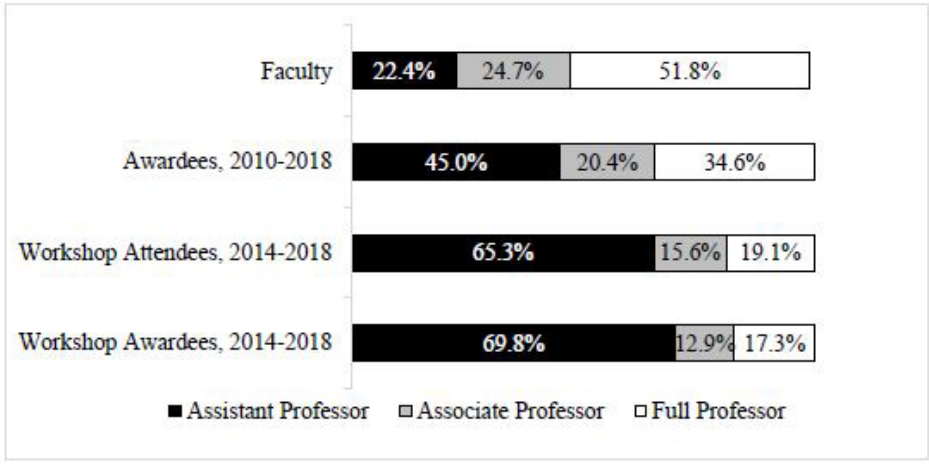
Of the 485 faculty grant awardees, 173 faculty (27%) had participated in at least one writing workshop since their implementation in 2014 (see Table 1). Of the 173 individual attendees, 139 have received at least one award through the Internal Award program (this subpopulation is termed "workshop awardees"), resulting in an 80% on average success rate for workshop attendees. In comparison, faculty who also received awards but did not attend a workshop (termed "non-workshop awardees") had only a 71.3% success rate overall. Analyzing the different demographic populations of workshop awardees compared to non-workshop awardees showed positive trends for underrepresented populations of faculty by race, rank, gender, and college affiliation. Faculty workshop awardees from the College of Business and College of Technology had the largest difference in success rates (+30.4 and +26.1, respectively) compared to their non-workshop awardee peers, while Library faculty and faculty from the College of Education had the poorest success rate (-35.7 and -21.7 respectively). Library faculty and faculty in the College of Education were also the smallest number of workshop attendees (4.1% and 5.2% respectively), the smallest number of all awardees (0.6% and 3.9% respectively) and made up the smallest populations of college faculty overall (3.2% and 10.5% respectively). Female workshop awardees had a success rate 14 percentage points higher than female non-workshop awardees; Asian faculty workshop awardees had a success rate 17.5 higher and Black faculty 5.4 higher than their non-workshop awardee counterparts.

Table 1. Success of Workshop Attendees Compared to Non-Attendee Peers, 2010-2018

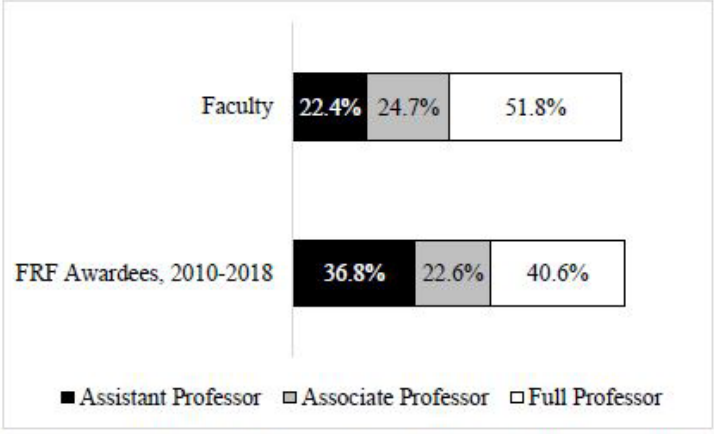
		2010-2018							
		All Faculty (Average N=650)*	All Awardees (N=485)	Workshop Attendees (N=173)	Workshop Awardees (N=139)	Workshop Attendee Success Rate (Attendee/ Awardees)	Non-Workshop Awardees (N=346)	Non Workshop Attendee/ Awardee Success Rate	Percentage Point Difference in Success Rate between Workshop & Non-Workshop Awardees
College	Arts & Sciences	50.9%	61.7%	47.3%	51.1%	86.6%	66.5%	76.4%	+10.2
	Health/ Human Serv	16.3%	16.1%	20.8%	20.1%	77.8%	14.5%	64.1%	+13.7
	Business	10.9%	11.3%	13.9%	15.1%	87.5%	8.1%	57.1%	+30.4
	Education	10.5%	3.9%	5.2%	3.6%	55.6%	4.9%	77.3%	-21.7
	Technology	8.2%	6.4%	8.7%	9.4%	86.7%	5.8%	60.6%	+26.1
	Library	3.2%	0.6%	4.1%	0.7%	14.3%	0.2%	50.0%	-35.7
Gender	Female	50.5%	54.3%	64.2%	64.0%	80.2%	50.0%	66.0%	+14.0
	Male	49.5%	45.7%	35.8%	36.0%	80.6%	50.0%	77.6%	+2.4
Race	Asian	11.4%	13.5%	17.3%	17.3%	80.0%	11.6%	62.5%	+17.5
	Black	6.6%	4.2%	7.5%	5.8%	61.5%	2.9%	55.6%	+5.4
	White	78.6%	80.1%	72.8%	74.9%	82.5%	83.5%	73.5%	+8.5
	Other	3.4%	2.2%	2.4%	2.0%	75.0%	2.0%	70.0%	+5.0
Overall						80.0%		71.3%	8.7

*Note: N=650 is an average of the faculty population per year between 2010 and 2018.

Longitudinal tracking by rank, race, and gender: Since the implementation of the writing workshops, the majority of workshop attendees and workshop awardees have been assistant professors even though they made up the smallest proportion of faculty overall. Figure 1a shows that assistant professors proportionately outperformed associate and full professors in receiving these awards. Furthermore, assistant professors who attended at least one workshop and secured an award (termed "workshop awardee") outperformed their non-attendee counterparts by +24.8 percentage points (difference between the proportions of workshop awardees to all awardees).



Success of workshop awardees by rank for all awards.



Success of workshop awardees by rank for the Faculty Research Fellowship (FRF) Award.

Figure 1a. Success of workshop awardees by rank.

The proportion of Black and Asian faculty who attended writing workshops and received grant awards was greater than the proportion of Black and Asian faculty overall (see Figure 1b). For Black faculty, the difference between the proportion of Black faculty workshop awardees (5.8%) and the proportion of all Black awardees (4.2%) was +1.6 percentage points. For Asian faculty, the difference between the proportion of Asian workshop awardees (17.3%) and all Asian faculty awardees (13.5%) was +3.8 percentage points.

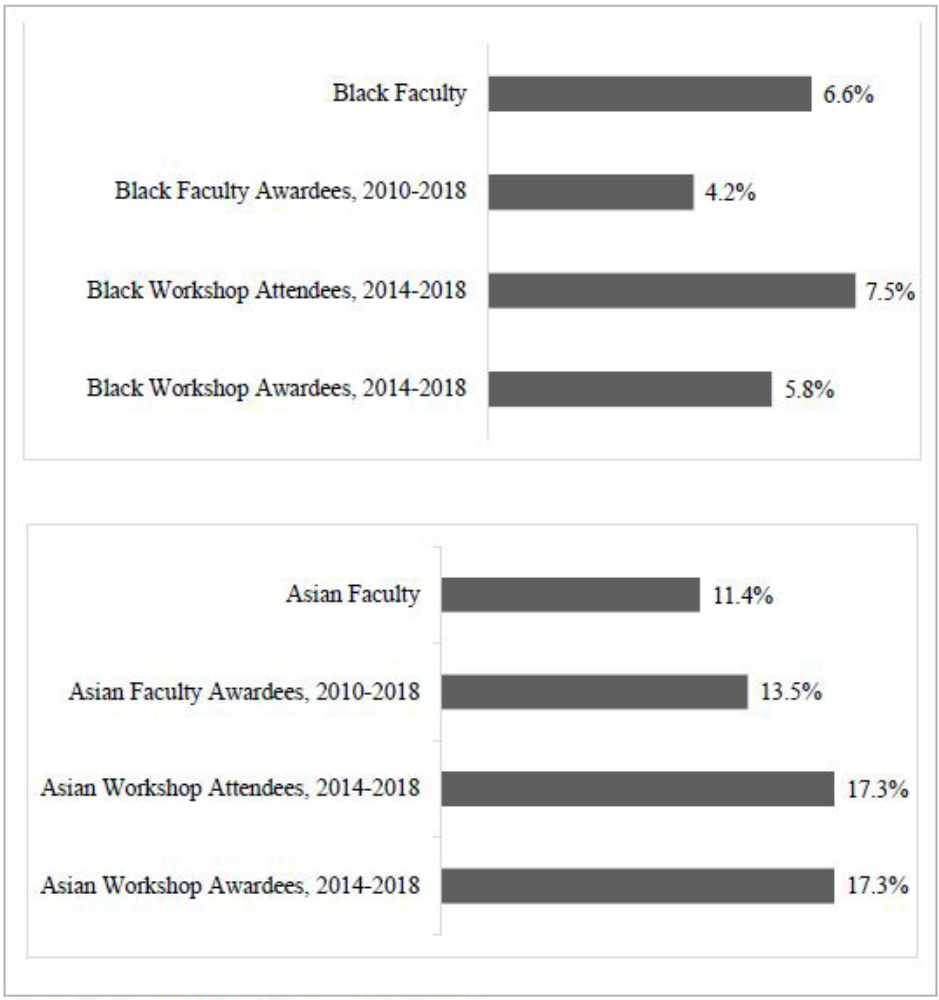


Figure 1b. Success of workshop awardees by race.

A third group that performed better after attending a writing workshop were female faculty (see Figure 1c). Since the start of the writing workshops, female faculty have surpassed their male counterparts as workshop attendees and workshop awardees. Additionally, the proportion of female workshop awardees was larger than the total female faculty population by +14.5 percentage points. Similarly, the proportion of female workshop awardees was 9.7 percentage points higher than the proportion of female non-workshop awardees.

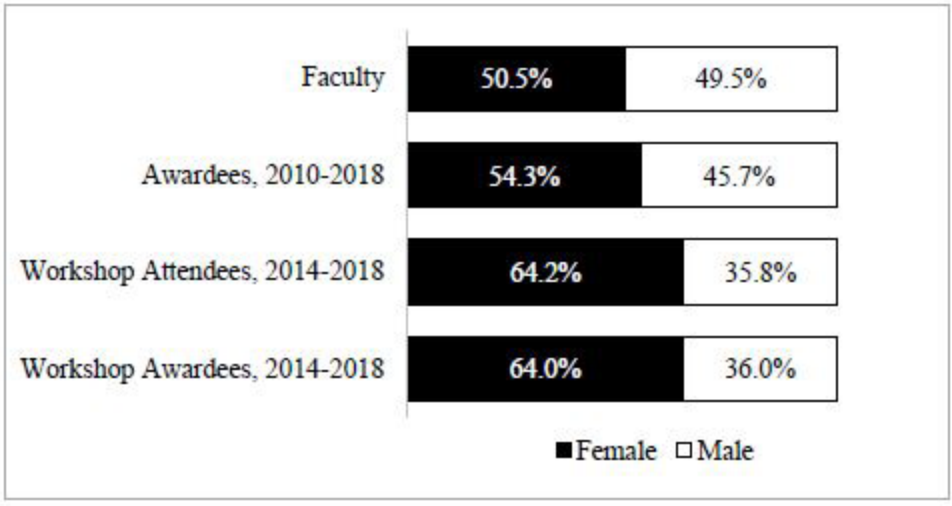


Figure 1c. Success of workshop awardees by gender.

Longitudinal tracking of the ""I finally got an award!" group": The "I finally got an award!" group consisted of 36 individuals, or 20.8% of the workshop attendee population, who were eligible for internal awards four years prior to the implementation of the workshops, but did not receive any awards during those years. After the workshops began in 2014, each individual in this group attended at least one workshop and secured at least one award (see Figure 2). The faculty within the "I finally got an award!" group have particularly benefited from these workshops and are fairly evenly distributed across colleges, rank, and gender. It was not possible to analyze by race because the population was too small in this category to distinguish an effect.

		Workshop Awardees, 2010-2018	
		Workshop Awardees	"I Finally Got the Award" Group
College of Arts & Sciences		71	19
College of Health & Human Services		28	4
College of Business		21	9
College of Education		5	0
College of Engineering & Technology		13	4
Library		1	0
	Totals	139	36
Females		89	22
Males		50	14
	Totals	139	36
Key:	 =	10 faculty workshop attendees who received at least one award.	
	 =	10 faculty "I finally got the award" people eligible from 2010-2013 who did not get the award, attended a workshop, and subsequently received at least one award, 2014-2018.	

Figure 2. "I finally got the award" group compared to all workshop awardees.

Evaluation of the Workshops using Feedback Forms

At the end of each workshop, participants completed a feedback form to communicate their perceptions of the Day One and Day Two sessions. Participants were asked Likert-style questions where 1= "not at all" and 4 = "a great deal." For both the Day One and Day Two sessions occurring from 2014 and 2018, each question scored an average of 3.52 or higher (see Figure 3).

Response choices: NA = not applicable, 1 = Not at all, 4 = A great deal	**Workshop Day**	**NA**	**1 or 2**	**3**	**4**	**Total**	***Ave.***
To what extent did the content of this workshop…							
Provide adequate information about writing a quality proposal?	Day One	3	5	36	112	156	*3.70*
	Day Two	7	3	10	57	77	*3.77*
Provide adequate information about the submission process?	Day One	3	2	24	127	156	*3.82*
	Day Two	1	1	9	66	77	*3.85*
Provide adequate information about the scoring rubric and evaluation process?	Day One	3	3	31	119	156	*3.76*
	Day Two	7	4	13	53	77	*3.70*
Answer all your questions and/or concerns today?	Day One	1	6	29	120	156	*3.73*
	Day Two	4	1	11	61	77	*3.82*
Boost your confidence in submitting a successful proposal?	Day One	3	14	45	94	156	*3.52*
	Day Two	0	1	17	59	77	*3.75*

Summary of Open Ended Responses Categorized by Themes

Would you recommend this workshop be repeated next year? Why?	*Day One*	Yes, helpful (49%) Yes, informative (42%) Yes, supportive (9%)
	Day Two	Yes, peer review helpful (63%) Yes, provides good advice (37%)
Which part of the workshop was most impactful?	*Day One*	Handouts/discussion of award criteria? (69%) Q & A session (22%) URSLC member as facilitator (9%)
	Day Two	Peer feedback/discussion (87%) Reviewing work of others (13%)
What recommendations do you have for improvement?	*Day One & Day Two Combined*	• Create a handout summarizing all awards on one sheet • Create a handout with other award programs on campus • Provide more diverse examples of successful proposals (programs &disciplines) • Offer workshops where faculty have their offices.

Note: Out of 173 workshop attendees, 156 completed the Day One evaluation and 77 completed the Day Two evaluation.

Figure 3. Summary of Day One and Day Two Workshop Feedback Forms, 2014-2018.

The feedback form also included three open-ended questions. The responses regarding the most impactful portions of the workshops were categorized by grouping repeated comments into themes (e.g., Helpful, Informative, Supportive). The most useful and impactful aspects of the workshops, according to faculty, were the handouts, the insights from the University Research and Sabbatical Leave Committee member, the question/answer session, and the opportunity for peer-review led by the Faculty Development Center Director. In response to ways to improve the workshops, faculty provided several ideas, and suggestions have been implemented over the last four years, including creating a more comprehensive "tips handout" to address formatting and writing style issues; presenting more examples of winning proposals from the various colleges; and offering more workshops in locations where faculty have their offices (see Figure 3).

Evaluation of the Faculty Survey

To gain further insights into faculty perceptions of the Internal Awards Program and the Internal Awards Writing Workshops, the Faculty Development Center emailed an electronic survey composed of thirteen questions to all faculty in the Fall 2018 semester. Ninety-one faculty responded to the survey (a 14.5% response rate). Sixty-seven percent of respondents applied for at least one type of award, and 80% of that group received the award. Of the respondents who received an award, 75% had attended a workshop, and 97% of this group said the workshops were helpful. Thirty-three percent of survey respondents did not apply for any awards, and 93% of this group said they did not attend a workshop. Questions 6, 10, and 12 were developed to understand why faculty do not apply for awards, do not go to workshops to support award writing, and what more the Faculty Development Center (FDC) can do to support faculty in receiving awards. Responses to these questions are summarized in Figure 4.

In response to question #6: "Why haven't you applied for an award?"

Reasons to Not Apply for an Award	*Percentage of Faculty Responses*
I do not believe I will receive an award	25%
I do not have time to complete a proposal	22%
I do not have a strong research agenda	22%
Other	31%
If you response was 'other,' please explain:	• New employee • Not ready to write a proposal

In response to question #10: "Why haven't you attended a workshop?"

Reasons to Not Attend Workshops	*Percentage of Faculty Responses*
Do not intend to apply for an award.	36%
Did not know about them.	8%
Do not believe attending would be helpful.	6%
Inconvenient location.	3%
Inconvenient times/dates.	22%
Other	25%
If you response was 'other,' please explain	• New employee • Plan to attend upcoming workshop • Unsure whether I can create a proposal • Get Feedback from colleagues • No time to attend or apply. • Not sure

In response to question #12: "How can the FDC further support your efforts to receive an internal research award?"

How the FDC Can Better Support Faculty	*Percentage of Faculty Responses*
The FDC already provides sufficient support.	51%
Offer workshops on developing a research agenda.	32%
Offer workshops at different times.	13%
Offer workshops at different locations.	4%

Note: 91 faculty respondents = 14.5% response rate

Figure 4. Faculty survey responses to questions 6, 10, & 12.

Comments after an Acceptance Result:

"I have the pleasure to let you know that I have got the 1 semester sabbatical for the fall of 2018. Your seminar on this topic helped a lot. After attending it I had to rewrite the proposal in layman terms before I succeeded. Keep on organizing these seminars!"

"Getting help writing the internal grants and using them to generate preliminary data was absolutely instrumental in getting a National Science Foundation grant for $359,776! So a big thanks to the FDC!"

"Thank you for the Sabbatical Workshop during winter semester (2019). I have submitted sabbatical proposals before, but I found this workshop especially helpful in understanding what requirements had changed since the last time. There were some format issues as well as some content requirements that had changed that were critical to a successful submission. It was very helpful, as well, to ask specific questions, especially because I was submitting more than one [type of] proposal."

"Without this workshop, I don't know if I would have been successful or not. But with the support of this workshop, I am certain that it increased the odds for success. I am very pleased to have been awarded a one year sabbatical. I look forward to a rich year of research ahead! Many thanks and with appreciation."

Comments after a Denial Result:

"I hope that this finds you well. I had attended the workshops and received quite positive peer feedback and was more than a bit surprised at the denial of my [sabbatical] application."

"I didn't get my sabbatical. I'm shocked and dismayed. I'd gotten such great feedback at the FDC workshop! Three glowing reviews! I'm trying to find out what was so wrong with it. The [URSLC chair's] comments shared seemed arbitrary, contradictory, and some were factually inaccurate. Like, did they actually read it? Did they look at the appendices at all? I'm super disappointed in the process. I wish we'd go back to vetting proposals in departments then sending them forth with [department chair letters of] support — it would at least give the reviewers some additional context."

"I received feedback on my sabbatical proposal and wanted to let you know that it was not funded. Thanks again for all your help and support."

"I wanted to thank you again for leading the FDC's workshop on writing internal awards. I learned a lot at the workshops I attended last fall—or at least I thought I did. Although I wrote my SRA application in accordance with the FDC guidance, peer review, and the provided rubric, I did not receive a summer award. However, a colleague of mine who did not attend the workshops did."

Changes to the workshops have been made as a result of these comments, such as: 1) informing senior faculty that the SRA has eight bonus points for new faculty who are within their first three years of employment, making the award more competitive for longer-termed faculty; 2) reviewers are not obligated to read appendices, so make sure the narrative provides important details; and 3) giving better directions in the peer-review session to avoid "glowing reviews" and focus on

comments that will improve clarity, organization, and detail as per the proposal evaluation form.

