JOURNAL OF RESEARCH ADMINISTRATION

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THE JOURNAL OF RESEARCH ADMINISTRATION

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FROM THE EDITOR'S DESK

The *Journal of Research Administration* (JRA) is the premier scholarly publication in research administration and management. We publish timely, essential work that enhances the knowledge base for research administration and supports research administrators worldwide, making JRA a crucial resource for career development as well as to grow the overall knowledge base for the field. Our contributors share best practices and innovative strategies to help research administrators worldwide navigate challenges and seize opportunities in our fast-paced, ever-evolving field. By publishing peer-reviewed scholarly articles, contributors not only advance their own careers but also elevate our profession.

I am pleased to introduce you to the nine original articles in the current issue—a number that reflects our growing submission pool of incisive manuscripts at a global scale. Articles in this issue have come to us from the United States, Canada, Australia, South Africa, and Japan. The first set of studies published in this issue focuses on the needs, nature, and challenges of the research administrator workforce, as well as an exploration of factors that shape their job satisfaction. The uses and utility of artificial intelligence (AI) are the focus of the next two articles. (AI and the complexities surrounding its use, not only by research administrators but also by faculty and other investigators, have increasingly been the focus of JRA submissions. These two timely articles serve as a preliminary venture into AI, joining the broad array of issues and topics JRA has covered in its more than five and a half decades of publication.) We next turn to manuscripts that provide our readers with critical lessons learned in the ongoing and ever-evolving work of research administration. These lessons prioritize the enhancement of research culture across institutions, providing insights that will improve the effectiveness of research administrators as they address essential tasks.

More specifically, the first article, entitled "The Needs and Challenges of the Research Administrator Workforce," comes to us from Dr. Jennifer Woodward from the University of Pittsburgh, At-Large Board Member and Distinguished

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Faculty at The Society of Research Administrators International (SRAI); and Evan Roberts, Executive Director at SRAI. In their manuscript, they discuss the findings and recommendations from an ambitious three-phase National Science Foundation (NSF)-funded GRANTED conference. The three phases began with a set of regional focus groups made up of research administration leaders and human resources professionals who identify themes related to organizational structures in which research administrators function, as well as workforce practices. Insights from these focus groups led to a national survey encompassing diverse institutional types, conducted among individuals with more than 1,200 distinct job titles. As part of a final workshop, senior practitioners reviewed the survey results and provided recommendations that emphasized the importance of developing a national job classification system for research administrators.

Next, a team spanning multiple Japanese Universities, including Dr. Shin Ito at the University of Tokyo, Hiroaki Hanaoka at the University of Osaka, Norihiro Hirata, Ph.D., at Shinshu University, and Makiko Takahashi, Ph.D., provides us with a study entitled, "What are the Crucial Factors Explaining Job Satisfaction and Dissatisfaction in RMAs? Statistical Analysis Based on the Japanese Survey." This work offers a detailed examination of approaches to enhance job content satisfaction and reduce employment dissatisfaction among research managers and administrators in Japanese Universities, as well as a fascinating comparison to these issues in the United States, as discussed in the prior manuscript by Woodward and Roberts.

Finally, Olanrewaju A. Wilhelm and Olumide Odeyemi of the University of Tasmania follow up with, "A Qualitative Content Analysis of Job Advertisements for Research Funding Managers-Related Positions in Australian Universities." In this study, the authors share their perspective on job roles and requirements for research managers in Australia, further contributing to a better understanding of the core elements that comprise the work of research administrators in that country.

When these first three articles in this issue are viewed in combination, they reflect an invaluable multinational perspective on the work and roles of research administrators, as well as the factors that impact their satisfaction and retention.

Our following two articles focus on a growing aspect of research administration processes: artificial intelligence (AI). In their contribution, "Advancing Research Administration with AI: A Case Study from Emory University," Lisa Wilson and her colleagues Benn Konsynski, Ph. D., and Tubal Yisreal at Emory University discuss an effort to develop an AI model tailored to support research administration operations. They share practical insights and experiences that resulted from their work, including feedback and evidence indicating the model's potential to streamline tasks and enhance productivity.

A team of authors from Arizona State University provide a reflective inquiry that reports on the experiences of a working group at the university. In their submission, "Reflections on AI Implementation in Research Administration: Emergent Approaches and Recommendations for Strategic and Sustainable Impact," authors Amber Hedquist, Max Castillon, Megan Cooper, Valerie Keim, Tasha Mohseni, and Kimberly Purcell describe a process in which they developed, integrated, and iterated artificial intelligence solutions into their daily work as research administrators. They go on to offer specific recommendations tailored to research administrators as they attempt to integrate AI into their work.

We hope that these initial AI-related manuscripts in JRA will stimulate further consideration and research regarding the uses of this rapidly growing technology in the field of research administration.

The remainder of this issue presents a set of manuscripts examining the efforts of research administrators in enhancing key aspects of their core tasks. In "Building a Culture of Grantsmanship at an Urban Community College via Internal Funding Opportunities," Dr. Sofia Oviedo and colleagues Yoel Rodríguez, Ph.D., and Antonios Varelas, Ph.D., from Eugenio Maria de Hostos Community College, share

their efforts to increase the volume of faculty and staff funding applications at an institution in which such efforts have not typically been emphasized. They describe the development of an internal funding and professional development program that appears to have resulted in increased motivation to apply for new grant opportunities, improved grant writing skills, and overall awareness of grant opportunities among the target groups.

The following two manuscripts are international submissions. The first is from our Canadian neighbors to the north. Jacqueline M. I. Torti and colleagues Kevin Oswald, Farah Friesen, Mariam Hayward, and Lorelei Lingard from Western University and the University of Toronto offer a unique perspective on creating and enhancing the culture for seeking funding. They examine the evolving roles of professional research staff (PRS) in Canadian universities, specifically their contributions to grant capture and the structures that influence their recognition. Critically, the authors found that essential elements in research settings perpetuate the invisibility and undervaluation of PRS work, as well as the negative consequences that result from this.

In the following paper, "Streamlining Grant Management: Lessons from Process Mapping in Research Administration," Ninette Kotzee and Prof. Elda du Tout of the University of Pretoria explore the implementation of process mapping within a grants management unit. The purpose of these efforts was to enhance efficiency in grant management and ensure adherence to the compliance requirements of US federal agencies. The study employed a multi-element approach that combined process mapping, activity-based costing, and a governance framework to identify areas for improvement in the post-award grant phase and to provide recommendations for institutions undertaking similar projects, particularly those that benefit foreign entities with limited resources to support research initiatives and monitor compliance. The paper offers an integrated approach to create a roadmap for greater efficiency in research administration.

The final article in this issue is contributed by Angela Navarrete-Opazo and colleagues at Advocate

Health Cheryl Lefaiver, Mercedes Robaina, Jessica Kram, Vida Vizgirda, and Laura Wrona, The study, "Research Authorization and Protocol Review (RAPR): A Centralized Research Review Model for Advocate Health Midwest," describes a) process to streamline the review and authorization of research conducted within a health center, encompassing a broad range of research efforts, including clinical trials, nursing, and academic research in various areas.

I hope you enjoy this issue, which I share with mixed feelings because it will be the last regular issue on which I serve as Editor-in-Chief of the *Journal of Research Administration.* I will close out my term as editor-in-chief with our upcoming special issue on Clinical Trials. By the time the special issue is published in 2026, I will have been in a leadership role for the Journal for about eight years. In 2018, Nathan Vanderford, then editor-in-chief, invited me to serve as deputy editor. In early 2021, I began my term as editor-in-chief. I would like to thank Dr. Vanderford for his support and mentorship during my tenure as deputy editor, as well as all my predecessors as editor, who provided me with the opportunity to carry forward their stewardship of a publication that has been growing and thriving for over 50 years. I have been in this role for a bit longer than is typical, as we were transitioning to implement the new electronic portal system for processing submissions, which is now fully operational. It has been an honor to serve as editor-in-chief as we enter the second 50 years of scholarly publishing, and I have many people to thank.

It is hard to overstate how much the Journal's success depends on the members of the editorial board, who dedicate countless hours to review manuscripts thoroughly and provide thoughtful, respectful feedback to our authors. No editor could ask for more than the outstanding contributions they have made to the Journal, and I am deeply grateful to them. Personally, the opportunity to get to know them and call many of them my friends has been a true privilege. Of course, the impact and quality of any Journal relies on the submissions it receives. We have been extremely fortunate to receive contributions from many extraordinary, insightful, hardworking authors who

have chosen to publish their work with the Journal over the years. On behalf of the Journal and SRAI, I would like to thank you and encourage you to continue considering JRA as your preferred outlet for your work.

I also want to thank the SRAI staff who have worked with me as partners and are essential to the Journal's success. Gina Snyder was invaluable as my staff counterpart for most of my tenure as editor, and more recently, Saleha Malik, who I am confident will provide the same critical support to the new editor as she did for me. This unsung team of SRAI staff members perform the hard work of editing and preparing each issue, pre-publishing articles SRAI journal website, and coordinate communication efforts so we may share this important work with the wider community. Thank you to Director of Technology Jim Mitchell, Executive Director Evan Roberts, and those who served as SRAI presidents during my term, along with members of several key committees, who have all made significant contributions to the ongoing excellence of the journal. I also want to highlight the vital work of the Author Fellowship Committee, including Amy Cuhel-Schuckers, who led the committee early in my term, and Holly Zink, who has since taken on that role, as well as all the Author Fellow Advisors, for their vital work in supporting the Author Fellows as they develop and publish their first scholarly articles. Many other individuals deserve thanks and recognition for their contributions to the Journal's success over the years. I regret that recognizing each one would make this letter much longer than it is possible, but please know how grateful I am for your essential contributions.

The JRA has continued to grow and strengthen its position as the leading scholarly journal in research administration today. We are receiving increasing numbers of manuscripts, and I am pleased to note that the number of exceptional international submissions we publish continues to grow. Over the past few years, we have implemented a significant upgrade to the Journal's infrastructure by introducing our ScholarOne electronic portal for processing submissions and reviews. As part of this effort, we conducted a thorough review and revision of the author guidelines, which will need further refinement as the types of manuscripts

we receive evolve and new concerns and requirements arise in our field. We have also developed a standard "composite review" process over the years, in which the editor incorporates feedback from the editorial board to share with authors for revision. We have established a tradition of publishing occasional special issues centered on critical topics in research administration, which are often particularly relevant or underrepresented in the manuscripts we receive. New initiatives, such as providing Digital Object Identifiers (DOI), are being pursued. These will continue to develop as SRAI and the Journal work to address the complex and expanding requirements confronted by research administrators. During my tenure as editor-in-chief, as have others in this role, I have participated in recognizing our "Editor of the Year" awards as well as the "Rod Rose" awards for outstanding manuscripts. These tasks have been particularly difficult every year because of the excellence of our editorial board members and the manuscripts we receive; there are many more deserving candidates than we can recognize. I apologize for the many we have missed.

I thank SRAI for trusting me with the stewardship of JRA; it has been a great privilege. Leaving a role that has been such a significant part of my daily thoughts is difficult. However, I look forward to more sleep, some extra free time, and, most importantly, watching what I am sure will be the continued growth and impact of the journal under Holly Zink's leadership. I will return to serving as an editorial board member once the Special Issue on Clinical Trials is ready for publication. Holly and I joined as members of the editorial team, where she first served as associate editor, working with Dr. Vanderford, and later as Deputy Editor, serving as a true partner and friend during my term as editor-in-chief. I cannot think of a more experienced or talented choice as my successor. I wish her, the editorial board—which I will continue to serve—and the entire team involved with JRA continued success as they move forward to serve our field amid the many new and ongoing challenges in research administration.

ARTICLES

THE NEEDS AND CHALLENGES OF THE RESEARCH ADMINISTRATOR WORKFORCE

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ABSTRACT

Research administrators are integral to the research enterprise, yet the profession remains hindered by the absence of standardized job titles, responsibilities, and compensation frameworks. These inconsistencies drive turnover, restrict career progression, and weaken institutional efficiency. The findings and recommendations from a three-phase National Science Foundation (NSF)-funded GRANTED conference are presented in this study. To begin, regional focus groups with research administration leaders and human resources professionals identified themes related to organizational structures and workforce practices. These insights informed a national survey that produced 2,441 responses across diverse institution types from individuals with more than 1,200 distinct job titles. A final workshop of senior practitioners reviewed the survey results and provided recommendations. Findings indicate that workload, limited advancement opportunities, and inadequate compensation are leading causes of attrition, while misaligned human resources policies, decentralized authority, and regional pay variation prevent standardization. Participants stressed the need for consistent job descriptions, defined competencies, and equitable pay frameworks. The results underscore the importance of developing a national job classification system for research administrators to stabilize the profession and strengthen institutional research infrastructure.

INTRODUCTION

Research administrators play a critical role in supporting the research enterprise across higher education institutions, academic medical centers, hospitals, and industry. They manage complex administrative, compliance, and fiscal responsibilities that enable faculty to focus on scientific discovery and advancing society. While the profession has grown into a specialized and increasingly essential workforce, the field continues to lack a standardized national framework for job classifications, titles, and responsibilities. Previous research has found that retention in research administration was steady in the presence of strong supervisor support and a positive culture, however, administrators that feel undervalued or lack career advancement opportunities are more likely to seek alternative employment (Welch & Brantmeier, 2021). The current lack of standardized roles and advancement structures in research administration runs counter to established principles of effective work design, which link job clarity and development to higher retention and motivation (Parker, Morgeson, & Johns, 2017).

Little standardization and consistency heighten concerns, given that researchers already spend approximately 44% of their time performing administrative tasks rather than conducting research (Schneider, 2018). Research administrators are instrumental in alleviating this burden and allowing research teams to focus on their core mission: advancing science and improving the human condition.

Despite their importance, research administrator practitioners continue to face significant challenges in professional advancement, recognition, and workforce stability (Zink, Hughes, & Vanderford, 2022).

These challenges have significant consequences for workforce development and institutional performance. A general lack of consistency persists in titles, core functions, and salaries, not only between institutions but also within the same organization. This inconsistency contributes to high turnover rates as research administrators frequently move between positions or institutions seeking better pay, professional development, or career advancement, resulting in financial loss and reduced productivity for the units and institutions they leave behind (Zink et al., 2022). The COVID-19 pandemic exacerbated gaps, with the shift to remote and hybrid work environments increasing turnover and further straining the already overburdened research enterprise (Reardon, 2021). These persistent barriers not only limit individual career growth but also threaten the sustainability of the profession by weakening the talent pipeline. Early-career administrators, in particular, are at greater risk of attrition due to a lack of mentorship, advancement pathways, and institutional support (Smith, 2017).

Emerging and minority-serving institutions face even greater difficulties in recruiting and retaining qualified research administrators due to limited resources and their inability to offer competitive salaries and benefits. This situation creates a vicious cycle where the lack of administrative support hinders faculty's ability to secure extramural funding, essential for sustaining and growing research programs, particularly in STEM fields (National Academies of Sciences, Engineering, and Medicine [NASEM], 2024). Without adequate administrative support, faculty members are often overwhelmed by the complexities of the application submission and award processes. Furthermore, evolving and expanding federal regulations, especially in STEM research areas, add layers of complexity to research administration. Research administrators must continually update their knowledge and skills to ensure compliance, adding to their workload and stress levels.

This paper presents the outcomes of a National Science Foundation (NSF) conference grant supported through the NSF's Growing Research Access for Nationally Transformative Economic Development (GRANTED) initiative. GRANTED was established to strengthen the research enterprise by enhancing administrative and support capacity. This project contributed to that mission by engaging a broad spectrum of research administrators and institutions to identify solutions for stabilizing and advancing the profession. Through a three-phase process, this project gathered data and developed recommendations for supporting the eventual creation of a standardized national job classification system.

METHODS

This one-year, three-phase conference project had three overarching objectives to be completed between January 1, 2024, and December 31, 2024. Phase 1 involved conducting virtual focus groups with research administration leadership from a broad distribution of institutions nationwide to gain diverse perspectives on the challenges and needs surrounding research infrastructure, particularly emphasizing the research administrator workforce. Five 90-minute Zoom focus group sessions were held with research administration leaders and human resources (HR) professionals from various institutions. Participants were offered a $200 honorarium for their involvement. The virtual focus group sessions, facilitated by a professional focus group facilitator from Leadership Strategies, took place on February 28 in the Midwest, March 5 in the South, March 12 in the Northeast, March 13 in the West, and March 14 in mixed regions. Fifty-three professionals participated, sharing their perspectives on research infrastructure challenges and needs. The data were transcribed and aggregated by Datagain Services into broad themes to maintain anonymity and were used to develop the comprehensive survey for Phase 2.

In Phase 2, a project-specific 38-question anonymous survey was developed by the project team in collaboration with the project steering committee and Datagain Services. Questions 35 and 36 in the survey were adapted with permission from the CUPA-HR Employee Retention Survey (Bischel, Tubbs, and Schneider, 2023). Distribution lists included the Society of Research Administrators International (SRAI) membership, National Council of University Research Administrators (NCURA) membership, NSF GRANTED listserv, Research Administration Listserv (RESADM-L), focus group participants, and the Midwest Research and Graduate Administrators Forum. The survey remained open for 30 days with one reminder. No compensation was provided for participation. The survey was distributed nationally by SurveyMonkey on behalf of the project team by SRAI, gathering data from June 17 to July 17, 2024, on the roles, responsibilities, and satisfaction of research administrators, and the challenges faced by institutions conducting research. Responses were received from 2,441 participants across various academic settings, including R1 institutions (both with and without medical schools), undergraduate institutions (PUIs), and R2 institutions. The large dataset collected and analyzed by Datagain Services is publicly available through the project website at https://nationalrajobclass.srainternational.org/ or directly on figshare at https://doi.org/10.6084/m9.figshare.28607711.v1.

Phase 3 involved a half-day in-person workshop, the "Research Administrators Classification Action Workshop," held during the SRAI Annual Meeting in Chicago on October 27, 2024. This workshop focused on discussing the Phase 2 survey results and developing key recommendations for creating a national job classification system and organizational models to support research administrators. The session included 26 research administrator leaders and decision makers from various academic institutions nationwide. The agenda included a concise presentation of recent survey results, questions-and-answers, and four breakout sessions to gather participant feedback on immediate actions,

best practices, and future strategic recommendations for a national job classification system. Attendees also had the opportunity to participate in the broader SRAI Annual Meeting, which offered additional training sessions, networking opportunities, and insights into best practices in research administration, enhancing the overall impact of the workshop.

RESULTS

Respondent Demographics

The survey, conducted between June 17 and July 17, 2024, received responses from 2,441 research administrators. The regional distribution of respondents was mostly balanced, with 30% from the South, 29% from the Northeast, 21% from the West, and 20% from the Midwest (See Figure A1 in the Appendix). The majority of respondents were from R1 institutions with a medical school (47%), followed by R1 institutions without a medical school (21%), Predominantly Undergraduate Institutions (PUI, 12%), R2 institutions without a medical school (8%), and R2 institutions with a medical school (6%). Public institutions represented 67% of the respondents, while private institutions accounted for 28%, land grant institutions 16%, minority-serving institutions 9%, and Historically Black Colleges and Universities (HBCUs) 1% (Figure A2).

On average, respondents had 14 years of experience in research administration, with an average of 5.1 years in their current position. The standard deviation for overall experience was 9.52 years, indicating a broad range of career stages among respondents. Most respondents had approximately 5 and 23 years of experience (mean ± 1 SD), suggesting that the sample is broadly representative of mid-career to senior-level research administrators rather than entry-level staff (Figure A3). The majority of respondents worked in Pre-award and Post-award areas, with titles varying based on the type of institution and the experience level of the respondents. Survey respondents identified more than 1,200 unique job titles. Additionally, 86% resided

in the same state as their institution, and 55% were in a hybrid work model arrangement (Figure A1).

The majority of institutions were classified as public (67%), and more than half (53%) reported research expenditures of less than $500 million in FY23, with an average expenditure of $407 million. For R1 institutions with medical schools, 20.3% had expenditures over $1 billion. Notably, 21% of the respondents were unsure of their institution's research expenditures (Figure A2).

Key Research Administrator Challenges

The survey highlights several key challenges related to organizational structure faced by research administrators. Inequities in resources and staff allocations between Pre-award and Post-award teams were identified as the most prominent challenge. Other significant challenges included meeting compliance responsibilities, overlapping and confusion between Pre-award and Post-award duties, and insufficient integration between these units (data not shown).

Most respondents observed some level of standardization in research administrator positions, although about 20% perceived these roles as lacking consistency. Respondents were divided regarding the alignment between job roles and titles. Just over a third of respondents (35%) felt there was a good match, while a quarter (24%) believed there was rarely or never a match between job roles and titles. Concerns about salaries and pay scales also emerged, with inequalities between similar roles being a significant issue. Nearly half of the respondents indicated that titles and salaries do not adequately reflect the risk, stress, responsibility, or expertise associated with their roles. In the South, 21.8% reported no standardization in titles for research administration positions, whereas 30.6% in the Midwest and 30.8% in the West stated that job descriptions were mostly standardized. Among central office respondents, 20.2% felt that research administration roles and responsibilities were mostly standardized. Similarly, in the West, 21.6% noted that

pay scales, pay categories, and job classifications for research administration were largely standardized (Figure A4).

Human Resources (HR) department policies and the inability to accommodate the nuances of research administrator roles were identified in 65% of the respondents as the most significant barrier to achieving consistency in titles, roles, and pay scales.

Respondents identified the following survey choices as significant barriers to standardization: 1) organizational structure enables differences in pay for similar roles or titles (58%); 2) lack of consistent leadership to create equitable job classification systems (51%); 3) departments want autonomy to decide job descriptions and salaries (51%); and 4) state institution designation requirements (34%). Those with over 11 years of experience in research administration, as well as 43% of respondents in the West, viewed HR policies as a significant challenge that prevents the organization from creating consistency around job titles, roles, and pay scales. Respondents from R1 institutions with medical schools (30.9%) cited departmental autonomy in deciding job descriptions and salaries as a major obstacle to consistency. Meanwhile, 29.3% of those with 0-5 years of experience in research administration were unsure if this posed a challenge (Figure A5).

Recruiting Research Administrator Challenges

Recruiting research administrators was identified as particularly challenging by 70% of respondents due to a limited pool of high-quality candidates, and by 62% due to lower salaries compared to other opportunities. A majority of respondents from non-HBCU minority-serving institutions (73.8%), public institutions (67.5%), and land-grant institutions (64.6%) indicated that their institutions offer lower salaries than other opportunities. Similarly, 67.6% of respondents from the South reported facing this same challenge. Respondents involved in department administration noted that position titles are confusing

and do not adequately describe the roles (34.1%), which presents a challenge for recruiting. Additionally, 29% of respondents from the South stated that not offering remote work opportunities is a major challenge in recruiting. Likewise, R2 institutions with medical schools (35.6%), without medical schools (28.6%), and PUIs (40.6%) indicated that the lack of remote work opportunities is a significant challenge in recruiting. Those with 0-5 years of experience as research administrators indicated at a rate of 27% that not offering remote work opportunities is a challenge in recruiting (Figure A6).

Retaining Research Administrator Challenges

The most prominent challenges identified for retaining research administrators were workload/stress and the search for higher pay/increased salary. Limited career advancement opportunities were the third most frequently cited challenge, with each of the top three challenges selected by approximately half or more of respondents (59%, 52%, and 48%, respectively; Figure A7). One of the most prominent reasons influencing employees' decisions to seek other employment was for higher pay/increased salary. Sixty-five percent of the respondents from the Midwest indicated that workload and stress were significantly larger challenges in retaining research administrators, while 51.7% of those from the South indicated that competitive salaries and benefits offered by other institutions were a big challenge. Furthermore, 51.5% from the South and 52.3% from the West indicated that limited career advancement opportunities within the organization were a challenge for retaining research administrators. Similarly, 64.5% from PUIs, and those with 8-15 years of experience in their current position (56.9% for 8-10 years and 56.6% for 11-15 years of experience in their current position) indicated that limited career advancement opportunities within the organization is a challenge for retaining research administrators.

For R1 institutions with medical schools, 44.4% of respondents identified competition with other internal departments as a major challenge in retaining research administrators. Similarly, 42.3% of

land grant institutions indicated that this competition posed a challenge. Likewise, 40.5% of respondents with 26-30 years of experience in research administration also noted the difficulty of retaining staff due to internal departmental competition.

Among respondents with 0-1 years of experience, 23.1% indicated that lack of recognition or appreciation is a challenge for retaining research administrators, and 23.1% noted limited training and development opportunities as a challenge. Additionally, 23.9% of research administrators with 0-5 years of experience in the field indicated that the lack of management or leadership support is a major challenge for retaining research administrators.

Factors for Seeking Other Employment Opportunities

When asked about the likelihood of seeking other employment opportunities in the next 12 months, 36% of respondents indicated they would likely do so. Among those with 0-5 years of experience, 80.2% cited a pay or salary increase as the primary reason for seeking new employment, while 75.5% of respondents with 6-10 years of experience echoed this sentiment. Respondents with 0-15 years of experience in research administration (35.9% with 0-5 years, 34% with 6-10 years, and 38% with 11-15 years) identified promotion and increased responsibility as motivation for exploring other opportunities. Additionally, 38.9% of respondents with 0-5 years of experience valued the opportunity to work remotely, a factor also influencing 36.2% of respondents from the South.

Those with 6-10 years of experience in research administration (32%) and individuals with 4-5 years in their current position (36%) expressed a desire for new challenges as a reason to seek other employment. A more flexible work schedule motivated various groups, including 22.1% of individuals with 0-1 year in their current role, respondents from R2 institutions with (30.2%) and without (27.5%) medical schools, PUIs (27.2%), and 27.5% from minority-serving institutions, excluding

HBCUs. Furthermore, 22.6% of respondents from hospitals or medical centers cited better benefits as a reason to pursue other employment, as did 18.1% of those with 0-5 years in research administration (Figure A8).

Strategies for Addressing Research Administrator Challenges

The top five strategies recommended by respondents as ways to address these challenges were competitive salaries (18%), training and development (17%), retaining existing staff (15%), recruiting more staff (14%) and clear and consistent job descriptions (14%). Respondents also suggested that enhanced cross-departmental collaboration and communication would in addition to the above improve the structure of research administration responsibilities within organizations (data not shown).

Top Workshop Themes – Key Issues and Considerations

Based on participant feedback during the workshop breakout groups at the SRAI Conference, 10 themes emerged providing a comprehensive overview of the key issues and considerations for improving research administration across institutions. Firstly, there was a consensus on the need to standardize job titles and responsibilities to ensure clarity and consistency within the field. Participants recognized essential skills and competencies for research administrators, such as communication, diplomacy, conflict resolution, regulatory and policy knowledge, financial expertise, IT proficiency, and adaptability. Aligning pay scales with job responsibilities and experience levels was identified as crucial, with recommendations for conducting job parity reviews, updating job descriptions, and considering cost-of-living factors.

The advantages and disadvantages of centralized versus decentralized research administration structures were acknowledged, with centralized models offering greater expertise and standardization, and decentralized models providing flexibility and closer alignment with departmental needs. The potential benefits of shared services and collaboration between institutions were noted, including handling complex issues, exchanging expertise, fostering mentorship programs, and leveraging resources.

Clear career pathways and professional development opportunities were emphasized to support career progression, alongside the identification of role-specific skills and competencies. Effective cost-recovery strategies, such as maximizing indirect cost recovery (IDC), were deemed essential for funding the expansion and sustainability of research administration infrastructures. Adjustments to salary ranges based on regional cost of living, while maintaining consistent role expectations, were recommended. Specific infrastructure needs for pre-award, post-award, and compliance roles were outlined, advocating for the implementation of electronic Research Administration (eRA) software systems, fiscal management systems, and compliance monitoring tools. Finally, steps toward developing a national job classification system for research administrators were considered, focusing on standardizing job titles and descriptions, defining core competencies, and establishing transparent and equitable pay scales.

DISCUSSION

The comprehensive three-phase NSF GRANTED conference project identified significant challenges and critical needs within the research administrator workforce across diverse U.S. academic institutions, including inconsistent job titles, roles, and salary structures. These inconsistencies hinder recruitment, retention, and overall workforce effectiveness. The data also revealed that workload and stress, non-competitive salaries, and limited career advancement opportunities are primary factors influencing turnover, particularly at public, minority-serving, and emerging institutions.