Discussion

Provisions for sabbatical leaves (one- and two-semester) and research fellowships appear in Eastern Michigan University-American Association of University Professors (EMU-AAUP) contracts dating back to December 1974. The contracts also state that other awards may become available as well, such as the Summer Research Award (Agreement by and between EMU and the EMU-AAUP, 1974). For years, the predominant winners of the Internal Research Awards were faculty from the College of Arts and Sciences. The College of Arts and Sciences has the largest number of faculty (50.9% of total) and the largest number of departments (18 out of 34; or 53% of total). Within this college, the majority of previous awardees were from science and math departments and likely had more grant writing experience. A higher percentage of faculty in these departments were securing awards compared to other faculty in the college. The Faculty Development Center recognized a need to better support faculty with less grant writing experience.

Since the internal award writing workshops were implemented in 2014, a shift has been observed in the subpopulations of faculty awardees (assistant professors, females, Blacks, Asians, faculty in the College of Business and College of Technology). Overall, the results of this study indicate that the writing workshops were successful in addressing the problems of poorly written proposals and the lack of awardee diversity.

One limitation to this study was tracking who submitted or did not submit a proposal for the SRA, FRF, and sabbatical awards, as this information was not publicly available. Without these data, it could not be determined why any unsuccessful workshop attendees did not secure an award. Possible reasons are either the unsuccessful workshop attendee did not submit a proposal at all, or the proposal was submitted but it received a poor rating from the review committee. Another limitation to not having the number of proposals submitted each year, was determining the mathematical odds for an individual to secure an award (number of proposals submitted / number of proposals funded). However, members of the University Research and Sabbatical Leave Committee have shared, anecdotally, that the odds of securing an award ranges between 40-70% depending on the year because each year there is a different number of applications submitted for each type of award.

Despite making up only 22.4% of all university faculty, over 65% of the workshop attendees and over 69% of workshop awardees were assistant professors. While one type of award, the SRA, gave preference to assistant professors through an automatic awarding of bonus points, this preference cannot fully explain the performance by assistant professors. The FRF awards, which have no extra points for a particular faculty group, are still awarded more often to assistant professors than associate or full professors. In this study, faculty were not asked specifically what motivated them to participate in the workshops. However, assistant professors at the university face expectations for scholarly output that require them to pursue a research agenda early in their careers (Lucas & Murry, 2011; Sorcinelli, 2007). The explicit purpose of both awards for which untenured professors are eligible—the SRA and the FRF—is to advance the recipients' scholarly endeavors. It is likely that assistant professors, motivated to earn tenure and promotion, took advantage of

the writing workshops to jumpstart their scholarly agenda and position themselves for success on the tenure track. The Faculty Development Center is considering adding a feedback question about participants' rationale for attending.

Although the percentage of Black faculty who received an award after attending a workshop (5.8%) was higher than the percentage of all Black faculty awardees (4.2%), that percentage was still lower than the percentage of all Black faculty at the university (6.6%). Additionally, the Black faculty workshop attendee success rate (61.5%) lagged far behind the workshop attendee success rates of Asian faculty (80.0%) and White faculty (82.5%). A study of Black faculty produced a list of thirteen concerns regarding their success at predominately white institutions, including a lack of mentors, a sense of being left out of campus politics, a lack of guidance in promotion and tenure applications, and a belief that their research is trivialized (Ross & Edwards, 2016).

The writing workshops, which provide information, guidance, and feedback to participants, do serve as a type of mentorship, which has been identified as an important form of support for minority faculty (Espino & Zambrana, 2019; Charleston et al., 2014). However, there needs to be additional institutional structures in place to support underrepresented populations and their scholarship. Edwards & Ross (2017) state, "After getting minority faculty on campus, universities have to create a favorable climate to encourage the faculty to stay. Retaining faculty of color has to be a priority. An environment has to exist that will facilitate their longevity on campus, and an avenue must be created for professional advancement for all of those who seek it" (p. 18). These workshops are one example of programming that can support minority faculty in the achievement of their scholarship goals, but it should be part of a larger institutional plan to bolster the efforts of marginalized populations.

Women make up 50.5 % of the university's faculty population; this group of faculty have secured the majority of internal research awards (54.3%) distributed between 2010 and 2018. Additionally, they have participated in the writing workshops at a rate that doubled that of their male colleagues. Several researchers have noted that female faculty face several barriers in higher education, including discrimination, family obligations, excessive service involvement, and structural practices that place them at a disadvantage (Monroe et al., 2008; Mason et al., 2006; Misra et al., 2011; Aiston & Jung, 2015). Grant writing workshops, such as the Faculty Development Center writing workshops, have been recognized as a strategy to assist female faculty in becoming more successful at securing grants (Easterly & Pemberton, 2008; Leberman et al., 2016).

Faculty from the College of Education and the Library received internal awards at a much lower rate than their colleagues in the other colleges; these areas of the university had a success rate of 55.6% and 14.3%, respectively, which is well below the overall workshop attendee success rate of 80%. They also attended the workshops at a lower rate than faculty from other areas of the university. One way to address the low workshop attendance and attendee success rate is to provide a series of workshops specifically for each group to address any particular concerns. Another way would be to encourage participation in Day Two of the workshop series for participants to receive peer-feedback on their proposals. However, Library faculty make up a small percentage of

the university's pool of total faculty. It may not be feasible for the number of Library workshop attendees and their success rate to approach those of colleges with more faculty eligible for awards.

Poorly written proposals frequently result in denied funding. The longitudinal analysis of awardees compared with faculty eligible to receive an internal research award revealed the "I finally got an award!" subgroup—a pool of 36 faculty who did not receive an award between 2010 and 2013, but did write a winning proposal between 2014 and 2018 after participating in the writing workshops.

Access to the list of faculty who apply for awards is not publicly available, so it was not possible to determine if the group of 36 did not receive an award prior to 2014 because they did not submit an application, or they did submit but their proposal ranked too low to receive an award. However, anecdotal evidence suggests that at least some of these 36 faculty had applied for awards and failed to secure them. For this group of faculty, the writing workshops likely provided them with the information and guidance necessary for them to finally write a successful proposal.

The role of faculty development centers in higher education has evolved from focusing solely on faculty teaching skills to meeting faculty needs in securing grants and producing scholarship (Lockhart & Stoop, 2018; Lockhart, 2014; Gray & Shadle., 2009). Results from both the writing workshop feedback forms and the faculty survey indicated that the Faculty Development Center should continue to support faculty with grant writing. In fact, 32% of respondents to the faculty survey indicated they would like the center to offer additional scholarship support in the form of workshops focusing on research agenda development.

The writing workshop evaluations reveal that faculty found the workshops worthwhile. Overall, the scores show that faculty felt the workshops provided adequate information about the process and the qualities of good proposal writing. The statement with the lowest average score (3.52/4) was the question about Day One boosting the faculty members' confidence in submitting a successful proposal. A likely reason for a lower score in this area is the large amount of information shared on Day One, which could make attendees feel overwhelmed and less confident in their abilities to write good proposals. The Day Two average score for the same question was 3.75/4, demonstrating that participation in the peer-review sessions buoyed feelings of confidence. The workshop facilitators need to consider restructuring future Day One workshops to deliver the information differently or to include only the most important recommendations for writing good proposals. The facilitators should also encourage faculty to engage with the peer-review portion of the workshops.

The results of the survey sent to all faculty revealed why respondents did not apply for an internal research award or sabbatical between 2010 and 2018. The most frequent response (25%) was "I do not believe I will receive an award." This statement aligns with the sentiments of the review committee members, who voiced concerns about the awards going to the same faculty year after year. Determining the validity of this belief is beyond the scope of this article. However, the number of faculty in the "I finally got an award!" group as well as the increase in diversity among awardees in terms of rank, race, gender, and college affiliation since the start of the writing workshops provides a compelling argument that this assumption is no longer true.

Key Findings to Adapt/Adopt at Other Institutions

The following insights from the current study are applicable for implementing at other institutions:

1. *For Grant Writing Support, Emphasize the Differences between Academic Writing and Grant Writing*. Our faculty demand professional development that is grounded by credible resources. On feedback forms, faculty have given favorable ratings to using the two main articles: "Why academics have a hard time writing good grant proposals" (Porter, 2017) and "Crafting a sales pitch for your grant proposal" (Porter, 2011) in workshops. Faculty new to grant writing are not aware that the two writing styles are very different, and the articles provide an external authoritative voice.
2. *Provide Examples of Model Proposals Written by Peers*. Faculty want to examine successfully written grant proposals, preferably from the colleges with which they are affiliated. The Faculty Development Center was proactive in collecting a range of proposals for each of the grant types and ensuring that workshop attendees would find relevant examples regardless of their home college or discipline. Awardees were eager to share their proposals as models when we assured the authors that the proposals would only be handed out as paper copies to workshop attendees with a watermark "confidential do not copy" stamped across them.
3. *Peer-Review is Powerful*. Offering the Day Two peer-review session is critical for faculty success. For example, when authors hear their peers say they are "lost" or "confused" in the proposal, they better understand that if they do not revise the narrative, it is likely the committee reviewers, which is also comprised of peers, will lower the rating of their proposal.
4. *Have Credible Workshop Presenters*. For attendees to respect the advice of the presenters, they must trust that the presenters are providing accurate and insightful information. The lead presenter for the Day One workshop is a member of the University Research and Sabbatical Leave Committee, who knows the criteria with which the proposals are evaluated. This individual also understands the pitfalls that faculty encounter with grant writing, and shares reviewer perspectives on what makes a proposal that they can support versus one that is relegated to the unreadable, impenetrable, or "so what" pile. As one committee reviewer commented, "Now, I have a much larger pile of proposals that are better written and thus have to be carefully scrutinized for the merits of their good ideas" (Anonymous University Research and Sabbatical Leave Committee Member, personal communication, September 23, 2017).

The Day Two presenter is the Director of the Faculty Development Center. The Director has specialized skills in coaching, leading groups, and creating a supportive environment. The Director's role during the Day Two workshop is to create a space where faculty feel safe critiquing others' works and having their own critiqued, guide the peer-review process, and offer ideas on how proposals might be further strengthened. The training room door is closed during the peer-review session and faculty are asked to keep review conversations confidential when they leave.

5. *Direct and Indirect Assessment Shows What Works and What Needs to be Improved*. By analyzing years of verifiable data about faculty performance collected by the university as opposed to self-reported data, we were able to determine which colleges and departments were over- and under-performing in regard to receiving internal grant awards. We are now hosting specialized workshops targeting the specific needs of faculty in disciplines that do not have a strong track record for submitting award-winning proposals. Additionally, faculty comments shared on feedback forms, in surveys, and in emails (which are examples of indirect assessment) provide suggestions on how to make impactful changes to the workshop structure.

Authors' Note

This project did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. The authors have no conflicts of interest to disclose. Data collection and analysis procedures involving human subjects was approved by the University Human Subjects Review Committee:

- Faculty Development Center Programming Effectiveness Project - UHSRC Protocol Number: 932606, and
- Faculty Development Center: Secondary Data Analysis Study – UHSRC Protocol Number: 934255

Acknowledgements

We would like to thank Kaitlyn Greer, Rachael Innocenzi, Kim Pavlock, Sara Memmot, and Doug Baker for their assistance and input.

Samantha Glowacki
Student Staff Member, Faculty Development Center, Eastern Michigan University
109 Halle Library
Ypsilanti, MI 48197
sglowack@emich.edu

Julia K. Nims, MA, MLS
Scholarly Communications Librarian, Eastern Michigan University
200 Halle Library
Ypsilanti, MI 48197
jnims@emich.edu

Peggy Liggit, PhD
Director of the Faculty Development Center, Eastern Michigan University
109 Halle Library
Ypsilanti, MI 48197
pliggit@emich.edu

Correspondence concerning this article should be addressed to **Julia K. Nims**, Scholarly Communications Librarian, Eastern Michigan University, 200 Halle Library, Ypsilanti, MI 48197, jnims@emich.edu.

References

Agreement by and between Eastern Michigan University and the Eastern Michigan University Chapter of the American Association of University Professors. (1974). The American Association of University Professors (AAUP) EMU Chapter Records. Eastern Michigan University Archives.

Aiston, S. J., & Jung, J. (2015). Women academic and research productivity: An international comparison. *Gender and Education, 27*(3), 205-220. https://doi.org/10.1080/09540253.2015.1024617

Anderson, D. M., & Slade, C. P. (2016). Managing institutional research advancement: Implications from a university faculty time allocation study. Research in Higher Education, 57(1), 99-121. https://doi.org/10.1007/s11162-015-9376-9

Charleston, L. J., Gilbert, J. E., Escobar, B., & Jackson, J. F. L. (2014). Creating a pipeline for African American computing science faculty: An innovative faculty/research mentoring program model. *The Journal of Faculty Development, 28*(1), 85-92.

Dankoski, M., Palmer, M., Banks, J., Brutkiewicz, R., Walvoord, E. Hoffmann-Longtin, K., Bogdewic, S., & Gopen, G. (2012). Academic writing: Supporting faculty in a critical competency for success. *The Journal of Faculty Development, 26*(2), 47-54.

Easterly, D. & Pemberton, C. L. A. (2008). Understanding barriers and supports to proposal writing as perceived by female associate professors: Achieving promotion to professor. *Research Management Review, 16*(1), 22-37. https://www.ncura.edu/Publications/ResearchManagementReview/Archives.aspx

Edwards, W. J., & Ross, H. H. (2017). What are they saying? Black faculty at predominantly white institutions of higher education. *Journal of Human Behavior in the Social Environment, 28*(2), 142-161. https://doi.org/10.1080/10911359.2017.1391731

Espino, M. M., & Zambrana, R. E. (2019). "How do you advance here? How do you survive?" An exploration of under-represented minority faculty perceptions of mentoring modalities. *The Review of Higher Education, 42*(2), 457-484. https://doi.org/10.1353/rhe.2019.003

Farrell, A., & MUA SWIFT. (2019). SWIFT beginnings – Exploring the effectiveness and transformative character of a Summer Writing Institute for Teachers (SWIFT). *Innovations in Education and Teaching International, 56*(2), 229-238. https://doi.org/10.1080/14703297.2017.1412833

Gray, T., & Shadle, S. E. (2009). Launching or revitalizing a teaching center: Principles and portraits of practice. *The Journal of Faculty Development, 23*(2), 5-12.

Kapp, C. A., Albertyn, R. M., & Frick, B. L. (2011). Writing for publication: An intervention to overcome barriers to scholarly writing. *South African Journal of Higher Education, 25*(4), 741-759. https://hdl.handle.net/10520/EJC37708

Kempenaar, L., & Murray, R. (2019). Widening access to writing support: Beliefs about the writing process are key. *Journal of Further and Higher Education, 43*(8), 1109–1119. https://doi.org/10.1080/0309877X.2018.1450964

Kulage, K. M., & Larson, E. L. (2016). Implementation and outcomes of a faculty-based, peer review manuscript writing workshop. *Journal of Professional Nursing, 32*(4), 262–270. https://doi.org/10.1016/j.profnurs.2016.01.008

Leberman, S. I., Eames, B., & Barnett, S. (2016). "Unless you are collaborating with a big name successful professor, you are unlikely to receive funding." *Gender and Education, 28*(5), 644-661. https://doi.org/10.1080/09540253.2015.1093102

Lockhart, M. S. (2014). Creating a holistic faculty development program. In C. Boden-McGill, & K. King (Eds.), *Developing and sustaining adult learners* (pp. 305-322). Information Age.

Lockhart, M. S., & Stoop, C. (2018). Assessing a faculty development program in a changing environment. *The Journal of Faculty Development, 32*(2), 13-21.

Lucas, C. J., & Murry, J. W. (2011) Getting published. *In New faculty: A practical guide for academic beginners* (3rd ed., pp. 133-166). Palgrave Macmillan.

MacLeod, I., Steckley, L., & Murray, R. (2012). Time is not enough: Promoting strategic engagement with writing for publication. *Studies in Higher Education, 37*, 641-654. https://doi.org/10.1080/03075079.2010.527934

Maki, P. (2010). *Assessing for learning: Building a sustainable commitment across the institution* (2nd ed.). Stylus Publishing.

Mason, M. A., Goulden, M., & Wolfinger, N. H. (2006). Babies matter: Pushing the gender equity revolution forward. In S. J. Bracken, J. K. Allen, & D. R. Dean (Eds.), *The balancing act: Gendered perspectives in faculty roles and work lives* (pp. 9–30). Stylus Publishing.

Misra, J., Lundquist, J. H., Holmes, E., & Agiomavritis, S. (2011). The ivory ceiling of service work. *Academe Online, 97*(1). https://www.aaup.org/AAUP/pubsres/academe/2011/JF/ Feat/misr.htm

Monroe, K., Ozyurt, S., Wrigley, T., & Alexander, A. (2008). Gender equality in academia: Bad news from the trenches, and some possible solutions. *Perspectives on Politics, 6*(2), 215–233. https://doi.org/10.1017/S1537592708080572

Murray, R., & Cunningham, E. (2011). Managing researcher development: 'Drastic transition'? *Studies in Higher Education, 36*(7), 831-845. https://doi.org/10.1080/03075079.2010. 482204

Noone, J. P., & Young, H. M. (2019). Creating a community of writers: Participant perception of the impact of a writing retreat on scholarly productivity. *Journal of Professional Nursing, 35*(1), 65–69. https://doi.org/10.1016/j.profnurs.2018.07.006

Porter, R. (2011). Crafting a sales pitch for your grant proposal. *Research Management Review, 18*(2), 79-84. https://eric.ed.gov/?id=EJ980463

Porter, R. (2017). Reprint 2007. Why academics have a hard time writing good grant proposals. *Journal of Research Administration, 48*(1), 15-25. https://www.srainternational.org/view document/spring-2017

Roberts, A., & Weston, K. (2014). Releasing the hidden academic? Learning from teacher-educators' responses to a writing support programme. *Professional Development in Education, 40*(5), 698–716. https://doi.org/10.1080/19415257.2013.835277

Ross, H. H., & Edwards, W. J. (2016). African American faculty expressing concerns: Breaking the silence at predominantly white research oriented universities. *Race Ethnicity and Education, 19*(3), 461-479. https://doi.org/10.1080/13613324.2014.969227

Singh, R. J. (2012). Promoting writing for research: The 'writing retreat' model. *South African Journal of Higher Education, 26*(1), 66-76. https://hdl.handle.net/10520/EJC123976

Sorcinelli, M. D. (2007). Faculty development: The challenge going forward. *Peer Review 9*(4), 4-8. https://works.bepress.com/marydeane_sorcinelli/23/

Turner, R., Brown, T., & Edwards-Jones, A. (2014). "Writing my first academic article feels like dancing around naked": Research development for higher education lecturers working in further education colleges. *International Journal for Academic Development, 19*(2), 87-98. https://doi.org/10.1080/1360144X.2013.792729

Wheaton, D., & Moore, L. (2019). Creating a multi-institutional writing retreat network: How we did it and why it works. *Journal of Faculty Development, 33*(2), 97–102.

Wiebe, N. G., & Maticka-Tyndale, E. (2017). More and better grant proposals? The evaluation of a grant-writing group at a mid-sized Canadian university. *The Journal of Research Administration, 48*(2), 66-92. https://www.srainternational.org/viewdocument/fall-2017

Appendix A
Internal Award Writing Workshop Feedback Form

Today's Date
Day 1 Day 2 *(choose one)*

Directions: Please circle the appropriate below using the following scale:

NA = not applicable 1 = Not at all 4 = A great deal

To what extent did this workshop...	NA	1	2	3	4
1. Provide adequate information about writing a quality proposal?	NA	1	2	3	4
1. Provide adequate information about the submission process?	NA	1	2	3	4
1. Provide adequate information about the scoring rubric and evaluation process?	NA	1	2	3	4
1. Answer all your questions and/or concerns today?	NA	1	2	3	4
1. Boost your confidence in submitting a successful proposal?	NA	1	2	3	4

In the Faculty Development Center we aim to support programming that facilitates *deep learning* and creates a *lasting impact* on your teaching and/or research. Your responses to this evaluation will be anonymous. Please use the back if you have more to say. Thank you!

6. Would you recommend this workshop be repeated next year? Why?
7. Which part of the workshop was most impactful?
8. What recommendations do you have for improvement?

Any other comments, questions, or concerns about this seminar (please continue on the back of this sheet):

Appendix B

Faculty Development Center's Fall 2018 Faculty Survey

The purpose of this questionnaire is to evaluate and improve the effectiveness of Faculty Development Center (FDC) programming and service.

Internal and external communities, as well as the academy, will also benefit from the FDC sharing our "good" practice models for faculty professional development.

Participation in this questionnaire is your choice. You may stop your participation at any time. All information you provide is anonymous and will be kept confidential.

By completing this questionnaire you are indicating that you understand the purpose of this study and that you agree to the terms as described.

If you have any questions, please contact Dr. Peggy Liggit, Director of the Faculty Development Center at pliggit@emich.edu.

Thank you in advance for your participation!

1) **Have you applied for an internal research support award in the last eight years (since the 2010 academic year?)**
- ○ Yes
- ○ No

2) **Did you receive your award? (If the answer to the previous question was "Yes")**
- ○ Yes
- ○ No

3) **If you did not receive your award, did you ask why?**
- ○ Yes
- ○ No

4) **Did you revise and re-apply?**
- ○ Yes
- ○ No

5) **If you did re-apply, did you receive an award?**
- ○ Yes
- ○ No

6) **Why haven't you applied? (If the answer to question 1 was "No")**
- ○ I am unaware of the internal research awards
- ○ I don't have time to complete a proposal
- ○ I don't have a strong research agenda
- ○ I don't believe I'll receive an award
- ○ I don't feel I have the support of my department/school or college
- ○ Other

Escaping the Drama Triangle: Strategies for Successful Research Administration from the Psychology of Codependence

Deborah J. Clark
Central Michigan University

Abstract: *The role of research administrator requires highly efficient and collaborative project management to develop competitive, compliant and properly targeted applications for sponsor support. When problems arise, stress and time pressures may lead to maladaptive forms of manipulation and micromanagement between research administrators and principal investigators that resemble dysfunctional, codependent relationships. Using Karpman's Drama Triangle (1968), this article describes the loss of independence and the cognitive bias that precede the development of codependent thinking and behavior in the workplace, particularly as it relates to research administration. Discussion includes the incidence of "helicopter parenting" and its potential application to research administrators' attempts at risk-averse project oversight and security. The remainder of the article provides suggestions for avoiding workplace codependence within the research office, including specific strategies for engaging with principal investigators with greater clarity, effectiveness and respectful collaboration.*

Keywords: *research administration, codependency, helicopter parenting, Karpman's Drama Triangle*

Navigating the Social Field of Research Administration

The role of research administrator has dramatically changed over the past two decades. Landen and McCallister (2002) foresaw profound changes in the field of research administration borne of rapidly advancing technology, sponsor emphasis on complex, problem-centered research, and ever increasing expectations for responsibility and accountability from all project stakeholders. While institutional assumptions and support for offices of research have struggled to contend with the reality of their daily work (Cole, 2008; Landen & McCallister, 2002), research administrators have capably pushed the field forward, using their skill and expanding knowledge to maximize sponsored funding, despite shrinking office resources and sponsor payouts.

Cole (2008) suggested that faculty and research administrators comprise a "living system" with strong interdependency on one another, and much potential for reformation and growth. Research administrators and their faculty cannot achieve their common goal of successful sponsorship absent their individual contributions to a successful process. Yet as opposed to faculty who focus on the essential subject matter of each funding request, research administrators dynamically shift

through a host of different roles and knowledge sets critical to the outcome of their work. Lehman (2017) observed that research administrators at times focus on an expansive set of legal, financial, and process information that they must fully understand to apply appropriately. At other times, research administrators rely on implicit knowledge and best practices that are garnered through experience and conveyed via the complex culture of research administration (Lehman, 2017).

Beyond the relatively simple skillsets that appear in research administrator job descriptions, like detail orientation and technology skills, every successful research administrator wields a toolbox of tacit skills that aid communication and expedite progress. These include the ability to instill confidence in an anxious, stalling principal investigator on deadline day, a communication style that directly addresses wrongdoing without shaming, and the sharp insight to accurately foresee a problem before it arises and resolve it.

An effective research administrator may shift between manipulation, intrusion, inspiration and vigilance. Ideally, they strive to respond to their colleagues with consistent clarity and respect. Nevertheless, when the time pressures and high-stakes outcomes common to the field intervene, research administrators are easily drawn into weakening their professional boundaries and allowing workplace conflicts with principal investigators to become personal affronts. Weak boundaries and enmeshment in other peoples' issues and problems can lead to inappropriate caretaking, or codependence, which in the workplace, can damage both relationships and professional outcomes (Alcorn, 1992; Larsen & Goodstein, 1993). Avoiding these situations requires personal clarity and an awareness of the dynamics in place (Wagner, 2015; Alcorn, 1992; Henley 2011), which can be difficult to recognize while in the heat of difficult situations.

Visualizing Research Administration on the Drama Triangle

Psychiatrist Stephen Karpman (1968) developed a model termed, The Drama Triangle, that diagrams how people in conflict think and behave in shifting, destructive ways. The model is used for everything from transactional therapy (Forrest, 2008; Zerin, 1988) to mapping dramatic scripts (Birk, 1994; Karpman, 1968;), but among its strengths is the model's ability to diagram toxic interaction, including the personal positions underlying codependency.

Figure 1. The Drama Triangle

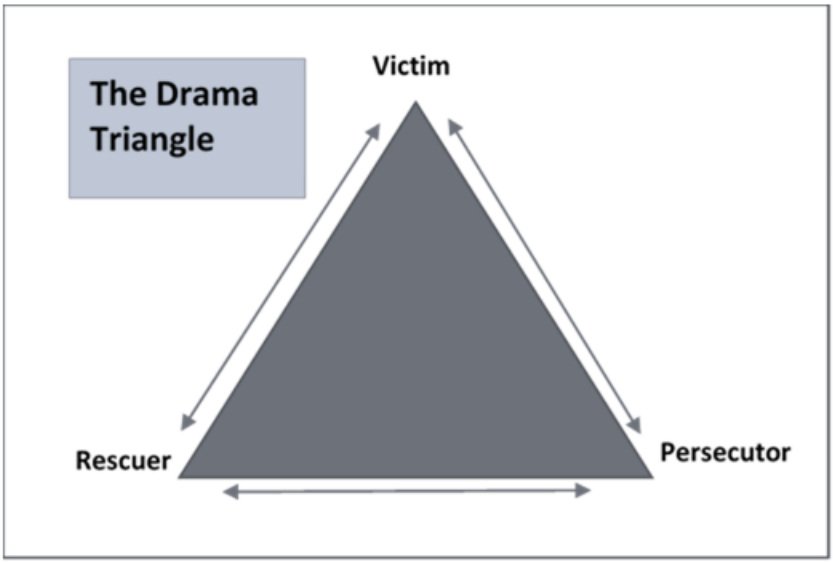


Figure 1. The Drama Triangle. This diagram, illustrating the inter-relation of three key roles in maladaptive communication, was developed by Stephen Karpman (1968).

The model has three revolving roles – victim, rescuer and persecutor. At the apex of the triangle is the "victim," – the "feel sorry for me" role that solicits assistance and sympathy from others. At their side is the rescuer, who faces conflict with the need to save the victim by control and manipulation. To their side is the persecutor who feels put upon, resentful, and angry about having to deal with the victim's problems.

As the arrows show, people dealing with conflict travel this triangle by assuming the various roles at different times in their own conflicted thinking and communication (Forrest, 2008). At times, several people in conflict with one another will act out the roles on the Drama Triangle as they struggle with a problem - like a principal investigator (victim), research administrator (rescuer), and college dean (persecutor) arguing about a large equipment purchase on a grant. At other times, individuals play out the roles on the Drama Triangle in response to their own shifting, emotional thinking about a problem, like a research administrator worrying, blaming, and fitfully recalculating as they struggle with a significant budget error on a submitted proposal. Accordingly, realizing when you are responding to a situation by "traveling the Drama Triangle" is an important first step toward reducing stress and working more efficiently.

Using Karpman's Drama Triangle and psychological theory regarding codependent behavior in the workplace, the author will help readers to visualize the blurring of effective boundaries between

research administrators, principal investigators and their project colleagues and illustrate the risk of negative impacts to their interrelating. Additionally, the article will provide strategic steps for recovering clarity, detaching from interpersonal matters, and resuming effective, respectful collaboration.

The Seduction and Sacrifices of Enmeshment

The fluid roles of research administrators – partner, authority, mentor, and coordinator – require some affinity for the people and projects they lead. It is commonly believed that cultivating professional friendships and mutual trust can improve the quality and effectiveness of work. Unfortunately, the same deeper understanding and empathy that helps research administrators sensitively push a project forward can create additional complexity and complicate stress.

Studies show that stress is a common component of the research administrator lifestyle (Shambrook, 2010; Shambrook, 2012). More than half of us are stressed at a level we perceive as "high" or "extremely high," as we struggle with work-life balance, and neglect of our own health through poor sleep, long hours and working while ill (Shambrook, 2012). High stress, coupled with a strong feeling of responsibility for all aspects of a job, even for those aspects that are out of a person's control can be problematic, particularly when it becomes habitual (Henley, 2011).

Arguably, one of the most important capabilities research administrators possess and manage throughout their careers is their ability to walk the tightrope between collaboratively co-managing very complicated projects with their principal investigators and becoming emotionally enmeshed with these projects and people, such that they lose the ability to see issues with independence and detachment. Because this behavior is reinforced by experience and supported by situational factors, anyone can fall into dysfunctional helping behavior (Alcorn 1992; Larsen & Goodstein, 1993; Wagner 2015). Letting stress, fear or insecurity prompt interference in the routine responsibilities of others or choosing to translate an impersonal conflict into a personal slight can elevate short-term frustrations into longer-term obstacles in anyone's working life. If these habits persevere, they can reinforce damage to working relationships, promote burnout, and even prematurely end careers (Alcorn, 1992; Larsen & Goodstein, 1993). At worst, enmeshed behavior can become habitual, leading to unmanageable and personal stress affecting home life and relationships (Alcorn, 1992; Larsen & Goodstein, 1993; Wagner 2015). Accordingly, learning to see the signs of emotional enmeshment with our principal investigators is among one of our most important abilities as research administrators, for those closest to us, and for the healthy longevity of our careers.

Attributional Bias As A Moderator Of Research Administrator Experience

Research administrators are expert knowledge managers with the ability to focus simultaneously on all the moving parts of a complex project: the principal investigator; the members of the team; the relation of the work to the sponsor's priorities; and the regulations, policies and requirements of all stakeholders. Research administrators recognize and support all of these assets, not for one project, but for all of the projects that overflow their "in" baskets, prepare for closeout, await

resubmission, and travel backward over the busy years of their individual careers.

Well-managed, successful grants and contracts can boost careers, elevate the reputation and success of the institution, and benefit the public good (Cole, 2008; Landen & McCallister, 2002). External funding advances fields of inquiry, promotes the survival of worthwhile programs, and keeps staff and students actively engaged and meaningfully employed. When proposals are declined or suffer serious compliance failures during implementation, all roles and resources are negatively impacted in ways that are difficult to fully assess. Failures in project launch, whether prior to submission, at the sponsor level, or cobbled post award, can be upsetting events for research administrators, especially if they feel some connection to the failure. Understanding how personal beliefs about situations, people, and events impact behavioral decisions is a first key to avoiding enmeshment.

Personal explanations of apparent successes and failures, including the outcomes of sponsored work, is an element of our attributional style; habitual, cognitive explanations for interpreting good and bad events, irrespective of their history or context (Higgins & Shaw, 1999; Peterson & Seligman, 1984; Riolli & Summer, 2010). These cognitive biases attach to individuals, and infect teams of colleagues through simple office discussion and interaction (Riolli & Summer, 2010). Those with a pessimistic attributional style – who blame themselves for negative outcomes and expect to experience similar failure in the future, can create a "shared mental model" of negativity through group interaction that results in team feelings of ineffectiveness, helplessness and negativity (Riolli & Summer, 2010)..

Negative Bias in Research Administration

The pressures of our interpersonal work as research administrators can easily contribute to the tendency to cultivate biased thinking. Attendees of the Society for Research Administration International (SRAI) meetings, who have engaged in the discussion sessions focused on creating better relationships with project principal investigators, may be surprised at how vividly a few negative interactions are remembered and remain a concern, even if they occurred years ago.

In reality, there are many valid reasons why principal investigators and their advocates may struggle to relate with research administrators. First, we arrive to each project with different priorities – principal investigators focus on the program or research described and the research administrator focuses on guidelines, protocol, compliance and process (Cole, 2008). Each of us speaks a different language, and owns a different part of the process. Not surprisingly, when experienced faculty were asked about the support research administrators should provide, faculty prioritized being more helpful and less focused on enforcing rules (Cole, 2008). Where there is misunderstanding and misalignment in priorities, frustration may lead to feelings of mistrust, which can manifest in controlling the sharing of information. Yet both parties are deeply committed to achieving the same all-important outcome - a successful, competitive proposal.

Where a pessimistic attributional bias continues unquestioned, the quality and persistence of work is impaired (Riolli & Sommer, 2010). Neutral situations, requiring questions rather than pre-judgement, are reinterpreted to fit an existing personal bias and explained as an intentional

fault or aggression. If research administrators see these conflicts as evidence of their insufficiencies or inability to manage challenging relationships, they may be hesitant to share their concerns with supervisors or colleagues who might question their choice to take situations personally or suggest alternative explanations. Believing the situation is intractable and beyond help, reinforces the research administrator's role as victim and facilitates a reactive response.

Codependency: The Research Administrator's Myth of Control

Many research administrators have stood at an impasse, working feverishly, late in the process, with a proposal that must go out and a principal investigator who is making excuses, is slow to respond, or is not producing work aligned with sponsor guidelines. Not wanting to face a failed process or take the time to untangle a troubled situation, the research administrator steps in and personally assumes project tasks, regardless of whose responsibility they are or whether they should. To facilitate tight deadlines, they may even choose to intercede in their principal investigators' work routinely. As the research administrator's regular duties sit untouched, they may rationalize their boundary-violating actions as examples of their excellent service orientation, and the means by which they earn faculty trust and demonstrate to all their indispensable value.

However, that may not be how the principal investigator sees it. They may be uncomfortable with the steps taken and view the overreach as intrusive; an infringement of their appropriate oversight and follow up. Alternatively, they may see the sacrifice as a glorious opportunity. If their research administrator is willing to do their work, why get in the way and assume responsibility for their own share of the effort? The research administrator may be shocked and angered by these responses, unsure why their sense of sacrifice was unappreciated by their principal investigator or so inappropriately used.

In the realm of popular psychology, this type of interaction is termed, codependency. This popular psychology term was originally developed by Melody Beattie (1989) to characterize the behavior of people engaged in deeply troubled relationships centering on a partner with addictions. Over time, the description of codependence has expanded to other types of toxic interactions including controlling workplace interactions (Alcorn, 1992; Larsen & Goldstein, 1993; Morkved, 2014), misguided entrepreneurial behavior (Wagner, 2015), and dysfunctional over parenting relationships (Caruso, 2019; Fingerman et al., 2012; Odenweller, 2014; Rousseau & Scharf, 2015; Rousseau & Scharf, 2018; Schiffrin, et al., 2014). In the codependent relationship, one person is compulsively, consistently, and at times, dramatically engaged in controlling and rescuing the other from their own age- and situation-appropriate responsibilities and consequences (Allcorn, 1992; Beattie, 1989; Burn, 201 5; Henley, 2011; Springer et al., 1998).

Interestingly, codependency, like other emotional and behavioral issues, occurs across a continuum - from those whose lives are deeply afflicted by these decisions and behaviors to those who exhibit this behavior only in certain situations and in response to certain persons (Alcorn, 1992; Larsen & Goldstein, 1993; Springer et al, 1998). Accordingly, researchers and practitioners contend that codependency is a pattern everyone experiences to at least some extent (Allcorn, 1992; Larsen & Goldstein, 1993; Wagner, 2005). Where codependent thinking predominates, there is greater likelihood that neutral stimuli will be interpreted inaccurately and skewed toward

codependent beliefs and chosen behavior (Allcorn, 1992; Larsen & Goldstein, 1993). As this behavior continues, boundaries are seriously blurred and the person providing all the unrequested assistance and interference loses track of their own needs and responsibilities (Allcorn, 1992; Beattie, 1989; Burn, 2015; Henley, 2011; Springer et al.,1998). Though persons dealing with codependence may realize the futility of trying to control another's behavior and consequences, their efforts at control continue (Beattie, 1989; Alcorn, 1992; Larsen & Goldstein, 1993). Over time, codependent behavior can become so compulsive that unrelenting "helping" extends beyond the original troubled relationship and situation to other important people in the rescuer's life, who neither need nor request support (Allcorn, 1992; Burn, 2015; Henley, 2011; Springer et al.,1998).

As expected, these boundary violations are not well perceived by many colleagues and where they are supported, there is much room for the codependent employee to be misused and disrespected by others (Allcorn, 1992). Because of all the additional work they assume, many codependents are consistently anxious, stressed and plagued by feelings of overwork, further complicated by their own neglected assignments and unnecessarily complicated responsibilities (Allcorn, 1992; Burn, 2015; Henley, 2011; Larsen & Goldstein, 1993; Pisor, 2015). Because they feel excessive responsibility for everyone's outcomes, employees contending with codependency are prone to painful guilt when their feverish work does not result in success. Their world feels controlled by outside forces which they try their best to manage and appease (Allcorn, 1992). As a consequence of their impaired state, they are subject to excessive denial of the reality of their situation, and prone to depression and burnout (Allcorn, 1992; Lancer, 2018; Larsen & Goldstein, 1993; Pisor, 2015).

How Codependency Places Research Administrators on the Drama Triangle

Understanding how codependent thinking and behavior affects research administrators is important to avoiding these problems. Returning to Karpman's Drama Triangle (1968) it is clear that irrespective of which role a person holds in a codependent relationship, there is suffering; the rescuer and persecutor are just two different extremes of victimhood (Forrest, 2008). Rescuers see themselves as superior to the victim because they firmly believe that they have accurately identified the victim's problem and are on their way to solving it singlehandedly, despite its impacts on them personally and professionally. The persecutor also feels superior to the victim because this role identifies as a mistreated person who knows better than to act, think or perform like the victim. Therefore, the persecutor is impacted by stress, animosity and resentment (Forrest, 2008).

When perceived conflict arises, each person enters the Drama Triangle at a "starting gate"– the position (rescuer, victim, persecutor) that is emotionally triggered for them by their prior experiences with conflict, perhaps going all the way back to childhood (Forrest, 2008). Then once they begin interacting on the Drama Triangle, people move from position to position trying to determine their way out, but usually end up intractably in the role of victim (Forrest, 2008).

What would working on the Drama Triangle look like for research administrators? The diagram below (Figure 2) is based on Karpman's Drama Triangle (1968) but is modified to illustrate how

the roles of victim, rescuer and persecutor might function and interrelate in an office of research.

First, note that the catalyst is a "problem" incoming at the center of the diagram. None of the roles dialogue about analyzing the situation or determining whether it needs immediate action. Instead, all victim roles are ready with a characteristic response. The title, the *De-Activation Triangle*, underscores how this chaotic approach activates emotional reactivity, rather than a logical, fact-based approach to issues.