Addressing these challenges requires a strategic approach. The development of a national job classification system for research administrators

is crucial in achieving this goal. This system will provide consistent job titles, roles, responsibilities, and salary structures, enhancing the efficiency and effectiveness of research administration nationwide. By standardizing these elements, institutions will be better equipped to recruit and retain qualified research administrators, ultimately improving the overall research productivity and success of faculty and institutions.

While this project engaged a broad and diverse cross-section of the profession, several limitations remain. Participation was voluntary, introducing the possibility of self-selection bias. Smaller or under-resourced institutions may be underrepresented, and the short timeline limited longitudinal follow-up. These constraints highlight the need for sustained inclusive research to build on the foundation provided by this work.

To address the challenges of the research administrator workforce, academic institutions need to invest in strengthening their research administration infrastructure. Possible strategies include using indirect cost recoveries from grants to fund research administrative positions, creating comprehensive career paths, and offering competitive salaries and professional development opportunities to attract and retain talent. By pursuing these initiatives, institutions can ensure that faculty members receive the necessary administrative support to focus on their research, leading to greater innovation and success in securing funding.

The creation and implementation of a National Job Classification System would enhance the research enterprise by addressing key operational challenges. By establishing well-defined career paths and competitive compensation frameworks, the system supports recruiting and retaining skilled research administrators, thereby reducing turnover, and bolstering institutional stability. This structural clarity allows faculty researchers to concentrate more on their research endeavors while research administrators efficiently manage administrative tasks. Furthermore, this standardization fosters a positive and fair workplace culture, which is crucial for sustaining a motivated and effective research administration workforce.

With a National Job Classification System, institutions can achieve greater research efficiency and productivity, contributing to a more robust and innovative research environment. All stakeholders, including academic institutions, research administrators, and funding agencies, are encouraged to support the development and implementation of a national job classification system for research administrators and to use the data obtained from the survey and themes from the workshop to address the research administrator infrastructure and workforce at their institutions.

AUTHORS' NOTE

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REFERENCES

Bichsel, J., Fuesting, M., Tubbs, D., & Schneider, J. (2023, September). *The CUPA-HR 2023 Higher Education Employee Retention Survey.* CUPA-HR. https://www.cupahr.org/surveys/research-briefs/higher-ed-employee-retention-survey-findings-september-2023/

National Academies of Sciences, Engineering, and Medicine. (2024). *A plan to promote defense research at minority-serving institutions.* Washington, DC: The National Academies Press. https://doi.org/10.17226/27838

Parker, S. K., Morgeson, F. P., & Johns, G. (2017). One hundred years of work design research: Looking back and looking forward. *Journal of Applied Psychology, 102*(3), 403–420. https://doi.org/10.1037/apl0000106

Reardon, S. (2021). The impact of COVID on research administration. *Research Management Review, 34*(2), 78-95.

Schneider, B. (2018). Faculty time on administrative tasks. *Journal of Higher Education Administration, 45*(3), 123-140.

Smith, J. A. (2017). *Retention and turnover of early career research administrators: Preliminary results* [NCURA Research Report]. National Council of University Research Administrators. Retrieved from https://www.ncura.edu/LinkClick.aspx?fileticket=AYHzHt9zsN4%3D&portalid=0

Welch, L., & Brantmeier, N. K. (2021). Examining employee retention and motivation trends in research administration. *Journal of Research Administration, 52*(2), 70–86. https://eric.ed.gov/?id=EJ132546

Zink, H. R., Hughes, D., & Vanderford, N. L. (2022). Reconfiguring the research administration workforce: A qualitative study explaining the increasingly diverse professional roles in research administration. J*ournal of Research Administration, 53*(2), 119–140. https://files.eric.ed.gov/fulltext/EJ1362090.pdf

APPENDIX

Figures

Figure A1. Location

Region of the Institution

29%

20%

21%

30%

(N=2329)

Whether participants reside in the same state as their institution

14%

86%

- Yes
- No

(N=2336)

Figure A2. Classification of Institution and Amount of Research Expenditures

Classification of Academic Institution

Public	67%
Private	28%
Land Grant	16%
Minority-serving, not HBCU	9%
HBCU	1%
Other	3%

(N=1946)

Amount of Research Expenditures in FY23

Less than $10 million	9%
$10 million to $25 million	6%
$26 million to $50 million	6%
$51 million to $100 million	7%
$101 million to $250 million	11%
$251 million to $500 million	14%
$501 million to $1 billion	12%
Over $1 billion	15%
Unsure	21%

↑ for PUI

$407M on average

(N=2341)

Figure A3. Experience – Total, and in the Current Position

Total Experience in Research Administration

0-5 years	22%
6-10 years	20%
11-15 years	18%
16-20 years	17%
21-25 years	11%
26-30 years	6%
30+ years	6%
N/A	0%

14 years on average

Experience in the Current Position

0-1 year	24%
2-3 years	30%
4-5 years	15%
6-7 years	8%
8-10 years	10%
11-15 years	7%
15+ years	6%

5.1 years on average

(N=2437)
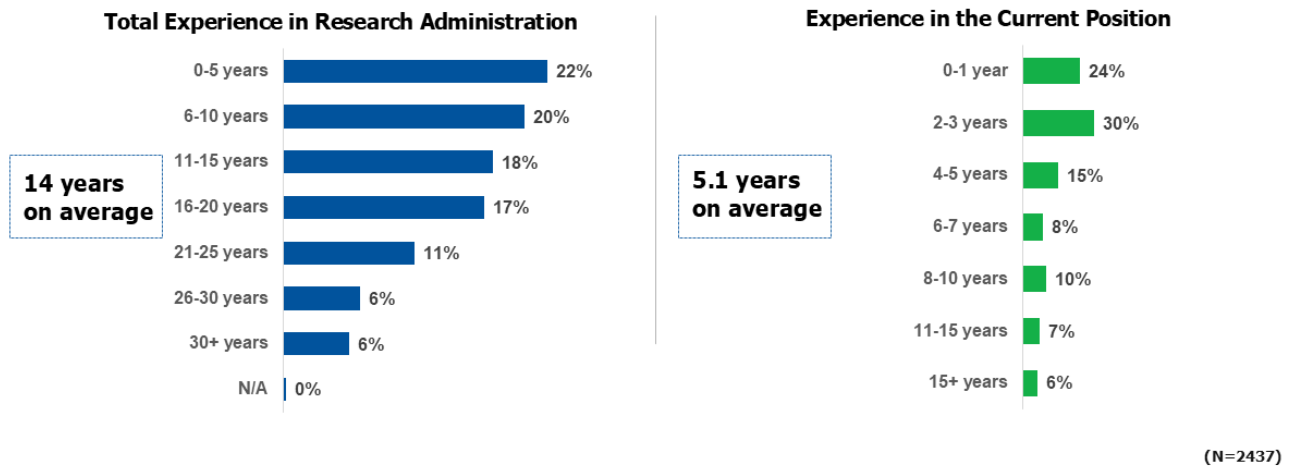
Figure A4. Level of Standardization

%

	Titles of research administration positions	Research administration job descriptions	Research administration roles and responsibilities	Research administration pay scales, pay categories, and job classifications	Union versus non-Union positions
Unsure or N/A	4%	6%	4%	9%	76%
Not Standardized at All	17%	17%	20%	23%	7%
Somewhat Standardized	35%	38%	39%	35%	4%
Moderately Standardized	18%	18%	20%	18%	3%
(green)	25%	22%	17%	16%	9%

(N=2039)

Figure A5. Challenges that Prevent the Organization from Creating Consistency Around Titles, Roles and Pay Scales

%

Legend:
- Unsure or N/A
- Major Challenge
- Moderate Challenge
- Minor Challenge
- No Challenge

Category	Unsure or N/A	Major Challenge	Moderate Challenge	Minor Challenge	No Challenge
HR department policies and inability to accommodate the nuances of research administrator roles	13%	39%	26%	15%	7%
The organizational structure enables differences in pay for similar roles/titles	14%	27%	31%	19%	8%
Lack of consistent leadership to create equitable job classification systems	14%	24%	27%	22%	13%
Departments want autonomy to decide job descriptions, salary	22%	24%	27%	17%	10%
State institution designation requirements (re. job classification and salaries)	43%	16%	18%	11%	12%
Union requirements	76%	4%	4%	4%	12%

(N=2034)

Figure A6. The Biggest Challenges for Recruiting Research Administrators

Challenge	%
Limited pool of high-quality candidates.	70%
Our salaries are lower than other opportunities.	62%
Greater career advancement opportunities at other organizations.	41%
Position titles are confusing and do not adequately describe the role.	29%
We do not offer remote work opportunities.	21%
Our location is not appealing to candidates.	17%
Our organization is not appealing to candidates. (Please explain in the comment box)	9%

(N=1988)

Figure A7. The Biggest Challenges for Retaining Research Administrators

(N=1999)

Figure A8. Top Reasons that Impact Research Administrators' Decisions to Look for Other Employment
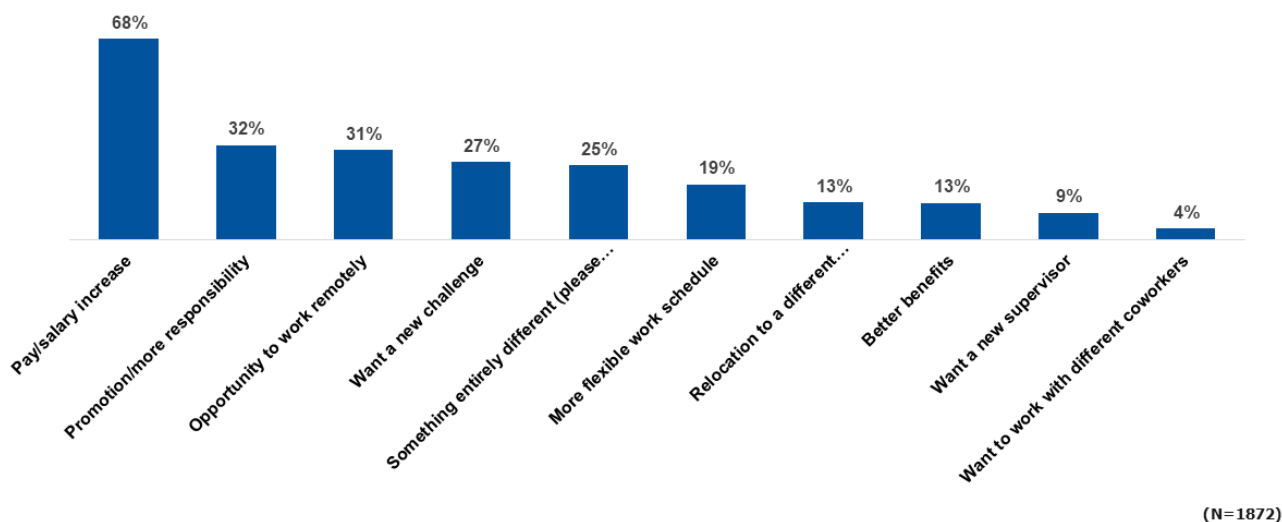
(N=1872)

WHAT ARE THE CRUCIAL FACTORS EXPLAINING JOB SATISFACTION AND DISSATISFACTION IN RMAS? STATISTICAL ANALYSIS BASED ON THE JAPANESE SURVEY

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ABSTRACT

Research managers and administrators (RMAs) face several challenges due to the various tasks and roles required in university research management. One of the challenges is their workplace environment, including job satisfaction. However, little empirical research has statistically analyzed the relationships between job satisfaction and its factors among RMAs. This analysis divided job satisfaction into Job content satisfaction and Employment dissatisfaction. Regression analysis statistically verified the relationships using Japanese survey data of 245 individuals. The logistic regression results showed that if RMAs experience Esteeming work content after employment, they have high Job content satisfaction and low Employment dissatisfaction. Some characteristics of RMAs were also significantly related to Job content satisfaction. Another regression analysis confirmed that high Job content satisfaction and low Employment dissatisfaction had significantly positive relationships with Affective commitment. An additional interview survey enforced these results. Affective commitment generally predicts organizational performance and employee turnover reduction. Thus, the results imply that specific approaches to improve job content satisfaction and employment dissatisfaction are necessary for universities and other institutions that hire RMAs to enhance research activities. Furthermore, the results provide valuable suggestions for RMAs' career development and emphasize the characteristics of RMAs as a profession.

Keywords:

INTRODUCTION

University research activities, which play an essential role in the knowledge economy, are growing and changing over time. In recent years, university researchers have expanded their roles not only to produce academic results but also to engage in various other activities, such as obtaining external funding, including from industry, managing projects, and disseminating and utilizing research results (Kyvik, 2013; Altamony et al., 2017). These changes require a highly diverse set 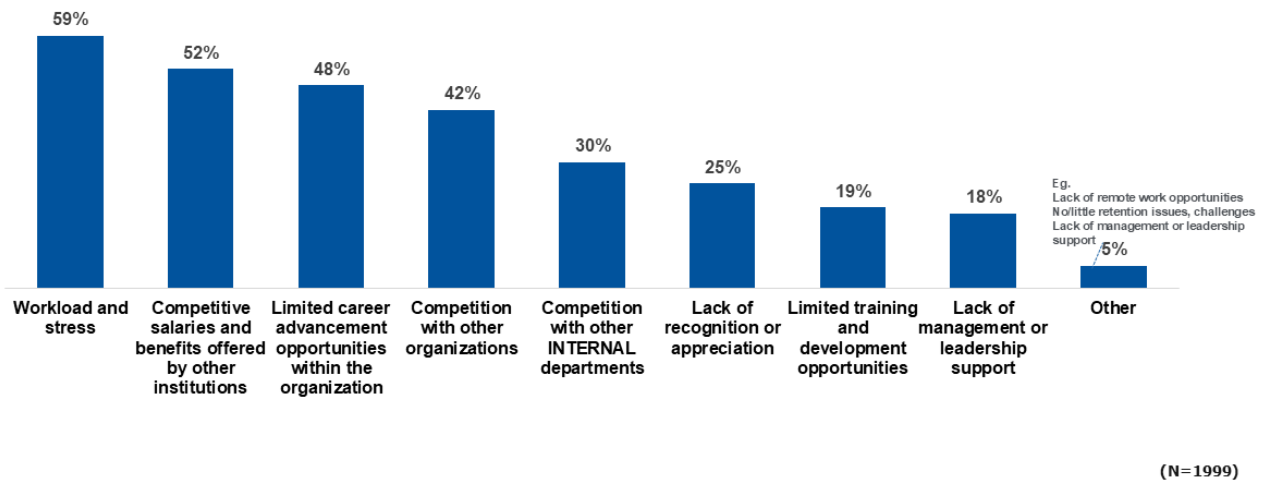of new professionals (Gibbs & Kharouf, 2020). This situation has led to an increase in the role of research managers and administrators (RMAs), who are professional personnel supporting research (Kerridge & Scott, 2018; Kerridge et al., 2023).

Research management and administration in universities is a growing area for effectively promoting research (Derrick & Nickson, 2014; Schützenmeister, 2010) and is associated with high research productivity (Beerkens, 2013). RMAs' extensive duties include acquiring external research funds, budget management, contract negotiation, compliance with

research ethics and laws, and planning research projects. RMAs with diverse titles are now present in universities and research institutions in various countries, and the RMA profession is growing worldwide and developing as a global profession (Kerridge & Scott, 2018; Kerridge et al., 2023).

RMAs constitute the foundation of research activities in universities and research institutions, but they also face several challenges: the tasks and roles required of RMAs are extensive (Tauginienė, 2009; Shelley, 2010; Shambrook & Roberts, 2011), and in many countries, their roles and functions are not clearly defined (Virágh et al., 2019). The boundaries of their operations also tend to be blurry. As a result, they do not receive sufficient recognition of their roles and tasks from the university executives and researchers, the direct stakeholders RMAs support (Poli, 2018; Virágh et al., 2019). Although the history of RMA, tracing its origins to the United States (Monahan et al., 2023), is more than 60 years old, it is still a developing profession.

Such difficulties for RMAs hinder the smooth execution of work and can have a negative psychological impact. In other words, RMAs may feel dissatisfied and find themselves unable to increase satisfaction due to work-specific circumstances.

Job satisfaction is one of the subjects that has drawn the highest interest from researchers in the field of organization management. The existing research indicates that job satisfaction affects employees' behavior and cognition, such as organizational commitment (e.g., Patrick & Sonia, 2012; Koo et al., 2020) and retention (e.g., De Sousa Sabbagha et al., 2018). Many studies report that job satisfaction positively correlates with individual and organizational performance (e.g., Bakotić, 2016; Katebi et al., 2022; Platis et al., 2015). RMAs' job satisfaction or dissatisfaction will also influence their activities and, in turn, the efficiency of research management and administration in the entire organization. However, only a few empirical studies have statistically analyzed the relationship between job satisfaction and its factors among RMAs (e.g., Volkwein & Parmley, 2000).

Employees' satisfaction depends on job characteristics (Hackman & Lawler, 1971; Hackman & Oldham, 1975). Hackman and Oldham (1975) proposed a model with five core dimensions as job characteristics: skill variety, task identity, task significance, work autonomy, and feedback on results. After that, many studies have examined this job characteristic model. For example, Ali et al. (2014) verified the positive relationships between the five core dimensions and job satisfaction based on a survey of fast-food managers. Although the regression analysis results indicated that skill variety most explained the variance in job satisfaction, the researchers judged it derived from the job background. Similarly, Blanz (2017) used survey data from social workers in Germany and confirmed that all five core dimensions correlate with job satisfaction.

Moreover, De Haan et al. (2012) added creativity as a job characteristic in a model. RMAs collaborate closely with researchers in universities and research institutions to improve the viability and efficiency of research activities (De Jong & del Junco, 2023). As RMAs' tasks contain survey analysis and project planning that require creativity, their job characteristics are presumably linked to job satisfaction.

A notable characteristic of professionals is that they are firmly committed to the field of their expertise and technology rather than to the organization that employs them (Gouldner, 1957; Wallace, 1995). However, in the case of RMAs, a holistic perspective is necessary to coordinate with related parties inside and outside the university (Shambrook & Roberts, 2011). Namely, having a high level of professional and organizational orientation is desirable. The relationship between these job characteristics and job satisfaction remains blurry.

On the other hand, since RMAs work and collaborate with faculty, they require a high level of expertise and communication skills. Their stress as an interpersonal service has also been reported (Katsapis, 2012; Shambrook, 2012). The intensity of stress on professionals has been the subject of extensive empirical research in fields such as nursing, caregiving, teaching, and hospitality. In these fields of stressful

interpersonal services, exploring factors improving job satisfaction is significant from both academic and practical perspectives.

In summary, RMAs face many challenges in performing their duties. The professional environment affects RMAs' job satisfaction, which in turn can influence individual and organizational performance. Examining these relationships could play a decisive role in improving the management of organizations with RMAs.

Therefore, this study aims to clarify the relationship between job satisfaction or dissatisfaction and its factors among RMAs. The relationship between organizational commitment and job satisfaction or dissatisfaction will also be clarified. Although RMAs' performance attracts attention, little research has examined organizational commitment that mediates between job satisfaction and performance. Specifically, this analysis will statistically verify these relationships using data from a Japanese questionnaire survey conducted by the Research Manager and Administrator Network Japan (RMAN-J).

The results of this study will not only fill a gap in academic literature but also help RMAs make specific improvements to achieve a more satisfying way of working. Increased job satisfaction might lead to smoother and more efficient research activities, ultimately contributing to improved research results and the development of the research institution. Furthermore, it will provide valuable suggestions for RMAs' career development and emphasize the attractiveness of RMAs as a profession.

THEORY

Concept of Job Satisfaction

Job Satisfaction

Job satisfaction is an umbrella concept that describes pleasing or positive feelings arising from an individual's evaluation of or experience on the job (Locke, 1976). There is an accumulation of research on job satisfaction in areas such as management organization theory.

Among them, Herzberg's two-factor theory (Herzberg et al, 1959) is a framework for collecting long-term attention to understand job satisfaction. This theory divides factors into two categories: motivational factors (satisfiers) leading to job satisfaction and hygiene factors (dissatisfiers) leading to job dissatisfaction. Motivational factors include achievement, recognition, job content, responsibility, promotion, and growth potential. In contrast, hygiene factors cover supervision, company policy and management, working conditions, interpersonal relationships, position, job security, and salary.

Motivational and hygiene factors have different effects on job satisfaction. When hygiene factors are vital, employees feel dissatisfied, but this does not mean satisfaction improves if these factors disappear. On the other hand, when motivational factors are vital, employee satisfaction increases. Many studies have referred to the two-factor theory, and debates on its validity have continued today, both in support and in opposition (e.g., Diener, 1985; Gawel, 1996; Knight & Westbrook, 1999; Mehrad, 2020; Siruri & Cheche, 2021). One of the remarkable contrary arguments is that some hygiene factors, such as salary, work as motivational factors in specific professions (Gawel, 1996). For research incorporating the two-factor theory, it is necessary to consider the background circumstances and context of the research subject.

Job Characteristics

Job characteristic theory (Hackman & Lawler, 1971; Hackman & Oldham, 1975) states that job characteristics influence job satisfaction, motivation, and performance. Job characteristics refer to the specific elements or descriptions of an employee's job. Job characteristics can also appear in employee attributes (age, gender, years on the job).

So far, many studies have attempted to understand how these job characteristics affect employees' job satisfaction (Ali et al., 2014; Blanz, 2017; De Haan et al., 2012; Ehrhart, 2006; Raihan, 2020). These studies show that the main dimensions of job characteristics theory have paths to job satisfaction. For example,

a high level of job variety, one of the five elements, allows employees to find new challenges and learning opportunities without boredom.

Furthermore, employees with high job diversity will find new challenges and learning opportunities without getting bored. Regarding RMAs, Ito and Takahashi (2023) indicate that perceived job attraction and acquired academic degrees after engagement have significantly positive relationships with the total experience years of research management. Different university professional staff have boosted cognition in their work contributions and deepened collaborations with faculty (Veles et al., 2023).

However, these relationships could depend on the context. For example, Zhao et al. (2016) analyzed the relationship between job characteristics and job satisfaction, focusing on interpersonal service characteristics. The data from hotel employees showed that skill variety, a core dimension in job characteristic theory, was negatively associated with job satisfaction. In certain interpersonal service professions, job variety may increase stress rather than interest or attractiveness of the job. Thus, there still appears to be considerable scope for research.

Organizational Commitment

Affective Commitment

Organizational commitment is a concept that describes an employee's perception or attitude toward the organization. Employees are generally more committed to highly specialized professions. Researchers have proposed various definitions and measurements. Among them, the three components of affective, continuance, and normative commitment proposed by Allen and Meyer (1990) have diffused. Affective commitment indicates the degree of an individual's sense of connectedness to the organization. Continuance commitment (utilitarian commitment) depends on the perceived benefits of continued participation and the perceived losses associated with leaving. Normative commitment is an activity that arises from an obligation or responsible connection.

Organizational commitment has attracted attention primarily because of its link to turnover and performance. It also gains social interest as the employment environment changes, such as workforce mobility. This study focuses on affective commitment as a factor that positively affects organizational performance.

Job Satisfaction and Affective Commitment

The relationship between job satisfaction and affective commitment has been an active theme in organizational behavior. Both concepts are related to employee involvement and loyalty to the organization and are critical managerial factors for organizations. Many past empirical studies have shown a positive relationship between job satisfaction and affective commitment (e.g., Patrick & Sonia, 2012; Koo et al., 2020). In other words, the more satisfied employees are with their jobs, the greater their affective commitment to the organization tends to be.

Diverse empirical studies have also progressed on the influence of other factors and circumstances on the relationship between job satisfaction and affective commitment. For example, Saha and Kumar (2018) confirm that organizational culture moderates the relationship between job satisfaction and affective commitment based on a questionnaire survey of Indian public sector employees.

Köse and Köse (2017) further examined the relationship between job satisfaction and organizational commitment by dividing job satisfaction into intrinsic and extrinsic. Continuance and normative commitment had significantly negative and positive relationships with extrinsic job satisfaction, respectively, while affective commitment had no significant relationship with intrinsic or extrinsic job satisfaction.

These empirical studies suggest that the relationship between job satisfaction and affective commitment is complex, as other factors and individual characteristics also influence the relationship. Thus, although employees with higher job satisfaction tend to have higher affective commitment, there remains room

to study the relationship in light of other factors and contexts.

Occupational stress of RMAs

Job characteristics can be associated with specific stressors. Mark and Smith (2012) investigated the relationship between job characteristics, coping behaviors, and mental health conditions among 307 employees at a single UK university. The focal university employees included administrative staff, managers, professors, researchers, and lecturers. Using a questionnaire survey, the researchers found that university employees had significantly stronger tendencies toward anxiety and depression compared with 120 non-university participants in the general population. Regression analysis showed that job characteristics such as high job demands in the workplace and the heavy workload required to meet those demands were associated with high levels of anxiety and depression.

Some researchers have investigated the nature and role of RMAs (Tauginienė, 2009; Cole, 2010; Shelley, 2010; Nash & Wright, 2013). Schiller and LeMire (2023) highlighted the burden of RMAs engaged in post-award administration. Stress of RMAs also has been reported (Katsapis, 2012; Shambrook, 2012).

Tabakakis et al. (2020) conducted a statistical analysis of burnout and related factors through an international Internet survey. The survey received responses from 2,416 individuals from RMA-related organizations in four countries: the United States, the United Kingdom, Australia, and Canada. They classified burnout into three categories: interpersonal, work-related, and customer-related. As a result, many items such as work pace, role clarity, quality of leadership, work-family conflict, and justice and respect were significantly related to burnout in all three categories. This research highlights that burnout is a common issue academic research organizations should undertake.

In summary, job satisfaction has long been the subject of management research. Job satisfaction is positively related to affective commitment, an individual's sense

of belonging to the organization. Furthermore, many researchers have confirmed that job characteristics influence job satisfaction, but the relationship is context-dependent and leaves room for further research, especially in the RMA field.

METHODS

Questionnaire Survey

RMAN-J, established in March 2015, is the professional association representing RMAs in Japan. As of the end of June 2023, it had 36 organizational members, 656 individual members, and six supporting members, and it holds a national conference annually.

In Japan, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) conducts an annual survey on industry-academia-government collaboration, using universities and other organizations as survey units. RMAN-J established a working group to consider the necessity of individual-level data complementary to the MEXT (2021) survey. The working group conducts questionnaire surveys for the members irregularly. This study utilizes the data from a survey conducted by RMAN-J in the 2022-23 Financial Year, which included questions on job satisfaction and career choices.

The survey was conducted from July to September 2022 and employed an online questionnaire using a Google form. The questionnaire was sent to all 637 RMAN-J individual members; participation was voluntary. In August, the survey working group reminded no-respondents to take the survey. As a result, the number of respondents reached 287 (response rate: 45.1%). Personal demographic information such as age, gender, and educational background was collected for all respondents. Respondents working in research administration (RA) or similar work, regardless of position title, were asked about their work experience, perceptions of their organization, employment conditions, and level of satisfaction. The attribute question items stem from those in RAAAP-2 (Kerridge et al., 2020; Poli et al., 2023), an international survey by research

management/administration-related organizations in various countries.

The number of respondents engaging in RMA or similar work was 247. This analysis excluded the two respondents with missing values in the focal items and, as a result, focused on the 245 responses. The type of affiliation of the subjects was 162 (66.1%) national universities, 10 (4.1%) public universities, 40 (16.3%) private universities, 15 (6.1%) inter-university research institutes, 12 (4.9%) national research and development corporations, and 6 (2.4%) companies and others.

Selection Bias

As mentioned earlier, the dataset is comprised of responses from RMAN-J individual members. The survey was free to join. Thus, there is an inherent selection bias. The gender differences between the Japan subset of RAAAP-2 data (Kerridge et al., 2022) and this dataset indicated no statistical significance: χ^2 (1) = 161.61, P = 0.704. Another test on age distribution between the MEXT (2021) survey and the dataset indicated a significant difference: χ^2 (3) = 25.974, P < 0.001. The dataset includes younger ages than the MEXT survey. Therefore, one must consider the selection bias and interpret the results carefully.

Objective Variables

Job Satisfaction

Based on the discussion after Herzberg's two-factor theory (Herzberg et al., 1959), this study measures satisfaction with job content as a motivational factor and dissatisfaction with working conditions as a hygiene factor. The respondents answered job satisfaction on a 5-point Likert scale ranging from "very satisfied" to "not satisfied at all." A dummy variable indicating *Job content satisfaction* was created by assigning 1 to the "very satisfied" and "somewhat satisfied" responses and 0 to the "neither satisfied nor dissatisfied," "not very satisfied," and "not satisfied at all" responses. Similarly, another dummy variable indicating *Employment dissatisfaction* was created by assigning 1 to the "not at all satisfied" and "not very satisfied" responses and 0 to the other responses. Both became objective variables.

Affective Commitment

For the affective commitment, the questionnaire selected three items from Allen and Meyer (1990): "I would be very happy to spend the rest of my career with this organization," "I want to introduce my organization to people outside it," and "I feel emotionally attached to this organization." The item "My current organization is a place where I can grow" was an additional question about the place of career development. The wording has reflected the recent discussion that employees see their organizations as a place to grow and develop their knowledge and skills (e.g., Manuti et al., 2017). The respondents rated their perception of their organization on a 5-point Likert scale from "Applicable" to "Not applicable" for the four items. Factor analysis generated the objective variable *Affective commitment* from these four items.

Explanatory Variables

Job Characteristic Variables

Researchers have long discussed Job characteristics as a factor in job satisfaction (Hackman & Lawler, 1971). This study created the *URA position* and *Research activity* dummy variables to reflect the job characteristics of RMAs. In Japan, individuals in diversified positions carry out RMA work and similar tasks. Therefore, the questionnaire survey asked about official positions with a wide range of options: URA (university research administrator), a faculty member, a professional at a university or other institution, a traditional university administrator, a corporate researcher, a corporate employee except researcher, an executive officer at a university or other institution, and other. URA is a growing position descriptor and title in Japan, and the position generally differs from that of a faculty and traditional administrator. Assigning 1 to the respondents holding a URA position and 0 to any other position created the *URA position* as an explanatory dummy variable.

RMAs may wish to conduct research as part of their work to utilize their research experience. Since some RMAs in Japan officially allocate part of their work to research, the questionnaire included an item with three

SRAI

options: "allowed to conduct research activities," "not allowed to conduct research activities," and "other." The *Research activity* dummy explanatory variable was created by assigning 1 if the research activity was allowed and 0 if not.

Experience in Multiple Organizations

Another question addressed the number of institutions to which they had ever belonged as RMAs as an explanatory variable. An increase in the number of institutions one has worked for may improve satisfaction and performance because of the variety of experiences one has gained. On the other hand, if required knowledge is highly organization-dependent, moving from one organization to another may result in a decline in satisfaction and performance due to the inability to utilize previous knowledge. In the past, Japan had a strong culture, system, and practices supporting lifetime employment in both the corporate and public sectors. Although they have been weakening in recent years, they remain deeply rooted.

For this reason, the number of organizations an employee enrolled in could likely connect to job satisfaction and dissatisfaction in Japan. This analysis generated the dummy variable *Experience in multiple organizations* for the number of institutions by assigning a value of 1 when the number of institutions was two or more and a value of 0 otherwise.

Crucial Item to Continue RMA

The RMAN-J survey had a section asking about what respondents had valued most in their decision to continue working as RMAs. The choices followed RAAAP-2 (Kerridge et al., 2020; Poli et al., 2023). The composition of responses was as follows: job content 123 respondents (50.2%); attractiveness of their organization 14 (5.7%); benefits (salary, length of employment) 16 (6.5%); location 16 (6.5%), research support position using research experience 42 (17.1%), utilization of qualifications and experience 10 (4.1%), and others 24 (9.8%). In this analysis, assigning 1 to responses for job content and 0 to all other responses generated a dummy variable of *Esteeming work content*.

Control Variables

Control variables arose from the questionnaire items regarding respondents' attributes. The age options consisted of six levels: every ten years for ages 20-59 and 60 or older. One respondent (0.4%) was aged 20-29, 42 (17.1%) were 30-39, 85 (34.7%) were 40-49, 73 (29.8%) were 50- 59, and 44 (18.0%) were 60 and older. Putting those *Ages under 40* as a reference category created three dummy variables for the *Ages 40-49*, *Ages 50-59*, and *Age 60 or older*.

Prior research (Ito & Watanabe, 2020) confirmed the link between academic qualifications and RMA skills. The RMAN-J survey also included a question about the highest academic qualification. The analysis contained 130 respondents (53.1%) with a doctorate, 71 (29.0%) with a master's degree, 39 (15.9%) with a bachelor's degree, and 5 (2.0%) with other such as junior college. This educational item created a dummy variable *Doctorate* by assigning 1 to the respondents with a doctorate and 0 to the others.

Since the working environment differs between Japan and overseas, such as Europe and the United States, the RMAN-J survey incorporated experience working overseas into the questions. A dummy variable, *Experience working abroad*, was assigned 1 if the respondent had worked abroad (61 respondents, 24.9%) and 0 otherwise (184 respondents, 75.1%).

Figure 1
Regression Model
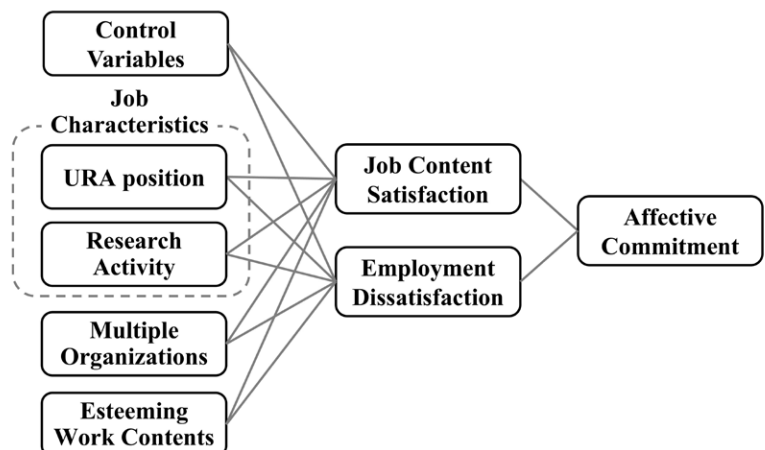
Considering that work arrangement flexibility also affects job satisfaction, the RMAN-J survey asked about work arrangements. The analysis included 128 (52.2%) fixed full-time, 29 (11.8%) flexible and full-time, 83 (33.9%) discretionary work, and 5 (2.0%) part-time and other. To create a dummy variable for *Discretionary or flexible work,* in this analysis, 1 was assigned to flexible full-time and discretionary work and 0 to all others.

In addition to full-time RMA duties, some Japanese RMAs have educational and research or traditional administrative duties. The sample included 195 (79.6%) full-time duty, 22 (9.0%) concurrently engaged in education and research duties, 25 (10.2%) concurrently engaged in administrative duty, and 3 (1.2%) in other duties. In the analysis, a dummy variable, *Full-time RMA duty*, with those reporting RMA as a full-time duty being assigned 1, and all others 0.

The questionnaire measured the respondents' career duration by the *Cumulative work years* as an RMA. The item set up several classes: in 1-year increments from less than 1 to 6 years, 7 to 9 years, 10 to 14 years, and 15 or more years. The median years replaced each class, and the class of 15 years or more was

represented by 20 years. Although this control variable is strictly an ordinal scale, it was treated as an interval scale because the number of years contained ten steps.

In the gender category, 101 (41.2%) women and 144 (58.8%) men responded. However, the item was excluded from this analysis because their correlations with the objective and main explanatory variables were weak, and the insertion did not change the regression analysis results.

Regression Model

Based on the previous studies and the meanings of the variables, this analysis statistically evaluated a model with *Job content satisfaction* as the objective variable first and then a model with *Job content satisfaction* as the explanatory variable and *Affective commitment* as the objective variable. Since *Job content satisfaction* is a binary variable, a binary logistic regression analysis was selected for the model with *Job content satisfaction* as the objective variable. The estimation method was the maximum likelihood method. Ordinary least squares (OLS) regression analysis with robust standard errors proceeded. The statistical analysis was conducted using SPSS version 29.

Table 1
Faculty Ranking Responses for the Usefulness of Various Coaching Activities

Variables	Average	S.D.	Min	Max
Affective commitment	0.000	0.915	-2.588	1.377
Job content satisfaction	0.702	0.458	0	1
Employment dissatisfaction	0.273	0.447	0	1
Ages 40-49	0.347	0.477	0	1
Ages 50-59	0.298	0.458	0	1
Age 60 or older	0.180	0.385	0	1
Doctorate	0.531	0.500	0	1
Experience working abroad	0.249	0.433	0	1
Discretionary or flexible work	0.457	0.499	0	1
Full-time RMA duty	0.796	0.404	0	1
Cumulative work years	7.312	5.753	0.500	20.000
URA position	0.653	0.477	0	1
Research activity	0.384	0.487	0	1
Experience in multiple organizations	0.376	0.485	0	1
Esteeming work content	0.502	0.501	0	1

n = 245. S.D., Standard deviation. *All variables are dummy items apart from Affective commitment and Cumulative work years as an RMA. The reference category of the three age dummy variables is Age under 40.*

Table 2
Logistic Regression on Job Content Satisfaction and Employment Dissatisfaction

	Model 1				Model 2				Model 3			
Variables	B	S.E.	p	Odds	B	S.E.	p	Odds	B	S.E.	p	Odds
Ages 40-49	0.583	0.419	0.164	1.792	0.728	0.446	0.102	2.071	-0.174	0.429	0.685	0.840
Ages 50-59	-0.145	0.419	0.729	0.865	0.040	0.445	0.928	1.041	-0.444	0.458	0.332	0.641
Age 60 or older	1.397	0.558	0.012	4.042	1.911	0.615	0.002	6.760	-1.443	0.588	0.014	0.236
Doctorate	0.120	0.305	0.694	1.128	0.275	0.348	0.429	1.317	-0.027	0.315	0.933	0.974
Experience working abroad	-0.434	0.336	0.196	0.648	-0.462	0.356	0.195	0.630	1.038	0.337	0.002	2.824
Discretionary or flexible work	-0.244	0.308	0.428	0.783	-0.502	0.350	0.151	0.606	0.052	0.317	0.869	1.054
Full-time RMA duty	-0.300	0.376	0.425	0.741	-0.545	0.431	0.206	0.580	0.077	0.373	0.835	1.081
Cumulative work years	0.023	0.027	0.393	1.023	0.048	0.032	0.131	1.049	0.034	0.027	0.208	1.034
URA position					0.794	0.372	0.033	2.212				
Research activity					0.741	0.375	0.048	2.097				
Experience in multiple organizations					-0.756	0.345	0.029	0.470				
Esteeming work content					1.188	0.333	<0.001	3.280				
Constant	0.749	0.485	0.122	2.114	-0.368	0.575	0.522	0.692	-1.187	0.500	0.018	0.305
Correct rate	68.6				70.2				73.5			
NagelkerkeR2	0.095				0.232				0.096			
-2 log-likelihood	281.5				254.7				270.6			
Hosmer-Lemeshow test	0.374				0.208				0.179			

B, non-standardization coefficient; S.E., standard error; p, significance probability; Odds, Odds ratio

Supplemental Interview Survey

Interviews were conducted from October to November 2023 to reinforce the questionnaire survey. The focal group consisted of 18 individuals with high *Job content satisfaction* and low *Employment dissatisfaction* among those willing to cooperate with the follow-up survey. As a consequence, 12 individuals agreed to be interviewed (response rate: 66.7%). The approach was a semi-structured interview based on a short version (20 items) of the Minnesota Satisfaction Questionnaire (MSQ, Weiss et al., 1967). The respondents selected all the statements that applied to them from the employment (8 items) and job content satisfaction (12 items) sections. The interview questionnaire slightly modified some items for RMAs.

RESULTS

Pre-Data Analysis

At first, the distributions of the objective variables were checked. As for the job content satisfaction measured on a 5-point Likert scale, the most frequent response was "somewhat satisfied" at 47.8%. The distribution of the variable was unimodal and showed no ceiling or floor effects. Similarly, the most frequent response to employment satisfaction was "somewhat satisfied" at 35.9%. The distribution exhibited a unimodal and no ceiling or floor effects. All four items to measure affected commitment on a 5-point Likert scale did not follow normality but were unimodal and indicated no ceiling or floor effects. The most frequent responses were "neutral" about "I would be very happy to spend the rest of my career with this organization" and "I want

Model 4			
B	S.E.	p	Odds
-0.311	0.453	0.492	0.733
-0.568	0.475	0.232	0.566
-1.425	0.613	0.020	0.241
-0.313	0.344	0.362	0.731
1.098	0.353	0.002	2.998
0.094	0.343	0.784	1.099
-0.304	0.425	0.474	0.738
0.032	0.031	0.303	1.032
0.816	0.388	0.035	2.262
0.110	0.363	0.761	1.117
0.772	0.345	0.025	2.165
-0.796	0.328	0.015	0.451
-1.215	0.594	0.041	0.297
73.5			
0.183			
254.3			
0.166			

to introduce my organization to people outside it." As for "I feel emotionally attached to this organization" and "My current organization is a place where I can grow," "somewhat applicable" was the most frequent response.

Factor Analysis

An exploratory factor analysis (EFA) using the maximum likelihood method determined the factor structure of the four items used to measure affective commitment. One factor had an eigenvalue greater than 1.0 (eigenvalue of 2.452), indicating a one-factor structure. Factor loadings ranged from 0.538 to 0.858. Cronbach's alpha coefficient, which indicates reliability for these four items, was calculated to be 0.778, confirming a high degree of internal consistency and meeting the reliability criterion of 0.6 or higher (Bagozzi & Yi, 1988). The factor scores of the first factor became the objective variable, *Affective commitment*.

Descriptive Statistics

Table 1 shows the descriptive statistics of the variables analyzed. All variables except for *Affective commitment* and *Cumulative work years* are dummy variables. *Affective commitment* derived from factor scores was a variable centered with a mean of 0.

Logistic Regression Analysis

Table 2 shows the results of the logistic regression analysis with *Job content satisfaction* and *Employment dissatisfaction* as the objective variables. Models 1 and 2 have *Job content satisfaction* as the objective variable,

while Models 3 and 4 have *Employment dissatisfaction* as the objective variable. Models 1 and 3 have only control variables, while models 2 and 4 have all control and explanatory variables. In both models, the input variables' VIF (variance inflation factor) values were below 2.1, indicating that the models were unaffected by severe multi-collinearity. The results of the Hosmer-Lemeshow test, an indicator of model goodness of fit, showed that the range of significance probabilities for models 1 to 4 was 0.166 to 0.374, which is above 0.05, and the goodness of fit was considered good.

Models 1 and 2 show that the control variable, *Age 60 or older* dummy, had a significant (p<0.05) relationship with high *Job content satisfaction*. In Model 2, the *URA position*, *Research activity*, and *Esteeming work content* had significant relationships with high *Job content satisfaction*. In contrast, *Experience in multiple organizations* had a significant association with low *Job content satisfaction*. In particular, the odds ratio for Esteeming work content was as high as 3.280.

Models 3 and 4 indicate that the control variable, the *Age 60 or older* dummy, had a significant relationship with low *Employment dissatisfaction*. In contrast, the coefficient of *Experience working abroad* was significant with high *Employment dissatisfaction*. In Model 4, the *URA position* and *Experience in multiple organizations* had significant links to high *Employment dissatisfaction*. Conversely, *Esteeming work content* was significantly related to low *Employment dissatisfaction*. *Research activity* had no significant relationship.

The goodness of fit in Model 2 improved concerning the correct response rate, the NagelkerkeR^2 pseudo coefficient of determination, and the -2 log-likelihood. Similarly, Model 4 was better than Model 3 in the goodness of fit.

OLS with Robust Standard Error

Next, an OLS regression analysis with robust standard errors used *Affective commitment* as the objective variable. The regression resulted in Table 3. The same variables as the control and explanatory ones in the logistic regression are used in Model 1. Model

2 added *Job content satisfaction* to Model 1, and Model 3 added *Employment dissatisfaction* to Model 1. Model 4 includes both *Job content satisfaction* and *Employment dissatisfaction*. In all models, the VIF value of each variable was less than 2.2, indicating no severe effects due to multi-collinearity. Regarding the overall significance of the models, the results of the F-test were all significant ($p<0.05$).

Models 2 and 4 indicate that *Job content satisfaction* had a positive and significant relationship with *Affective commitment*. Similarly, in Models 3 and 4, *Employment dissatisfaction* had a negative and significant relationship with *Affective commitment*. Comparing the adjusted R^2 coefficient of determination, Models 2 and 3 were better than Model 1, with Model 4 having the highest adjusted R^2.

Cumulative work years and *Affective commitment* possessed positive and significant relationships for all models in Table 3. *Discretionary or flexible work* was significantly positively related to *Affective commitment* only in Models 2 and 4.

Interview Survey Results

The supplemental interview survey followed the questionnaire survey. Tables 4 and 5 show the question items and answers. The following interpretation reflects the results of the interview survey.

Interpretation of Results

Characteristics of URA Positions

Logistic regression analysis showed that *URA position* among job characteristics related to high *Job content satisfaction* and *Employment dissatisfaction*. In other words, compared to other RMAs, such as university faculty members and administrative staff, individuals holding a *URA position* are attracted to the job content but dissatisfied with employment conditions. Specific causes of dissatisfaction could be compensation, employment status, and criteria for promotion. Regarding employment conditions, many of Japan's URAs are employed on fixed-term contracts (Takahashi & Ito, 2023).

Using Research Experience

Among the job characteristics, the *Research activity* connected with high *Job content satisfaction* but did not have a significant connection with *Employment dissatisfaction*. These results are consistent with the two-factor theory of Herzberg et al. (1959). In other words, for RMAs, conducting research as part of their job provides an opportunity to utilize their research experience. It increases satisfaction, but being unable to conduct research does not increase dissatisfaction. The increase in satisfaction would be because many RMAs have research experience, and using their past professional research experience leads to satisfaction.

As specific reasons for job content satisfaction (Table 4), "The opportunity to work that makes use of my capabilities" was selected the most frequently among the 12 items. The feeling of meaningfulness derived from using the skills and knowledge through previous

Table 3
Multiple Regression on Affective Commitment

Variables	Model 1			
	B	S.E.	t value	P
Ages 40-49	0.046	0.187	0.248	0.805
Ages 50-59	0.119	0.196	0.609	0.543
Age 60 or older	0.326	0.197	1.652	0.100
Doctorate	0.126	0.129	0.977	0.329
Experience working abroad	-0.069	0.157	-0.442	0.659
Discretionary of flexible work	0.174	0.122	1.424	0.156
Full-time RMA duty	-0.119	0.149	-0.796	0.427
Cumulative work years	0.027	0.011	2.485	0.014
URA position	-0.099	0.127	-0.780	0.436
Research activity	-0.006	0.142	-0.042	0.967
Experience in multiple organizations	-0.327	0.138	-2.364	0.019
Esteeming work content	0.286	0.119	2.408	0.017
Job content Satisfaction				
Employment Dissatisfaction				
Constant	-0.294	0.233	-1.263	0.208
F value	2.319			0.008
Adjusted R^2	0.061			

work and research experience and the sense of responsibility for planning and carrying out projects led to job satisfaction. This result is in common with research findings (Hackman & Oldham, 1975) that job characteristics create psychological states of meaningfulness and responsibility, which lead to job satisfaction and performance.

In the interviews, the respondents stated the following: "I was able to improve the facility based on my experience as an experimental researcher" (E); "Transferring from the industry, I gained a deeper understanding of research as an RMA and doctorate student. I was able to proceed with my work from both industry and academia's perspectives" (C); "I was able to utilize my experience and skills in editing and planning books and videos in my previous job" (L).

Esteeming Work Content

Next, *Esteeming work content* was associated with high *Job content satisfaction* and low *Employment dissatisfaction*. In other words, respondents who selected job content as the most important reason for continuing to work had higher *Job content satisfaction* and lower *Employment dissatisfaction*. There could be several reasons why *Esteeming work content* after employment as an RMA led to high *Job content satisfaction* and low *Employment dissatisfaction*.

One clue is that "The opportunity to do things for others" was selected frequently in the interview survey (Table 4). RMA is considered a professional occupation based on advanced knowledge and skills. Hall (1968) proposed five elements for the attitudes and behaviors of these professional workers: (1) independent action, (2) self-control, (3) conformity to the professional group, (4) contribution to the public interest, and (5) dedication to the profession, and "The opportunity to do things for others" is related to the elements (4) and (5).

There was diversity in how the expression "do things for others" was perceived; some said it is satisfying to do work that pleases company employees, university

Model 2				Model 3				Model 4			
B	S.E.	t value	p	B	S.E.	t value	p	B	S.E.	t value	p
-0.077	0.164	-0.470	0.639	0.009	0.173	0.052	0.959	-0.082	0.159	-0.513	0.608
0.127	0.174	0.727	0.468	0.044	0.180	0.243	0.808	0.080	0.171	0.469	0.640
0.046	0.176	0.259	0.796	0.163	0.186	0.877	0.381	-0.012	0.172	-0.068	0.946
0.079	0.112	0.707	0.480	0.086	0.121	0.708	0.479	0.062	0.110	0.563	0.574
0.004	0.132	0.027	0.979	0.079	0.145	0.543	0.588	0.082	0.128	0.640	0.523
0.259	0.108	2.390	0.018	0.186	0.115	1.616	0.108	0.253	0.105	2.402	0.017
-0.028	0.143	-0.193	0.847	-0.152	0.145	-1.048	0.296	-0.061	0.139	-0.437	0.662
0.019	0.009	1.996	0.047	0.031	0.010	2.927	0.004	0.022	0.009	2.385	0.018
-0.219	0.114	-1.915	0.057	0.005	0.125	0.037	0.971	-0.139	0.114	-1.224	0.222
-0.129	0.125	-1.030	0.304	0.009	0.133	0.071	0.944	-0.101	0.124	-0.821	0.412
-0.199	0.118	-1.689	0.093	-0.228	0.131	-1.746	0.082	-0.158	0.117	-1.352	0.178
0.089	0.108	0.821	0.413	0.190	0.113	1.682	0.094	0.059	0.106	0.558	0.577
0.979	0.130	7.532	<0.001					0.836	0.134	6.223	<0.001
				-0.712	0.142	-5.018	<0.001	-0.429	0.141	-3.052	0.003
-0.761	0.236	-3.226	0.001	-0.121	0.223	-0.542	0.589	-0.588	0.231	-2.548	0.011
7.959			<0.001	4.797			<0.001	8.591			<0.001
0.270				0.168				0.303			

B, non-standardization coefficient; S.E., standard error; p, significance probability

Table 4
Items Selected by Respondents with High Job Content Satisfaction

Items	B	C	D	E	F	G	H	I	J	K	L	Total
The opportunity to work that makes use of my capabilities	Yes	Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	9
The feeling of achievement that comes from the work	Yes		Yes				Yes			Yes		4
Being able to work a lot												0
Good rapport among co-workers								Yes				2
Opportunity to experiment with my own way of working				Yes				Yes			Yes	3
The opportunity to work independently				Yes								1
Being able to work without conflicting my conscience							Yes					2
Being praised for doing a good job	Yes				Yes				Yes			4
The opportunity to do things for others		Yes	Yes		Yes	Yes			Yes	Yes	Yes	8
The opportunity to become a respected person in the workplace												0
The way supervisors treat their subordinates												0
The capability of the supervisor to make decisions			Yes									1

faculty, and students (C, J, and L). In contrast, others said that RMAs could change social systems through universities with a public status (D) and that RMAs do something for others (F), emphasizing the social nature of RMAs.

Furthermore, the positive linkage between esteeming work content after employment and high job content satisfaction could derive from the attractiveness of flexibility in research management and administration work. In the interview survey results, "The freedom to act on my own judgment" was often selected as a reason for low *Employment dissatisfaction* (Table 5). This result could reflect the autonomous behavior cultivated through their research experience. Autonomous behavior is one of the characteristics of professionalism. It refers to the right of individuals to make decisions about the means and goals of their work based on their professional judgment (Bartol, 1979a, 1979b; Miner, 1980).

In the interview survey, the related comments are: "Job discretion and flexibility lead to satisfaction" (L); "Although responsibility is involved, I was able to act entirely on my judgment" (C); "Regarding my work in institutional research, I have the discretion to decide how to proceed with my task, and I work in collaboration with my team members" (H); "I can decide to some extent how to proceed with my work before consulting with the executive director, and I can set my own priorities within a broad scope of work" (I).

Multiple Factors on Job Satisfaction

The respondent attribute variables indicate that *Job content satisfaction* declines and *Employment dissatisfaction* increases when the number of organizations the respondent has enrolled in is two or more (*Experience in multiple organizations*). One could interpret the results in various ways. First, it reflects the local working environment. Japan highly depends on knowledge, such as peculiar organizational rules, to do

Table 5
Items Selected by Respondents with Low Employment Dissatisfaction

Items	A	B	C	D	E	F	G	H	I	J	K	L	Total
The opportunity to be promoted in this job		Yes		Yes									2
The opportunity to give directions to others		Yes											1
Operating policies indicated by the university or department				Yes									1
The salary and the workload and duties			Yes	Yes			Yes		Yes				4
The freedom to act on my own judgment	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	10
The workplace provides stable employment						Yes				Yes	Yes		3
The opportunity to do a variety of works from time to time	Yes			Yes	Yes		Yes	Yes			Yes	Yes	7
The working conditions	Yes					Yes		Yes		Yes			4

the job. Changing jobs forces one to rebuild knowledge and experience. Thus, even though RMAs have accumulated experience, they need additional time to engage in advanced work. This situation increases the cost of changing organizations.

The other factor is Japanese employment and work assignment practices. RMAs in Japan, especially URA positions, tend not to have detailed job descriptions, even though they are professionals. Due to organizational circumstances, such as a small budget, RMAs tend to be assigned more varied tasks.

The second most frequently selected reason for low *Employment dissatisfaction* in the interview survey was "The opportunity to do a variety of works from time to time" (Table 5). In general, professionals are satisfied with becoming more proficient in specific tasks. However, respondents with low *Employment dissatisfaction* viewed more diversified tasks as preferable. Given these results, RMAs with high *Employment dissatisfaction* may be too focused on being a "specialist" and, therefore, unable to adapt to multitasking. An interviewee stated that he considered himself good at doing diversified jobs and connecting

people rather than concentrating on one job (D).

Difference between Job Satisfaction and Dissatisfaction

Next, a regression analysis treated *Affective commitment* as the objective variable and *Job content satisfaction* and *Employment dissatisfaction* as explanatory variables. *Job content satisfaction* was positively associated with *Affective commitment*, while *Employment dissatisfaction* was negatively associated with *Affective commitment*. This result is in line with the findings of previous studies (e.g., Patrick and Sonia, 2012; Koo et al., 2020) that show a positive relationship between job satisfaction and affective commitment. Little research has statistically examined the relationships between job satisfaction and affective commitment among RMAs. This study divided job satisfaction into *Job content satisfaction* and *Employment dissatisfaction* as variables, which were significantly related. *Affective commitment* generally predicts organizational performance and employee turnover reduction. The results suggest that approaches to improve RMAs' *Job content satisfaction* and *Employment dissatisfaction* may enhance research management and administration for universities and other institutions.

In the research, the variables of job satisfaction and dissatisfaction were operated based on the Two-Factor Theory (Herzberg et al., 1959). The Allen and Meyer (1990) scale employed to measure *Affective commitment* is a highly reliable tool used for an extended period in many studies. The definite paths from *Job content satisfaction* and *Employment dissatisfaction* to *Affective commitment* will support the validity of creating the variables of job satisfaction and dissatisfaction.

CONCLUSION AND CONTRIBUTION

This study aimed to clarify the relationships between job content satisfaction, employment dissatisfaction, their factors, and affective commitment among RMAs supporting research at universities and other institutions. The survey data from 245 individuals engaged in research management and administration or similar work in Japan validated the relationships. First, logistic regression analysis used *Job content satisfaction* and *Employment dissatisfaction* as objective variables. Least squares regressions with robust standard errors proceeded, putting *Affective commitment* as the objective variable. An additional interview survey followed the questionnaire survey.