Figure 2. The Research Administration De-activation Triangle

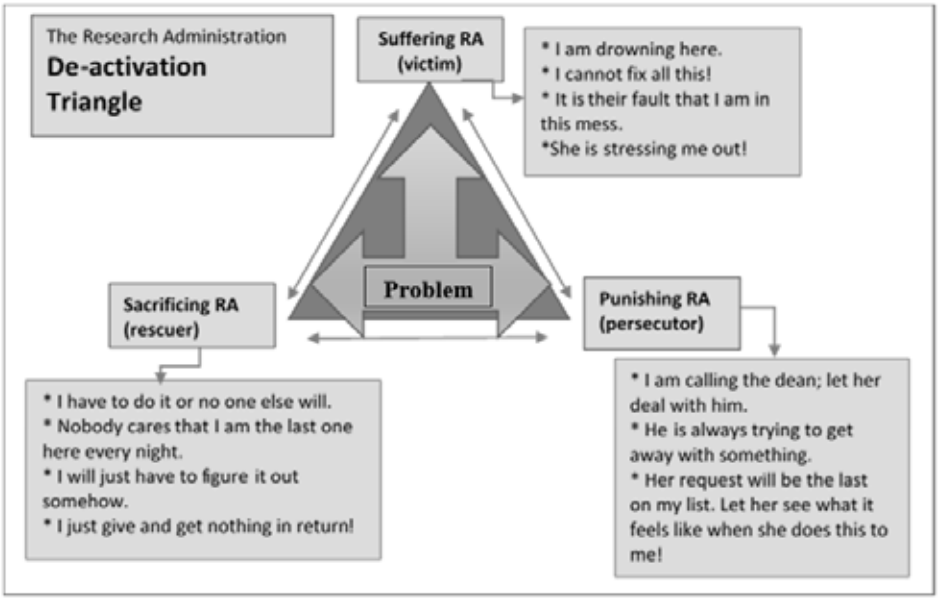


Figure 2. The Research Administration De-activation Triangle. Based on the work on Stephen Karpman (1968), this diagram provides examples of how the research administration roles of victim, rescuer and persecutor might assess information and interrelate when a perceived problem arises in a busy research office.

Applying these tenets to the field of research administration makes this behavior easier to recognize in the workplace. We know the colleague who eats her lunch at her desk all week and stays later at work in the evening, even on non-deadline days, because she believes she "should" or "must." We work with a colleague who is always short on time, but routinely assumes the work of his principal investigators because "they can't do it themselves" or because his principal investigators "expect it." We feel sorry for an anxious, tired and contentious colleague who fears every negative service review, proposal denial, or post award issue because she never feels truly secure in her abilities or position. Perhaps from time to time, we are these colleagues.

The literature specifies some particular types of codependent tendencies that manifest in the workplace (Larsen & Goldstein, 1993). These include: *Caretakers* who struggle to maintain

control by solving other people's problems and controlling how others work; *People Pleasers* who are loathe to ever say no and are motivated to remove the risk of conflict; *Martyrs* who are subject to worry and guilt and act based on their negative worldview; *Perfectionists* who may suffer from low self-esteem and take mistakes very personally, while holding others to their impossibly high standards; and *Workaholics* who are generally rewarded by institutions for their appearance of commitment, while they hide behind a veil of unfocused busyness (Larsen & Goldstein, 1993). While categorical types help us to recognize these behaviors more readily, we benefit most from seeing how these thought patterns and motivations can pull research administrators and principle investigators off task and in conflict with the urgent and sometimes, confrontational work of developing and supporting sponsored work.

In contrast, Allcorn (1992) identified the "faces" behind codependent tendencies that spur people to focus unwaveringly on some aspect of their work life that is very difficult to secure – the myth of absolute control, perfection and protection from all errors, alleviation of difficult conflicts, and protection from being revealed as weak or incapable (Alcorn, 1992). To meet these needs, codependent employees will assume extra work willingly and put previously assigned responsibilities in jeopardy. They deny their own feelings until small upsets become explosive. They ask nothing for themselves, but have deep-seated expectations to be likewise, rescued, protected and supported by their colleagues. Common failure to achieve these outcomes further depletes their weak self-esteem and self-efficacy (Allcorn, 1992), making stressful work and situations more difficult to overcome.

Does this mean that research administrators are never privileged to overstep the routine bounds of their positions to steer difficult projects to success? Is gatekeeping and vigorous project support always a threat for codependent action? Daire et al. (2012) noted that "emotional overinvesting" occurs when attachment to a particular need or outcome increases, while attachments to other outcomes and needs decrease. This narrowing of focus and energy, particularly when accompanied by controlling, manipulation, and people pleasing are warning signs of maladaptive overinvesting (Daire et al., 2012). This description of enmeshment suggests a deeply different scenario from pulling a project to the finish line along with other qualified roles.

Before a research administrator assumes a task that is ordinarily handled by a principal investigator, the key to determining whether that boundary violation is problematic or appropriate for the situation is taking the time to consider why that course of action is necessary. *In Codependency: The Helping Problem*, Lee (2018) suggested that individuals who feel at risk for codependent actions should ask themselves some key questions before taking action. These questions include: *Do you feel mean saying 'no'? Do find yourself consistently resentful when other do not put in as much effort as you? Do you often find yourself in the 'savior' role?* (Lee, 2018). Taking on additional responsibility to influence someone, seek some action in kind, or to alleviate problems for someone else are all questionable motivations, in the absence of better intentions. Given our deep awareness of all the different aspects that support project success, it is sometimes necessary to decline a request for direct support from a principal investigator and instead focus on enabling their own knowledge and abilities to assume a task themselves while fostering their independence. This is a goal completely foreign to persons who think and act codependently, while wishing to be

everyone's oracle and savior. Sometimes it is better to empower others to perform work delegated to them, so in your role as research administrator you are free to pursue work that only you have the understanding and training to complete.

Our field has a service orientation that rewards "going the extra mile" for our principal investigators, especially for those whose full collaboration we have yet to win. A similar argument has been made in the literature declaring that codependent behavior is gender-specific and in fact represents social ideals of feminine care and support (Dear & Roberts, 2002). Though males and females do not differ significantly in their degree of codependent behavior (Lee, 2018; Springer et al., 1998), codependent characteristics are sometimes described in positive, stereotypically feminine terms – such as expressing empathy, nurturing others, and demonstrating self-sacrifice for the good of others (Dear & Roberts, 2002). From this perspective, overreaching and navigating across professional boundaries could be considered as nothing more than a commendable, client service orientation. Experienced research administrators are keenly aware of the stresses of grantsmanship and the necessary commitment to drop all other actions and attend to the investigator in need. The difficulty is in offering the right kinds of assistance where and when appropriately needed, while maintaining a professional, and appropriately detached position from principal investigators and proposals. This demeanor, which seems impersonal and uncaring from a codependent perspective, is actually the stable, unclouded perspective with the best likelihood of reviewing situations with clarity and objectivity, leading to an appropriate and useful level of support.

"Helicopter Parenting" Project Success And Compliance

Though the broad terminology of codependency has fallen out of favor in segments of the psychology community (Dear & Roberts, 2002), new terminology has become commonplace to describe codependent behavior specific to particular types of relationships and circumstances. Among these is the term "helicopter parenting" – described as the "use of developmentally inappropriate forms of involvement, control, and problem-solving" to spirit children of any age toward success at various milestones or tasks (Rousseau & Scharf, 2018). Helicopter parents are overprotective and overzealous communicators, who interfere in their children's personal matters, usurp their decision-making, and make unreasonable investments in their success, while freeing their pathway of ordinary obstacles (Odenweller, et al, 2014). As opposed to the maladaptive and contentious relationships common in codependency, helicopter parents often enjoy positive, loving relationships with their young offspring (Schiffrin, et al, 2014). In early childhood, helicopter parenting is associated with a host of positive outcomes for their children, including healthy development and prosocial behavior, but as children approach adolescence, this parenting approach becomes more likely to cause harm (Schiffrin, et al, 2014).

Though there are certainly articles describing the perils of codependent bosses and colleagues (Burns, 2015; Henley, 2011; Morkved, 2014; Pisor, 2015; Robertson, 2018), descriptions of "helicopter bosses" and "helicopter managers" (Grant, 2013; Rao, 2016) seem more in line with the primarily positive, but potentially, overreaching relationships research administrators form with principal investigators. Rao (2016) described helicopter bosses as well-intentioned autocrats

who micromanage their employees, interfere in their work, discourage new approaches and innovative plans, and distrust their employee's abilities. Do the stresses of grantsmanship and the principal investigators that cannot, or will not, comply with urgent needs transform logical, independent research administrators into hovering "helicopter project managers?"

There are certainly useful parallels between anxious parents and anxious research administrators. Studies have shown that helicopter parents are more risk averse than adults with more normative parenting styles (Rousseau & Scharf, 2018). They lack confidence in their children's efficacy and mistrust their children's ability to follow up appropriately. Helicopter parents experience unusual fear and/or anxiety about their children's outcomes, act from a prevention-focused position toward security, safety and compliance, and protect themselves and their children from difficulties, failure, negative outcomes and the perception of incompetence (Rousseau & Scharf, 2018).

The comparison seems odd when balancing children against brilliant and competent principal investigators, yet research administrators may feel like parents struggling to convey their wisdom to their disinterested offspring. Research suggests that faculty see the requirements and regulations of sponsored research as impediments to their work (Cole, 2008). In contrast, staff in sponsored programs offices are much more aware of the serious and costly risks that can arise from poor project planning and follow through. So at times, research administrators engage in vigorous due diligence and ask repeated, difficult questions to make sure that matters of importance will not be missed. Though the research administrator sees these actions as protective and supportive, the experience for a frustrated faculty member may be insulting and restrictive. Then just as an adult striving for autonomy under a hovering parent, principal investigators can grow weary of the protracted permission process, followed by exhaustive oversight, and begin to navigate around the sponsored program office.

Addressing Problems of Codependency and Hovering: Preparing for Respectful Collaboration

The following suggestions for counteracting codependent workplace behaviors are based on the work of Seth Alcorn (1992), Earnie Larsen and Jeanette Goodstein (1993) and Melody Beattie (1989) and are adapted to the specific parameters of research administration. Emphasis is placed on three important levels of decision-making and action: the institution; the workgroup; and the individual.

Addressing the Problems of Codependency and Hovering: Fostering Institutional Collaboration

Two of the key factors that lead people to respond to stressful circumstances codependently are a lack of institutional safety and boundaries (Allcorn, 1992). For research administrators, institutional safety requires a firm set of policies governing how projects are handled at submission, award and implementation, a process for integrating regular administrative duties

with unanticipated, moment to moment deadlines, and staffing policies that provide enough cross-training and potential for reallocating time to meet high demand situations capably and reliably. These plans foster teamwork over less efficient, self-sacrifice.

The ability to rely on institutional rules and processes for particular types of requests serves everyone by setting expectations for success. When protocols are understood and reiterated uniformly by everyone, there is little opportunity for principal investigators to claim they are unaware and rationalize their own passing lane around the sponsored research office.

Then there are the physical boundaries – effective workspaces that allow people to focus on their work, to secure quiet when needed, and to engage in open conversation with their principal investigators and stakeholders without disrupting others. Even relatively commonplace considerations, like a stable, protected desk space and individualized computing, can help to reinforce a feeling of independence and provide the security and convenience to easily locate needed resources.

Addressing the Problems of Codependency and Hovering: Fostering Interpersonal Collaboration

Larsen and Goldstein (1993) emphasized the following qualities that lead to professional success: *loyalty; motivation for success; willingness to improve; and personal responsibility.* Each provides a useful standard for professionalism in the field of research administration.

Loyalty is a shared commitment to the mission, goals and objectives of the organization (Larsen and Goldstein, 1993). In research administration, staff uniformly share a commitment to facilitating the growth of principal investigators. Devising useful and effective professional development supports responsible project stewardship and helps research administrators facilitate a transparent process.

Motivation for success provides the intention of the research office; a way of doing work that achieves shared outcomes and puts interpersonal insecurities that move staff toward hovering, controlling and overstepping outside of priorities. Each research administrator needs to plan their own toolkit for success – one that reduces stress, celebrates outcomes and prompts detachment from conflict. Exercise, hobbies, relaxation, and a positive social network are all healthy buffers for maintaining forward progress.

Willingness to improve is an asset that compliments the dynamic, every-changing nature of research administration. Just as sponsor guidelines, programs and policies are forever in a state of flux, flexibility in welcoming new situations and challenges enhances working life. Striving for perfection and fearing the appearance of inexperience makes staff less able to handle these new situations – but a desire to grow professionally invites a positive challenge.

Personal responsibility encourages administrators to share issues openly for group discussion and resolutions that foster group productivity and success. Fortunately, the same open sharing that helps to produce better plans and policies also counteracts the anxious, sequestering of information common to codependent thinking.

Addressing the Problems of Codependency and Hovering: Fostering Individual Success

Melody Beattie, the best-selling author who introduced the world to the concept of codependency in her book, *Codependent No More*, specified *Core Symptoms* over which people struggling with codependency can feel powerless (1989). Reviewing these symptoms raises awareness of the situational and emotional states that reinforce feelings of powerlessness and a need to take action - any action - to gain control of a situation that feels out of control. Based on Beattie's book, *Breaking Free: A Recovery Workbook for Facing Codependence* (1989) the list of personal priorities below suggest how to recapture personal strength when the work of research administration feels overwhelming.

Level Your Self-Esteem

Though importance and self-worth are not externally determined, reminders of past successes reinforce continued effort and growth. Keep positive emails commending a job well done, letters of thanks and statistics for awards received within easy access.

Set Strong Boundaries

Setting boundaries on available resources raises awareness of their limits. Plan the day, even if disruptions are anticipated, and be selective about which and how many unanticipated needs integrate into the schedule.

Own Your Now

When applications are flying, it is easy to become disengaged from feelings and perspective in the moment. Checking in with emotions, and the ideas that prompted them, provides a path to stability and calmer processing.

Decipher Needs from Wants

When hovering over situations and trying to keep control, delegating work or waiting for a more convenient time seems impossible. Yet the ability to let go of assumptions and an unfair, unattainable, version of our professional selves are the first steps toward a more effective, and less stressed productivity.

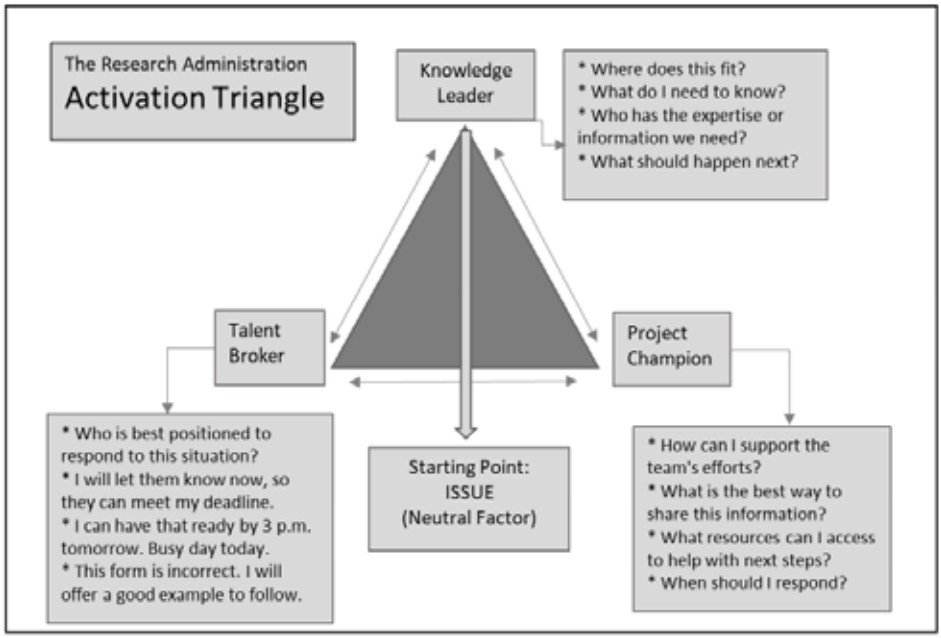
Addressing Problems of Codependency and Hovering: Revisiting the Drama Triangle

In Figure 1, a review of Karpman's Drama Triangle (1968) provided readers with a visual representation of how people engaged in toxic interrelations think and communicate. The thought patterns and behaviors of these roles closely mirror the codependent relationship, complete with a voice relevant to the roles of victim, rescuer and persecutor. The Drama Triangle was then redrawn into a *De-activation Triangle* (Figure 2) that mirrored how these types of victims might think and interrelate within a busy research office. Processing was focused internally, (ie. "How will this problem affect me?") rather than on the identification of the issue and the planning of an appropriate resolution.

The diagram in Figure 3, the *Activation Triangle*, represents a reinterpretation of the three roles into their more collaborative, cognitively independent counterparts. In this format, each role is motivated by curiosity to understand a new, incoming issue and externalize processing to determine which office resources and what schedule is most appropriate for follow up. Each role on the *Activation Triangle* translates into its functional opposite when compared with the prior figures. The descriptions of each role, below, provide useful examples of collaborative, independent thinking that can reduce stress and promote efficiency.

Figure 3

The Research Administration Activation Triangle



Note. **Based on Karpman's Drama Triangle (1968), this diagram translates the roles of victim,** rescuer, and persecutor into their functional opposites within an active research office.

The shift from Suffering RA (Victim) to Knowledge Leader (KL)

The cornerstone of the victim role is deficiency; they believe themselves incapable of solving problems, and see themselves as too weak, fragile or ignorant to manage. Nonetheless, they are deeply resentful of those who come to their rescue (Forrest, 2008).

On the Activation Triangle, the Suffering Research Administrator (Victim) is transformed into a Knowledge Leader (KL) who symbolizes the first cognitive and behavioral approach to any new issue that arises. The KL sees a lack of information as an external issue, not a personal shortcoming. The KL questions what data are missing and who has the needed expertise to strengthen the KL's

understanding of the issue. Focus is on identification, understanding and next steps.

The transition from Sacrificing RA (Rescuer) to Talent Broker

For the sacrificial research administrator, successfully addressing any situation is a lesser priority than earning others' gratitude, recognition, and eventual reciprocation, for their seemingly selfless acts (Forrest, 2008).

On the Activation Triangle, the Sacrificing RA evolves into a Talent Broker (TB) who approaches issues by choosing staff with whom to collaborate or helping key roles feel competent and confident while successfully moving forward. TBs set expectations for responding, and provide resources to empower learning, professional growth and independence.

The shift from Punishing RA (Persecutor) to Project Champion

The Punishing Research Administrator needs someone to attack when things go wrong. They believe they can do no wrong themselves, and are generous with their blame, threats, lectures and retribution (Forrest, 2008).

In contrast, the Punishing RA finds their strength as a Project Champion (PC) on the Activation Triangle. As asset manager, the PC focuses on improving the delivery, quality, and value of resources provided by the office of research to the project and its team. Consequently, the PC becomes a valued and trusted collaborator, rather than a disruptive, outside influence.

Conclusion

The role of research administrator requires an unusual set of skills and competencies, including the emotional intelligence to navigate an ever-changing landscape of complicated projects and people. The belief that interpersonal acrimony is just an unavoidable fixture of the profession is inaccurate. Emotionally detached, rewarding investment in our principal investigators' projects is possible and preferred. Further, research administrators can do much to determine how frequently they travel the Drama Triangle and visit its uncomfortable points of victimhood. Each thwarted journey on the Drama Triangle begins with awareness of the risk and appropriately, ends with us.

Authors' Note

Author Deborah Clark gratefully acknowledges the support of the SRAI Author Fellow Program and program mentor, Dr. Rani Muthukrishnan, Director, Office of Research Protections, Villanova University for invaluable assistance toward the development of this manuscript. In addition, Ms. Clark is deeply gratefully to Dr. Bobbi Vogelsang, DBH, LCSW, for professional insights and comment regarding the behavioral tendencies discussed throughout this article.

Deborah J. Clark, B.S., M.S.
Research Officer
Central Michigan University
Office of Research and Graduate Studies
Foust 251
Mount Pleasant, MI 48859
Telephone: 989-774-1903

References

Allcorn, Seth (1992). *Codependency in the workplace: a guide for employee assistance and human resource professionals*. Quorum Books, New York.

Beattie, M. (1989). *Codependent no more*. New York, NY: Walker.

Birk, J.F. (1994). Fated Boy –Karpman Drama Triangle and Melville "Billy Budd." *Literature And Medicine*, Fall, Vol.13(2), pp.274-283.

Burn, S.M. (2015). Are you a codependent beast of others' burdens? *Psychology Today*, on February 15, 2019, from https://www.psychologytoday.com/blog/presence-mind/201506/are-you-codependent-beast-others-burdens?eml.