Although RMAs are a growing global professional workforce and job satisfaction and affective commitment are essential factors affecting organizational performance, few empirical studies have statistically analyzed the relationships between job satisfaction, its factors, and affective commitment among RMAs. The study revealed the relationships between job characteristics and personal attributes of RMAs and job satisfaction. The analysis classified job satisfaction into *Job content satisfaction* and *Employment dissatisfaction*. Furthermore, significant relationships between *Job content satisfaction* and *Affective commitment* were also confirmed.

Implications

The findings of this study advance not only academic research in the field of research management but also offer unique insights for practical operations. By enhancing job satisfaction and affective commitment

among RMAs, the study paves the way for more vibrant research activities at universities and other institutions, leading to expanded research outcomes and overall organizational development. Moreover, the study deepens our understanding of the professional characteristics of RMAs, thereby aiding in their career progression.

This analysis provides some practical implications, particularly for managers of RMAs. First, they should carefully consider the diversity of work, which is an RMA's job characteristic. Based on the positive association between URA positions and job satisfaction in the regression analysis and the interview survey results, RMAs with high satisfaction have a positive attitude toward job diversity. This result is the opposite trend of the hotel employees surveyed by Zhao et al. (2016). It would be meaningful for managers to entrust RMAs with work in new fields that they are likely to be interested in or that will lead to their growth.

Second, assigning work for RMAs to utilize their research experience is worthwhile. The *Research activity* followed a path to high *Job content satisfaction*. The interviews also revealed RMAs' desires to utilize their experience. Independent researchers can autonomously carry out tasks from problem discovery to solution. In order to make the most of these abilities, it is possible to make RMAs responsible for the project from the planning stage to the final one. That role allows them to see the overall picture. In job characteristic theory, this increases task identity.

Finally, hiring and developing RMAs from a long-term perspective is essential. The regression analysis showed that URA positions correlated to *Employment dissatisfaction*. A unique Japanese situation where most positions are fixed-term employment may impede career planning and skill development. Flexible systems would be preferable to allow RMAs to update their knowledge in the research fields and develop their interpersonal service skills during working hours. In addition, it would also be effective to encourage them to participate in professional societies, take training courses, and obtain qualifications and additional degrees. These approaches will likely lead to improved

performance for RMAs and organizational performance through improved job satisfaction among RMAs.

Limitations and Future Research

One should be cautious in interpreting the results of this study. First, the data for this study was responses from individual members of RMAN-J. Respondents were highly educated and relatively middle-aged. In addition, Japan's social structure and culture regarding employment may have influenced the relationship among the variables. For example, in Japan, job descriptions are often less detailed than in the West. Grasping some behavioral principles and practices requires long-term work at the same organization. As a result, turnover is often a high barrier for workers. The relationship between RMAs and the faculty also depends on the culture and customs of the country. Further empirical research in other countries with different social and cultural backgrounds would be beneficial.

Since there are other concepts related to job satisfaction, such as organizational culture, turnover intention, job performance, and empowerment, in addition to the variables in this study, future research could examine these concepts. Due to the cross-sectional data, it is impossible to identify a causal relationship between job satisfaction and affective commitment with the findings of this study. Further, longitudinal studies are needed to obtain evidence of a causal relationship.

AUTHORS' NOTE

Acknowledgments

Disclosure Statement

The authors have no conflicts of interest to declare.

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REFERENCES

Ali, S. A. M., Said, N. A., Yunus, N. M., Kader, S. F. A., Latif, D. S. A., & Munap, R. (2014). Hackman and Oldham's job characteristics model to job satisfaction. *Procedia-Social and Behavioral Sciences*, *129*, 46-52. https://doi.org/10.1016/j.sbspro.2014.03.646

Allen, N. J., & Meyer, J. P. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of Occupational Psychology 63*(1), 1-18. https://doi.org/10.1111/j.2044-8325.1990.tb00506.x

Altamony, H., Masa'deh, R., & Gharaibeh, A. (2017). The role of academic researcher to Mintzberg's managerial roles. *International Journal of Business Management and Economic Research, 8*(2), 920–925. https://doi.org/10.13140/RG.2.2.27971.40484

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science, 16*(1), 74–94. https://doi.org/10.1007/BF02723327

Bakotić, D. (2016). Relationship between job satisfaction and organisational performance. *Economic research-Ekonomska istraživanja*, *29*(1), 118-130. https://doi.org/10.1080/1331677X.2016.1163946

Bartol, K. M. (1979a). Individual versus organizational predictors of job satisfaction and turnover among professionals. *Journal of Vocational Behavior, 15*, 55–67. https://doi.org/10.1016/0001-8791(79)90018-6

Bartol, K. M. (1979b). Professionalism as a predictor of organizational commitment, role stress, and turnover: A multidimensional approach. *Academy of Management Journal, 22*(4), 815–821. https://doi.org/10.5465/255817

Beerkens, M. (2013). Facts and fads in academic research management: The effect of management practices on research productivity in Australia. *Research Policy, 42*(9), 1679–1693. https://doi.org/10.1016/j.respol.2013.07.014

Blanz, M. (2017). Employees' job satisfaction: A test of the job characteristics model among social work practitioners. *Journal of Evidence-Informed Social Work, 14*(1), 35–50. https://doi.org/10.1080/23761407.2017.1288187

Cole, K. W. (2010). *Principal investigator and department administrator perceptions of services provided by offices of research administration at research universities* [Doctoral Dissertation, University of South Florida]. http://scholarcommons.usf.edu/etd/1602

De Haan, J., Naus, F., & Overboom, M. (2012). Creative tension in a lean work environment: Implications for logistics firms and workers. *International Journal of Production Economics*, *137*(1), 157-164. https://doi.org/10.1016/j.ijpe.2011.11.005

De Jong, S., & del Junco, C. (2023). How do professional staff influence academic knowledge development? A literature review and research agenda. *Studies in Higher Education, 49*(6), 1042–1065. https://doi.org/10.1080/03075079.2023.2258155

De Sousa Sabbagha, M., Ledimo, O., & Martins, N. (2018). Predicting staff retention from employee motivation and job satisfaction. *Journal of Psychology in Africa, 28*(2), 136–140. https://doi.org/10.1080/14330237.2018.1454578

Derrick, G., & Nickson, A. (2014). Invisible intermediaries: A systematic review into the role of research management in university and institutional research processes. *Journal of Research Administration, 45*(2), 11–45. https://files.eric.ed.gov/fulltext/EJ1157172.pdf

Diener, T. (1985). Job satisfaction and college faculty in two predominantly Black institutions. *The Journal of Negro Education*, *54*(4), 558–565. https://doi.org/10.2307/2294716

Ehrhart, K. H. (2006). Job characteristic beliefs and personality as antecedents of subjective person-job fit. *Journal of Business and Psychology*, *21*(2), 193–226. https://doi.org/10.1007/s10869-006-9025-6

Gawel, J. E. (1996). Herzberg's theory of motivation and Maslow's hierarchy of needs. *Practical Assessment, Research, and Evaluation, 5*(1), 11. https://eric.ed.gov/?id=ED421486

Gibbs, T., & Kharouf, H. (2020). The value of co-operation: An examination of the work relationships of university professional services staff and consequences for service quality. *Studies in Higher Education 47*(1), 38–52. https://doi.org/10.1080/03075079.2020.1725878

Gouldner, A. W. (1957). Cosmopolitans and locals: Toward an analysis of latent social roles—I. *Administrative Science Quarterly, 2*(3), 281–306. https://doi.org/10.2307/2391000

Hackman, J. R., & Lawler, E. E. (1971). Employee reactions to job characteristics. *Journal of Applied Psychology, 55*(3), 259–286. https://doi.org/10.1037/h0031152

Hackman, J. R., & Oldham, G. R. (1975). Development of the job diagnostic survey. *Journal of Applied Psychology, 60*(2), 159–170. https://doi.org/10.1037/h0076546

Hall, R.H. (1968). Professionalization and bureaucratization. *American Sociological Review, 33*(1), 92–104. https://doi.org/10.2307/2092242

Herzberg, F. I., Mausner, B., & Snyderman, B. (1959). *The motivation to work* (2nd ed.). New York: John Wiley.

Ito, S., & Takahashi, M. (2023). Key perspectives for a long-term career–Statistical analysis of international data for a new profession. In S. Kerridge, S. Poli, & M. Yang-Yoshihara (Eds.) *The Emerald handbook of research management and administration around the world* (pp. 395–404). Emerald Publishing Limited. https://doi.org/10.1108/978-1-80382-701-820231032

Ito, S., & Watanabe, T. (2020). Multilevel analysis of research management professionals and external funding at universities: Empirical evidence from Japan. *Science and Public Policy 47*(6), 747–757. https://doi.org/10.1093/scipol/scaa074

Katebi, A., HajiZadeh, M. H., Bordbar, A., & Salehi, A. M. (2022). The relationship between "job satisfaction" and "job performance": A meta-analysis. *Global Journal of Flexible Systems Management*, *23*(1), 21–42. https://doi.org/10.1007/s40171-021-00280-y

Katsapis, C. C. A. (2012). The incidence and types of occupational role stress among university research administrators. *Research Management Review, 19*(1), 1–23. https://files.eric.ed.gov/fulltext/EJ1002153.pdf

Kerridge, S., & Scott, S. F. (2018). Research administration around the world. *Research Management Review, 23*(1), 1–34. https://www.researchgate.net/publication/326753859_Research_Administration_around_the_World

Kerridge, S., Ajai-Ajagbe, P., Kiel, C., Scott, S., Shambrook, J., Wakefield, B., & Zornes, D. (2020). *RAAAP-2 Questionnaire (pdf)* (Version 1). Figshare. https://doi.org/10.6084/m9.figshare.11901897.v1

Kerridge, S., Ajai-Ajagbe, P., Kiel, C., Shambrook, J., & Wakefield, B. (2022). *RAAAP-2 datasets (17 linked datasets)* (Version 1). Figshare. https://doi.org/10.6084/m9.figshare.18972935.v1

Kerridge, S., Poli, S., & Yang-Yoshihara, M. (Eds.). (2023). *The Emerald handbook of research management and administration around the world.* Emerald Publishing Limited. https://www.emerald.com/insight/publication/doi/10.1108/9781803827018

Knight, P. J., & Westbrook, J. (1999). Comparing employees in traditional job structures vs telecommuting jobs using Herzberg's hygienes & motivators. *Engineering Management Journal, 11*(1), 15–20. https://doi.org/10.1080/10429247.1999.11415014

Koo, B., Yu, J., Chua, B. L., Lee, S., & Han, H. (2020). Relationships among emotional and material rewards, job satisfaction, burnout, affective commitment, job performance, and turnover intention in the hotel industry. *Journal of Quality Assurance in Hospitality & Tourism, 21*(4), 371–401. https://doi.org/10.1080/1528008X.2019.1663572

Köse, S. D., & Köse, T. (2017). The effect of job satisfaction on organizational commitment of healthcare personnel. *IOSR Journal of Business and Management, 19*(1), 54–59. https://doi.org/10.9790/487X-1901025459

Kyvik, S. (2013). The academic researcher role: Enhancing expectations and improved performance. *Higher Education, 65,* 525–538. https://doi.org/10.1007/s10734-012-9561-0

Locke, E. A. (1976). The nature and causes of job satisfaction. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (pp. 1297–1349). Chicago: Rand McNally. https://www.researchgate.net/publication/238742406_The_Nature_and_Causes_of_Job_Satisfaction

Manuti, A., Impedovo, M. A., & De Palma, P. D. (2017). Managing social and human capital in organizations: Communities of practices as strategic tools for individual and organizational development. *Journal of Workplace Learning, 29*(3), 217–234. https://doi.org/10.1108/JWL-07-2016-0062

Mark, G., & Smith, A. P. (2012). Effects of occupational stress, job characteristics, coping, and attributional style on the mental health and job satisfaction of university employees. *Anxiety, Stress & Coping, 25*(1), 63–78. https://doi.org/10.1080/10615806.2010.548088

Mehrad, A. (2020). Evaluation of academic staff job satisfaction at Malaysian universities in the context of Herzberg's Motivation-Hygiene Theory. *Journal of Social Science Research, 15*, 157–166. https://doi.org/10.24297/jssr.v15i.8725

MEXT. (2021) Survey of the university-industry collaboration and regional R&D. https://www.mext.go.jp/a_menu/shinkou/sangaku/1413730_00010.htm

Miner, J. B. (1980). The role of managerial and professional motivation in the career success of management professors. *Academy of Management Journal, 23*(3), 487–508. https://doi.org/10.5465/255514

Monahan, K., Shaklee, T., & Zornes, D. (2023). History of research administration/management in North America. In S. Kerridge, S. Poli, & M. Yang-Yoshihara (Eds.), *The Emerald handbook of research management*

and administration around the world (pp. 27–36). Emerald Publishing Limited. https://doi.org/10.1108/978-1-80382-701-820231004

Nash, J. A., & Wright, D. A. (2013). Profile of the chief research officer at major research universities in the United States and examination of the current pathways to the position. *Journal of Research Administration, 44*(2), 74–93. https://files.eric.ed.gov/fulltext/EJ1156072.pdf

Patrick, H. A., & Sonia, J. (2012). Job satisfaction and affective commitment. *IUP Journal of Organizational Behavior, 11*(1), 23-36. https://ssrn.com/abstract=2148283

Platis, C., Reklitis, P., & Zimeras, S. (2015). Relation between job satisfaction and job performance in healthcare services. *PROCEDIA-Social and Behavioral Sciences*, *175*, 480-487. https://doi.org/10.1016/j.sbspro.2015.01.1226

Poli, S. (2018). Who are today's research managers? Roles, professional development, and evaluation of the profession. In J. Andersen, K. Toom, S. Poli, & P. F. Miller (Eds.), *Research management: Europe and beyond* (pp. 1–29). Academic Press. https://doi.org/10.1016/B978-0-12-805059-0.00001-8

Poli, S., Kerridge, S., Ajai-Ajagbe, P., & Zornes, D. (2023). Research management as labyrinthine – How and why people become and remain research managers and administrators around the world. In S. Kerridge, S. Poli, & M. Yang-Yoshihara (Eds.) *The Emerald handbook of research management and administration around the world* (pp. 141–154). Emerald Publishing Limited. https://doi.org/10.1108/978-1-80382-701-820231013

Raihan, T. (2020). Role of job characteristics model on employee job satisfaction: An empirical study. *Journal of Business Administration, 32,* 179–196. https://www.researchgate.net/publication/348742451_Role_of_Job_Characteristics_Model_on_Employee_Job_Satisfaction-_An_Empirical_Study

Saha, S., & Kumar, S. P. (2018). Organizational culture as a moderator between affective commitment and job satisfaction: Empirical evidence from Indian public sector enterprises. *International Journal of Public Sector Management, 31*(2), 184-206. https://doi.org/10.1108/IJPSM-03-2017-0078

Schiller, J. L., & LeMire, S. D. (2023). A survey of research administrators: Identifying administrative burden in post-award federal research grant management. *Journal of Research Administration, 55*(3), 9–28. https://files.eric.ed.gov/fulltext/EJ1412033.pdf

Schützenmeister, F. (2010). University research management: An exploratory literature review. *UC Berkeley: Institute of European Studies*. https://escholarship.org/uc/item/77p3j2hr

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), 107–118. http://eric.ed.gov/?id=EJ1003771

Shambrook, J., & Roberts, T. J. (2011). 2010 Profile of a research administrator. *Research Management Review, 18*(1), 19–30. https://files.eric.ed.gov/fulltext/EJ980454.pdf

Shelley, L. (2010). Research managers uncovered: Changing roles and 'shifting arenas' in the academy. *Higher Education Quarterly, 64*(1), 41–64. https://doi.org/10.1111/j.1468-2273.2009.00429.x

Siruri, M. M., & Cheche, S. (2021). Revisiting the Hackman and Oldham job characteristics model and Herzberg's two factor theory: Propositions on how to make job enrichment effective in today's organizations. *European*

Journal of Business and Management Research, 6(2), 162-167. https://doi.org/10.24018/ejbmr.2021.6.2.767

Tabakakis, K., Sloane, K., Besch, J., & To, Q. G. (2020). Burnout and its correlates in research administrators. *Research Management Review 24*(1), 1–21. https://files.eric.ed.gov/fulltext/EJ1253136.pdf

Takahashi, M., & Ito, S. (2023). The profession of research management and administration in Japan. In S. Kerridge, S., Poli, S., & Yang-Yoshihara, M. (Eds.) *The Emerald handbook of research management and administration around the world* (pp. 519–526). Emerald Publishing Limited. https://doi.org/10.1108/978-1-80382-701-820231046

Tauginienė, L. (2009). The roles of a research administrator at a university. *Public Policy and Administration*, *1*(30), 45–56. https://ojs.mruni.eu/ojs/public-policy-and-administration/article/view/1214/1162

Veles, N., Graham, C., & Ovaska, C. (2023). University professional staff roles, identities, and spaces of interaction: Systematic review of literature published in 2000–2020. *Policy Reviews in Higher Education, 7*(2), 127–168. https://doi.org/10.1080/23322969.2023.2193826

Virágh, E., Zsar, V., & Balázs, Z. (2019). *Research management and administration: A profession still to be formalized*. HÉTFA Research Institute and Center for Economic and Social Analysis. https://doi.org/10.13140/RG.2.2.23699.09765

Volkwein, J. F., & Parmley, K. (2000). Comparing administrative satisfaction in public and private universities. *Research in Higher Education, 41(1)*, 95–116. https://www.jstor.org/stable/40196390

Wallace, J. E. (1995). Organizational and professional commitment in professional and nonprofessional organizations. *Administrative Science Quarterly*, *40(2),* 228–255. https://doi.org/10.2307/2393637

Weiss, D. J., Dawis, R. V., England, G. W. & Lofquist L. H. (1967). Manual for the Minnesota satisfaction questionnaire. *Minnesota Studies in Vocational Rehabilitation.* https://vpr.psych.umn.edu/sites/vpr.umn.edu/files/files/monograph_xxii_-_manual_for_the_mn_satisfaction_questionnaire.pdf

Zhao, X. R., Ghiselli, R., Law, R., & Ma, J. (2016). Motivating frontline employees: Role of job characteristics in work and life satisfaction. *Journal of Hospitality and Tourism Management, 27*, 27–38. https://doi.org/10.1016/j.jhtm.2016.01.010

A QUALITATIVE CONTENT ANALYSIS OF JOB ADVERTISEMENTS FOR RESEARCH FUNDING MANAGERS-RELATED POSITIONS IN AUSTRALIAN UNIVERSITIES

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ABSTRACT

Research funding managers require diverse knowledge, skills, and experience to provide excellent research support services. This study aims to identify the topmost critical knowledge, skills, and experience required of a research funding manager in higher education in Australia. A qualitative content analysis of the job descriptions of research manager positions in Australia was conducted. A total of 51 research funding managers' positions were advertised within the study period. Most of the positions (92.2%) were advertised as full-time positions, and continuing positions (58.8%). Twenty-three major skills (soft and hard skills) were identified. The most required skills are communication, interpersonal, leadership, problem-solving and analytical, and organization and planning, while 11 core knowledge areas were required. The most required knowledge areas are funding schemes, contract management, research landscape, funding and institutional regulations. A total of 17 areas of experience were identified. The most required experience includes grant management and administration, research grant system, leadership, management and project management. It was also concluded that a research funding manager must know about funding schemes, contract management, research landscape, regulations of a tertiary institution environment and grant development while experience in contract management, research grant system and project management are also germane.

INTRODUCTION

Research management and administration is a dynamic profession that spans various higher education and private sectors. Professionals in this field provide support to researchers throughout the research lifecycle, helping to alleviate the administrative burden associated with research (Spencer & Scott, 2017). These professionals are required at each stage of the research lifecycle, with more than ten areas of specialization (Kerridge & Scott, 2017). They are named based on the stage or phase of the research lifecycle in which they provide support services. For example, those providing research support services at the ideation phase are called research development professionals, while those providing support at the research funding application phase are called research funding (pre- or post-award) professionals, with titles such as research funding officer, research administration officer, or grant officer. Research funding managers oversee the operation of the research funding team, providing excellent support services to improve the quality of research funding applications and increase success rates. Despite the ubiquitous usefulness of this profession, there is no formal undergraduate educational program required to enter the profession (Shelley, 2010). However, more recently, postgraduate degrees in research management and administration are being offered in some universities in the United States of America, and some professional societies are now offering short development courses and certifications. Although professional certification has been a useful tool to equip members of the profession, not all professionals are interested in pursuing certification.

The growing demand for research funding professionals can be attributed to the increase in global research activities and the need for research funding to drive scientific innovation (Shelley, 2010). As funding requirements continue to rise, so does the need for research funding professionals to possess a diverse set of knowledge, skills, and experience to provide excellent research funding support services. Research management and administration professionals must have a wide range of competencies to support research excellence and impact (Andersen, 2018). Job advertisements, primarily posted online, play a crucial role in attracting the most suitable candidates to fill vacant positions (Kim & Angnakoon, 2016). These advertisements typically include position descriptions that outline the knowledge, skills, and experience required for the role, as well as the responsibilities of the hired candidate. Job seekers can use these position descriptions to understand the current demands of the workplace (Bronstein, 2015; Wise et al., 2011).

Analyzing the content of job advertisements has become increasingly important for identifying the critical knowledge, skills, and experience required in various disciplines, such as library and information science (LIS) (Bronstein, 2015), knowledge management (Harper, 2012), consultancy (Carliner et al., 2015), health informatics and management (Meyer, 2019) and project management (Ahsan et al., 2013). However, despite the evolving nature of the research management and administration profession, there has been no such study focusing on this field. Therefore, this study aims to identify the top five most critical knowledge, skills, and experiences required of research funding managers in higher education in Australia. The findings of this study will be valuable in determining the most essential knowledge, skills, and experience needed for research funding positions, thereby supporting professional development and skill acquisition for those aspiring to take up managerial roles in the research management and administration profession.

The study seeks to answer the research question: what are the top five most important knowledge, skills, and experiences required for the position of research funding managers in Australia?

METHOD

This study was conducted in two phases. In the first phase, research questions were formulated to guide the study and provide a clear focus for the investigation. The second phase involved the collection of job advertisements and the extraction of relevant data for content analysis.

Job Advertisement Collection

Job advertisements for research management and administration positions were collected over six months (late 2022–early 2023) from university job websites, job search websites (Seek, Jora), and LinkedIn (a professional social networking site). The collected advertisements encompassed various aspects of the research management and administration profession, including research funding (pre- and post-award), research performance, research integrity and ethics, intellectual property, research development, and research infrastructure. However, this current study focuses specifically on the data collected for research funding manager positions.

To streamline the search and ensure relevance to the profession of interest, keywords such as "research management" and "research administration" were used when searching for job advertisements on the websites. Additionally, daily or weekly notifications were set up to ensure that no potential job advertisements were missed, as most job postings are typically active for only two weeks. For each advertised position, the position description was extracted and used for data.

Data Extraction

From the position description of each job advertisement, the following information was extracted:

- The university advertising the job.
- Position and level (Higher Education Officer - HEO/Higher Education Worker - HEW).
- Core areas of knowledge required for the role.
- Working hours (full-time, part-time, or casual).
- Basis of employment (continuing, fixed-term, or contract).
- Source of the job advertisement (university website, job search website, or LinkedIn).
- Professional framework (if applicable).
- Position requirements (qualifications and education).
- Selection criteria.
- Position description.
- Roles and responsibilities associated with the position.

Data Analysis

The extracted data, excluding the roles and responsibilities, were organized, deduplicated, and analyzed descriptively using Microsoft Excel. The roles and responsibilities were downloaded into Microsoft Word and then exported to the content analysis software, NVivo (version 20), for coding and visualization of the qualitative data. The content analysis followed the method described by Meyer (2019), which includes preparing the data, organizing the data, and reporting the analyzed data.

RESULTS

During the study period, 51 job positions for research funding managers were advertised, as shown in Table 1. Only 28.6% of these positions were advertised by Group of Eight universities. Most positions (92.2%) were advertised as full-time, and more than half (58.8%) were advertised as continuing positions. Over two-thirds (66.7%) of the advertised positions were at HEO/HEW level 8. Postgraduate education was the most preferred qualification, with 86.2%

of the job listings requiring this level of education. Most of the job positions were advertised on the universities' job websites. Universities from Victoria (39.2%) and Queensland (31.4%) accounted for more than half of the advertised positions.

Table 1
Descriptive Statistics

Characteristics	Frequency	Percentage (%)
Type of higher institution (N=22)		
Group of 8	6	28.6
Others	16	76.2
Appointment (51)		
Full time	47	92.2
Part time	4	7.8
Basis of employment (N=51)		
Continuing	30	58.8
Contract	1	2.0
Fixed	20	39.2
Employment level (N=51)		
HEO 6	1	2.0
HEO 8	34	66.7
HEO 9	15	29.4
HEO 10	1	2.0
Qualification (N=51)		
Bachelor	5	9.8
Not mentioned	2	3.9
Postgraduate	44	86.3
Source of advertisement (N=51)		
Jora	5	9.8
LinkedIn	1	2.0
Seek	9	17.6
University jobs website	36	70.6
Location (State N=6, Territory N=2)		
Northern Territory	1	2.0
South Australia	6	11.8
Western Australia	2	3.9
Victoria	20	39.2
Tasmania	1	2.0
New South Wales	4	7.8
Australian Capital Territory	1	2.0
Queensland	16	31.4

Table 2
Categorization of Skills Required for a Research Funding Manager's Position

Skills	Frequency	Soft skills						Analytical skills	Technical skills
		Communication skills	Problem-solving skills	Leadership skills	Collaboration skills	Interpersonal skills	Cognitive skills	Analytical skills	Technical skills
Creativity and innovation	3							x	
Data analysis	1								x
Communication	24	x							
Organisation and planning	7			x					
Problem-solving and analytical	8		x						
Interpersonal	19							x	
Information Technology	3								x
Work independently and ability to work under pressure	2		x						
Conflict resolution	1		x						
Attention to detail	5						x		
High-level advice and recommendation	7			x					
Leadership (motivation, liaison, training)	12			x					
Management	7			x					
Negotiation	1					x			
Project management	6								x
Grant development (writing)	3								x
Grant budgeting	1								x
Grant management and administration	4								x
Contract management	5								x
Research partnership	1				x				
Stakeholders' management	3				x				
Promote research capabilities	1								x
Health Safety	1								x

Table 3
Categorization of Knowledge Required for a Research Funding Manager's Position

Knowledge	Frequency	Types of knowledge		
		Industry	Regulatory	Organizational
Intellectual Property	1	x		
Grant development (writing)	2	x		
Grant management and administration	1	x		
Contract management	4	x		
Funding schemes	7	x		
Research partnership	1	x		
Research policy	1	x		
Research landscape	3	x		
Regulations of a tertiary education environment	3			x
Regulatory and ethical approval process	1		x	
Risk management	1			x

Selection Criteria (Knowledge, Skill, and Experience – KSE)

To answer the research question, the selection criteria of the job positions were analyzed qualitatively using content analysis. The content of the selection criteria was grouped into three categories: knowledge, skills, and experience. The results, presented in Figure 1, revealed overlaps between the knowledge, skills, and experience required of research funding managers. To avoid undue repetition, overlapping requirements were not repeated in the analysis.

Skills

A total of 23 skills (soft and hard skills), mentioned 125 times, were required in all the position descriptions analyzed in this study. The skills were further categorized into communication skills, problem-solving skills, leadership skills, analytical skills, technical skills, collaboration skills, and cognitive skills, as shown in Table 2. Communication (oral and written) was the most frequently mentioned soft skill required for the position of research funding manager, appearing 24 times. Interpersonal skills were the second most required soft skill, while leadership skills were the third most required. Other skills included problem-solving, analytical, management, and organization and planning skills. The top five most required skills were discussed in detail.

Knowledge

Eleven core knowledge areas, mentioned 25 times, were identified and further categorized into industry (research funding), regulatory, and organizational knowledge, as shown in Table 3. Knowledge of

funding schemes was the most required knowledge area, mentioned seven times. Contract management was the second most required (mentioned four times), while knowledge of the research landscape and knowledge of funding and institutional regulations were the third most required knowledge areas (mentioned three times each). The top five most required knowledge areas were discussed in detail.

Table 4
Core Areas of Experience Required for a Research Funding Manager's Position

Experience	Frequency
Creativity and innovation	1
Data analysis	1
High-level advice and recommendation	2
Intellectual Property	3
Leadership (motivation, liaison, training)	4
Management	4
Negotiation	1
Priorities setting (prioritizing, meeting deadlines)	2
Project management	4
Record management	1
Research grant system	11
Contract management	21
Research partnership	3
Stakeholders' management	1
Health safety	3
Working in a University environment	1

Experience

Seventeen areas of experience, mentioned 65 times, were identified. The five most required experiences were grant management and administration (mentioned 21 times), research grant systems (mentioned 11 times), leadership (motivation, liaison, training), management, and project management (each mentioned four times). Only four of the top five most required experiences were discussed in detail, as leadership had already been discussed as a skill (Table 4).

Overlapping of Knowledge, Skills and Experience

The analysis of the position descriptions in the job advertisements revealed overlaps among some of the listed knowledge, skills, and experience requirements, as illustrated in Figure 1. The majority (8) of these overlaps occurred between skills and experience, while no overlaps were observed between knowledge and skills. Only one overlap was identified between knowledge and experience. Interestingly, grant management and administration, contract management, research grant systems, and research partnerships were listed as knowledge, skill, and experience requirements in some of the analyzed position descriptions.

DISCUSSION

A content analysis of research management and administration job positions was conducted to identify the top five most requested knowledge, skills, and experiences. The position descriptions of the advertised jobs included data on the institution advertising the position, department, basis, and level of employment, position summary, responsibilities, selection criteria, and other institutional requirements, aligning with the definition of position description provided by Bhargava and Theunissen (2019). This study used a purposive sampling method, focusing on research management and administration positions advertised on university websites and job websites like Seek.

Figure 1
Knowledge, Skill and Experience (KSE)
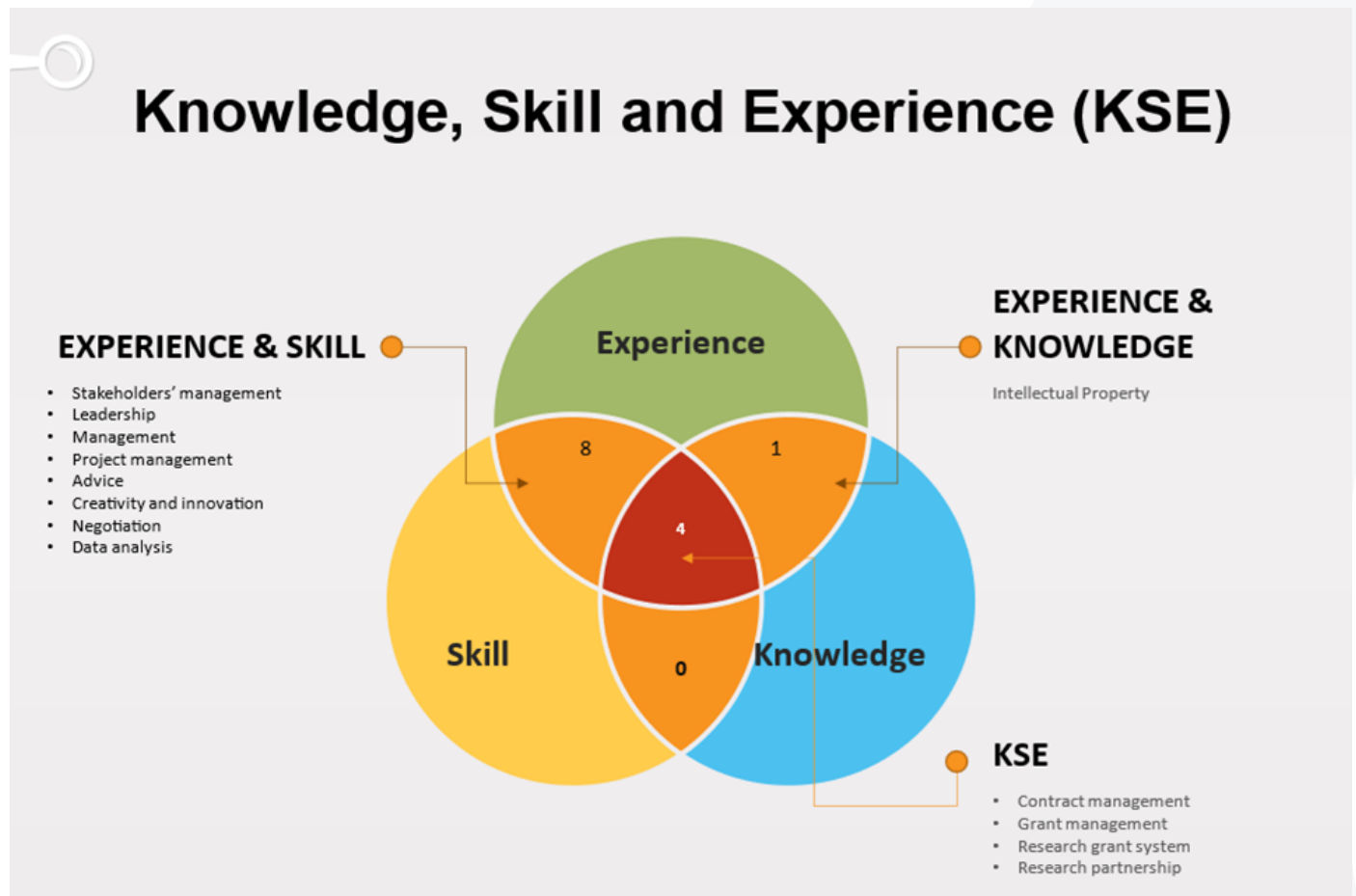
The sample size and sampling period of this study fall within the ranges reported in a systematic review by Kim and Angnakoon (2016), which found that studies on job advertisements used sample sizes between 10 and 10,000 and sampling periods ranging from two months to 44 years. Although experience in various skills was required, the position descriptions did not specify the number of years of experience.

The descriptive statistics of appointment type and qualification in this study agree with previous findings. Kerridge and Scott (2018) reported that over 70% of respondents from Oceania were employed full-time, and more than 50% had postgraduate degrees. Oliveira et al. (2023) found that 60% of 308 respondents from Oceania, primarily from Australia,

had postgraduate degrees, suggesting that the profession requires highly educated individuals who can work on a continuing full-time basis. Globally, professionals at managerial levels had more postgraduate qualifications than those at operational or leadership levels. Postgraduate degrees build trust in the services provided by research managers and administrators who support highly educated researchers (Byrne, 2023).

Research funding managers can be categorized as pre-award or post-award managers. Pre-award managers lead the pre-award research funding team and provide support services from ideation to the submission of funding applications. Post-award managers lead the team that provides support

services when funding applications are successful, assisting with establishing contract agreements with funding bodies.

The top five skills identified (communication, interpersonal skills, leadership, problem-solving and analytical skills, and organization and planning) are considered transferable skills required in the profession (Virágh et al., 2020). These soft skills can be acquired through various means, including postgraduate education. Kerridge and Scott (2017) reported that soft skills are required in higher proportions among leaders and managers compared to hard skills required by operational professionals, indicating an increasing need for transferable skills when progressing to managerial and leadership positions. The diverse skills needed to complete different tasks impact career development in research management and administration, as practitioners are multifunctional by default (Bonnici & Cassar, 2020; Reardon, 2021). Vidal et al. (2015), noted that research management and administration professionals provide basic, intermediate, and advanced support services to researchers applying for funding, with each level requiring different knowledge, skills, and experience. Advanced support, such as reviewing proposals, providing professional feedback, ensuring proposals meet funding objectives, and organizing development sessions, requires communication skills, interpersonal skills, organizational skills, and attention to detail. The study reported a 61% success rate for funding applications that received advanced support services.

In a recent global study, Dutta et al. (2023) found that 68.1% of 3,465 respondents reported communication skills as necessary to enter the profession, with communication skills ranking first among respondents from Oceania (77.5%). These skills are essential for communicating with various stakeholders involved in the research funding lifecycle, such as communicating funding opportunities to researchers and interacting with funders and partner organizations.

Interpersonal skills are crucial for maintaining good working relationships and avoiding reputational

damage. Campo (2014) emphasized the importance of interpersonal skills for good leadership in research management and administration. Virágh et al. (2020), and Poli et al. (2023) reported that interpersonal skills are among the most important transferable skills required by research management professionals in Europe.

Leadership skills are unsurprisingly required for research funding manager positions, although there is a lack of studies on leadership roles in research management and administration, possibly due to the limited number of leadership roles in the profession. Problem-solving and analytical skills have been identified as important transferable skills with Poli et al. (2023) reporting them among the top four most important transferable skills required by research management and administration professionals in Europe. Organization and planning skills are necessary due to the complexity of tasks associated with the profession, such as organizing documents related to funding applications. Dutta et al. (2023) reported that 72.1% of respondents stated organizational skills enabled them to enter the profession, with 77% of 371 respondents from Oceania, including Australia, possessing organizational skills when starting their roles.

Research funding managers must understand the objectives and requirements of various funding schemes and rounds to provide professional advice to researchers. For example, in Australia, the Australian Research Council (ARC) and National Health and Medical Research Council (NHMRC) have different schemes for their Discovery and Linkage Programs. Knowledge of contract management is required by post-award research funding managers to establish contract agreements with funding bodies, while both pre- and post-award managers need this skill to understand the research ecosystem and the latest developments in administering new funding opportunities and requirements.

Research funding managers are expected to have knowledge of their institution's internal requirements

for funding applications. To secure funding, applications must be novel, systematic, and meet all internal and external requirements, necessitating well-written grant development. This requires good writing skills and attention to detail as specified in the funding guidelines. Research funding managers are expected to demonstrate their skills and knowledge through experience, which can be gained through employment or volunteering.

CONCLUSION

In conclusion, research funding managers require diverse knowledge, skills, and experiences to provide excellent research support services. The findings of this study benefit early career research management and administration professionals intending to transition to managerial roles. The analysis of job advertisements for research funding manager positions at level 8 and above establishes that candidates must be skilled in communication, interpersonal relations, leadership, problem-solving, analytical thinking, organization, and planning. Additionally, research funding managers must have knowledge of funding schemes, contract management, research landscape, tertiary institution

regulations, and grant development, as well as experience in contract management, research grant systems, and project management.

AUTHORS' NOTE

Originality Note

This manuscript reflects the original work of Olanrewaju A. Wilhelm and Olumide A. Odeyemi. All references have been properly cited in the manuscript.

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REFERENCES

Ahsan, K., Ho, M., & Khan, S. (2013). Recruiting project managers: A comparative analysis of competencies and recruitment signals from job advertisements. *Project Management Journal*, *44*(5), 36-54. https://doi.org/10.1002/pmj.21366

Andersen, J. (2018). Chapter 15 - Transferable skills. In J. Andersen, K. Toom, S. Poli, & P. F. Miller (Eds.), *Research Management* (pp. 319-332). Academic Press. https://doi.org/https://doi.org/10.1016/B978-0-12-805059-0.00015-8

Bhargava, D., & Theunissen, P. (2019). The future of PR is 'fantastic', 'friendly' and 'funny': Occupational stereotypes and symbolic capital in entry-level job advertisements. *Public Relations Review*, *45*(4), 101822. https://doi.org/https://doi.org/10.1016/j.pubrev.2019.101822

Bonnici, C., & Cassar, V. (2020). The implications of contextual realities on career development: The specific case of university research managers and administrators in small island states. *Journal of Career Development*, *47*(3), 266-279. https://psycnet.apa.org/doi/10.1177/0894845317709352

Bronstein, J. (2015). An exploration of the library and information science professional skills and personal competencies: An Israeli perspective. *Library & Information Science Research*, *37*(2), 130-138. https://doi.org/10.1016/j.lisr.2015.02.003

Byrne, D. (2023, September 22). Culture clashes: Unpicking the power dynamics between research managers and academics. *Nature Careers Podcast*. https://doi.org/10.1038/d41586-023-02983-x

Campo, M. A. (2014). Leadership and research administration. *Research Management Review*, *20*(1). https://files.eric.ed.gov/fulltext/EJ1038832.pdf

Carliner, S., Castonguay, C., Sheepy, E., Ribeiro, O., Sabri, H., Saylor, C., & Valle, A. (2015). The job of a performance consultant: A qualitative content analysis of job descriptions. *European Journal of Training and Development*, *39*(6), 458-483. https://eric.ed.gov/?id=EJ1072337

Dutta, M., Oliveira, C., Fischer, M., Kerridge, S., Kerridge, S., Poli, S., & Yang-Yoshihara, M. (2023). Routes into research management and administration. In Kerridge, S., Poli, S., & Yang-Yoshihara, M. (Eds.), *The Emerald handbook of research management and administration around the world*, (pp.125-140). Emerald Publishing Limited. https://doi.org/10.1108/978-1-80382-701-820231012

Harper, R. (2012). The collection and analysis of job advertisements: A review of research methodology. *Library and Information Research*, *36*(112), 29-54. https://doi.org/10.29173/lirg499

Kerridge, S., & Scott, S. F. (2017, August 6-9). *Research Administration as a Profession (RAAAP) - A snapshot of research administrators and their skills from around the world* [Poster presentation]. NCURA 2017 AM59 Conference in Washington DC. http://dx.doi.org/10.6084/m9.figshare.5278195.v1

Kerridge, S., & Scott, S. F. (2018). Research administration around the world. *Research Management Review*, *23*(1), 1-34. https://eric.ed.gov/?id=EJ1187515

Kim, J., & Angnakoon, P. (2016). Research using job advertisements: A methodological assessment. *Library & Information Science Research*, *38*(4), 327-335. https://doi.org/https://doi.org/10.1016/j.lisr.2016.11.006

Meyer, M. A. (2019). Healthcare data scientist qualifications, skills, and job focus: A content analysis of job postings. *Journal of the American Medical Informatics Association*, *26*(5), 383-391. https://doi.org/10.1093/jamia/ocy181

Oliveira, C., Fischer, M., Kerridge, S., & Dutta, M. (2023). The research administration as a profession (RAAAP) survey. In Kerridge, S., Poli, S., & Yang-Yoshihara, M. (Eds.), *The Emerald handbook of research management and administration around the world* (pp. 113-123). Emerald Publishing Limited. http://doi.org/10.1108/978-1-80382-701-820231011

Poli, S., Oliveira, C., & Zsár, V. (2023). From conceptualisation to action–The quest for understanding attitudes of research managers and administrators in the wider world. In Kerridge, S., Poli, S., & Yang-Yoshihara, M. (Eds.), *The Emerald handbook of research management and administration around the world* (pp. 201-220). Emerald Publishing Limited. http://dx.doi.org/10.1108/978-1-80382-701-820231019

Reardon, S. (2021). 'We're problem solvers': Research administrators offer guidance to working scientists. *Nature*, *595*(7866), 321-322. https://doi.org/10.1038/d41586-021-01829-8

Shelley, L. (2010). Research managers uncovered: Changing roles and 'shifting arenas' in the academy. *Higher Education Quarterly*, *64*(1), 41-64. https://doi.org/10.1111/j.1468-2273.2009.00429.x

Spencer, T., & Scott, J. (2017). Research administrative burden: A qualitative study of local variations and relational effects. *Research Management Review*, *22*(1). https://eric.ed.gov/?id=EJ1161542

Vidal, S., Laureano, R., & Trindade, M. (2015). Assessing the impact of Grant Managers on the success of grant applications. *Perspectives: Policy and Practice in Higher Education*, *19*(3), 84-91. https://doi.org/10.1080/13603108.2015.1019948

Virágh, E., Zsár, V., & Balázs, Z. (2020, March). *Research Management and Administration: The relevance of specific education and training programmes*. HEFTA Working Paper. http://dx.doi.org/10.13140/RG.2.2.29780.83847

Wise, S., Henninger, M., & Kennan, M. A. (2011). Changing trends in LIS job advertisements. *Australian Academic & Research Libraries*, *42*(4), 268-295. https://eric.ed.gov/?id=EJ955082

ADVANCING RESEARCH ADMINISTRATION WITH AI: A CASE STUDY FROM EMORY UNIVERSITY

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ABSTRACT

This case study examines the development of a proof-of-concept (PoC) generative artificial intelligence (genAI) model inspired by OpenAI's ChatGPT®, implemented within the Office of Research Administration (ORA) at Emory University. Generative artificial intelligence (genAI) refers to AI models capable of producing human-like text. Specifically, this study shares practical insights and experiences from developing a private AI model tailored to support research administration operations. The initiative involved forming a specialized team, identifying a secure and efficient platform, and creating ORAgpt—a chatbot designed to provide Emory's research administrators with instant and accurate guidance on institutional policies, procedures, and administrative tasks. Key elements discussed include strategies for team selection, data curation, and model architecture, such as leveraging internal subject matter expertise, curating institutional documentation, and deploying cloud-based technology through Microsoft Azure. Despite challenges such as constrained funding and a compressed timeline, the project reached significant milestones, including positive stakeholder feedback and evidence indicating the model's potential to streamline tasks and enhance productivity. The findings underscore genAI's promise to transform research administration by increasing efficiency and providing a scalable framework for adoption by similar institutions. Future phases will incorporate structured governance, rigorous document vetting processes, and comprehensive financial planning to ensure sustainability.

INTRODUCTION

The rapid development of artificial intelligence (AI) has opened new frontiers for enhancing efficiency across a wide range of industries, including research administration. This includes advancements in natural language processing AI models, such as large language models (LLMs). LLMs are AI systems capable of processing and generating human-like text by analyzing vast datasets of human content, such as the internet and literature, to better understand speech syntax (Naveed et al., 2024, p. 2). These generative models referred to as genAI, can comprehend and produce natural language, enabling transformative

applications across various sectors (Naveed et al., 2024, p. 3).

Despite their potential, LLMs present challenges, such as generating inaccurate or misleading information, commonly known as hallucinations. These occur when models produce plausible but incorrect content due to limitations in their understanding and reliance on patterns from their training data (Naveed et al., 2024, p. 15). To mitigate these risks, institutions have emphasized developing private models that limit external data sources, thereby enhancing the accuracy and security of AI outputs. Additionally, effective use of LLMs requires a practice known as prompt engineering, which involves refining queries to elicit accurate and relevant responses from the model (Naveed et al., 2024, p. 6).

In November 2022, OpenAI launched ChatGPT®, an advanced generative AI model. GPT stands for "Generative Pre-trained Transformer," a neural network architecture designed to generate coherent and contextually relevant text based on input prompts (Naveed et al., 2024, p. 10). Given the novelty and complexity of these technologies, conveying the potential of genAI to non-technical colleagues posed a significant challenge. To address this, a project team at Emory embarked on a proof-of-concept (PoC) project to explore the application of genAI in research administration.

This article presents a case study detailing the ORAgpt chatbot development, capturing real-world experiences and practical insights gained throughout the process. The ORAgpt chatbot, named after the Office of Research Administration (ORA), was developed as a private LLM-based assistant to streamline administrative tasks and support research operations. This initiative, led by the Office of Strategic Optimization and Training (OSOT) with the ORA, in collaboration with Goizueta Business School, aimed to provide research administrators with instant, accurate information on ORA processes and policies. The project demonstrated AI's potential to transform research administration by reducing response times and ensuring information

consistency. Secondary objectives included raising awareness of genAI technology among research administrators and conducting live demonstrations of ORAgpt (Konsynski, B. 2023). This case study highlights the development process, including team selection, platform choices, overcoming significant challenges, preparing for demonstrations, and navigating budgetary constraints.

Background

Recognizing AI's potential, the interim assistant vice president of OSOT began collaborating with Leena AI in December 2022 to develop a ChatGPT-like sandbox customized for research administration. This external (buy) approach leveraged the vendor's expertise for a rapid turnaround, allowing for a quickly developed sandbox model. This external model served to demonstrate the potential impact, value, and strategic benefits of integrating generative AI (genAI) into research administration. The collaboration with Leena AI was designed to inform a build-or-buy decision. It was later presented to Emory's vice president for research in July 2023, marking a significant step toward revolutionizing research administration through AI.

While the external model demonstrated the potential of generative AI, the absence of allocated funding in the FY23 budget led to the decision to explore an internal development approach and not move further than the Leena AI sandbox. The decision was therefore to focus on an internally built chatbot.

In August 2023, the interim assistant vice president assembled an internal team to build a second proof of concept (PoC) for a private LLM/GPT solution. While the development platform had not yet been selected, the team named the solution and the bot "ORAgpt," after the Office of Research Administration (ORA), reflecting its intended purpose and organizational alignment. This dual approach was strategically chosen to address several key objectives:

1. **Demonstrate Value**: Develop a compelling AI demo to secure buy-in from senior leadership for further investment.

2. **Identify Use Cases**: Address real pain points in research administration by refining specific AI functionalities.

3. **Establish Feasibility**: Assess resources, cost, and team structure needed to scale from PoC to full production.

The internal PoC was successfully unveiled in October 2023, showcasing the project's rapid progression and strategic planning from the initial concept to the demonstration of both solutions.

Use Cases Driving the Project

Through discussions with new employees, it was discovered that they often experienced frustration due to the length of time it took for colleagues and peers to answer questions about specific job-related tasks. Some reported waiting hours or even days for responses, preventing them from completing their work on time. Additionally, many job aids and Standard Operating Procedures (SOPs) were outdated or difficult to follow.

One of the primary goals of this PoC was to demonstrate how an AI-powered solution could address these pain points by improving response times and ensuring consistent, accurate, and complete information delivery.

The vision and intent of the ORAgpt PoC project was to explore the new technology for feasibility in ORA. Traditional chatbots are well known tools for managing information requests from users, but the envisioned genAI assistant would push the current capabilities further. Virtual assistants with the capacity to create and update files would transform research administration and the way we perform work. A detailed description of each is provided below.

Virtual Assistant for Instantaneous Answers: A virtual assistant designed to offer 24/7 access to process and procedure information, enabling research administrators to receive immediate guidance. Such a tool can reduce delays at full scale by providing reliable, consistent answers to task-related questions. It can potentially enhance new hires' onboarding and training experience and decrease employees' time to achieve portfolio management proficiency. For instance, research administrators can quickly obtain information about award setup and closeout, system navigation, invoice processing, and other key policies and procedures. Benefits may include lower operational costs, better customer service, and reduced staff turnover (Wilson, 2023a).

Document Generation for SOP Updates: SOP development has long been time-consuming and inconsistent for ORA staff. With over 90 SOPs needing revision, outsourcing these updates proved cost-prohibitive, with vendor quotes starting at $50,000 per SOP. Leveraging genAI, the project aimed to streamline SOP development, eliminate outsourcing costs, and ensure consistency in style, language, and format. This use case aimed to assist research administrators in revising or creating new SOPs by guiding them through pre-set prompts, references, and templates, generating updated or new SOP documents. The goal was to standardize formatting, reduce development time, and update SOPs as needed using AI-powered document generation.

Student Collaboration

In collaboration with Emory's Goizueta Business School George S. Craft Distinguished University Professor, the project team envisioned leveraging the latest AI technology and providing students with valuable hands-on learning experiences. A select group of students, affectionately known as the 'Students of Benn' (SOBs), were recruited, and directly involved in developing the private ORA genAI model.

The newly established capstone project for the students integrated academic theory with practical application, creating a dynamic learning environment and infusing the classroom with real-world business problem-solving experiences.

Collaborative Development

The project emphasized configuring the model to utilize select, curated knowledge resources from

ORA's Knowledge Repository, compiling and vetting SOPs, policies, training materials, and more into a shared directory. Unrelated, confidential, sensitive, personally identifiable information, proposals, awards, and Intellectual Property (IP) data were excluded from the LLM's knowledge base, upholding data integrity and security standards. The charge was to manage the LLM's output and response to user queries using only ORA-related data.

The student team initially tested platforms like Private GPT and FlowiseAI before the project team agreed on Microsoft Azure.

Constraints

The project encountered several significant constraints, particularly during the exploration phase. Key constraints included a limited budget, a self-imposed compressed timeline, and the critical need to mitigate data security and system integration risks. These obstacles necessitated meticulous planning and the implementation of robust risk management strategies to safeguard project outcomes. The tight schedule underscored the urgency to quickly demonstrate the potential of generative AI (genAI) capabilities, yet the project team prioritized carefully selecting a secure and scalable platform. Organizational approval of the chosen solution was paramount, especially given concerns about data confidentiality and system performance. The team faced the non-negotiable imperative of preventing potential risks to sensitive institutional data while ensuring the solution's scalability.

Each potential solution was rigorously evaluated against these stringent criteria. PrivateGPT, while promising in managing Personally Identifiable Information (PII), proved inadequate due to its slow response times and susceptibility to errors, making it unsuitable for live demonstrations. Similarly, FlowiseAI, another contender, demonstrated potential but ultimately underperformed in critical performance benchmarks. These limitations underscored the complexity of balancing security, scalability, and functionality in selecting a viable AI platform.

Theoretical Framework

This study is grounded in multiple organizational theories that provide a comprehensive framework for understanding the integration of AI into research administration. The primary theories applied include Weber's The Theory of Social and Economic Organization (1947), Knowledge Management Theory (Nonaka & Takeuchi, 1995), and Simon's concept of Bounded Rationality (1957).

- Weber's Theory of Bureaucracy emphasizes efficiency, consistency, and predictability in large organizations. AI's ability to automate routine tasks and provide standardized responses aligns with these principles, allowing research administrators to focus on higher-level responsibilities and improving overall organizational performance.
- Knowledge Management Theory supports the integration of AI by highlighting its role in capturing, storing, and disseminating institutional knowledge. The ORAgpt model addresses the challenge of knowledge transfer by making critical, time-sensitive information readily accessible to research administrators, thus reducing delays and inconsistencies.
- Simon's Bounded Rationality concept underscores the limitations of human decision-making due to available information and cognitive constraints. AI enhances decision-making by providing timely and relevant information, compensating for these limitations. However, the risk of generating incorrect or misleading information necessitates strong governance structures and ethical guidelines.

Furthermore, this work's theoretical underpinnings emphasize AI's potential to significantly improve administrative efficiency by delivering accurate and timely information. Drawing on theories of knowledge management and information systems, the study explores how AI can streamline operations, support decision-making, and optimize resource utilization in research administration. This is supported by Popenici and Kerr (2017), who explored the impact of artificial intelligence on teaching and learning in higher education, including its implications for administrative efficiency and effectiveness.

This theoretical framework guided the study from the formulation of core questions to the methods used and the qualitative exploration conducted. It also informed the conclusions drawn, emphasizing AI's potential to significantly improve administrative efficiency by delivering accurate and timely information.

At the time, much of the existing literature related to the utilization of AI focused on industries such as healthcare, ecommerce, finance, and marketing (Deloitte Center for Higher Education Excellence, 2023; Popenici & Kerr, 2017). While Deloitte (2023) discusses AI applications in healthcare, finance, and ecommerce, Popenici and Kerr (2017) specifically explore AI within higher education. Few discussions addressed the use of AI, or in this case generative AI, in the university research administration environment (particularly the integration of private LLMs).

This case study acknowledges, addresses, and contributes to existing gaps in the literature by providing practical insights into the exploration, deployment, and use of private LLMs within university research administration operations. The successful implementation of this proof-of-concept underscores generative AI's significant potential to enhance research administration through improved knowledge retrieval, efficient creation and updating of SOPs and related process documentation, and other effective natural-language content generation.

METHODOLOGY

The core approach to deploying Emory ORA's private LLM leveraged preview access to Microsoft Azure's 2023 Generative AI model, made possible through Microsoft's partnership with OpenAI. The OpenAI Studio GPT-3 engine was made available to licensed users and the public via an early production preview. Through Microsoft's Access Request Form, approved users gained access to Azure AI Developer Studio, where developers could configure and deploy models within a controlled environment.

Requirements

Obtaining a license to use the Azure platform was the first step to developing the model. Since Emory already had a Microsoft enterprise agreement for Azure services, the team, including the students, only needed to deploy specific Azure resources and gain access to the new model. This required submitting an Access Request Form to Microsoft to request OpenAI Studio, where the use case and impact were reviewed before approval.