Caruso, J. (2019, Mar 26). Snowplow parents. *The Weekly Standard, 25*, 6-7.

Cole, S. S., PhD. (2007). Research administration as a living system. *Journal of Research Administration, 38*(2), 14-278.

Daire, A. P., Jacobson, L., & Carlson, R. G. (2012). Emotional stocks and bonds: A metaphorical model for conceptualizing and treating codependency and other forms of emotional overinvesting. *American Journal of Psychotherapy, 66*(3), 259-78.

Dear, G.E., & Roberts, C.M. (2002). The relationships between codependency and femininity and masculinity. *Sex Roles: A Journal of Research*, 159.

Fingerman, K., Cheng, Y., Wesselmann, E., Zarit, S., Furstenberg, F., & Birditt, K. (2012). Helicopter parents and landing pad kids: Intense parental support of grown children. *Journal of Marriage and Family, 74*(4), 880-896.

Forrest, L. (2008). *The three faces of victim – an overview of the victim triangle*. Retrieved July 29, 2019 from https://www.lynneforrest.com/articles/2008/06/the-faces-of-victim/

Grant, A. (2013). The helicopter manager. *Government Executive*. Retrieved February 21, 2019 from https://www.govexec.com/advice-and-comment/management-matters-advice-and-comment/2013/08/helicopter-manager/67784/

Henley, J.M. (2011). Part III: When co-dependents are identified in the workplace. *Good Therapy*. Retrieved on February 21, 2019, from https://www.goodtherapy.org/blog/workplace-co-dependents/

Higgins, N., & Shaw, J. (1999). Attributional style moderates the impact of causal controllability information on helping behavior. *Social Behavior and Personality, 27*(3), 221-235.

Karpman, S. (1968). Fairy tales and script drama analysis. *Transactional Analysis Bulletin, 7*(26), 39-43.

Lancer, D. (2018). Symptoms of Codependency. *Psych Central*. Retrieved on February 15, 2019, from https://psychcentral.com/lib/symptoms-of-codependency/

Landen, Marcia, & McCallister, Michael. (2002). Evolution or revolution? Examining change in research administration. (Shop Talk). *Journal of Research Administration, 33*(3), 17-20, 3.

Lee, R. (2018). Codependency: The helping problem. *Psych Central*. Retrieved on May 17, 2019, from https://psychcentral.com/lib/codependency-the-helping-problem/

Lehman, D. (2017). Organizational Cultural Theory and research administration knowledge management. *Journal of Research Administration, 48*(2), 52-66.

Morkved, R. (2014). Recognizing and overcoming codependency in the workplace. *Linked In*, May 22, 2014, retrieved on February 21, 2019, from https://www.linkedin.com/pulse/20140522020657-249419883-recognizing-and-overcoming-codependency-in-the-workplace

Odenweller, K.G., Booth-Butterfield, M. & Keith Weber (2014) Investigating helicopter parenting, family environments, and relational outcomes for millennials, *Communication Studies, 65:4*, 407-425.

Peterson, C., & Seligman, M. E. P. (1984). Causal explanations as a risk factor for depresion: Theory and evidence. *Psychological Review, 91*, 347-374.

Pisor, Brian, host. "Workplace Codependency with Dr. Marie-Line Germain." *Codependency No More*, CNM Podcast Episode 19.

Rao, M.S. (2016) Lessons in Leadership: Autocrats and "Helicopter Bosses," *Training Magazine*, February 18, 2016, https://trainingmag.com/lessons-leadership-autocrats-and-%E2%80%9Chelicopter-bosses%E2%80%9D

Robertson, J. (2018). Bad Bosses: 3 Ways to spot the codependent. *Psych Central*. Retrieved on July 26, 2019, from https://psychcentral.com/blog/bad-bosses-3-ways-to-spot-the-codependent/

Rousseau, S, and Scharf, M. (2015). "I will guide you" The indirect link between overparenting and young adults' adjustment. *Psychiatry Research*, Vol 228(3), pp. 826-834.

Rousseau, S., & Scharf, M. (2018). Why people helicopter parent? An actor–partner interdependence study of maternal and paternal prevention/promotion focus and interpersonal/self-regret. *Journal of Social and Personal Relationships, 35*(7), 919–935. https://doi.org/10.1177/0265407517700514

Schiffrin, H., Liss, H., Miles-McLean, M., Geary, H., Erchull, K., & Tashner, A. (2014). Helping or Hovering? The effects of helicopter parenting on college students' well-being. *Journal of Child and Family Studies, 23*(3), 548-557.

Shambrook, J. (2012). Comparison of stress-related factors in the 2007 and 2010 Research Administrator Stress Perception Surveys (RASPerS). *Journal of Research Administration, 43*(2), Number 2, 2012, 107-118.

Shambrook, J. (2010) *Health behavior, occupational stress, and stress resiliency in research administrators working in the academic environment* (Doctoral dissertation, Walden University) Dissertation Abstracts International, AAT 3412291.

Springer, C., Britt, T., & Schlenker, B. (1998). Codependency: Clarifying the construct. *Journal of Mental Health Counseling, 20*(2), 141-158.

Wagner, D. (2013). When do your strongest success traits make you codependent? *The Good Men Project*. Retrieved on February 21, 2019, from https://goodmenproject.com/featured-content/when-your-strongest-success-traits-make-you-codependent-dwgr/.

Zerin, M. (1988) An Application of the Drama Triangle to family therapy, *Transactional Analysis Journal, 18*:2, 94-101.

Establishing a Project Management Community of Practice in a Large Academic Health System

Marcus R. Johnson
CSP NODES National Program Manager
Durham VA Health Care System

Jean Bolte
Senior Project Leader
Duke Clinical and Translational Science Institute
Duke University School of Medicine

Timothy Veldman
Director, Center Strategy and Operations
Duke Center for Applied Genomics and Precision Medicine
Duke University School of Medicine

Lynn Sutton
Assistant Dean of Clinical Research Initiatives and Alliances
Duke University School of Medicine

Abstract: *An organization's ability to accomplish its mission is often contingent upon its collective capacity to execute projects and/or initiatives in a timely and organized manner. Project management has a critical role in the delivery of projects within designated timelines, budgets, and defined quality. Duke University, in its entirety, comprises both its university campus and a growing health system. The organizational complexity of this enterprise necessitated the creation of a shared resource and platform for project managers across the institution to come together to share ideas, best practices, network, and engage in opportunities for professional development to better support the University's research mission. The mission of the Duke Project Management Community of Practice (Duke PMCoP) is to provide a professional network for project managers, including professional development activities; education and training for students, faculty, and staff; and a repository for best practices, tools, and resources in project management. In just over two years from its official launch, the Duke PMCoP has evolved into an active and robust community and boasts over 400 members participating from across Duke University and the local Veterans Affairs Health Care System in Durham, NC. This manuscript describes the development and implementation of the Duke PMCoP, in the context of the successes, challenges, and lessons learned during its establishment in a large, academic health system. Moving forward, the focus of the PMCoP is to sustain and grow the community to achieve recognition as the*

primary resource for project management expertise and mentorship across campus.

Keywords: *project management, academic research, community of practice*

Background

Project management (PM) involves the practice of both envisioning a future undertaking and the act of making it happen, and can be defined as the practice of initiating, planning, executing, monitoring, and closing a specific work, aimed at achieving specific goals at a specified time (Garel, 2013; Lippi & Mattiuzzi, 2019). Traditional PM has its origins in the construction and engineering fields of the 1950s and 1960s whereby large engineering projects—military projects, highway construction, public works projects, industrial complexes, schools and university campuses—necessitated that management methods and techniques become standardized into project management-based best practices in order to meet tight timelines, coordinate huge supply chains, and control costs (Garel, 2013). Today's (modern) PM incorporates an adaptive approach and is described as "a series of flexible and iterative steps through which you identify where you want to go and a reasonable way to get there with specifics of who will do what and when" (Howard Hughes Medical Institute [HHMI], 2006).

Although PM principles and practices have become ubiquitous in many other sectors (e.g., military, industry, information technology, etc.), their adoption in the academic medical research environment remains challenging (Garel, 2013; Riol & Thuillier, 2015; Kridelbaugh, 2017). There are a number of potential contributing factors to this situation, including: (1) institutional structures and academic traditions remain prominent and underlie traditionally siloed strategic planning and operations within and across academic medicine departments; (2) academia is a knowledge-driven enterprise versus product- or profit-driven as in industry; and (3) project management and team science are relatively new concepts in academic institutions, which is in part a consequence of the lack of training offered in traditional medical or graduate school curricula (Zucker, 2012; Sutton et al., 2019).

The current demand for the U.S. healthcare system to undergo a major redesign, inclusive of academic medical centers, will require the use of PM principles such as agile methodology, strategic implementation, and the utilization of metrics to measure performance and progress, in order to achieve the broad transformation that will be needed to reshape how healthcare is organized, financed, and delivered (Doebbeling & Flanagan, 2011; Goodison et al., 2019; Shine, 1997; Baum & Swig, 2017). In contrast, for example, industry is product-driven with an overarching focus on its bottom line and generating profits. Industry projects are managed under team-based and project management approaches that are integral to business environments whereas much of the management and leadership of academic (research) projects falls essentially on the single faculty (principal) investigator. Altogether, these factors present a seemingly insurmountable challenge for project management to make inroads into the academic research space, but important changes in recent years offer some promise.

The academic research environment is quickly evolving and trending towards the development of strategies and initiatives that involve systems approaches such as population health management,

'big data' science, and team science (Disis & Slattery, 2010; Bennett & Gadlin, 2012; Sutton et al., 2019). Team science is defined as "a collaborative effort to address a scientific challenge that leverages the strengths and expertise of professionals trained in different fields" (National Cancer Institute, Team Science Toolkit, 2020). Interdisciplinary engagement and collaboration across different academic departments or institutions are increasingly necessary for these types of efforts. For example, federal sponsors (NIH, DoD, etc.) often require descriptions of project management plans and teaming strategy in interdisciplinary research program proposals (Calhoun et al., 2013). Sponsors are also requiring greater accountability in budget spending and project milestone tracking through regular progress reports. The increased scale and complexity of system-wide initiatives, a complex regulatory environment, coordination of interdisciplinary teams, and management of project budgets and milestones paint a reality of the modern academic research environment that necessitates the academic scientist to take on multiple complex roles and functions, but they are unequipped to do so. Consequently, this reality has become a catalyst for organic change for non-traditional academic approaches including integration and engagement of PMs to take active roles in support of academic research agendas to ensure successful and sustainable research programs. Despite the opportunity, however, little data exists regarding the benefits of PM in academic medical research, or how best to deploy PM principles and best practices in this setting (Goodarzynejad & Babamahmoodi, 2015; Payne et al., 2011).

Since academic research is hypothesis-driven and often exploratory in nature, the PM approach in research should be flexible to account for unexpected events and adaptable to allow for new discoveries and lines of inquiry (Laufer et al., 2015; Kridelbaugh, 2017). Indeed, the successful project manager will often combine 'agile' methods with the more traditional PM approach to manage the lifecycle of dynamic and complex research projects (Laufer et al., 2015). Regardless of traditional, adaptive, or combined PM methods used, employing project management principles and practices brings value added to a research project and its project team. HHMI in its training report states, "While keeping creativity intact, project management can help reduce wasted effort, track progress (or lack of it) and respond quickly to deviations from important aims" (HHMI, 2006). Project management also considers other key factors for project success including the communication strategy among team members, collaborators, and the sponsor, risk mitigation planning and project monitoring, and clear identification of team member roles and responsibilities to increase team effectiveness. However, it is unclear to what extent PM is utilized in an academic research setting:, if PM resources and tools are available to support academic investigators and research teams, if there are training and educational opportunities offered to address PM knowledge gaps, if there are organized events or networking opportunities for the PM professional (or trainee) in academic research, and or if the academic HR department has appropriately described roles and career track opportunities for project managers in research.

In this paper, we describe the development and implementation of a project management community of practice (PMCoP) at Duke University that was intended to bring together the 300+ individuals at the institution involved in PM with a primary focus on health research to share best practices, tools, and resources. We do this with the hope that our experience of identifying opportunities, navigating challenges, understanding lessons learned, and achieving successes might serve as a useful template for other similar academic medicine institutions

(Figure 1). Specifically, we highlight our approach from an academic research perspective, discuss outcomes and achievements to date, and discuss next steps for continued engagement and growth for a sustainable PMCoP model at Duke.

Figure 1: Duke PMCoP Development Process

Methods

The concept of convening project managers across Duke surfaced in conversations at the same time as several of the eventual steering committee members were working to organize PMs in their respective groups for support. Four people representing three health research-related organizational units at Duke met for coffee in November 2016 and began outlining goals and objectives for creating a PM community. This group became the nascent Steering Committee. Our first step was to identify a target group for initial community membership by understanding the PM landscape at Duke University. To accomplish this, we conducted a simple landscape analysis of the university. We worked with Duke Human Resources to conduct a thorough review of Duke position descriptions (PDs) and identified those that contained a significant number of project management-related components (Table 1).

Table 1. HR Position Titles with PM-related Roles

Table 1		
HR Position Titles with PM-related Roles	**Number of employees in any work area**	**Subset of employees in a health research related work area**
Clinical Trials Project Leaders I-III	124	124
Program Coordinators	276	57
Program Coordinator, Senior	100	29
Project Planners I-II	32	22
Research Program Leaders	53	50
Research Project Manager, School of Medicine	19	19
Research Project Manager, University	10	8
Total	**614**	**309**

The results of that review indicated that there were 614 individuals employed in the targeted PDs. We then identified the organizational units across the Duke enterprise that had a primary focus on health research and a subset of 309 employees were identified. We also administered a survey to the Duke community in order to better understand the PM landscape at our institution. Over 300 respondents from across Duke medical and university schools completed this survey and the results showed that PM activity was occurring widely and supported basic and translational science, clinical research and even research administration. While widespread, however, the survey also revealed project management occurring in isolation within individual units, with highly varying levels of expertise and experience, and with variable or limited PM standards and best practices employed. Importantly, the findings illuminated clear needs to support, train, and connect project managers across the university and to establish structures and standards that help streamline academic research projects. This approach enabled our identification of those groups that we wanted to engage as stakeholders throughout the community formation process. Given the long-standing relationship between the Duke enterprise and Durham VA Health Care system (DVAHCS) in terms of shared resources, academic and clinical affiliations, and physical proximity, the decision was made to include the DVAHCS in the development of the Duke PMCoP (Erwin et al., 2019).

We determined that having faculty champions would be advantageous to successfully advocate to leadership and other stakeholders across the institution on behalf of the PMCoP. We identified and engaged two senior faculty members who had demonstrated strong support for PM: Duke's Vice Dean for Translational Sciences and the Director of the Duke Center for Applied Genomics and Precision Medicine (CAGPM) to serve in those roles. We also recognized the need for an institutional home that would provide support in terms of start-up effort and resources, and the Duke Clinical & Translational Science Institute (CTSI) agreed to serve in this capacity (Duke Clinical & Translational Science Institute, 2019a). Having CTSI's support allowed the Steering Committee to leverage their website and the expertise of their communications specialists during the development and dissemination of PMCoP media content to the Duke community and the general public.

PMCoP Steering Committee

With the support of our faculty champions, the PMCoP Steering Committee (SC) formalized a charter in February 2017 which defined the roles and responsibilities of the SC, described its composition, established Committee meeting schedules, and described procedures for decision-making. The SC has primary responsibilities of providing governance and leadership for the Duke PMCoP and serving in an advisory role while contributing subject matter expertise to Duke leadership, administration, and the Duke community. The inaugural Committee had 9 members and currently has 11 members including representation from both Duke and the DVAHCS. The Committee initially held a standing bi-weekly meeting but has now transitioned to a monthly meeting due to the PMCoP's evolution into a mature, high-functioning group that no longer requires the frequency of planning and decision-making by the Committee that was required during its preliminary stages. The SC discussed potential models for this initiative and decided to pattern it after the Project Management Institute's (PMI) Communities of Practice (CoP) (PMI,

North Carolina Chapter, 2019).

The development of the charter was followed by a half-day strategic planning exercise at which consensus was reached by the Committee that the development of a project management career path at Duke was a key priority, and that a communication strategy, speaker program series, and plan for engaging key sponsors were needed to increase the likelihood of success for the PMCoP. The Committee also agreed that membership in the PMCoP would be open to anyone with an interest in project management both within and external to Duke. This decision was reached due to the group's shared interest in promoting team science and collaboration (Sutton et al., 2019).

The PMCoP is a volunteer organization, so one significant challenge that SC members have experienced is difficulty with balancing the demand of competing work priorities that exist between their primary work positions and their volunteer commitment to serve on the SC. This conflict also exists for those serving on various PMCoP subcommittees.

Results

The creation of the PMCoP was announced on September 1, 2017 and that update was disseminated via newsletters and targeted emails to solicit membership and participatione in a launch event in October 2017. The launch event included a keynote speech by the Duke CAGPM Director, an information session facilitated by SC members on the PMCoP mission and values, volunteer opportunities, and networking opportunities. Concurrently, we launched a web-based member registration form that included survey questions related to the background, interests, and event format preferences of those queried. Initial registration exceeded our expectations with over 300 responses. Upon registration, individuals were immediately added to the PMCoP listserv for future communication.

The Duke PMCoP has evolved into an active and robust community on the Duke campus and is currently comprised of 412 members across Duke University, Duke University Health System, the DVAHCS and other institutions. The community has demonstrated the accomplishment of its mission, which is to provide professional development and a professional network for project managers; education and opportunities for students, faculty, and staff; and a repository for best practices, tools, and resources in project management.

Professional Development Opportunities and Resources

Professional development and networking opportunities are offered to PMCoP members through a variety of approaches including hosting speakers to discuss topics aligned with their respective expertise, other training/development activities, and networking/social activities. One such event was a case study session entitled, "Successfully Navigating Through Project Challenges" where groups worked on case studies that highlighted common pitfalls in project management including managing difficult personalities, project mission and scope creep, project timeline and budget challenges, and vendor issues. Project groups presented their proposed risk mitigation strategies. The event was both well-attended and received, and was a reminder that risk and risk mitigation strategies are something that all project managers will encounter and be asked

to address, regardless of discipline. Determining convenient locations for these events has been somewhat of a challenge as PMCoP members are not centrally located on campus and the group also includes remote employees. When possible, events are made available via WebEx.

PMCoP Website and Social Media

In addition to the aforementioned in-person professional development opportunities, the PMCoP developed a website that houses a number of informative resources for its members (Duke Clinical & Translational Science Institute, Duke Project Management Community of Practice, 2019b). These resources include a toolbox in *Duke Box*©, a cloud-based storage and collaboration service that contains sample project management tools and templates, information on other organizations that have a focus on project management, as well as links to relevant journal articles and other recommended reading for those interested in the discipline of project management. Access to this content is restricted to PMCoP members but general information about the PMCoP, including its SC and instructions for how to join the community is accessible to the general public. A community group page was established on the LinkedIn® platform in order to create an online social networking presence, as well as to disseminate articles related to the field of project management.

Subcommittee Development

The SC also established subcommittees deemed essential for the development of the PMCoP, as well as to sustain its activities for the foreseeable future. The roles and responsibilities of each group are as follows:

- Membership/Volunteer: New PMCoP member recruitment, membership listserv maintenance, review and reporting of member survey data, PMCoP subcommittees volunteer matching, and solicitation of additional volunteers as needed.
- Programming: Development of monthly program plans and schedules, presenter recruitment, special interest group development, and program evaluation and reporting.
- Communications: Provide strategic marketing and communication to increase awareness of the Duke PMCoP organization, events, and resources.
- PM Toolbox: Identification and cataloging of existing project management tools and resources for users to explore and locate the needed tools and resources required to facilitate the successful execution of projects.

Conclusion

Following a year of planning, our PMCoP was launched and has completed two years of operations. Membership grew to 412, membership on the Steering Committee expanded from 9 to 11 members, and we hosted a number of networking and professional development events. As we enter our third year of operations, we are now turning our attention towards ensuring continued success and stability for the PMCoP as a solid organization supporting project

management at Duke University.

Moving forward, our focus is to sustain and grow the community to achieve recognition as the primary resource for project management expertise and mentorship across campus. We want to retain engagement with our current members while continuing to recruit new members. Ongoing evaluation of our membership demographics will be important to facilitate membership that is representative of all the segments of project management professionals campus wide. To ensure the community is responsive to its members' needs, an annual survey has been distributed to the membership to elicit their feedback and suggestions. The PMCoP continues to offer valuable educational activities while ensuring current and relevant content is maintained in our online toolbox. This content enhances our internal communication and marketing strategies to educate the campus community about our mission and values. Ensuring continued timely response to inquiries and building a process by which we can match inquiries/needs with PMs who are best positioned to provide advice, expertise, mentorship and links to training opportunities will help to build a positive reputation for the PMCoP as a "go-to" resource.

One significant barrier that our group must overcome in order to be able to sustain and ensure the growth of the PMCoP is the absence of dedicated funding towards the program. Although the group relies heavily on the Duke CTSI for specific resources such as the use of their website to house the PMCoP's website, and continued use of their expertise to develop and disseminate PMCoP media content to the Duke community and general public, the PMCoP does not currently have any dedicated, full-time (or part-time) staff that have the sole responsibility of executing the necessary work associated with its day-to-day operations. Although the Duke CTSI itself is funded through an award provided by the National Center for Advancing Translational Sciences of the National Institutes of Health, the PMCoP itself is not directly funded, although the aforementioned support is provided to it (National Center for Advancing Translational Sciences, 2020). The work performed across all levels of the PMCoP i.e. Steering Committee, Subcommitees, etc. is being provided on a volunteer basis from Duke and VA employees with full-time positions. Over upcoming months, the Community will place an increased emphasis on identifying financial support in the form of sponsorship, both internal and external to Duke, and other strategies that aim to generate revenue (i.e., utilizing registration fees for membership and/or conferences, in order to be able to host additional meetings and events that align with its mission).

Examples of sponsorship models that the PMCoP will further explore are those that are currently being utilized by various chapters of the Project Management Institute (Project Management Institute, 2020; PMI North Carolina Chapter, Sponsorship Program, 2020; PMI Long Island Chapter, Sponsorship Plan, 2020; PMI Metrolina Chapter, Partnering Opportunity Summary for 2016, 2020). It will also be imperative for the PMCoP Steering Committee to take the lead on developing metrics that will demonstrate the group's efficacy, as it relates to the impact that the Community's provision of PM education and training for students, faculty, and staff has on Duke's academic and research mission. Demonstrating the PMCoP's value through the achievement of defined goals and metrics that are aligned with the larger Duke enterprise's strategic goals will likely be necessary to secure internal funding.

We continue to evaluate our structure and function and make necessary revisions to ensure continuity for the community. This includes assessment of our membership model and committee structure. Our current charter outlines a mostly volunteer organization although a more formal election process for all or part of the SC and functional subcommittee chairs going forward has been discussed. We must also ensure that there is a plan for financial sustainability in place including annual budgeting, solicitation of sponsorship funding, and regular financial status reporting. Lastly, we would also like to network with PM communities in other academic settings and particularly with fellow CTSA institutions.

Authors' Note

This work was supported by the National Center for Advancing Translational Sciences of the National Institutes of Health under Award Number UL1TR002553. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The other current members of the Duke Project Management Community of Practice Steering Committee are as follows: Amelia Karlsson, PhD, Mary Ellen Matta, PMP, Emily Miller, PhD, PMP, Christian Stephens, PMP, Chris Todd, MPH, and Hilary Bouton-Verville, PSM, RLATG. We would also like to thank former Steering Committee members Ana Sanchez, PhD, Megan Lott, MPH, RD, Christine Purchell, CPLP, PMP, Mary Trabert, MBA, CAPM, and Joanna Downer, PhD. Lastly, we would like to thank Vonda Rodriguez, PhD, PMP, who previously served as Chair for the Steering Committee, and Ashley Lennox, PhD, who previously served as an intern with the Committee.

Marcus R. Johnson, MPH, MBA, MHA
CSP NODES National Program Manager
Durham VA Health Care System
508 Fulton Street (152)
Durham, NC 27705
(919) 452-1464
marcus.johnson4@va.gov

Jean Bolte, MSN, RN
Senior Project Leader
Duke Clinical and Translational Science Institute
Duke University School of Medicine
701 West Main Street
Durham, NC 27701
(919) 314-7423
jean.bolte@duke.edu

Timothy Veldman, PhD
Director, Center Strategy and Operations
Duke Center for Applied Genomics and Precision Medicine
Duke University School of Medicine
101 Science Drive, Box 3382
Durham, NC 27708
(919) 684-5479
tim.veldman@duke.edu

Lynn Sutton, MS, MAEd, PMP
Assistant Dean of Clinical Research Initiatives and Alliances
Duke University School of Medicine
200 Morris Street
Durham, NC 27701
(919) 668-8925
lynn.sutton@duke.edu

Correspondence concerning this article should be addressed to **Marcus R. Johnson**, MPH, MBA, MHA, CSP NODES National Program Manager, Durham VA Health Care System, 508 Fulton Street (152), Durham, NC 27705, marcus.johnson4@va.gov.

References

Baum, N., & Swig, B. (2017). Project management for healthcare practices: Costs and timing. *Journal of Medical Practice Management, 32*(4), 271–275.

Bennett, L. M., & Gadlin, H. (2012). Collaboration and team science: From theory to practice. Journal of Investigative Medicine: The Official Publication of the *American Federation for Clinical Research, 60*(5), 768–775. https://doi.org/10.2310/JIM.0b013e318250871d

Calhoun, W. J., Wooten, K., Bhavnani, S., Anderson, K. E., Freeman, J., & Brasier, A. R. (2013). The CTSA as an exemplar framework for developing multidisciplinary translational teams. *Clinical and Translational Science, 6*(1), 60-71. https://doi.org/10.1111/cts.12004

Disis, M. L., & Slattery, J. T. (2010). The road we must take: Multidisciplinary team science. *Science Translational Medicine, 2*(22), 22cm9. https://doi.org/10.1126/scitranslmed.3000421

Doebbeling, B. N., & Flanagan M. E. (2011). Emerging perspectives on transforming the healthcare system: Redesign strategies and a call for needed research. *Medical Care, 49* suppl., S59–S64. https://doi.org/10.1097/MLR.0b013e31821b57eb

Duke Clinical & Translational Science Institute. (2019a). CTSA Cores. Retrieved December 4, 2019 from https://ctsi.duke.edu/about/ctsa-cores

Duke Clinical & Translational Science Institute. (2019b). Duke Project Management Community of Practice. Retrieved February 15, 2019 from https://www.ctsi.duke.edu/pmcop

Erwin, M. C., Dennis, P. A., Coughlin, L. N., Calhoun, P. S., & Beckham, J. C. (2019). Examining the relationship between negative affect and posttraumatic stress disorder symptoms among smokers using ecological momentary assessment. *Journal of Affective Disorders, 253*, 285-291. https://doi.org/10.1016/j.jad.2019.04.035

Garel, G. (2013). A history of project management models: From pre-models to the standard models. *International Journal of Project Management, 31*(5), 663-669. https://doi.org/10.1016/j.ijproman.2012.12.011

Goodarzynejad, H., & Babamahmoodi, A. (2015). Project management of randomized clinical trials: A narrative review. *Iranian Red Crescent Medical Journal, 17*(8), e11602. https://doi.org/10.5812/ircmj.11602

Goodison, R., Borycki, E. M., & Kushniruk, A. W. (2019). Use of Agile project methodology in health care IT implementations: A scoping review. *Studies in Health Technology and Informatics*, 257, 140–145. https://doi.org/10.3233/978-1-61499-951-5-140

Howard Hughes Medical Institute. (2006). Chapter 7: Project management. *In Making the right moves: A practical guide to scientific management for postdocs and new faculty* (2nd ed., pp. 125-142). http://www.hhmi.org/developing-scientists/making-right-moves

Kridelbaugh, D. (2017, February 2). How project management techniques can improve research. *Lab Manager*. Retrieved February 8, 2019 from https://www.labmanager.com/business-management/2017/01/how-project-management-techniques-can-improve-research#.XF3Xg6qWyUl

Laufer, A., Hoffman, E. J., Russell, J. S., & Cameron, W. S. (2015). What successful Project Managers do. *MIT Sloan Management Review*. Retrieved December 9, 2019 from https://sloanreview.mit.edu/article/what-successful-project-managers-do/

Lippi, G., & Mattiuzzi, C. (2019). Project management in Laboratory Medicine. *Journal of Medical Biochemistry, 38*(4), 401-406. https://doi.org/10.2478/jomb-2019-0021

Payne, J. M., France, K. E., Henley, N., D'Antoine, H. A., Bartu, A. E., Elliott, E. J., & Bower, C. (2011). Researchers' experience with project management in health and

medical research: Results from a post-project review. *BMC Public Health*, 11, 424. https://doi.org/10.1186/1471-2458-11-424

Project Management Institute. (2020). Retrieved February 25, 2020 from https://www.pmi.org/

Project Management Institute, Long Island Chapter. (2020). Sponsorship Plan. Retrieved February 25, 2020 from https://pmilic.org/index.php/sponsorship

Project Management Institute, Metrolina Chapter. (2016). Partnering opportunity summary for 2016. Retrieved February 25, 2020 from https://pmi-metrolina.com/downloads/Partnering/partnering_opportunity_summary_for_2016.pdf

Project Management Institute, North Carolina Chapter. (2020). Communities of Practice. Retrieved December 10, 2019 from https://ncpmi.org/

Project Management Institute, North Carolina Chapter. (2020). Sponsorship Program. Retrieved February 25, 2020 from https://ncpmi.org/public-documents/sponsorship-program

National Cancer Institute. (2020). Team Science Toolkit. Retrieved March 6, 2020 from https://www.teamsciencetoolkit.cancer.gov/public/WhatisTS.aspx

National Center for Advancing Translational Sciences. (2020). About NCATS. Retrieved February 25, 2020 from https://ncats.nih.gov/about

Riol, H., & Thuillier, D. (2015). Project management for academic research projects: Balancing structure and flexibility. *International Journal of Project Organisation and Management, 7*(3), 251-269. https://doi.org/10.1504/IJPOM.2015.070792

Shine, K. I. (1997). Challenges facing academic health centers and major teaching hospitals. *Journal of Nursing Administration, 27*(4), 21–26. https://doi.org/10.1097/00005110-199704000-00007

Sutton, L., Berdan, L. G., Bolte, J., Califf, R. M., Ginsburg, G. S., Li, J. S., McCall, J., Moen, R., Myers, B. S., Rodriquez, V., Veldman, T., & Boulware, L. E. (2019). Facilitating translational team science: The project leader model. *Journal of Clinical and Translational Science, 3*(4), 140–146. doi:10.1017/cts.2019.398

Zucker, D. (2012). Developing your career in an age of team science. J*ournal of Investigative Medicine: The Official Publication of the American Federation for Clinical Research*, 60(5), 779–784. doi:10.2310/JIM.0b013e3182508317

Project Management Application in Academic and Research Institutions in Zambia

Innocent Mandona
Master of Engineering Student
Department of Civil and Environmental Engineering, University of Zambia

Mundia Muya
Professor of Civil Engineering
Department of Civil and Environmental Engineering, University of Zambia

Abstract: *Research and development needs effective and efficient management as it is the vehicle by which organizations and economies create opportunity, innovation and secure a stream of future products and services. However, research projects face various challenges which may lead to unsatisfactory performance. Various studies have shown that traditional project management methods can be adapted for research projects to make work more efficient and productive. For Zambia, it was not clear to what extent the research institutions in the country implemented project management techniques in managing research projects. Therefore, this study sought to determine whether academic and research institutions in Zambia were using project management techniques in managing research projects. The study adopted a descriptive research design and used a mix of both qualitative and quantitative techniques. The results showed that the majority of academic and research institutions in Zambia applied project management techniques in managing research. Additionally, the study revealed that the majority of the respondents had identified weaknesses in the research management frameworks in their respective institutions. Therefore, in order to improve performance of research projects, this study recommended the need to develop a national research agenda for Zambia, to further enhance the respective institutional research management guidelines or policies, to enhance project management skills of researchers in academic and research institutions, to improve the monitoring and evaluation frameworks in these institutions as well as to offer consistent and adequate funding to support research.*

Keywords: *Research project, research organisation, innovation, project management, monitoring and evaluation*

Introduction

Research and Development is the vehicle by which organizations and economies create opportunity, innovation and secure a stream of future products and services. Research and development, therefore, requires effective and efficient management. Endogenous growth theory assumes that an economy automatically benefits from its investments in new knowledge (Lucas 1988; Romer, 1990) because knowledge is a public good that can be used by an entire

economy, leading to innovation and economic growth (Cantner et al., 2008). Research projects are fundamentally unpredictable and therefore require effective management (Basu, 2015). Basu (2015) further states that this unpredictability of research could arise because research projects may experience unplanned scope changes and in a number of instances goals may not be clearly defined. However, research projects could be efficiently and effectively implemented by adapting project management techniques (Donna, 2017). Further, the adaption of these techniques to research projects means that the research project schedule, cost, and scope must be balanced whist ensuring quality (Donna, 2017).

Project implementation may be constrained in a number of ways and this has potential to prevent a project from achieving its goals (Gray & Larson, 2018). With the foregoing, it becomes imperative that effective constraint identification and management is conducted and a look-ahead schedule (aligned to the overall project strategy) is defined for successful project execution. Further, for successful project implementation, it is important to ensure that the project plan remains on track by monitoring and controlling the various activities. Monitoring and controlling of project activities also assists the project team or research institution to assess the performance of the respective project management systems.

The Project Management Institute (PMI, 2017) defines project management as the application of knowledge, skills, tools, and techniques to project activities in order to meet project needs. Project management, therefore, focuses on achieving set goals or delivering a product within a defined timeframe and budget allocation. This attribute makes project management an important tool for many organisations whose business is to deliver a service or product that meets customer expectations. According to Gray & Larson (2018) application of project management in a number of organisations does not yield the desired results and this may be due to the fact that these organisations do not tailor the best practices to suit their needs but merely replicate them. Project management ultimately has three functions; planning, executing and controlling (Gray & Larson, 2018).

Statement of the Problem

According to the Zambia Association of Manufacturers Report (2017) the country continues to export raw materials more than it exports finished products—a situation which may signal that Zambia does not add value to its natural resources to the desired levels, and that this may be due to the lack of capacity to do so. This capacity can only be enhanced when academia improves its research performance resulting in improved academia and industry collaboration where industry funds demand driven research and development. Further, the majority of sector interventions in Zambia were being implemented without a coherent and harmonized policy framework.

Aim of the Study

The study sought to determine the extent to which academic and research institutions in Zambia apply project management techniques when implementing research projects. This is because it was not known the extent to which research institutions in Zambia implemented project management techniques. The study makes recommendations on how performance of research projects could be improved.

The main aim of the study was to determine whether research organizations in Zambia were using project management techniques in managing research projects in order to improve performance of these research projects.

Objectives

The study aim was achieved by satisfying the following objectives:

i. establishing the level of project management knowledge among researchers and academicians;

ii. determining the extent of application of project management techniques in research and academic institutions;

iii. ascertaining how the research management frameworks in research and academic institutions were performing; and

iv. identifying the potential impediments to the successful performance of research projects in Zambia.

Literature Review

Overview of Project Management

Literature proposes that the concept of project management has been around for a long time and can be traced to the earliest human activities. Project management has enabled people to plan bold and massive projects and manage funding, materials and labor within a designated time frame (Barron & Barron, 2011). According to the Project Management Institute (2017) a project is a temporary endeavor undertaken to produce a unique product, service or result. Projects ideally have certain characteristics that differentiate them from other endeavors and research activities subscribe to these (Gray & Larson, 2018).

Project management ultimately balances the demands placed on duration, available finances and the defined scope of activities whilst ensuring quality (see Figure 1). The project schedule, available funding and scope of activities which are referred to as the triple constraints are therefore cardinal to the project's performance as compared to the other project demands. Balancing the triple constraints is one of the primary functions of project management.

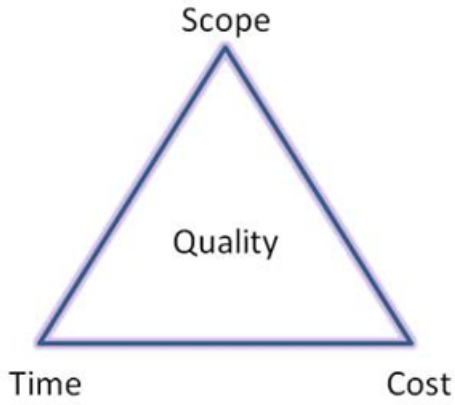


Figure 1: Project Management Triple Constraints

While time is usually the limiting factor in industry, the uncertain funding environment in academic and research institutions may constrain projects more (Donna, 2017). Further, in a number of cases, it has been observed that the triple constraints of time, cost and scope have not been adequately balanced, and this has led to compromised quality and performance of research projects (Donna, 2017).

According to Barron and Barron (2011) every project has a beginning, a middle period and an end period with four phases of initiation, planning, execution and closure. Activities in the middle period move the project toward completion which may either be successful or unsuccessful. The project phases are collectively called the project life cycle as they represent the path a project takes from the beginning to its end (PMI, 2017). Gray and Larson (2018) further state that the uniqueness of project work is better illustrated using the project life cycle. Some project managers use the project life cycle as the cornerstone for managing projects because it assists them to predict the changes in the level of effort and to focus over the life of the project. During the life of a project the start point is marked when the project gets the necessary approval. Initially efforts are low but build to a peak, and then decline towards closure of the project. It has been noted that different models for lifecycles exist and these are industry specific. Figure 2 shows a typical project life cycle.

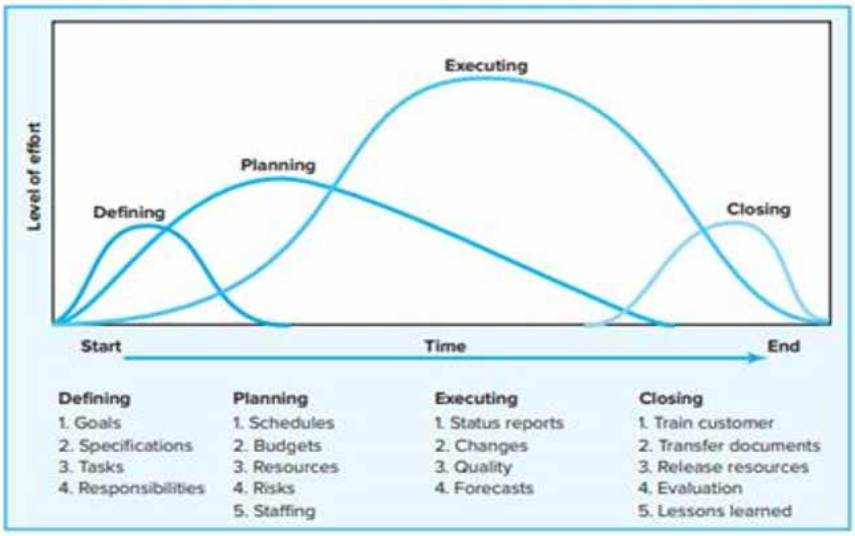


Figure 2: Project Life Cycle

The first stage in the cycle is referred to as 'Defining'. Project definition involves outlining the specifications of the project, establishing objectives, forming teams and assigning responsibilities. The following stage is known as 'Planning'. During planning the level of effort increases, and plans are developed to determine what the project will entail, when it will be scheduled, whom it will benefit, what quality level should be maintained, and what the budget should include. The next stage is referred to as 'Executing'. During this phase major portions of the project work takes place. Physical products such as bridges, reports or software programs are produced during this phase, as are the project schedule, project cost together with the specification measures being used for monitoring and controlling the project. There are various factors taken into consideration during this phase, such as whether the project is within the defined schedule, budget allocation, and meeting other specifications. There is need to determine forecasts of each of these parameters and the required revisions/changes (Gray & Larson, 2018). The last phase referred to as 'Closing' phase is characterised by the handing over of the product to the customer. The other activities under this phase include redeploying project resources, and conducting the post project review.