Once approved, the development team deployed the basic Azure architectural tools needed for customizing the model. The team then compiled and indexed the ORA knowledge documentation to serve as the foundation for grounding the bot. In OpenAI Studio, the developers selected and configured the model which became ORAgpt, Emory ORA's private chatbot tailored for research administration. After grounding ORAgpt with Emory ORA data, it was deployed to an Azure-hosted web instance using Azure App Services.

Following deployment, the team conducted testing and evaluation, using various prompts to assess overall performance, accuracy, and responsiveness.

Payment Structure

The project team leveraged Microsoft Azure's pay-as-you-go model, which provided flexible cost management while offering scalable resources as needed.

Pay-as-you-Go Approach

This pricing model enabled billing only for the resources used, with no upfront costs or termination fees. It was ideal for an unfunded PoC project, as resources could be scaled up or down dynamically based on demand.

Billing Details

The private ORAgpt chatbot's architectural components were billed monthly based on the type and quantity of resources used. These included storage, databases, search and retrieval

enhancement services, and interface instance components. Since each resource had its own pricing model, the team calculated initial and projected costs using the available Microsoft Azure Pricing Calculator to estimate initial and projected costs.

Billing was directly tied to resource scalability with costs increasing as storage expanded and decreasing when scaled down. This flexibility was ideal for the bot's future development.

Azure invoices provided a detailed breakdown of all resources used and their associated costs. Several built-in tools, including cost analysis and budgeting, helped the team maintain transparency and effectively manage development expenses.

Qualitative Approach to Model Evaluation

The PoC aimed to demonstrate insights from OpenAI's newly announced generative AI model, GPT-3.5 Turbo. The project team's decision to conduct a qualitative analysis of the selected OpenAI-GPT 3.5 Turbo model was driven by its enhanced capacity to generate, summarize, and present search results using human syntax (natural language).

The testing phase evaluated the model's output against ORA grant lifecycle source documentation, with stakeholder feedback assessing accuracy, completeness, and relevance. A key focus was "grounding,"—ensuring the model's responses were derived exclusively from the provided knowledge documentation.

Another key objective was to determine whether the model relied on pre-trained knowledge or remained within research administration topics. This evaluation took place in the Azure AI Studio's developer playground before deployment, where model parameters could also be adjusted based on performance. These parameters included the level of creativity in referencing documents and system prompts to influence behavior with end users.

The project team began the verification process to assess the accuracy and validity of the model's

output, focusing on whether the responses were appropriately aligned with the queries. To support this process, a shared Prompt Evaluation Log was created using Google Docs to document tester prompts and the model's responses, allowing for systematic tracking of performance and quality. This log featured a "notes" section for commenting on interactions and identifying iterative prompts that may have influenced the output. In this detailed spreadsheet, the project team meticulously recorded each interaction with the AI model, capturing essential information such as the question ID number, the specific question asked, and the model's response. Additional details recorded included the department category, the source document with the correct answer, the date the question was posed, and an analysis indicating whether the response was accurate. This structured and thorough approach allowed for a robust assessment and serves as a foundation for necessary adjustments. To strengthen the evaluation process, the development team held weekly meetings to share insights, discuss findings, and collaboratively reflect on the model's behavior. These meetings fostered a dynamic exchange of ideas, allowing for real-time improvements. This collaborative space also allowed team members to track the model's development and modifications, providing a transparent record of ongoing refinements. By capturing a broad range of data points and fostering open dialogue, these recurring discussions maintained a rigorous and adaptive approach to optimize the model to meet the practical needs of research administrators.

In addition to accuracy and validity, responses were evaluated for completeness. The goal was to determine whether prompts were sufficiently answered and included necessary levels of detail. In other words, the team sought to determine if any output information was diluted through summarization or if the model could be prompted to provide varying levels of details from the source documents. This process also helped to identify gaps in documentation related to queried topics. If the responses were found to be insufficient, new files

were indexed and the model was prompted again to assess any improvements in detail.

The project team also investigated format control—the model's ability to generate tailored text output with specific elements such as headings, bullet points, tables, and font styles based on end-user prompts. They evaluated prompts that directed output text structure and format, such as bold headings, style, bullet points, key takeaways sections, and Q&A designs.

Through the investigation of these factors, the project team was able to identify the limitations or areas of opportunity for the model under basic architecture. The development process was inherently iterative, with the AI model undergoing continuous adjustments. The developer team continued to revise the AI model's knowledge base to enhance response accuracy. This iterative loop emphasized the project's experiential nature, focusing on real-world application rather than formal experimentation, ensuring that improvements were responsive and practical.

Prompt engineering played a crucial role in shaping the AI model's performance, with carefully designed prompts aimed at eliciting precise and contextually relevant responses. For example, by understanding and utilizing the 'system prompt' feature in the OpenAI studio developer space, many identified issues or opportunities could be mitigated and/or embedded in the immediate output behavior of the model before any user input. The reality was that the 'system prompt' preceded and accompanied any subsequent prompts from an end user, thus altering the output with predefined instructions from the developer side.

The end user would not see these tailored prior inputs and would only be aware of their initial prompt. A better understanding of the intended use case for the model would therefore lead to unique system prompts which can be used to influence or limit the responses of the model, essentially guiding how that response is presented to an end user. Areas of guidance included but are not limited to tone, focus, follow-up behavior, and specific instruction

to not use pre-trained base knowledge (general knowledge) in its output (grounding).

Overall, extensive testing would be required to cover the broad volume and range of content that is provided as the knowledge base of a generative model. Therefore, the test logs should reflect and sample the full scope of subject matter the end user would seek.

Knowledge Data Volume and Model Response Speeds (Not Originally Tested)

Quantitative measures are equally important factors to consider when testing generative models before and during deployment. In this context, key assessment areas include system throughput (real-time or average user activity), response speed (query handling, search/retrieval lag time to data volume), and volume testing (stress factors).

These factors were outside the scope of the PoC as the primary goal was to introduce benefit, impact, and value of generative AI capabilities to the Emory University ORA community and stakeholders. Therefore, the testing phase focused on assessing information retrieval capacity and response quality.

Through the Microsoft Azure platform, the project team had access to projected billing cost, architectural resources, and various data dashboards that provided timestamped insights on service-level components, model performance, and end user activity. Identifying the availability and depth of these insights informed the need to create and track them separately.

Additionally, the cost of implementing private Generative AI models is a significant factor to consider in assessing the institution's feasibility for larger-scale deployment. Cloud environments offer significant advantages as server storage and computational resources are quickly allocated to the end users (organizations), while infrastructure management is handled on the back end by the serving entity, Microsoft Azure.

Equally important, these types of low-code cloud-based platforms, architecture components, and model deployment approaches generate cost via Cloud Service Level Agreement (SLA) expenditures and tokens generation/processing fees.

Although the project adopted a practical testing approach, the documentation phase underscored the need for a more structured Testing, Evaluation, Validation, and Verification (TEVV) process in future iterations to ensure even greater rigor and reliability.

Assessing the Generative AI Use Case in ORA

Following the testing phase, the model's capabilities were thoroughly documented and supported by test logs. Using these logs, the next step was gathering feedback from ORA research administrator Subject Matter Experts (SMEs) before transitioning to real-time interactions with pilot groups.

The initial approach involved sharing the test log data with SMEs familiar with the subject matter files selected for the model, aiming to evaluate its relevance for departmental workflows and new hire onboarding inquiries. Research administrators were encouraged to provide feedback on an ad hoc basis, facilitating a flexible and continuous review process that accommodated work schedules and emergent observations.

Four volunteer SMEs from both pre-and post-award administration participated in the review process. The volunteers were selected based on peer recommendations or supervisors' approvals and had mid-career to seasoned experience, defined as over five years in research administration. The decision to use mid-to-seasoned research SMEs rather than a broader group of evaluators, was based on the need to use evaluators that understood research administration processes. This approach ensured the completeness, level of detail, relevance, and accuracy of the model's output.

SMEs had the opportunity to interact directly with the ORAgpt chatbot, posing research administration-related questions that mirrored real-world scenarios

encountered by both new and seasoned research administrators. The questions were crafted to reflect typical inquiries related to daily tasks, responsibilities, and relevant policies, aligning with the SMEs' roles.

By evaluating the perceived usefulness of ORAgpt in key ORA areas, the team assessed how a fully deployed generative chatbot within the ORA community might perform. This is an important step for use case development as without prior testing and documentation of the bot's generative features and capabilities, it would be difficult to envision its potential benefits or develop realistic expectations regarding impact.

Engaging SMEs helps validate the bot's value and demonstrate the benefits of integrating generative technology into operational workflows.

Generative models are trained on vast amounts of human language syntax, making them incredibly proficient at producing and predicting strings of text. However, like all developed machine learning models, rigorous testing is essential to identify errors and ensure the consistency and quality of the data being provided to end users. Early and thorough issue detection further strengthens the business case for investing in Generative AI in Research Administration and enhances stakeholder confidence in its potential.

Selection and Curation of ORA Documentation

Deploying Generative AI models that respond using organizational data requires careful curation and identification of datasets, systems, and documentation to build reliable knowledge bases or corpuses. In Emory's case, data collection was facilitated through multiple channels to ensure comprehensive and systematic evaluation.

Documents were selected from an established ORA Knowledge Repository and placed into a "working files" project folder for curation. Once curated, source data were subsequently stored (uploaded) and indexed in Microsoft Azure for model retrieval. The development team validated the accuracy and reliability of files before integrating into the LLM.

This process was essential for ensuring that the information provided by the model met institutional standards of precision and relevance.

Project Foundation and Charter

Before recruiting and formally charging the internal development team, a comprehensive project charter (business case) was developed to provide a strategic and operational framework for the ORAgpt initiative. This charter outlined the project's purpose: to create a proof-of-concept AI chatbot using a LLM trained on curated documents from the ORA Knowledge Repository. The primary objectives were to validate the model's feasibility, streamline research administration operations, and improve staff productivity by offering an AI-powered virtual assistant.

The charter specified key deliverables, including the deployment of a chatbot capable of generating SOPs, job aids, and training materials, as well as an AI demonstration at Emory's ORA Research Week conference in the Fall of 2023. The need was driven by challenges such as the steep 180-day learning curve for new hires, inefficiencies in updating SOPs, and the need for instant access to answers to task-specific questions. Additionally, the charter defined key use cases and delineated both in-scope and out-of-scope content to maintain data security and relevance.

This well-structured foundation provided a clear direction for the project and set the stage for recruiting a diverse, cross-functional team of subject matter experts, students, and collaborators.

Project Team

Developing an LLM for research administration was a complex initiative that required extensive collaboration across the Offices of Research Administration, Information Systems, and Cybersecurity. The project was conceived, initiated, and sponsored by the Interim Assistant Vice President of the Office of Strategic Optimization and Training (OSOT) within ORA, who provided high-level oversight to ensure alignment with the institution's organizational goals and strategic vision.

The Director of Cybersecurity played a crucial role in Azure resource deployment, configuration, subscription management, and security-related subject matter, ensuring the model's infrastructure was secure and compliant with institutional policies.

Faculty from the Goizueta Business School, with expertise in information systems and operations management, offered critical insights into AI applications while upholding rigorous ethical and technical standards. Graduate and undergraduate students from the Goizueta Business School worked alongside faculty in the technical development and refinement of the chatbot. Students of Benn (SOBs) applied academic training to configure the Azure-based model, optimize performance, and troubleshoot technical issues, gaining invaluable hands-on experience in implementing generative AI technologies. This faculty-students collaboration was essential for successfully integrating theoretical knowledge with practical application and fostering innovation in AI-driven research administration solutions.

The project support specialist from OSOT played a pivotal role in coordinating implementation, including curating essential documentation from the knowledge repository, managing the project timeline, facilitating collaboration among team members, and leading the content delivery for the proof-of-concept demonstration.

Seasoned research administrators from ORA contributed in-depth content expertise ensuring the chatbot's knowledge base accurately reflected institutional policies, procedures, and compliance guidelines.

A strategic partnership with Microsoft further enhanced the project. A specialized team of data and AI experts dedicated to advancing technology in education provided essential technical guidance and support. Their expertise was crucial for seamlessly integrating Azure-based AI tools and optimizing the LLM's overall functionality and efficiency.

Academic scholars, administrative professionals, cybersecurity specialists, and external technology experts collaborated to create a comprehensive proof-of-concept model. This interdisciplinary effort underscored the project's complexity and set the stage for future advancements in the application of artificial intelligence within research administration. The initiative highlighted AI's potential to drive transformative improvements in efficiency, accuracy, security, and strategic decision-making.

Project Management Implementation Plan

The development of the ORAgpt chatbot followed a structured yet adaptive project management approach, balancing known requirements with emerging insights as the team navigated a new AI-driven landscape. The project management methodology was chosen because of its proven approach and applicability toward increased organization and reproducibility: capturing the resulting tasks/steps for deployment of a generative chatbot.

Plan Development

The team created a Work Breakdown Structure (WBS) in Excel, listing known steps for project initiation in sequential order. The charter was created first and later, it informed the business plan, defining the project's purpose, objectives, scope, and risk mitigation strategies. The next step involved identifying the project lead and assembling a cross-functional team. As part of this phase, the team explored potential LLM development platforms and evaluated their technical feasibility to determine the best fit for the project.

Unknown Action Items: Iterative Development & Agile Adjustments

Since AI chatbots in research administration were still an emerging technology, the team did not have predefined implementation steps for specific generative chatbot deployment. Instead, the project plan WBS evolved simultaneously with development. The technical team conducted extensive research into AI development platforms, consulting experts to gain insight into best practices. As findings emerged,

action items were updated dynamically, allowing the team to remain agile.

Managing Critical Path & Execution Strategy

Given the project's ambitious timeline, the team set a self-imposed six-week deadline to demo the chatbot at an upcoming conference. With every component being critical to the project's success, delays in any area, whether technical, content-related, or testing, could have impacted the demo. To operate efficiently, the team formed parallel workstreams. One group focused on LLM learning and chatbot development, while another worked on identifying and testing prompt questions for accuracy. This second group also prepared for both a live demonstration and a pre-recorded version as a backup to mitigate any technical risks.

Tracking Progress & Adapting the Plan

To maintain momentum, the team conducted daily check-ins, tracking real-time progress, and addressing roadblocks as each arose. The project management approach allowed the team to track and manage changes to tasks and or changes in scope. While there were opportunities for changes, the team maintained strict adherence to the predefined use cases, SOP updates, and 24/7 task-related questions, preventing scope creep. The use of Gantt charts allowed effective communication to parallel teams, monitoring task dependencies, ensuring timely execution, and for reporting project progress to stakeholders.

Project Communication

Due to the self-imposed deadline, the team did not implement a formal communication plan but instead relied on real-time collaboration. Regular Zoom and Teams calls facilitated virtual meetings, while in-person discussions allowed for more direct problem-solving. Email and text messaging were used for quick updates. Daily meetings ensured continuous alignment among research administration staff, business school developers, and IT personnel, allowing the team to stay synchronized despite the rapid development cycle.

Scope & Timeline Management

Despite the challenges encountered, the project remained on track, meeting the six-week deadline as originally planned. No major changes or delays were introduced, as the team had clearly defined objectives and adhered to their structured project timeline.

Architecture Design and Development Details

The architecture for the proof-of-concept (PoC) LLM was meticulously crafted using a suite of Microsoft Azure cloud services to create a secure, scalable, and efficient system tailored to the unique demands of research administration (Microsoft, n.d.).

The development process was initiated with Azure Storage, a service that provides a robust, secure, and highly scalable cloud-based storage solution. This service housed sensitive and confidential organizational data, ensuring data integrity, and enabling seamless access for subsequent indexing

and querying. Before storage, the data underwent a rigorous review and preparation phase to ensure that only the most relevant and vetted information was included in the model's knowledge base, a critical step for delivering precise, AI-driven responses aligned with institutional requirements.

Once the data was securely stored, Azure Cognitive Search was deployed to index the content. This search-as-a-service tool utilizes artificial intelligence to extract insights from both structured and unstructured data, transforming it into a comprehensive, full-text searchable index. Azure Cognitive Search was a critical intermediary between data storage and the language model by facilitating complex and efficient search queries. It enhanced the efficiency and precision of the model's outputs. It supported API calls and allowed for sophisticated search and retrieval functionalities, thereby significantly improving response accuracy (Microsoft, n.d.).

Figure 1
PoC Azure Architecture: Workflow from data collection to end-user interface, including Azure Synapse Analytics (for future big data integration), Azure Storage, Azure Cognitive Search, and the OpenAI GPT-3.5 engine.

Proof-of-Concept Architecture for AI Integration Using Azure
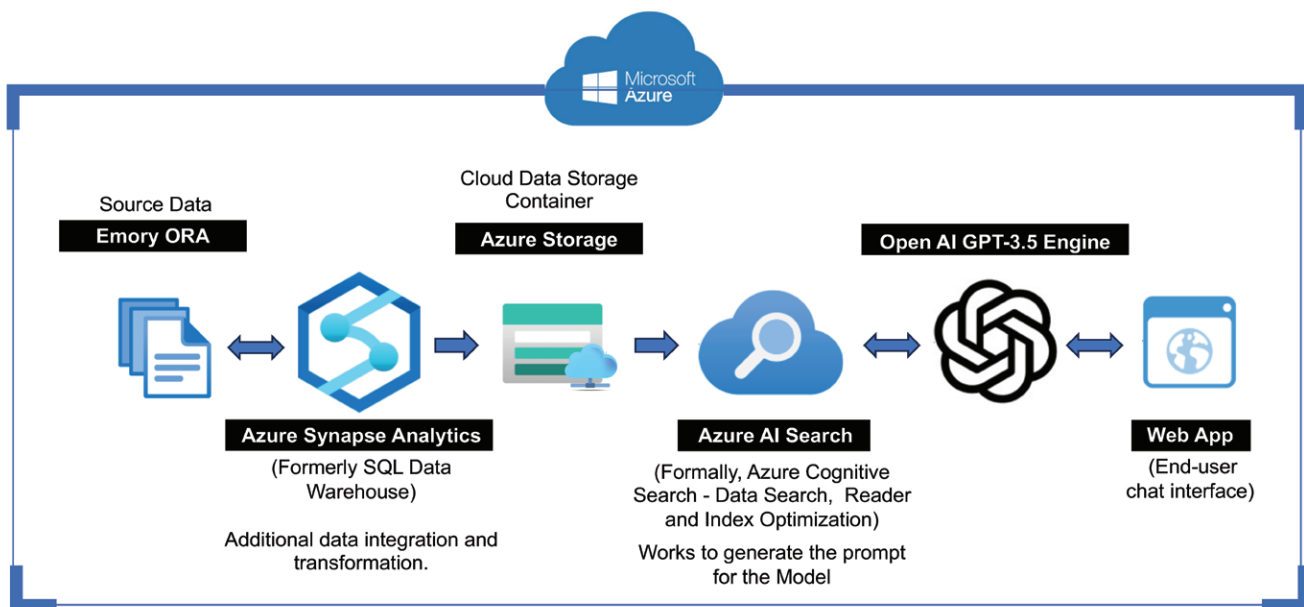
The core natural language processing capabilities were powered by the OpenAI GPT-3.5 Turbo model, accessed through OpenAI Studio. This model played a pivotal role in interpreting and processing user queries, converting them into actionable search requests executed by Azure Cognitive Search.

The advanced natural language understanding of GPT-3.5 Turbo-optimized the search experience, generating both contextually appropriate responses compliant with institutional guidelines, thus meeting the lofty standards required for research administration tasks (Microsoft, n.d.).

To ensure seamless user experience, the model's responses were delivered through Azure App Services, a fully managed platform designed for building, deploying, and scaling web applications and APIs. Azure App Services provided a streamlined, user-friendly interface that supported interactions across multiple platforms, including web pages, mobile applications, and chatbots. This multi-platform accessibility allowed research administrators to interact seamlessly with the AI model, making it a practical and effective tool that supports daily tasks and operational needs.

Although Azure Synapse Analytics was not utilized in the initial deployment phase, it was identified as a key component for future scalability. This integrated analytics service combines big data and data warehousing capabilities, offering data ingestion, preparation, and complex analysis functionalities. Integrating Azure Synapse Analytics in the future would enable the system to handle larger, more complex datasets and support comprehensive data analysis, thereby expanding the model's capabilities and enhancing its overall utility for research administration (Microsoft, n.d.).

The architecture of the PoC LLM demonstrated a robust and well-considered approach to integrating artificial intelligence into research administration. The design emphasized data security, operational efficiency, and scalability by leveraging Microsoft Azure's secure and scalable infrastructure. This

thoughtful deployment laid a solid foundation for future enhancements, supporting the long-term vision of integrating AI-driven solutions into administrative processes for improved efficiency, accuracy, and strategic decision-making (Microsoft, n.d.).

To ensure data security and mitigate risks, the ORAgpt chatbot operated within Emory's secure network infrastructure, with access restricted to ORA staff. The model's training data was curated from vetted internal resources, such as SOPs, FAQs, checklists, training materials, and sponsor guidelines, while explicitly excluding any confidential or sensitive data, including personally identifiable information and proprietary content. The project adheres to ethical guidelines and compliance measures to safeguard data privacy.

Model Functionality: GPT Model Customization and Use of Private Data

The GPT model's behavior was customized through the "System Message" configuration within Microsoft Azure's OpenAI Studio, as shown in Figure 2. In this setup, the chatbot was designated as "ORAgpt" and assigned a specific role as a "support assistant designed to help research administrators find and create necessary information." This system-level configuration enabled the project team to comprehensively define the model's language style, behavior, and outputs. Customization features included crafting tailored opening responses, follow-up interactions, and ensuring the chatbot could cite relevant source documents.

Maintaining the model's grounding exclusively within the provided dataset was crucial for ensuring response accuracy and relevance. The configuration process included strict adherence to the parameters set for the model, effectively reducing the risk of generating inaccurate or misleading information—commonly known as "hallucinations" in AI terminology. This meticulous approach allowed ORAgpt to operate within clearly defined boundaries, delivering dependable and context-appropriate answers tailored to the needs of research administration staff.

Figure 2
Configuring the Model and Bot's Behavior: Developer playground in Microsoft Azure's OpenAI Studio.
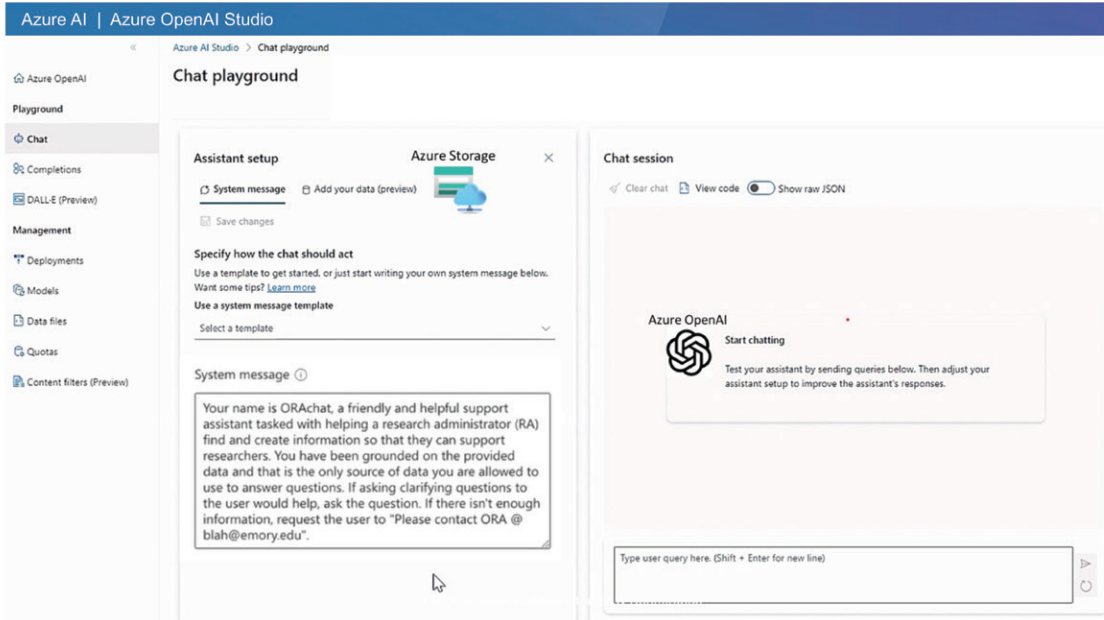
RISK MANAGEMENT AND SCOPE OF SOURCE DATA

Developing ORAgpt involves recognizing several key risks and implementing effective mitigation strategies. The project charter documented these risks and the corresponding strategies to ensure the project's success and safeguard sensitive data throughout the development process.

Scope of Source Data

A fundamental part of minimizing risks was carefully defining the scope of the data corpus used for the proof-of-concept (PoC). The in-scope documents came from the ORA Knowledge Repository and included SOPs, checklists, job aids, and policies. These documents addressed critical tasks, especially post-award closeout processes, where staff often faced difficulties. One of the most significant challenges encountered was the reliance on outdated SOPs as training data. The chatbot generated responses directly from these documents, but because many policies and procedures had changed without being formally updated, the bot's answers often conflicted with end-user expectations. This discrepancy led some users to perceive the chatbot as inaccurate, even though it correctly reflected the data provided. While acknowledging that some SOPs were outdated, the primary goal of the PoC was to validate the model's functionality rather than ensure comprehensive, current content. Therefore, the emphasis was on quickly incorporating documents into the corpus, with plans to sunset the PoC and implement a more rigorous vetting process in a later phase.

These challenges of using outdated SOPs as training data highlighted a broader institutional issue—the need for timely updates to organizational knowledge bases to ensure AI tools remain relevant and effective.

Out-of-scope content included confidential, sensitive, and proprietary information such as PII, proposals, awards, and IP. To maintain strict data security, the integration of third-party applications and access to external internet-based knowledge sources were also excluded. Documents like 2 Code of Federal Regulations (CFR) 200 – Uniform Guidance, the National Science Foundation (NSF) Proposal & Award Policies & Procedures Guide (PAPPG), and National Institute Health (NIH) guidelines were initially considered but excluded due to time constraints. Future iterations will include these external guidelines as part of an expanded and more refined data set.

Risk Management Strategies

Network Security

One of the primary risks identified was the potential for data breaches or unauthorized access to the system. ORAgpt was hosted on Microsoft Azure within Emory's secure network infrastructure to mitigate this. Specific measures included restricted access protocols, allowing only authorized ORA staff to interact with the system. Additionally, Emory's IT department conducted rigorous security audits and reviews to ensure compliance with institutional and network security standards, employing practices like data encryption and regular security updates.

Data Privacy and Security

Data privacy risks included the possibility of inaccuracies, data breaches, and copyright violations. To address these, the data set used for the AI model consisted of over 31 rigorously vetted ORA documents. This vetting process confirmed the suitability and relevance of each document, ensuring that no confidential, proprietary, or personally identifiable information was included. Data protection measures, such as restricted data permissions and regular audits, reinforced the model's security framework and safeguarded against data misuse.

Responsible AI: Addressing Compliance, Bias, Transparency, and Accountability

Ensuring compliance with government and university guidelines was crucial to the project. AI regulations, at the time, in the United States, the European Union, and Emory University were still in the early stages. The European Union released its first Artificial Intelligence Act as law on July 12, 2023, with enforcement set to begin on August 2, 2026 (European Union, 2024). The U.S. released its Executive Order-14110, *Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence* on October 30, 2023, taking effect immediately. Emory convened its first AI governance working group Spring of 2023 with the goal of developing a governance framework for AI.

The framework initially focused on the responsible use of generative AI, particularly in academic integrity, research, and privacy.

Because formal AI-specific guidance from the U.S. and E.U. was still evolving—and Emory had not yet issued institutional guidance—during the summer of 2023, the development of the ORAgpt chatbot took place in a regulatory vacuum. Still, the team adhered to existing and overlapping data security and sharing policies. This included internal ethical AI standards and best practice frameworks, including those outlined by the National Institute of Standards and Technology (2022).

Evolving government and University regulations were continuously monitored throughout the development timeline to ensure compliance and uphold ethical practices. To address transparency concerns, the team disclosed details about the purpose, scope, and selection process of documents used to build the model's corpus to SMEs and stakeholders.

All things considered, with reliance on SME and institutional documents, there is an inherent risk of bias in human judgment and the AI model's output. While SME judgment and the language within source materials can introduce biased performance

evaluations and knowledge dissemination, the project remained focused on ORA policies and procedures. Policy documentation serves to guide ethical behavior and compliance. Procedures are intended to ensure task consistency and accuracy. To facilitate the collection of relevant feedback, the team selected source documents familiar to stakeholders and verified them for sensitivity and secure use.

Documents containing demographic language, unethical viewpoints, or other accountability-related content were not considered, as they fell outside the scope and objectives of the generative proof-of-concept. Additionally, grounding ORAgpt exclusively in institutional documents prevented potential bias from external internet sources.

As a result, the team recognized these mitigation factors related to bias, transparency, and accountability while maintaining a focused approach solely on model performance—safeguarding accuracy and verifying predefined features of generative AI capabilities.

Late Adoption and Strategic Positioning

Another significant concern was the risk of late adoption and the potential for Emory to fall behind in AI advancements. To address the risk of late adoption and ensure Emory remained competitive in AI advancements in research administration, the project prioritized early AI adoption and invested in continuous training for research administrators. The project fostered a culture of innovation by positioning Emory as a frontrunner in integrating AI technologies. It ensured that staff had the necessary skills to leverage AI tools effectively. This proactive approach aimed to secure Emory's competitive edge in research administration.

Future Planning and Impact Assessment

To ensure the continued effectiveness of these risk mitigation strategies, the project will incorporate a more structured document vetting process in the pilot phase. This approach will ensure that only current and accurate documents are used in the

corpus, enhancing the model's reliability. Network security measures will be subject to ongoing testing and updates, while compliance practices will be reassessed as guidelines evolve. Data privacy protocols will be refined to align with emerging best practices, and the AI adoption strategy will be reviewed periodically to sustain Emory's leadership in research administration innovation. The project remains committed to maintaining a secure, compliant, and forward-thinking AI infrastructure by addressing immediate and long-term risks. Naturally, with infrastructure comes cost. The Azure platform as a service model invokes the need to understand how architectural decisions (i.e. additional services or resources) augment billing.

## Cost Management and Budget Considerations

Managing costs was a critical component of the ORAgpt project requiring transparent expense tracking and strategic resource allocation. The project team leveraged Microsoft Azure's platform, effectively monitoring and controlling expenses, ensuring transparency, and scalability based on resource usage. Understanding the costs associated with deploying cloud services, such as Microsoft Azure, was fundamental to the project's financial planning. This included itemizing the architecture and projecting costs related to data throughput, which allowed for a more accurate budget assessment.

The project team used the Microsoft Azure pricing calculator to review estimated service costs before resource deployment. This provided a comprehensive understanding of potential expenditures, essential for crafting an informed business case and communicating budget requirements to sponsors and stakeholders.

Azure services incur charges over time, including costs for storage operations (indexing, reading, and writing), token generation (input/output), and additional AI services. The team managed the budget efficiently by actively monitoring these costs, ensuring that expenditure aligned with the project timeline and available funding. The Azure Cost Management and

Figure 3
Example: Microsoft Azure Cost Analysis Tool.
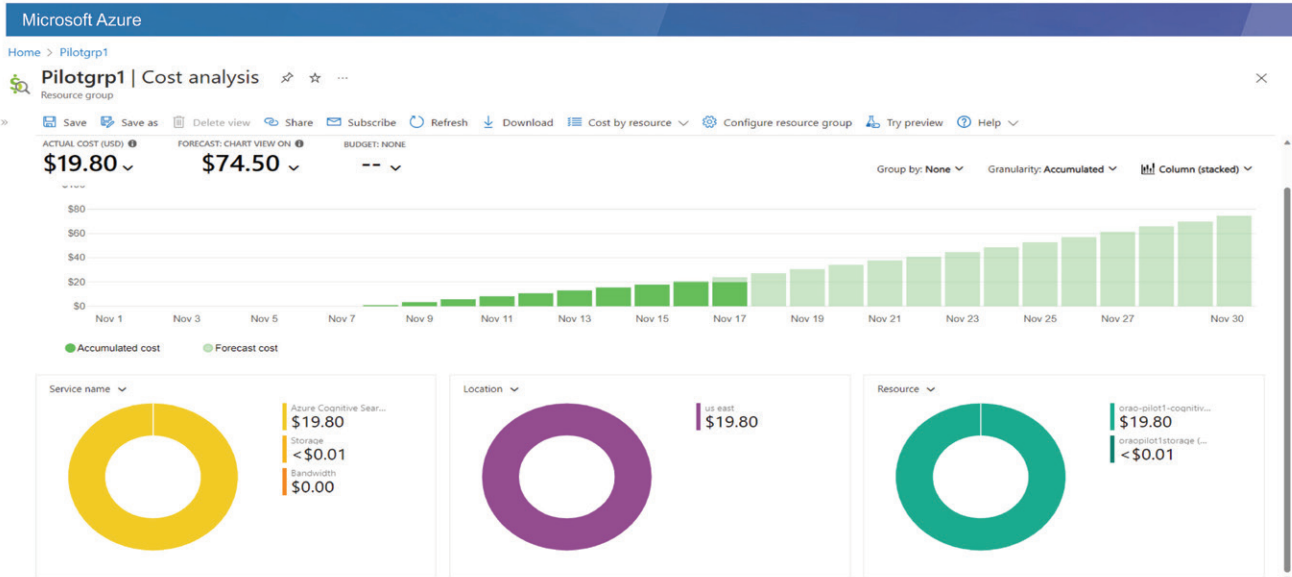
Note: The cost analysis shown is not specific to this project.

Analysis tools offered insight into cost distribution, highlighting the most cost-intensive services, and informing budget adjustments, as necessary.

This illustration demonstrates how developers can monitor resource expenditure using itemized breakdowns for monthly, hourly, and projected billing.

The team carefully selected Azure resource components and service plans based on project needs to optimize cost efficiency. Azure's scalability allowed resources to be adjusted dynamically, scaling up or down as needed. This approach ensured cost-effectiveness, as resources were only scaled in response to specific demands, maintaining alignment with the budget.

Monthly costs were calculated based on actual resource usage, including user token generation and

Azure AI Search service fees. By regularly monitoring these monthly expenses, the team could adjust resource usage proactively, maximizing cost efficiency throughout the project.

Specific Cost Management Considerations for Model Services

Specific cost items unique to AI model services, such as token usage, required careful consideration. User token generation incurred expenses based on the number of tokens processed by the chatbot GPT model, costing $0.002 per 1,000 tokens.

Azure Cognitive Search services also contributed significantly to the project's overall costs. These services were essential for efficient information retrieval, with expenses varying according to the project's scale, the range of resources selected, and the number of Search Units (SUs) allocated. The SUs

determined capacity and usage patterns, influencing the service's overall cost and performance. Balancing functionality with budget considerations was critical, so the project frequently leveraged free-tier resource deployments, when possible, to minimize expenses.

Budget Constraints and Resource Optimization

Operating under a limited budget, the project relied on resourcefulness and the contributions of volunteers, including students and staff. The team initially used Azure's free $200 introductory credits or one month access to reduce costs, which supported early prompt testing and model verification. Once these credits were exhausted, the students' professor provided additional financial support, paying for the Azure subscription costs of $70 per month, sustaining the project. The professor's lighthearted remarks about the expense added a positive and humorous atmosphere to the project meetings. The overall cost for the ORAgpt PoC was estimated at less than $1,000.

This financial support was vital in extending the project's duration beyond its initial phase, allowing for further testing and optimization. Monitoring minimum Azure architecture expenditures helped project costs for future pilot phases, ensuring the team could plan for anticipated expenses and budget accordingly.

Given the budget limitations, testing efforts were focused on essential components, and the testing duration was carefully managed. This approach maximized the value derived from limited financial resources, ensuring that all critical project objectives were met efficiently and effectively.

RESULTS

The AI chatbot, ORAgpt, underwent rigorous testing to ensure reliability and accuracy. Testing involved approximately 31 questions related to research administration, policies, and procedures, yielding an accuracy rate of over 90% during later tests. The chatbot's response times were significantly faster than traditional methods, suggesting substantial time savings for real-world applications. For example,

when prompted with, "How do I use the [Financial Outlook Reconciliation Tool] FORT for budget projection?" ORAgpt provided detailed step-by-step instructions that were consistent with official procedures. Another successful case involved guiding users through submitting an IRB application, where the chatbot presented a comprehensive guide covering each step, required documentation, and submission timelines.

The AI model effectively handled diverse content formats, including text-based PDFs, image-based files, and Excel sheets. Initially, the model struggled with robustness of response, but accuracy improved significantly after implementing enhancements like Azure AI Search's Vector Search and Semantic Ranking capabilities. These additions refined the model's search functions and improved output relevance. Due to time constraints, testing on capabilities like generating or revising SOPs was deferred to the next project phase.

Live demonstrations of ORAgpt during the Research Week conference on October 31, 2023, marked a significant milestone. The chatbot was showcased just six weeks after the project's inception, and feedback from cross-departmental senior leaders provided a balanced view of the model's effectiveness, noting areas for improvement. Despite these areas for growth, the initial project goals—raising awareness of AI's potential, creating a generative chatbot, and performing live demos—were successfully met (Yisrael, T., & Konsynski, B., 2023).

Positive feedback from ORA staff underscored the model's potential to streamline administrative processes and enhance productivity. By demonstrating the chatbot's capacity to generate clear, accurate, and standardized responses, ORAgpt proved its value as a tool that could significantly reduce response times and administrative burdens. However, the project was not without obstacles.

Challenges and Obstacles

The project faced several obstacles, beginning with budgetary constraints. Contributors, including

students and staff, volunteered their time, and Azure's introductory $200 credits were initially used to test the model. Upon exhausting these credits, the student's professor contributed additional funds, highlighting the project's reliance on limited financial resources. Resource expenditures, such as monthly fees for Azure AI Search, data storage operations, and token generation, limited testing activities and required careful cost management.

Platform selection was another challenge. Various options, including PrivateGPT and FlowiseAI, were tested before Microsoft Azure was chosen. PrivateGPT provided a Python-based terminal interface, while FlowiseAI offered a low-code platform for API integrations. Azure Cloud Services best met the project's needs despite initial unfamiliarity with the platform.

Coordinating student schedules and managing varying levels of expertise require flexibility. With other academic obligations, students had to juggle project work with coursework, complicating scheduling and extending office hours. Moreover, the six-week timeline added pressure, demanding efficient document selection, promotional content creation, and model testing.

Technical challenges arose, including model resets and permission-related issues, sometimes leading to inaccessible chatbot instances. These problems, often stemming from bugs or user errors, necessitated rebuilding parts of the model. Despite the setbacks, the team gained proficiency in deploying chatbots and established multiple contingency plans.

Nevertheless, the initiative demonstrated Emory's commitment to leveraging technology for operational excellence, setting a benchmark for research institutions worldwide. The ORA internal newsletter communicated the project's key results and goals to the Emory community, and senior leadership expressed excitement, stating, "We are excited to announce a groundbreaking initiative to revolutionize operations and enhance efficiency in the Office of Research Administration."

DISCUSSION

Lessons Learned

The lessons learned from this project extended beyond technical development and provided key insights into effective project execution, stakeholder engagement, and long-term feasibility.

The initial dataset, which contained outdated SOPs, highlighted the importance of using current, well-curated documents. Data quality and accuracy play a crucial role in a generative chatbot's effectiveness. The project demonstrated that an AI chatbot is only as strong as the quality of its training data. Outdated SOPs led to incorrect responses, even though the model itself functioned correctly. This reinforced the importance of maintaining up-to-date institutional knowledge bases. Although the outdated data was a practical choice for the proof-of-concept, projects must prioritize content accuracy to avoid confusion. Future phases of ORAgpt will implement a formal pre-deployment SOP validation process to ensure all included SOPs reflect current practices.

Managing user perception was also essential. AI skepticism emerged when chatbot outputs contradicted existing institutional knowledge. Effective communication and user education were necessary to ensure that stakeholders understood the model's reliance on its provided data and to prevent misconceptions about AI performance.

Sustained investment is a prerequisite for long-term success. Although the proof-of-concept was successful, the project was put on hold due to the lack of financial planning for full-scale deployment. AI initiatives require dedicated funding beyond the pilot phase to ensure their continued development and integration. Future phases will include creating a formal budget proposal and presenting it to senior leadership to secure dedicated financial support before scaling beyond the proof-of-concept phase.

Real-time collaboration proved to be a key factor in the project's agility. The informal yet highly responsive communication model enabled rapid problem-solving and alignment across teams. This flexibility allowed

the project to meet its ambitious deadline despite the challenges encountered.

These lessons provide a roadmap for institutions looking to implement AI-driven solutions in research administration, ensuring both technical and strategic success.

Improvements and Recommendations

Several recommendations emerged from the proof-of-concept phase. First, continuously updating the data corpus with current policies and guidelines is essential. A dedicated content curation team could support this effort and ensure data accuracy and relevance.

Building in-house expertise is recommended to reduce dependence on external vendors, enhance project control, and lower costs. Structured stakeholder feedback loops will also be necessary for iterative improvements, fostering transparency and collaboration.

Adopting agile methodologies and scheduling regular progress reviews will improve project management. These measures will help address issues promptly and keep stakeholders aligned with project objectives.

Developing a comprehensive charter or business plan is essential. Clearly defining the chatbot's purpose, objectives, risks, and institutional value helps align the initiative with organizational priorities before committing resources to development.

Assembling a committed cross-functional team is critical. A dedicated group of technical developers, research administrators, and project managers ensures the initiative can be executed effectively within a compressed timeline.

A cost framework should be developed before seeking investment. Financial projections must account for both the cost of building the proof-of-concept and scaling the model to full deployment. Presenting this financial roadmap prior to requesting funding enhances the likelihood of securing institutional backing.

Upcoming phases of this initiative will integrate structured SOP validation, expand testing with a larger validation set, introduce flexible timelines to accommodate technical challenges, establish a formal governance and communication framework, secure dedicated financial support through an official budget proposal, and align with Emory's AI governance working group to ensure compliance with evolving regulatory and ethical standards.

Emerging Trends and Future Directions

The project revealed significant potential for AI to transform research administration at Emory. Emerging capabilities include leveraging generative AI models to analyze complex data sets, producing interactive dashboards, forecast research funding trends, and draft detailed impact statements for grant proposals and reports. The integration of AI could also streamline the creation of dynamic content, such as PowerPoint presentations tailored for research updates or Excel reports that automate budget projections and financial analysis. Additionally, there is potential for automating coding tasks to support administrative processes, such as database management or compliance tracking. Expanding Emory's curated data sources and providing comprehensive, prompt training for research administrators will be crucial to fully harnessing these advancements. Future efforts could also focus on performing staffing analyses and balancing workload to optimize human and AI-driven resources, enhancing efficiency and strategic decision making across the university's research administration landscape. Scaling ORAgpt will address complexities in research administration, train new staff, and improve quality control. Anticipated features include the integration of multi-modal AI capabilities and automated task execution. Developing pilot projects, like the recommended post-award focus, will guide the scaling process and ensure the model's continued relevance and utility.

Resource Accessibility: Alternatives for Deploying Private Generative AI Models

Emory's ORA proof-of-concept chatbot for a research

administration-focused LLM was developed using a low-code approach via OpenAI Studio on the Microsoft Azure platform. Institutions with varying levels of resources and access to enterprise-level cloud solutions may explore similar approaches, such as OpenAI's Private GPTs, Google's Vertex AI, or other pre-trained generative AI models like Meta's Llama, which can be hosted on local or cloud-based infrastructure. When selecting an AI platform, institutions should evaluate pricing models (pay-per-use vs. subscription), computational resource requirements, and scalability costs. Additionally, collaborating with institutional IT team and AI governance committees is essential to ensure secure deployment, policy compliance, and long-term sustainability of AI-driven solutions in research.

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Acknowledgements

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REFERENCES

Deloitte Center for Higher Education Excellence. (2023). *The future of research administration: Adapting to thrive*. Deloitte. https://www2.deloitte.com/content/dam/Deloitte/us/Documents/public-sector/the-future-of-research-administration-adapting-to-thrive.pdf

European Union. (2024, July 12). *Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonized rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act)*. Publications Office of the European Union. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202401689

European Union. (2024, August 1). *Implementation timeline*. Future of Life Institute (FLI). https://artificialintelligenceact.eu/implementation-timeline/

Konsynski, B. (2023). *ORAgpt project in Appcology*. Emory University. https://bit.ly/ORAgptPlaylist

Microsoft. (n.d.). *Azure products by category*. https://azure.microsoft.com/en-us/products/category/

Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford University Press.

National Institute of Standards and Technology. (2022, August 18). *Artificial intelligence risk management framework: Second draft.* U.S. Department of Commerce. https://www.nist.gov/document/ai-risk-management-framework-2nd-draft

Naveed, H., Khan, A. U., Qiu, S., Saqib, M., Anwar, S., Usman, M., Akhtar, N., Barnes, N., & Mian, A. (2023). *A comprehensive overview of large language models*. arXiv.org https://doi.org/10.48550/arXiv.2307.06435

Popenici, S.A.D., Kerr, S. Exploring the impact of artificial intelligence on teaching and learning in higher education. *RPTEL* 12, 22 (2017). https://doi.org/10.1186/s41039-017-0062-8

Simon, H. A. (1957). Rationality and administrative decision making. In *Models of man: Social and rational* (pp. 196–198). Wiley.

United States Government. (2024, October 30). *Executive Order 14110: Safe, secure, and trustworthy artificial intelligence*. Federal Register Office of the Federal Register, National Archives, and Records Administration (NARA). https://www.govinfo.gov/content/pkg/CFR-2024-title3-vol1/pdf/CFR-2024-title3-vol1-eo14110.pdf

Weber, M. (1947). *The theory of social and economic organization* (A. M. Henderson & T. Parsons, Trans.). New York: Oxford University Press.

Wilson, L. (2023a, August 11). *Office of Research Administration to Revolutionize Operations with Cutting-Edge AI ChatGPT Integration*. Emory University. https://scholarblogs.emory.edu/orastaffnews/2023/08/11/harnessing-ai-technology-for-enhanced-efficiency-in-emory-research-administration

Wilson, L. (2023b, November). Unlocking opportunity: Leveraging generative AI in university-sponsored program operations. In E. Ruiz & G. Belle (Chairs), *CUNY IT Conference 2023*. Symposium conducted at the meeting of the CUNY IT Conference 2023, New York, NY.

Wilson, L. (2023c, November). AI in research administration: Promises, problems, and possibilities panel discussion. In C. Callahan (Chair), *Research Week 2023*. Symposium conducted at the Research Week 2023 Concurrent Session meeting, Atlanta, GA.

Yisrael, T., & Konsynski, B. (2023). *ORA chatbot proof of concept video*. Emory University. https://bit.ly/ORAgptPlaylist

SUPPLEMENTARY CONTENT

List of Sample Prompts and Model Responses

This section contains a curated list of sample prompts tested with ORAgpt and the chatbot's responses. The prompts are categorized by their type, including Training FAQs, Role, and task-related Queries, Internal and External Guidance, and Award Management. Each entry describes the prompt, followed by a summary of ORAgpt's response.

Training FAQs

1. Prompt: What research administration training is offered by ORA?
2. Response: ORAgpt provided a detailed list of available training programs, including self-paced and instructor-led courses. The chatbot emphasized the importance of continuing education for research administrators.
3. Prompt: How many professional development hours are needed for ORA?
4. Response: ORAgpt outlined the required hours, citing Emory's professional development policy and offering links to additional resources.
5. Prompt: Where can I find the professional development tracking log?
6. Response: The chatbot directed users to the ORA website, specifying the location of the tracking log and how to access it efficiently.
7. Prompt: What are the training requirements for staff involved in NIH clinical trials at Emory?
8. Response: A comprehensive explanation of NIH training requirements was provided, including required certifications and how to maintain compliance.

Role, Responsibilities & Task-Related Queries

1. Prompt: What system will help me determine the status of the CT agreement?
2. Response: ORAgpt listed systems such as the Clinical Trial Management System (CTM) and detailed features for agreement status tracking.
3. Prompt: How can I access the FORT, and what features does it offer for clinical trial financial management?
4. Response: The chatbot explained the FORT access process and described the features available for financial management, including budget projections and expense tracking.
5. Prompt: What is the Award Closeout process?
6. Response: ORAgpt outlined the steps in the award closeout process, highlighting timelines, documentation requirements, and key responsibilities.

Internal Guidance

1. Prompt: Tell me about Research Training and provide details on the continuing education policy requirements.
2. Response: The chatbot provided an overview of research training programs, emphasizing continuing education policies, and offering guidance on meeting these requirements.
3. Prompt: How will eNOAs be distributed?
4. Response: ORAgpt specified the electronic Notices of Award (eNOAs) distribution method, including the departments responsible for distribution.
5. Prompt: What is the escalation process if I am unable to validate and/or resolve a financial compliance or reporting issue?
6. Response: The response included a step-by-step escalation process detailing whom to contact at various stages and emphasizing the importance of timely communication.

External Guidance

1. Prompt: What is Research.gov?
2. Response: ORAgpt briefly explained Research.gov, outlining its purpose and key features relevant to research administrators.
3. Prompt: What is the Davis-Bacon Act?
4. Response: The chatbot summarized the Davis-Bacon Act, emphasizing its implications for federally funded construction projects and how it relates to research administration.

Award Management Queries

1. Prompt: What is the award start date for "Meissa RSV Vaccine MV-006"?
2. Response: ORAgpt retrieved the start date from the provided database and presented it accurately.
3. Prompt: What is the Award PI ID for "Meissa RSV Vaccine MV-006"?
4. Response: The chatbot provided the Principal Investigator ID, ensuring consistency with Emory's research administration records.
5. Prompt: In the Sample FORT file, tell me about the award Emory-CHOA Clinical Immunization.
6. Response: The model described the award details, including funding amounts, key milestones, and reporting requirements.

REFLECTIONS ON AI IMPLEMENTATION IN RESEARCH ADMINISTRATION: EMERGENT APPROACHES AND RECOMMENDATIONS FOR STRATEGIC AND SUSTAINABLE IMPACT

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Abstract

This reflective inquiry reports on the experiences of a working group at Arizona State University (ASU) that, over the course of four months, built, integrated, and iterated artificial intelligence (AI) solutions into their daily work as research administrators. During this process, the group focused on creating AI solutions for the complex, repeatable, and time-consuming tasks across teams in Research Operations (ROps) at ASU. Through this collaborative reflection, featuring the insights of both the facilitators (n=2) and the research administrators (n=4) involved in the implementation process, this paper offers insights into early approaches and recommendations for strategically, effectively, and sustainably incorporating AI into the work of research administrators. Given the emergent concepts of usability, flexibility, and sustainability, this paper proposes three recommendations for AI implementation: develop educational materials, create space for iteration, and define roles and protocols.

Keywords:

INTRODUCTION

Generative artificial intelligence (AI) is increasingly accessible and applicable to research-related activities; however, early research has focused on improving the work processes of academic researchers, with few best practices for research administrators. Overall, AI is heralded for its capacity to automate rote tasks (Mallette, 2024), assist in idea generation (Yu-Han & Chun-Ching, 2023), and quickly synthesize complex information in more accessible outputs (Lyu et al., 2023). Given these affordances, university researchers have experimented with AI integration for their more laborious research tasks such as supporting the writing process (Babl & Babl, 2023; Chamurliyski, 2023) and analyzing data (DeJeu, 2024; Hedquist et al., 2024; Morgan, 2023). While these insights benefit academic researchers, there are minimal best practices for research administrators. AI is a promising solution for administrative work processes given its potential to reduce human labor (Zhang, 2024), save costs (Rizvi et al., 2023), and improve workflows (Vapiwala & Pandita, 2024); however, despite early explorations of AI in research administration contexts (Komperla, 2021, 2022), there are few evidence-based strategies for implementing the emerging technology into research administration.

To address this gap, this reflective inquiry reports on the experiences of a multi-team working group at Arizona State University (ASU) that, over the course of four months, systematically integrated AI into their daily operations. The working group was assembled in response to ASU's AI Innovation Challenge: a university-wide initiative that offered staff, students, and faculty ChatGPT Enterprise licenses through OpenAI (ASU, n.d.-a; OpenAI, n.d.). The licenses differ from the free, public access version of ChatGPT. Namely, the Enterprise license ensures that ASU data is not used to train the models ("OpenAI, Arizona State

University collaborate to advance AI in academia," 2024), which facilitates internal sharing of AI tools and ensures a higher level of data privacy and security.

Nineteen research administrators received a license to create and implement potential AI solutions across teams within research operations (ROps). At ASU, research administration is a hybrid between centralized and decentralized support. The central office manages organization oversight and serves as the authorized organization representatives, while individual colleges, schools, and departments have in-unit research administrators who provide more in-depth support for faculty and staff. The administrators involved in this project belong to the central office, with expertise ranging from pre-award to compliance, to post-award. Given the diversity of the working group, we were able to create AI models that support central office processes, which could in the future be disseminated to department-level administrators to support their work as well.

Through a structured four-phase implementation process—Identify, Innovate, Integrate, and Iterate—the team developed twelve customized chatbots, known as "GPTs," within the OpenAI interface (OpenAI, n.d.). In phase one, the Identify phase, the team surveyed nineteen colleagues to determine which processes across ROps could benefit from AI integration, focusing on repetitive and time-consuming tasks. During the Innovate phase, ten colleagues participated in a month-long series of workshops to collaboratively draft and refine the initial functionality of the bots. Then, the Integrate phase involved asking colleagues to incorporate the GPTs into their daily work and write about their experiences. Finally, in the Iterate phase, the team worked on incorporating the feedback to refine the bots for improved usability and utility for colleagues.

This reflection features the voices and experiences of two groups: the implementation facilitators (n=2) and the research administrators involved in the implementation process (n=4). The facilitators were responsible for educating the administrators about AI, leading informational and interactive workshops, and supporting the individual development of each bot. The

administrators were responsible for participating in the workshops, building and iterating a bot, as well as incorporating the bots into their daily work. By featuring both voices, this report offers a holistic overview of the implementation process and experience. As such, this paper's emergent findings and recommendations are grounded in multiple perspectives that afford new insights into AI integration.

Problem Statement

How can universities successfully and systematically integrate artificial intelligence (AI) into research administration?

OBSERVATIONS

This section is organized according to the four phases of an emerging heuristic for AI implementation. Proposed by Hedquist and Keim (Society for Research Administrators International., n.d.), the implementation process involves four phases: identify, innovate, integrate, and iterate. The working sessions were organized around these phases, which is also how the observations will be structured.

With the implementation heuristic as a guide, this section will detail the guiding questions of each phase, as well as a vignette from one employee and one facilitator about their experiences executing the objectives in that phase. A vignette is a brief and descriptive reflection about a moment in time; by using this style of reflection, our paper offers snapshots of critical moments in each phase from the perspectives of facilitators and employees.

Phase 1: Ideate

The goal of phase one was to collaborate to find processes that AI can improve so that human work is dedicated to more complex decision-making. The guiding questions in this phase were:

1. Which organizational processes are currently inefficient or resource-heavy?
2. Which tasks require repetitive decision-making that AI could streamline?

3. Which team members or departments would benefit most from AI support?

To achieve these objectives, we started by having conversations with various stakeholders. We also sent out a survey to those we could not schedule time with due to availability limitations. Through both the surveys and meetings, we were able to identify a list of processes that could benefit from AI implementation.

To determine the most impactful AI applications, we selected processes that were high-volume, repetitive, and complex. These criteria led us to prioritize AI solutions such as the NSF FOA bot: a bot that could complete NSF checklists and develop review templates based on FOAs to save research administrators valuable time. Overall, our goal in the ideation process was to ensure that we found at least one AI opportunity in each of ROps teams, ranging from pre-award and post-award to compliance and contracts. While AI offers broad applications in RA—including grant application support and financial reporting—we prioritized areas that could immediately respond to the felt difficulties and opportunities designated by our colleagues.

The following vignettes highlight notable experiences from this phase of the process.