Project life cycles are used by project teams to time activities over the entire life of the project. As an example, planning for commitment of resources could be done in the defining stage while the quality aspects could be planned for the later stages of the life cycle (Barron & Barron, 2011). Gray and Larson (2018) further say, considering that a number organisations run many projects at the same time and that these may be at different stages of the life cycle, the coordination units

requires careful planning and management for these projects to be implemented successfully.

Process Groups and Knowledge Areas are the core technical subject matters of project management, and these processes along with their individual inputs, tools, techniques, and outputs bring the project to life (PMI, 2018). The Project Management Institute has developed arguably the most important project management standard which it has named the Project Management Body of Knowledge (PMBOK) Guide to aid practitioners.

The PMBOK Guide is approved as an American National Standard by American National Standard Institute (ANSI) and is recognized by the Institute of Electrical and Electronics Engineers (IEEE) as an IEEE standard (IEEE, 2009). The institute describes that much of the knowledge of tools and techniques for managing projects are unique to project management (IEEE, 2009).

However, understanding and applying the above described best practices alone may not be sufficient for effective project management (Project Management Institute, 2017). According to Johnson (2013), to be the most effective, project managers need to have a balance of general management skills, technical management skills and project management skills. To support this, Taylor (2006) said:

Research is an intensely personal activity, strongly dependent on the ideas and imagination of individuals or groups of individuals. . . . Research, therefore, does not lend itself to control and management. Yet, in the fast-changing competitive world of today's higher education, there are constraints that require the application of some sort of management framework. (p. 2)

Barron and Barron (2011) summarise the foregoing in Table 1.

Table 1 Project Management Areas of Expertise

Areas of Expertise
Application knowledge, standards and regulations
Understanding the project environment
Management knowledge and skills
Interpersonal skills

In order to ensure a project's success, there are a number of models a particular project could adopt and there are also certain essential processes that should be present in almost all of these models (Oxbridge Academy, 2019). Essentially, there are about 47 identifiable processes categorized into five groups, namely: initiating, planning, executing, monitoring and control, and closing (PMI, 2017). Every project management process produces one or more outputs (deliverable or outcome) from one or more inputs by using appropriate project management tools and techniques (PMI, 2017).

The project processes can also be categorized by knowledge areas (KA's), which are categories of concepts and processes with a common goal (Harrin, 2019). These knowledge areas are categorised into ten as given below:

1. Integration – Coordinates activities across all project management areas and process groups;
2. Scope – Ensures that the project work includes all elements required to complete the work;
3. Schedule – Ensures that the project work is completed in a timely way;
4. Cost – Plans, estimates, manages and controls project finances;
5. Quality – Ensures that the project delivers a quality output that is fit for purpose;
6. Human Resource – Secures, manages and monitors use of human resources throughout the project;
7. Communications – Ensures that communications on the project are planned and carried out appropriately;
8. Risk – Identifies, assesses and manages risk;
9. Procurement - Carries out purchasing and contracting as required; and
10. Stakeholder – Identifies and engages stakeholders throughout the project.

From the above categorisation, it is seen that process groups are the chronological phases that the project goes through, and knowledge areas occur throughout the time of the process groups. The process groups are horizontal, and the knowledge areas are vertical (Hartney, 2016). It is the collection of the process groups and the knowledge areas that, when tailored and applied to a particular project, ensure success and are therefore key project management techniques.

Different types of project management systems have been developed to satisfy the specific needs of organisations or types of projects (LaBarre, 2019). Some of these methodologies are given below:

1. Waterfall Project Management - This is similar to traditional project management but includes the caveat that each task needs to be completed before the next one starts. The steps in this type are linear and progress flows in one direction (LaBarre, 2019).
2. Agile Project Management - This is best suited for incremental and iterative projects and usually involves processes with demands and solutions evolving through the collaborative effort of self-organizing and cross-functional teams and their customers (Muslihat, 2018).

3. Lean Project Management - This methodology aims to avoid waste and borrows heavily from the Japanese manufacturing practices. The main thrust of this method is creating more value for customers with fewer resources (LaBarre, 2019).
4. Scrum Project Management - The main goal for scrum project management is developing, delivering, and sustaining complex outputs through collaborative, accountable, and iterative progress and is best suited for projects teams of less than seven members who require a flexible approach to delivering a product or service (Muslihat, 2018).
5. Kanban Project Management - This is a visual method that uses the agile framework and aims to deliver high quality results by depicting the workflow process so that bottlenecks could be identified early on in the development process. It is ideal for lean project teams that require a flexible approach to delivering the output and is best suited for personal productivity purposes (Muslihat, 2018).
6. Six Sigma Project Management - This method aims to improve quality by reducing the number of errors in a process by identifying what may not be working and then removing it from the process. The method employs empirical and statistical quality management methods, and expertise of people who are specialists in these methods. The method is best suited for larger companies and organizations that aim to improve quality and efficiency through a data-driven methodology (Muslihat, 2018).
7. Project Management Body of Knowledge (PMBOK) – This is a set of standard terminology and guidelines for project management and not a methodology per se. PMBOK gives five process groups (initiating, planning, executing, monitoring & control, and closing) that are prevalent in almost every project (PMI, 2018).

Besides the ones listed above, there are many other types of project managements systems and methodologies.

Application of Project Management Techniques to Research Projects

Academic research faces new methods of knowledge generation that trigger a need for managing research projects effectively (Riol & Thuiller, 2015). Therefore, the methodologies outlined above together with the project management processes and knowledge areas can positively impact research projects when they are well tailored and applied. Johnson (2013) said project management came out of engineering practice and has been adapted to many fields since. Riol and Thuiller (2015) investigated whether and to what extent academic research projects can be managed using classical project management (PM) principles. The study revealed that research projects are project management compatible considering certain structural similarities and a cultural acceptance of project management value. However, the human factors and uncertainties inherent in research are not addressed by classical project management. Riol and Thuiller thus developed a prescriptive framework for facilitating PM implementation in academic research at the institutional, organisational and operational levels.

The compatibility confirmed by Riol and Thuiller (2015) becomes important due to the fact that research performance is widely considered to be a major factor in a country's economic output and

national innovation system, with the so-called push toward a western-style knowledge economy (Rinne & Koivula, 2005; Holliday, 2012). Therefore, research outcomes have a significant impact both directly and indirectly on an institution's prestige, which in turn attracts/leads to the likelihood of more funding for research from both internal and external sources. Today's leading organizations recognize the importance of research and development (R&D) to maintain and grow their market share (Johnson, 2013).

According to the Science Business Society Dialogue Conference (Academy of Science of South Africa, 2016), "whilst Southern Africa boasts of much excellent science research centres and has an outstanding entrepreneurial community, science and the private sectors do not often sit alongside each other and there are few connections or strategic collaborations" (p. 3).

In the Zambia Association of Manufacturers Report (2017) the chief executive officer emphasized the importance of value addition to local raw materials, with the statement; "Notably the continued level of high dependence on the export of copper and the subsequent need for favorable commodity prices for economic growth has once again left Zambia exposed" (p. 6). This implicitly states that there is need for the country to harness the manufacturing sector for sustainable economic growth through effective and efficient research and development. In Zambia, the research community has appreciable potential that could be harnessed by industry for sustainable economic development.

However, this desired relationship between industry and the research community may not flourish, due to different reasons. In a number of instances, the industry does not engage the Zambian research community due to lack of confidence in the institutions and this may be attributed to the perceived inadequate infrastructure and expertise to deliver. The collaboration between industry and academia is meant to facilitate research, development and discovery of new knowledge of how to further benefit from the raw materials the country has. This new knowledge has potential to deliver processed materials for export at higher prices, thereby earning the country more revenue. Recognizing that knowledge is reliably acquired through conduct of research, it is therefore, important that the research process be well managed. The techniques of project management may be utilized to achieve this.

Methodology

Research Design

This study employed descriptive research in trying to establish whether researchers and research institutions in Zambia were using project management techniques in implementing their work. This type of research design involves observing and describing the behavior of the sample without influencing and explaining it in any way (Shuttleworth, 2008). The study, therefore, did not focus on answering questions about how/when/why academic institutions do or do not apply project management techniques (Shields & Rangarajan, 2013).

Target Population and Sample Size

Forty-two out of the 50 targeted respondents participated in the study. These respondents were drawn from universities and research and development institutions. These institutions were selected for their relevance to the study and because they fit in the time frame and resources of the researcher. Consent was obtained from the 42 respondents who participated in the study before they could answer the self-administered questionnaires. The sample size subscribed to Mosco's rule of the thumb which states that a minimum sample of 30 respondents is sufficient (Sekaran, 2000). Further, the opinion of ten researchers, government ministries and research granting institutions was sought in the study to confirm/provide explanations regarding the respondent's feedback through structured interviews.

Sampling Methods

The sampling technique employed was purposive sampling. This type of sampling employs non-probability techniques where subjects are selected because of their convenient accessibility and proximity to the researcher and importance for the study. This technique was preferred because it is fast, inexpensive, easy and the subjects were readily available (Cooper & Schindler, 2001).

A representative sample was selected in order to obtain more scientific results that could be used to characterise the entirety of the sampled population. A list of all research and development institutions and universities was drawn. From this list, the ones specializing in scientific research were identified and picked through purposive sampling and these were the target sources of respondents for the research.

Data Collection

Questionnaire surveys and structured interviews, respectively, were the two methods used to collect primary data during the study. Questionnaires were chosen because they were easy to administer and could be distributed simultaneously thereby saving time (Mugenda & Mugenda, 2003). The participants in the self-administered questionnaires were assured of anonymity and explained the objectives of the study. Further, informant consent forms were made available to the respondents who signed them to confirm that they participated freely and were not forced to participate. The procedure used in administering the questionnaires increased the confidence in the results of the study as there was no undue pressure on the respondents.

The questionnaires contained closed-ended as well as open-ended questions and was divided into four sections. Section A sought to get general information about the respondents who participated in the study; the information collected and used to profile the respondents included gender, age, qualifications, years of experience, and institutions the respondents worked for. The information helped to confirm reliability of the data collected. Section B contained questions related to the research or academic institution the respondents worked for; the questions sought to determine whether the academic and research institutions had already developed policies or guidelines for managing research, what performance assessment criteria the institutions used, and whether these institutions kept databases for the research projects undertaken. Section C discussed project management techniques and processes employed by researchers and the institutions they worked

for; the questions asked related to the project management knowledge areas of Integration Management, Time Management, Cost Management, Risk Management, Scope Management, and Quality Management. Section D focused on monitoring and evaluation of research projects.

Ten structured interviews were successfully conducted out of the 13 appointments made. The structured interviews were conducted to enhance and verify the questionnaire results obtained. Participants in the interviews were drawn from academic institutions, research fund granting institutions, research institutions, government ministries and departments. The structured interview guide contained four sections as indicated below:

Section A - personal information about the interviewee;

Section B - managing research projects in research and academic institutions;

Section C - implementation of project management techniques in research management; and

Section D - monitoring and evaluation of research projects

Methods of Data Analysis

The study employed a combination of qualitative and quantitative methods, respectively of data analysis and approach in order to analyse the obtained results. Data obtained from the field was in raw form and therefore difficult to interpret unless it was cleaned, coded and analyzed (Mugenda & Mugenda, 2003).

In this study, qualitative data obtained from the open-ended questions in the questionnaires and interviews, respectively, was analyzed descriptively. This data was summarized and organized by grouping it into meaningful patterns and themes that were observed.

Quantitative analysis was also used to analyse the quantitative data collected from closed-ended questions through the use of statistical techniques such as frequency counts, percentages, pie charts and tabulation to show differences in frequencies. Bar charts were used to display nominal or ordinal data. Statistical Package for Social Sciences (SPSS) and Microsoft Excel software was to aid in data coding, data entry and analysis of the quantitative data

Results and Discussion

The study involved ten structured interviews and 42 questionnaire responses, respectively. The study had representation from institutions in Zambia that conduct research. The respondents to the questionnaire survey included experienced researchers with 67% of them having more than ten years' experience as shown in Figure 3.

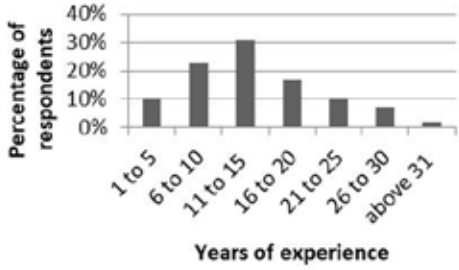


Figure 3: Percentage distribution of respondents' experience in conducting research

In Figure 4 it is seen that majority of the respondents were PhD holders with 33% of the respondents being master's degree holders. The distribution by gender: 83% of the respondents were males and 17% females.

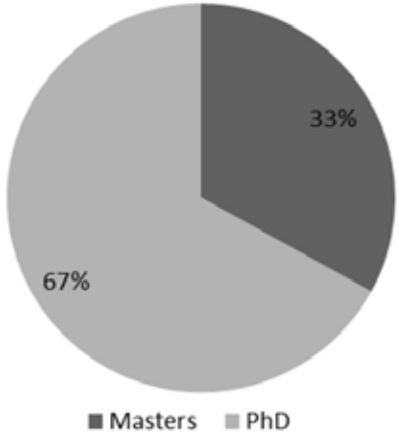


Figure 4: Percentage distribution of respondents' academic qualifications

The feedback from the structured interviews was in agreement with the questionnaire survey responses even if the two guides were structured differently so as to answer the research questions. The questionnaire survey and structured interview questions aimed to collect information that would help determine the extent to which researchers and the institutions they work for implemented project management techniques when managing research projects; the challenges faced by these institutions when trying to adapt project management techniques and the challenges faced when conducting research projects in general. The results of the study were discussed as outlined below:

- availability of policies and guidelines for managing research projects;
- application of project management techniques in research institutions;
- application of project management techniques by researchers;
- monitoring and evaluation of research projects;
- challenges in managing research projects; and
- identified weaknesses in the research project management frameworks.

Availability of Policies and Guidelines for Managing Research Projects

The findings clearly show that policies and guidelines for managing research projects are available in the majority of the academic and research institutions in Zambia. Both the questionnaire survey and structured interviews confirm this result. From the questionnaire survey, 62% of the respondents confirmed that their institutions had the policies or guidelines for managing research, 19% of the respondents indicated that their institutions did not have these documents, and the remaining 19% of the respondents were not sure whether their institutions had these policies/guidelines or not. From the structured interviews, six participants confirmed existence of policies or guidelines in academic and research institutions, three participants answered in the negative and one was not sure whether academic and research institutions have these policies or guidelines.

The availability of policies and guidelines for managing research in academic and research institutions was supported through examples given of the various institutions that had them, both from the public and private sectors, respectively, such as the University of Zambia (UNZA), Copperbelt University (CBU) and Cavendish University among others. It was also established that among the academic institutions only UNZA and CBU have within their structures directorates for guiding research in their respective institutions, and that the other institutions spread out these functions to the respective faculties or departments. Further, it was confirmed that from the list of academic and research institutions sampled, only UNZA and CBU have intellectual property (IP) policies that offer guidance on how intellectual property rights and therefore, proceeds of research, ought to be handled. The other institutions in the study did not have IP policies, or at best these were in draft form.

As much as it is cardinal to have well-defined policies or guidelines for managing an important activity like research, what is even more important is the implementation of these policies or guidelines. What is evident from the findings is that the study could not reveal much evidence

of the implementation of these policies or guidelines. Taking the example of databases for research projects undertaken in a particular institution as proof of implementing the developed research guidelines or policies, only 40 % of the participants confirmed that their institutions kept databases for the research projects undertaken in the past. Thirty-one percent said their institutions did not have databases of research projects and 29% were not sure whether their institutions kept the databases or not.

This data was obtained by using closed-ended questions in both the questionnaire survey and the structured interviews and the quantitative data analysed statistically using Statistical Package for Social Sciences (SPSS).

The findings of the study, therefore, confirm that the majority of the research institutions had policies or guidelines for managing research projects but these policies or guidelines were probably not being utilized much in most of these institutions that had them. Combining the two results indicate that the research management systems in these institutions require implementation plans for them to be of benefit. Further, the participation of private institutions was noted to be low which shows that private institutions conduct research to a lesser extent as compared to public funded institutions. This may mean that most of the private institutions do not have policies or guidelines for managing research. One explanation for the low levels of research activities in privately run institutions may be the lack of resources to formulate these policies or guidelines and to conduct the research itself. For the public institutions the policies or guidelines in a number of instances were developed with assistance from government facilitated collaborations with donor agencies. The private sector, however, did not befit from this kind of support.

Application of Project Management Techniques in Research Institutions

The findings clearly show that academic and research institutions in Zambia apply project management techniques when managing research projects. Figure 5 shows that 58% of the respondents confirmed that their institutions apply project management techniques; 21% said their institutions do not apply the project management techniques and the remainder of the respondents said they were not sure whether their institutions applied the project management techniques or not.

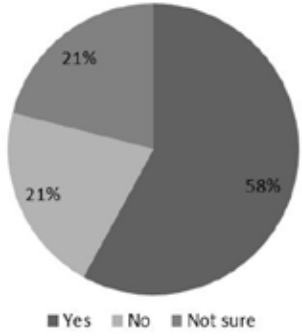


Figure 5: Percentage distribution of organizations' usage of project management techniques

The quantitative data on the application of project management techniques in academic and research institutions was collected through closed-ended questions in the questionnaires. Further, the structured interviews were used to collect qualitative information on the same topic. The qualitative information obtained through explanations agreed with the frequency counts of the questionnaire survey.

The findings in Figure 5 reiterate that the majority of the respondents confirmed their institutions have already developed policies or guidelines for managing research projects. This is because application of project management techniques can best be done in an environment where established policies or guidelines are in place. Further, the structured interview results showed that 50% of the respondents agreed that the research institutions they are familiar with use project management techniques in research management. There was an indication that the application of the project management techniques was not implemented to the desired levels with one reason being that the project management techniques were not fully integrated. Some examples pointed to the fact that institutions would apply project management techniques to big projects in particular and not small projects. This is because the implementers would assume that small research projects did not require application of project management techniques as the resources (time, personnel, among others) to do certain activities were not readily available and that this would be a drain on the scarce institutional resources. However, for big projects, project management activities are usually budgeted for in order to help run operations efficiently as many funding agencies want to see value for their money. The funding organisations in these cases would ensure that due processes are followed and the relevant techniques are applied so that research is well-conducted and completed on time with high chances of success.

Application of Project Management Techniques by Researchers

Figure 6 shows that the researcher's knowledge and application of project management techniques when managing research is average. The data collected indicates that the number of researchers who apply project management techniques when conducting research is equal to the number of researchers who do not apply project management techniques when conducting research.

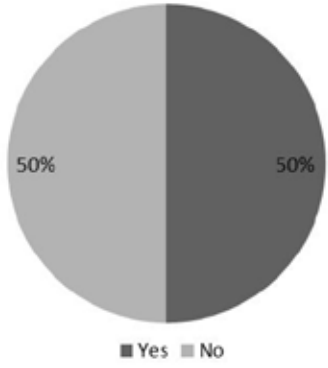


Figure 6: Percentage distribution of researchers' usage of project management techniques

The results revealed that the most commonly used project management knowledge areas are time and quality management, respectively, with the majority of the respondents confirming that they use five out of the six time management activities provided and three out of three quality management activities presented. Most of the respondents were able to indicate how important it is to manage time and further gave examples of how they do that. The Gantt charts and time schedules were the most common examples. This result could be attributed to the fact that observing time is an inherent activity which may require specialized skills only in big and complex projects. Half of the respondents did not put coordination of research projects as a priority but expected the institutions they work for do that task. The main reason for this was that they would be too stretched if they combined these two tasks.

Managing risks associated with the research projects undertaken was not common with most respondents. From the five risk management activities presented, 51% of the respondents confirmed that they identified the project risks as a matter of practice but do not perform any of the other four activities which include risk management planning, qualitative risk analysis, risk response planning and risk monitoring and control. This situation may be typical of basic research projects. For demand driven research, the researchers would worry of the risk of project failure and the associated financial implications. The intervention then is an active risk research management framework.

Managing the project finances and scope of activities was also seen to be appreciated by many respondents to some extent. The majority of the respondents confirmed implementing two out of the three project cost management activities but only 40% of the respondents confirmed implementing cost control. The low levels of cost control can be attributed to low financial management skills by researchers as well as to the fact that researchers expect the accounts units of their institutions to perform the activity. For scope management, the majority of respondents used three out of the five scope control activities presented. The majority of respondents, however, said they did not control nor verify scope of the research projects during implementation. The result actually confirms the statement by Basu (2015) that research is unpredictable and this makes scope control challenging for the researcher.

The main reason attributed to the average knowledge and application of project management techniques by researchers when managing research is the inadequate project management skills of the researchers.

This data was collected through the survey questionnaire administered and this process was followed by the structured interviews in order to confirm the questionnaire results. The questionnaire method was preferred in this study because it was able to cover the major aspects of project management knowledge areas and processes as well as to reach many researchers in the different locations at low cost. The statistical package for social sciences (SPSS) and Microsoft Excel software was used to aid in data coding, data entry and analysis of quantitative data obtained from the closed-ended questions. The quantitative data collected from the closed-ended questions was analysed and presented through the use of statistical techniques which included frequency counts, pie charts and bar charts.

From the literature Riol and Thuillier (2015) confirmed that research projects are project management compatible considering certain structural similarities and a cultural acceptance of project management value. Donna (2017) further adds that implementation of project management techniques when managing research projects increases the effectiveness and efficiency of the research work leading to increased chances of success. That only 50% of the respondents apply project management techniques when managing research projects may suggest that the performance of research projects in the sampled institutions and indeed Zambia is not as desired. Further, this has an implication on the relationship between research/academia and industry. Because of this, industry is not likely to engage academic and research institutions in the country to research and develop means of adding value to the abundant raw materials Zambia is blessed with. This situation would not assist the country's aspirations to diversify the economy through industrialization and converting raw materials into finished goods.

Monitoring and Evaluation of Research Projects

With regard to monitoring and evaluation, the study revealed that 82% of the respondents indicated that they used 'results-based project monitoring' to assess effectiveness of the research work and 59% indicated the use of the 'activity-based monitoring approach.' This result from the survey questionnaires was also confirmed during the structured interviews where seven out of the ten participants said monitoring and evaluation was implemented in academic and research institutions. With results-based monitoring and activity-based monitoring being the major approaches cited, there was also an indication that researchers would at times mix the two approaches when monitoring the research activities.

Regardless of the approach used to monitor research projects, it is important to identify an indicator for measuring the project success. The findings indicated that 73% of the researchers said their institutions look at outcomes of the research projects to determine success and 68% of the researchers said that besides the outcomes they also look at meeting the objectives of the research projects. What is interesting to note is that only 32% of the researchers pointed to financial impact being a factor, with 27 % saying financial impact is not a factor and 41% not sure whether financial impact is a factor or not.

The low level of consideration for the financial impact as a success factor by researchers agrees with the explanation given earlier that the academic and research institutions in Zambia most likely do not work closely with industry to conduct demand driven research. What is evident is that focus for most research conducted in the country is on basic research which, according to Kowalczyk (2013), is driven purely by curiosity and desire to expand our knowledge in a subject matter and not commercial application. If the country's focus was demand driven research funded by the private sector/industry, financial impact of the research could have been a factor in the research conducted.

Closed-ended questions were used to collect the information on monitoring and evaluation in both the survey questionnaires and the structured interviews. This feedback gave quantitative data which was analysed using statistical methods. Further, the questions had an option for specifying other answers. It was from this that qualitative feedback was drawn.

Challenges in Managing Research Projects

Implementation of research projects faces numerous challenges in Zambia. The structured interviews conducted clearly brought out these challenges, with all the ten people interviewed confirming that researchers face a number of challenges when implementing research projects. These challenges could be attributed to the respective academic and research institutions and to the individual researchers. The challenges identified revolve around three key issues and these cut across all sectors. It is expected that research performance would be enhanced if these three issues are resolved:

1. National research agenda - The country seemingly does not have a common document to guide research. This has led to a situation where policies or guidelines for academic and research institutions that have the capacity develop their own guidelines have been developed but these do not feed into a national strategy for research. As a result, these institutional policies or guidelines may fail to effectively contribute to the national development plans. The lack of a national research agenda has led to institutions working in 'silos' and because of this it is more likely that research efforts may be uncoordinated with the risk of duplication of efforts. Another result for lack of a national research agenda would be a situation where a certain institution lacking a particular piece of equipment fails to progress because they are not aware that another institution in the country has that equipment. It is expected that within the framework of this national research agenda, platforms for information sharing would exist.
2. Financing - This is an issue that was common to all participants in the study. Evidently, research in Zambia does not receive the desired funding neither from the national treasury nor from the private sector. Naturally, the few available financial resources from government are spread out to the government-supported academic and research institutions like UNZA, CBU, National Institute for Scientific and Industrial Research (NISIR), and Zambia Agricultural Research Institute (ZARI), among others. The said budget allocations do not suffice to fund any meaningful research. Industry, which should be collaborating with research institutions and fund demand driven research, does not do that in Zambia. This may be attributed to the fact that the majority of players in the private sector are foreign-owned corporations who fund research in their countries of origin. Further, the Zambian academic and research institutions have not positioned themselves well to give confidence to these multinational corporations.
3. Training/skills and infrastructure - This aspect refers to skills in core disciplines and/or complementary skills. The lack of project management and financial management skills explains this. For infrastructure, there are instances when researchers send samples outside the country for testing and this may be due to either, because of working in 'silos' one institution does not know that another institution in the country has that particular piece of equipment or in the entire country no institution has that particular equipment. Further, research infrastructure in the country is outdated and requires replacing/upgrading. The poor state of research infrastructure in the country does not give confidence to stakeholders.

To some extent the identified challenges faced when managing research projects could contribute and be reasons for the non-optimal application of project management techniques in Zambia. It is clear that issues relating to financing can impact negatively on the application of project management techniques as some of these techniques require procuring. Some examples would be certain software, and training staff to upgrade skills. Considering that budget allocations are low, academic and research institutions may not prioritise these activities. A well-defined national research agenda would assist academic and research institutions to include at least the basic best practices of research management in their individual policies. With the established link between project management techniques and research performance, it therefore fits that application of project management techniques for improved research performance could be one of these basic practices.

The structured interview guide contained open ended questions used to collect qualitative feedback on challenges faced by researchers when managing research projects as well as when applying project management techniques to research. This qualitative data collected was analysed using qualitative techniques. The data collection and analysis employed in this study has brought out key and valid issues that could not be obtained from closed-ended questions.

In order to ensure that quality research is conducted, considerable effort must be made. Clearly, with the whole list of challenges presented and the three key issues outlined, it becomes difficult to attract funding for demand driven research from industry by the academic and research institutions. The results obtained in this study give an indication of the magnitude of the problems faced by academic and research institutions. However, it should be noted that solving these challenges requires commitment and effort by the researchers, academic and research institutions, industry and the government. Otherwise, if the status quo is left as is, the country will continue to export raw materials and to import finished goods.

Identified Weaknesses in the Research Project Management Frameworks

Figure 7 shows that 60% of the respondents in the questionnaire survey said they identified weaknesses in research management frameworks and 37% of the respondents said they did not find any weaknesses. Three percent did not respond to this question. The structured interviews confirmed the results of the questionnaire survey with seven out of ten saying there are weaknesses in the research management frameworks found in academic and research institutions in Zambia. As much as the earlier results show that academic and research institutions in Zambia do have policies or guidelines for managing research, the average feedback of 50% individual researchers having knowledge and applying project management techniques agrees with the findings that the majority of the samples for both the questionnaire survey and structured interviews said there are weaknesses in the research frameworks.

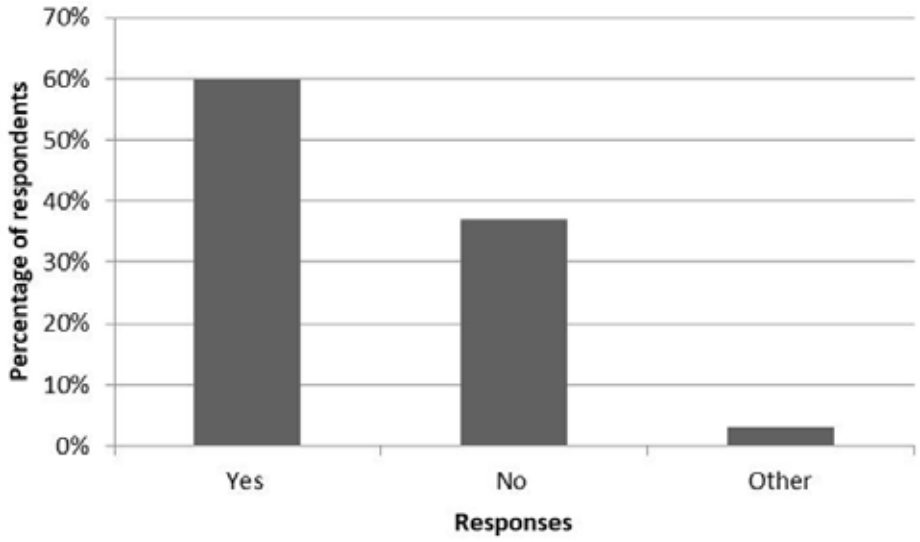


Figure 7: Weakness in research management framework response rate

In a number of situations, what is apparent is that the developed frameworks are not in use and therefore serve no purpose. These weaknesses tend to affect the performance and therefore, quality of research in the academic and research institutions. The situation if left unchecked may lead to the growing lack of confidence in these institutions by various stakeholders. Two key issues relating to weak research frameworks can be identified:

1. Monitoring and evaluation systems may not be consistent with the aspirations of various stakeholders. The results show that most respondents indicated that their institutions have monitoring and evaluation systems, but the results also suggest that these current monitoring approaches may not be as desired by the researchers as this has been identified by many respondents as a major weakness. A most likely case is of developed monitoring guidelines that are not being followed. This calls for an implementation plan to make use of these monitoring guidelines.
2. Guidelines and frameworks for managing research appear not to be institutionalized or they might not have been tailored well to suit the particular institutions.

The above two issues are not the only weaknesses identified in the study. It is also important to acknowledge that, since research projects depend on other support units of these academic and research institutions, any inefficiencies in these support units could affect the performance of research projects. From the responses obtained, the following weaknesses associated with the support units were noted:

- bureaucracy in the procurement process;
- poor project governance resulting in poor risk management;
- irregular disbursement of the project funds;
- research management not being prioritized; and
- lack of incentives for conducting research due to low appreciation by the other units.

Both open-ended and closed-ended questions in the structured interviews as well as the questionnaire survey were used to arrive at these findings. The data obtained, therefore, was both quantitative and qualitative. The qualitatively obtained data from the open-ended questions provided explained the identified weaknesses.

Conclusions and Recommendations

In this era where knowledge is the cornerstone for economic development, the search for new knowledge through research and development is vital (Cantner et al., 2008). Various studies have shown that research performance can be improved by adapting project management techniques (Riol & Thuiller, 2015). Therefore, this study aimed to determine whether research institutions in Zambia were using project management techniques in managing research projects. The aim was achieved by obtaining and analyzing information from key stakeholders that implement research projects in the respective academic and research institutions in Zambia.

By considering the literature on project management and its application to research, and by employing the descriptive research design, the study found out that the majority of academic and research institutions in Zambia apply project management techniques in research management.

The findings on the specific objectives are presented as follows.

Application of Project Management Techniques in Research Institutions - This study has established that the majority of the academic and research institutions in Zambia apply project management techniques when managing research projects. Further, the study revealed that these institutions have policies or guidelines for managing research. The findings agree with the findings of the studies conducted by Riol and Thuiller (2015) which showed that in order to successfully implement project management techniques to research projects, there is need for well-defined guidelines or policies.

Application of Project Management Techniques by Researchers - The findings from the study suggest that to some extent researchers in Zambia apply project management techniques when managing research projects. The study has also shown that the extent to which individual researchers apply project management techniques is relatively lower than the extent to which the respective institutions do this. These findings agree with the presentation by Johnson (2013) that not all scientists have the ability to comply with institutional research guidelines which may include the requirement to adapt traditional project management techniques.

Performance of Research Management Frameworks - The majority of academic and research institutions in Zambia have weaknesses in the respective research management frameworks. These weaknesses can negatively affect the performance of research projects. The study has also shown that the majority of the academic and research institutions do monitor the research projects implemented and that the results-based approach is used more than the activity-based approach. Further, these institutions tend to use the project outcomes as the measure of success for the projects rather than the research meeting the objectives. The identified weaknesses broadly cover the following areas:

- policies or guidelines not being effectively utilized by researchers for various reasons;
- dilapidated and in some instances lack of research infrastructure;
- financing for research being inadequate;
- complementary skills like project management techniques lacking;
- focus on non-demand driven research;
- collaboration between industry and academia is low; and
- poor work culture.

Challenges in Managing Research Projects - The challenges faced by researchers and institutions when managing research projects can be grouped as follows:

- lack of a national research agenda which leads to fragmented efforts;
- lack of financing for research activities;
- poor research infrastructure; and
- lack of complementary skills

Recommendations

Having understood the weaknesses of the respective project management frameworks and the challenges faced by researchers when implementing research projects, the study yielded the following recommendations aimed at enhancing the performance of research projects in academic and research institutions in Zambia:

3. Develop a national research agenda to guide and harmonise the conduct of research and development. (The document is currently in draft form.)
4. Enhance the project management skills of researchers in research institutions through tailored courses by funders and the research institutions.
5. Strengthen research management frameworks in research institutions.
6. Encourage a mindset change by researchers to embrace techniques aimed at improving research management.
7. Improve monitoring and evaluation frameworks by research institutions.

Further Research

The study determined whether academic and research institutions in Zambia apply project management techniques but more detailed studies are recommended in order to develop a model for the adaptation of project management techniques when managing research.

Acknowledgements

My sincere appreciations go to everyone that supported me during the course of studies.

I shall remain grateful to my supervisor, Professor Mundia Muya for having been thorough in guiding and encouraging me during the study.

I wish to thank my employers the National Technology Business Center (NTBC), for having accommodated my study time table.

I pay special gratitude to respondents from the various academic and research institutions that were kind enough to spare their valuable time to assist with information.

Lastly, I acknowledge the support of my family during the study

Innocent Mandona
Master of Engineering Student
Department of Civil and Environmental Engineering
University of Zambia School of Engineering
P.O BOX 32379
Lusaka, Zambia
innocentmandona@yahoo.com

Mundia Muya
Professor of Civil Engineering
Department of Civil and Environmental Engineering
University of Zambia School of Engineering
P.O BOX 32379
Lusaka, Zambia
mmuya@unza.zm

Correspondence concerning this article should be addressed to **Innocent Mandona**, Department of Civil and Environmental Engineering, University of Zambia, School of Engineering, P.O BOX 32379, Lusaka, Zambia, innocentmandona@yahoo.com.

References

Academy of Science of South Africa. (2016). *Strengthening the Science Business Society Dialogue in the SADC Region*. Science Business Society Dialogue Conference, Pretoria. http://dx.doi.org/10.17159/assaf.2016/0014

Barron, M., & Barron, A. R. (2011). *Project management for scientists and engineers*. Retrieved November 11, 2019 from https://archive.org/details/ost-engineering-col11120-14

Basu, R. (2015). *Managing*. Retrieved October 26, 2018 from https://www.bookdepository.com/ Managing-Projects-Research-Development-Ron-Basu/9781472450104

Cantner, U., Gaffard, J., & Nesta, L. (2008). Schumpeterian perspectives on innovation, competition & growth. *Journal of Evolutionary Economics, 18*(3), 291–293. https://doi.org/10.1007/s00191-008-0090-z

Cooper, D. C., & Schindler, P. S. (2001). *Business research methods* (7th ed.). McGraw-Hill.

Donna, K. (2017). How project management techniques can improve research. *Lab Manager*. Retrieved October, 26, 2018 from https://www.labmanager.com/business-management/ 2017/01/how-project-management-techniques-can-improve-research#.W9MJwPZuLIU

Gray, C. F., & Larson, E. W. (2011). *Project management: The managerial processes* (5th ed.). McGraw-Hill Education.

Gray, C. F., & Larson, E. W. (2018). P*roject management: The managerial processes* (7th ed.). McGraw-Hill Education.

Harrin, E. (2019). *10 knowledge areas of project management (PMBOK 6) with PPT & PDF*. Retrieved November 9, 2019 from https://www.girlsguidetopm.com/10-knowledge-areas-of-project-management-pmbok-6-with-ppt-pdf/

Hartney, J. (2016). *The 10 PMBOK knowledge areas*. Retrieved November 9, 2019 from https://www.projectengineer.net/the-10-pmbok-knowledge-areas/

Holliday, C. O. (2012). Universities, key to prosperity. *Science, 336*(6088), 1482. https://doi.org/10.1126/science.1225457

Johnson, A. M. (2013). *Improving your research management: A guide for senior university research managers* (3rd ed.). Elsevier.

Kowalczyk, D. (2013). *Basic research and applied research: Definitions and differences*. Retrieved November 13, 2019 from https://study.com/academy/lesson/basic-research-and-applied-research-definitions-and-differences.html

LaBarre, O. (2019). *Project management*. Retrieved November 11, 2019 from https://www.investopedia.com/terms/p/project-management.asp

Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*(1), 3–42. https://doi.org/10.1016/0304-3932(88)90168-7

Mugenda, O. M., & Mugenda, A. G. (2003). *Research methods: Quantitative and qualitative approaches*. African Centre for Technology Studies.

Muslihat, D. (2018). *7 popular project management methodologies and what they're best suited for*. Retrieved November 9, 2019 from https://medium.com/zenkit/7-popular-project-management-methodologies-and-what-theyre-best-suited-for-8f2c790267f6

Oxbridge Academy. (2019). *Project management processes – What are they?* Retrieved May 27, 2017 from https://www.oxbridgeacademy.edu.za/courses/project-management/process/

Project management Institute. (2017). *A guide to the project management body of knowledge* (6th ed.).

Project Management Institute. (2018). *A guide to the project management body of knowledge* (7th ed.).

Rinne, R., & Koivula, J. (2005). The changing place of the university and clash of values: The entrepreneurial university in the European knowledge society. *Higher Education Management and Policy, 17*(3), 91-123. http://dx.doi.org/10.1787/hemp-v17-art20-en

Riol, H., & Thuillier, D. (2015). Project management for academic research projects: Balancing structure and flexibility. *International Journal of Project Organisation and Management, 7*(3), 251. https://doi.org/10.1504/IJPOM.2015.070792

Romer, P. M. (1990, October). Endogenous technical change. *Journal of Political Economy, 98*(5 Part 2), S71–S102. https://www.jstor.org/stable/2937632

Sekaran, U. (2000). *Research methods for business: A skill business approach*. John Wiley & Sons.

Shields, P., & Rangarajan, N. (2013). *A playbook for research methods: Integrating conceptual frameworks and project management*. New Forums Press.

Shuttleworth, M. (2008). *Descriptive research design*. Retrieved November 10, 2019 from https://explorable.com/descriptive-research-design

Taylor, J. (2006). Managing the unmanageable: The management of research in research-intensive universities. *Higher Education Management and Policy, 18*, 1-25. https://doi.org/10.1787/hemp-v18-art8-en

Zambia Association of Manufacturers Report. (2017). *Arise the sleeping giant: Harnessing the manufacturing sector for sustainable economic growth* (10th ed.). The Zambian Manufacturer.



SRA INTERNATIONAL CAREER CENTER

Uniting Talent with Opportunity

www.srainternational.org/CareerCenter

Live & On-Demand Webinars

Cost-effective and easily accessible

- 2 NEW live webinars each month
- Over 80 on-demand webinars
- Earn CEU's from anywhere
- Available 24/7

Learn more by visiting
www.srainternational.org/Webinars

SRA INTERNATIONAL | SOCIETY OF RESEARCH ADMINISTRATORS INTERNATIONAL

Society of Research Administrators International
Serving the Profession Since 1967
1560 Wilson Blvd., Suite 310
Arlington, VA 22209
www.srainternational.org

Published by the Society of Research Administrators International