Employee Vignette

The first phase of this project focused on identifying processes that AI could manage to enhance human productivity. When speaking with the Research Compliance's Institutional Review Board (IRB) team, I noticed that there was an opportunity to take advantage of AI to enhance our productivity, and we decided to see areas of opportunities to create a GPT to help us out. A primary goal of implementing AI was to take on time-consuming tasks, enabling humans to focus on more creative and strategic responsibilities, ultimately improving timelines. We noticed that researchers often had inquiries regarding tasks and documentation needed for their studies, and gathering the information and getting in contact with researchers delayed the process, so we concluded that an IRB GPT could be a great solution. In this

phase, the team collaborated to identify those specific tasks that AI could effectively handle. For this project, every ASU team member and researcher stands to benefit from AI support, as the GPTs will streamline workflows, enhance timing metrics, and allow more time for innovation and complex problem-solving by providing them a tool that redirects them to the form or document they are looking for, the right answer for a question they may have or the right person to get in touch with in case they need any additional information.

Facilitator Vignette

When starting to identify who should be included in the collaboration, we took into consideration an individual's level of interest in new technology and asked all teams within the department for interested individuals. Demonstrations were conducted for those participating in the working group so everyone could see what it looked like to interact with a GPT before identifying opportunities for a custom GPT. This let users who might be less adventurous with technology get familiar with the tool before trying to train their own GPT. Users were encouraged to work together if they preferred at any step of the process, whether it was to talk through an idea, create a custom GPT, or test one of the bots. The group also talked through whether there were any concerns with data used to train the custom GPTs; similarly, the group talked about what data custom GPTs should and should not request from users. For instance, we did not want to create a custom GPT that encouraged users to upload confidential, identifiable data. One consideration that was encouraged when creating a custom GPT was how often the training materials would need to be updated, and how cumbersome it would be to update. In addition to looking at the processes individuals were looking to support, the working group also evaluated how complex creating and maintaining the bots may be before any custom GPTs were created.

Phase 2: Innovate

The goal of phase two was to design models that address identified opportunities, enhancing human-

centered workflows and improving operations. The guiding questions in this phase were:

1. Are there ethical considerations in how the AI will be used or developed?
2. How do we ensure the AI model is adaptable to future needs?
3. What human oversight is required for the AI to function effectively?

Phase two was arguably the most labor intensive, as we both built AI models and reflected on them from an ethical, adaptability, and sustainability standpoint throughout the design process. This phase involved synchronous and asynchronous work to build the bots, as well as several educational materials that were circulated to support employee training.

The working group was comprised of research administrators with varying levels of AI familiarity. To bridge knowledge gaps, this phase was run by the implementation facilitators who jointly have expertise in technical communication and process optimization. Additionally, ASU's IT department provided insights into data security and system integration on an ad hoc basis as informal consultants. As ASU staff members, we are grateful to have robust support from the Research Technology Office, IT specialists, and the expanding group of subject matter experts specializing in AI. This collaboration helped establish a foundation for AI literacy across the working group that prepared us for this phase.

The following vignettes highlight the building experience from an employee perspective as well as a reflection on the facilitator's approach to training during this phase.

Employee Vignette

I developed the concept of a chatbot called the "Office of Research Integrity and Assurance (ORIA) Compass" which was solely meant to serve as a navigation tool for the research compliance website for all compliance areas. Upon initial training of the model for all compliance areas, I learned that not only human oversight is necessary, but expertise for each compliance area is essential. Further, it is essential that

chatbots have a highly specific function for a specific purpose as there are character limits to the GPT's instructions. Though GPTs have built-in Knowledge centers where the bot creator can upload additional instructions in the form of word files, the key here is that the proper expertise is required to vet through the GPT's instructions and Knowledge center. Lastly, the bot should be periodically reviewed and monitored for changes in Federal, state, local, and institutional policies as well as changes in procedures specific to the compliance area being monitored.

Facilitator Vignette

I developed an activity called the "P.I.T. C.R.E.W." exercise (Appendix A), to meet my colleagues at their level of expertise with AI and help them quickly design and execute impactful bots. The first part of the exercise—P.I.T.—encouraged everyone to think about the purpose, instructions, and topic for their bot. The second part of the exercise—C.R.E.W. —was a mechanism through which to think about the utility and usability of their bot. In sum, they had to describe if the task was complex, repeatable, necessitating expertise, and widespread enough to justify a customized bot. Combined, these two acronyms were accessible to all colleagues and supported an expedited process of bot creation.

Phase 3: Integrate

The goal of phase three was to incorporate AI into workflows while educating employees to ensure smooth adoption and enhanced performance without disrupting daily operations. The guiding questions in this phase were:

1. How do we train employees to interact with and manage AI?
2. How will AI adoption affect roles and responsibilities within teams?
3. What communication plan will ensure employees feel supported and involved in the process, and fully informed of the intended use of the bot?

Phase three was an opportunity for us to test our bots in the "real world," as in putting the bots into the context of a workday. This required us to ask

our colleagues to incorporate the bots into their daily work and report on their experiences. We structured this phase by asking our colleagues to test at least one bot, once a week, by asking at least one question. Then, we created a collaborative document wherein they could report on their experiences and recommendations for each bot.

Employee Vignette

Before integrating the Enterprise Research Administration (ERA) User Help bot, I reached out to colleagues in different roles, inviting them to test the bot's knowledge and provide feedback. Throughout the testing process, my colleagues and I were pleasantly surprised by the accuracy of the bot's responses. In fact, any bot responses that lacked vital information stemmed from gaps in our existing guides and knowledge databases. This insight was invaluable, as it highlighted areas where we needed to create additional instructions and process guides to aid bots and humans alike.

Facilitator Vignette

During this phase, I was responsible for sending the drafted bots to nineteen colleagues who expressed interest in testing the bots for a month. Initially, I was apprehensive about how much information to share. On one hand, I could inform my colleagues about how each bot was trained and its intended purpose; on the other, I could invite them to test out the bots, with their only context being the bot's name and its brief description in ChatGPT. I opted to pursue the latter. Though a bit ambiguous, this was a method for truly testing the utility of the bots as there is no way to guarantee that every user has an opportunity to be primed, so to speak, on the bot's functionality, purpose, training, and so on. This approach presented affordances—such as a "real life" testing scenario—as well as limitations, as it led to several colleagues expressing confusion and lacking a clear pathway for how to consider integrating the bot. Overall, this approach highlighted ways that improved communication about the bot's descriptions could support more seamless integration.

Phase 4: Iterate

The goal of phase four was to continuously refine AI through user feedback and performance evaluations to ensure ongoing optimization and relevance. The guiding questions in this phase were:

1. What specific Key Performance Indicators (KPIs) will be used to evaluate the AI's effectiveness?
2. How do we identify when it's time to upgrade or replace the AI model?
3. How will we gather qualitative feedback from employees and users and meaningfully incorporate feedback in model upgrades?

For this final phase, we spent significant time reflecting on the input from our colleagues to inform design adaptations to the AI models. Our colleagues provided feedback about how the AI was performing, as well as the types of metrics we could use to evaluate the AI.

Employee Vignette

During the testing and evaluation of a drafted AI bot, I had insight into additional information and materials that should be reflected in the next versioning process. This was an "aha" moment revealing how multiple perspectives and resources would need to collaborate to develop a fully fleshed-out AI bot. A typical user of the bot I reviewed would frequently reference the standard work instructions for research administrators in a particular system. My experiences within the same system often reference additional tools and resources not included in work instructions. These additional items include resources for research administrators who use the system and the faculty, staff, and student researchers who complete activities within the same system. These additional items include 1) the system's integrated "help text" tools (which provide on-demand information for specific fields in the system), 2) training materials (optional workshops and required online training), and 3) associated teams who act as experts who can assist faculty, staff, and student researchers with completing system activities or other requirements. The perspectives of these other potential users and a better understanding of their needs will be essential to the future iteration of this particular AI bot.

The biggest considerations during this phase were: What guidance would users need when interfacing with this bot? Are there any ethical or privacy concerns with the latest version of the bot? And is the bot producing accurate information for users? Careful discussion has also centered around the sustainability of the custom GPTs. At the time of the working groups, everyone had temporary enterprise licenses. The facilitators of the working group are evaluating options so the custom GPTs can be utilized long-term. For bots supporting processes that have a corresponding department KPI tracking processing time, KPIs before and after bot implementation will be compared to quantify personnel time saved by the custom GPT. Bots without a corresponding established KPI will rely on user feedback on their experience in using the bot. Some custom GPTs will supplement training experiences for new team members or help users troubleshoot processes in the institution's grant management system. Users will also be able to provide feedback to the creator of the bot if an error occurs when using the bot. Most of the bots have been trained with materials that update annually, but any custom GPTs officially launched will be included in ongoing continuous improvement processes in place for the related department process.

EMERGENT CONCEPTS

This section proposes three emerging concepts arising from this project. To arrive at a set of concepts, the group met to discuss the objectives of each phase, share experiences, and read through the vignettes. Through a brainstorming session, the group finalized a list of emerging concepts, which are defined and exemplified in this section.

Usability: Prioritizing User Experience

Throughout the implementation process, we recognized the utility and importance of adopting user experience (UX) design principles, such as usability, to guide our work. At its core, UX is a discipline committed to moving "beyond ideals and principles held by designers to include evidence of what users really do, feel, and believe" (Mara, 2020, p. 1). Often, this evidence-based and user-driven approach to design manifests in concerns around usability, which is the user's ability to "navigate through a variety of tasks that an end product was designed to facilitate" (Lauer & Brumberger, 2016, p. 249). Thus, by prioritizing usability, our team continually reflected on the extent to which our AI models were meeting the needs—and being successfully navigated by—our end users. In most cases, the end users of our bots were our colleagues in ROps—not principal investigators, as our project focused on improving internal processes. We achieved this reflection by establishing multiple points of feedback into the design process, starting with the initial design.

First, we worked to ensure that the bots we were building were reflective of earnest needs within ROps. Rather than predict what teams might need, phase one included extensive conversations with, and surveys of, employees across ROps to collect evidence on what processes could be supported by AI. Accomplishing this work involved significant time and effort, as it was occasionally difficult to converse with team members who were low on bandwidth. While this may have delayed the project timeline slightly, their input was invaluable. This exemplifies the importance of prioritizing usability over other project goals—such as a rigid timeline—to ensure that the products we created were meeting a user need. We continued this commitment to usability throughout the design process, especially once we had working bots to report on.

Later in the design process, our team recognized the importance of continuous feedback to fuel positive user experiences. For instance, by surveying our colleagues on their early experiences with our AI models, we learned how we could better meet their expectations. Several users noted that one bot—which was designed to provide information about a specific website—needed additional instructions for scenarios wherein the user wanted contact information or assistance with specific links. While we did not anticipate these needs,

our survey mechanism helped us quickly pivot and iterate the bot to meet user needs.

Though usability is an important consideration, it is a difficult hurdle when considering the limited bandwidth that often persists in ROps as a discipline. As Schiller and LeMire highlight, research administrators are often burdened by "bureaucratic regulations, unwieldy processes, and burgeoning reporting standards," which results in long days and endless to-do lists (2023, p. 9). As a result, it can be difficult to ask colleagues to volunteer their time to test and provide feedback on an emerging technological tool such as AI. Our team is continuing to work toward striking a balance between requesting usability support and not overburdening our colleagues. In the Recommendations section, we will offer suggestions on how to strike a balance for usability-minded AI implementation.

Sustainability: Ensuring Long-Term Success

Early on, the working group identified the importance of planning for multiple facets of sustainability. From an operations standpoint, we define sustainability as the ability to maintain our processes and products at the same quality for a long duration of time. Namely, we were concerned with how we would sustain the AI models as well as the human capital required to maintain their iteration and success in the workplace.

From the standpoint of the AI models, a big question that arose was where the AI models would 'live,' and how they would evolve over time. While we did not completely remedy this concern, we spent time during our weekly meetings discussing the implications of different methods for sustainability. For instance, we discussed how including certain AI bots on our websites could help users navigate content across our website ecosystem; however, when websites changed, it was unclear how we would proceed. In the ever-changing landscape of research administration, change is inevitable. If AI is to become a fixture of our work, where AI solutions are placed and how they are maintained needs to be a proactive rather than reactive decision. Meaning, as we worked to embody, that sustainability is a front-of-mind design consideration

that is continually discussed and prioritized.

Secondly, human capital is critical for sustainability, as it refers to the importance of human skills, training, and attitudes (Shimazoe, 2021). In our case, our working group is comprised of employees across ROps who are volunteering their time for experimentation with AI. Currently, no team member is able to permanently shift their job responsibilities to provide long-term maintenance and oversight to AI implementation. As a result, there is a need to capture people's expertise when they can offer it, while also planning for the moments wherein that expertise cannot be called upon and incorporated.

Flexibility: Accommodating Evolving Needs

By following the implementation heuristic, we were able to follow a systematized plan for AI implementation that also prioritized procedural flexibility across the team. Rather than asking each group member to be flexible and adaptable, the collaborative heuristic helped us channel what Hannah and Lam coin as functional flexibility: "team members' ability to function effectively, efficiently, and economically within the subcultures of a group, unit, or team" (2023, p. 144). A key component of functional flexibility is a deep understanding of subcultures, as well as their language and values. Our team was able to channel this depth of understanding because we are all from different teams. In practice, this flexibility often meant facilitating dialogue across differing professional and methodological orientations. Working across such boundaries is difficult, but thoughtful and systematic facilitation that seeks to preserve and empower difference proved essential to our process (Hedquist et al., 2025). By fostering shared understanding through reflective discussion, we were able to reposition what "effective collaboration" meant for our project: not consensus or uniformity, but a generative process that made visible the diverse epistemologies shaping our work.

The main way that we practiced flexibility was by consistently reporting on our experiences during weekly meetings to identify adaptation opportunities.

These reporting opportunities included both our personal reflections as well as insights from our various teams. For instance, one colleague raised a concern about a public-facing help bot providing inaccurate information to a Principal Investigator (PI). This affected our initial plans to make the bot a resource for PIs via the website; however, by accounting for potential misuse, we were able to proceed with the project in a way that reduced misinformation and harm. As illustrated by this pivot, flexibility in our processes ensured that we accommodated diverse needs and drove impact that would be long-lasting.

Additionally, as we look to the future, we are cognizant of the importance of flexibility as guidance regarding AI and institutionally supported tools may change. For instance, our institution's technology office vetted the tool we used—ChatGPT—however it was important for us to acknowledge that access to the tool, and the university's stance on it, could change. To accommodate these potential future pivots, we documented all our processes and training materials. By maintaining clear training documentation, we can be flexible if we are asked to move platforms or change software.

Though important, our concerns about usability were reflected in our difficulties in flexibility as we struggled to attract feedback from our colleagues about the bots. We were open to input throughout the design process to ensure flexibility and adaptability; however, many colleagues did not have the time to offer direction or feedback due to time constraints. While this was unfortunate, the moments we were able to exercise flexibility were fruitful and worthwhile. Furthermore, we were able to maintain a stance of functional flexibility by leaning into our understanding of our individual teams and their subcultures. Overall, as a general habit of mind, flexibility was fortuitous.

RECOMMENDATIONS

Building off the emergent concepts, this section proposes three recommendations for universities that are looking to incorporate AI into ROps: develop educational materials, create space for iteration, and define roles and protocols. The recommendations were developed collaboratively through a series of meetings and reflections within the working group. Each emergent concept is woven into the recommendations to further emphasize the importance of usability, sustainability, and flexibility in AI implementation.

Develop Educational Materials

Leaders from business and academic sectors are building infrastructure to educate the workforce on AI, which will be essential resources for AI implementation in research administration teams. In our case, OpenAI offered a suite of online tutorials and case studies to support students, staff, and faculty who were integrating AI into their work and classrooms (OpenAI Platform, n.d.). Similarly, ASU has developed best practices and courses to support AI education in the workforce (ASU, n.d.-b). We utilized this suite of educational materials—including video tutorials and office hours—to continually learn about AI as it has evolved. Given the evolving nature of AI, as well as varying comfortability with the technology, we recommend research administration teams prioritize education in two distinct ways: training employees how to use AI to build bots, and training employees and/or end users on how to interact with the AI bots that are created.

First, ROps teams will need to educate employees on how to train, use, and disseminate AI bots. Albeit no easy feat, we recommend turning to early scholarship on AI education and literacy (Bearman & Ajjawi, 2023; Cardon et al., 2023; Gupta & Shivers-McNair, 2024), as well as publicly available best practices (Google AI, n.d.). Utilizing existing frameworks, such as the implementation heuristic we offer in this article, can offer employees a starting point to stretch and grow their AI muscles, so to speak. One way to achieve these educational goals is through facilitated working sessions, or through the dissemination of tutorials and best practices. Whether synchronous or asynchronous, it is important that employees are not expected to sift through the chasm of AI materials alone; rather, by offering vetted and appropriate educational materials, employees can better understand the world of AI that

they are stepping into. Though, education cannot stop at employees—it must extend to the prospective end user as well.

Perhaps you are building an AI model for your ROps colleagues, or perhaps you are building one for PIs to use to better understand resources at the institution; either way, these end users will need to understand how to interact with the bots you present to them. In our experience, we benefited from writing clear descriptions of the bots, situating them among our preexisting websites, and distributing tutorials and best practices to end users. Without these educational resources in place, there's a risk that people may not know how to use the AI models effectively, leading to potential confusion or misuse. By prioritizing clear communication and providing accessible educational materials, research administrators can help ensure that users understand how to interact with the bots and feel confident using them. This proactive approach makes it easier to guide end users toward the support they need and reduces the likelihood of misunderstandings.

Create Space for Iteration

Given our experiences, we recommend allotting time and effort for iteration, despite potential disruptions to project goals. For instance, adopting a flexible and usability-centered approach to implementation may require a slower process. Though this may require a mindset shift—especially as research administrators are known for being systems-oriented and deadline-driven—adopting a stance of openness toward iteration can ensure a better product. Thus, the act of 'creating space' requires room in your project timeline, as well as mindfulness about how you will maintain a sustainable process for iteration.

Regarding timeline shifts, our project benefitted from iteration as we asked our colleagues to continually provide feedback on our ideas in phase one, as well as our drafted AI models in phase four. Before the project, we intentionally carved out these touchpoints to ensure ample time allotted for iteration. Through their feedback, we opened ourselves to intentional, evidence-based iteration. Creating space for this work was

uncomfortable and labor intensive at times; however, the end products benefited, as did our end users.

In addition to planning time for iteration, it is important for research administration teams to identify means through which to maintain this space for iteration. By space, we refer to a continued commitment to adaptation of the AI models to best meet user needs. Sustaining this commitment can be tricky, as it requires the dedication of time and personnel to continued feedback collection and iteration. For instance, an employee may be required to check a feedback survey every week, or perhaps the working group agrees to meet once a month to discuss necessary iterations. Regardless of the setup, creating space for iteration is inconsequential if it is not paired with the maintenance of the space for a sustained amount of time. By prioritizing long-term space for iteration, the team is thereby committing themselves to prioritizing evolving user needs.

Define Roles and Protocols

To ensure sustainability, teams working with AI will need to clearly define the roles and protocols related to the bots. In our team, we were driven by the motivation to create proof-of-concept bots and experiment with what AI can do through the ASU AI Innovation Challenge. Though this experimentation is important and worthwhile, we repeatedly stopped throughout the process to ask ourselves how we might sustain this work if our proof-of-concept was successful and useful to our colleagues. In these moments of reflection, we transcribed our training materials and protocols for the bots so that they could be maintained long-term or moved to another software if needed. This action of continuous documentation was critical to our implementation protocol and ensured sustainability.

To offer an example, we built a bot that is an expert in Uniform Guidance, which has successfully supported the workflows of several colleagues. However, we had to ask several sustainability-focused questions, such as: When the Uniform Guidance policies are updated, who is responsible for updating the bots training? If the bot starts to produce inaccurate responses, who is

responsible for fixing the bot? How often will we solicit feedback from users to ensure that it is usable? These questions, among others, are a focal point for our team as we consider which bots will continue to be prioritized in our work, who will be responsible for them, and what processes those individuals will need to follow. Albeit uncharted territory, we invite other scholars and administrators to share their experiences crafting AI-centered goals so that ROps teams can better plan for and execute AI implementation efforts.

AUTHORS' NOTE

Acknowledgements

Originality Note

This manuscript reflects the original work of the authors Any references used in developing the manuscript are cited.

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REFERENCES

Arizona State University. (n.d.-a). *AI Innovation Challenge*. Retrieved November 15, 2024, from https://ai.asu.edu/AI-Innovation-Challenge

Arizona State University. (n.d.-b). *Artificial intelligence*. Retrieved November 15, 2024, from https://ai.asu.edu/

Babl, F. E., & Babl, M. P. (2023). Generative artificial intelligence: Can ChatGPT write a quality abstract? *Emergency Medicine Australasia*, *35*(5), 809–811. https://doi.org/10.1111/1742-6723.14233

Bearman, M., & Ajjawi, R. (2023). Learning to work with the black box: Pedagogy for a world with artificial intelligence. *British Journal of Educational Technology*, *54*(5), 1160–1173. https://doi.org/10.1111/bjet.13337

Cardon, P., Fleischmann, C., Aritz, J., Logemann, M., & Heidewald, J. (2023). The challenges and opportunities of AI-assisted writing: Developing AI literacy for the AI age. *Business and Professional Communication Quarterly*, *86*(3), 257–295. https://doi.org/10.1177/23294906231176517

Chamurliyski, P. (2023). Enhancing efficiency in scientific writing in the field of plant growing: Collaborating with AI assistant ChatGPT for enhanced productivity. *Acta Scientifica Naturalis*, *10*(3), 73–81. https://doi.org/10.2478/asn-2023-0023

DeJeu, E. B. (2024). Using generative AI to facilitate data analysis and visualization: A case study of Olympic athletes. *Journal of Business and Technical Communication*, *38*(3), 225–241. https://doi.org/10.1177/10506519241239923

Google AI. (n.d.). *Google responsible AI practices*. Retrieved November 15, 2024, from https://ai.google/responsibility/responsible-ai-practices/

Gupta, A., & Shivers-McNair, A. (2024). "Wayfinding" through the AI wilderness: Mapping rhetorics of ChatGPT prompt writing on X (formerly Twitter) to promote critical AI literacies. *Computers and Composition*, *74*, 102882. https://doi.org/10.1016/j.compcom.2024.102882

Hannah, M. A., & Lam, C. (2023). 6. Functional flexibility: Cultivating a culture of adaptability for the work of professional writing. In A. L (Ed.), *Rewriting work* (pp. 141–158). WAC Clearinghouse.

Hedquist, A., Hannah, M. A., & Caputo, C. (2025). Facilitation in TPC Research Practice: Navigating the Complexities of Collaborative Research. In P*roceedings of the 43rd ACM International Conference on Design of Communication* (pp. 234-235). https://doi.org/10.1145/3711670.3764650

Hedquist, A., Willers, H., & Hannah, M. A. (2024). Discipline-driven AI: Training a GPT to qualitatively code for technical and professional communication research. *Proceedings of the 42nd ACM International Conference on Design of Communication*, 266–268. https://doi.org/10.1145/3641237.3691686

Komperla, R. C. A. (2021). AI-enhanced claims processing: Streamlining insurance operations. *Journal of Research Administration*, *3*(2), 95–106.

Komperla, R. C. A. (2022). Artificial intelligence and the future of auto health coverage. *Journal of Research Administration*, *4*(2), 259–269

Lauer, C., & Brumberger, E. (2016). Technical communication as user experience in a broadening industry landscape. *Technical Communication*, *63*(3), 248–264.

Lyu, Q., Tan, J., Zapadka, M. E., Ponnatapura, J., Niu, C., Myers, K. J., Wang, G., & Whitlow, C. T. (2023). Translating radiology reports into plain language using ChatGPT and GPT-4 with prompt learning: Results, limitations, and potential. *Visual Computing for Industry, Biomedicine, and Art*, *6*(1), 9. https://doi.org/10.1186/s42492-023-00136-5

Mallette, J. C. (2024). Preparing future technical editors for an artificial intelligence-enabled workplace. *Journal of Business and Technical Communication*, *38*(3), 289–302. https://doi.org/10.1177/10506519241239950

Mara, A. (2020). *UX on the go: A flexible guide to user experience design*. Taylor & Francis Group. http://ebookcentral.proquest.com/lib/asulib-ebooks/detail.action?docID=6247179

Morgan, D. L. (2023). Exploring the use of artificial intelligence for qualitative data analysis: The case of ChatGPT. *International Journal of Qualitative Methods*, *22*, 16094069231211248. https://doi.org/10.1177/16094069231211248

OpenAI. (n.d.). *Introducing GPTs*. Retrieved March 1, 2024, from https://openai.com/blog/introducing-gpts

OpenAI, Arizona State University collaborate to advance AI in academia. (2024, January). *Communications Today*. https://www.proquest.com/docview/2916401779/citation/D2C693BD03D0402DPQ/1

OpenAI Platform. (n.d.). *Tutorials*. Retrieved November 15, 2024, from https://platform.openai.com

Rizvi, A., Rizvi, F., Lalakia, P., Hyman, L., Frasso, R., Sztandera, L., & Das, A. V. (2023). Is artificial intelligence the cost-saving lens to diabetic retinopathy screening in low- and middle-income countries? *Cureus*, *15*(9), e45539. https://doi.org/10.7759/cureus.45539

Schiller, J. L., & LeMire, S. D. (2023). A survey of research administrators: Identifying administrative burden in post-award federal research grant management. *Journal of Research Administration*, *55*(3), 9–28. https://files.eric.ed.gov/fulltext/EJ1412033.pdf

Shimazoe, J. (2021). Research managers and administrators in conflicting organizational cultures: How does their human capital help professional survival in knowledge-intensive organizations? *Journal of Research Administration*, *52*(1), 102–140. https://files.eric.ed.gov/fulltext/EJ1293150.pdf

Society for Research Administrators International. (n.d.). *Past winners—SRA International*. Retrieved November 15, 2024, from https://www.srainternational.org/membership-experience/get-involved393/symposium591/past-winners271

Vapiwala, F., & Pandita, D. (2024). Streamlining talent management for modern business through artificial intelligence. *2024 ASU International Conference in Emerging Technologies for Sustainability and Intelligent Systems (ICETSIS)*, 619–623. https://doi.org/10.1109/ICETSIS61505.2024.10459450

Yu-Han, C., & Chun-Ching, C. (2023). Investigating the impact of generative artificial intelligence on brainstorming: A preliminary study. *2023 International Conference on Consumer Electronics - Taiwan (ICCE-Taiwan)*, 193–194. https://doi.org/10.1109/ICCE-Taiwan58799.2023.10226617

Zhang, T. (2024). Imagining a more artificially intelligent future: AI offers multiple solutions to save time and improve processes for stage and production managers. *Theatre Design & Technology (TD&T)*, *60*(2), 34–41. https://www.usitt.org/sites/default/files/2024-07/Free%20Article%20hickmanbrady_tdt_2024summer.pdf

APPENDIX

Appendix A - PIT CREW Exercise

[Insert Name for AI Model]

Step 1: The P.I.T. Exercise

P - **Purpose** (What the AI is Helping Achieve): What will this bot accomplish?

I - **Instructions** (How to Create the Right Output): How will the bot respond?

T - **Topic**: (What the AI Needs to Know): What knowledge does the bot need?

Step 2: The C.R.E.W. Test

C - **Complex**: Is the task complex or multi-step?

R - **Repetitive**: Is the task repetitive and performed frequently?

E - **Expert**: Does the task require expert-level knowledge or domain-specific expertise?

W - **Widespread**: Is the task needed by many people or across various teams?

Step 3: Documents

Reread your answers to the P.I.T questions. What documents will you need, if any, to upload to the AI model so that it behaves as intended?

BUILDING A CULTURE OF GRANTSMANSHIP AT AN URBAN COMMUNITY COLLEGE VIA INTERNAL FUNDING OPPORTUNITIES

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ABSTRACT

Securing external grants is essential for the nation's institutions of higher education where decreased funding for research and educational programs has triggered the imperative to find ways to supplement university budgets. However, there are many challenges that inhibit grantsmanship success, particularly for those at community colleges, including limited time due to teaching, advising, service and other scholarly duties, the absence of experience and grant writing skills, and the void of a culture of grantsmanship at the institution. To address these gaps at an urban community college, an internal funding and professional development program, the Hostos Research Center (HRC), was created and replicated the internal funding processes developed by Balaji et al. (2007) and Kulage and Larson (2017). The HRC aimed to educate faculty and staff on grantsmanship to increase the number of competitive applications submitted to external funding sources and increase the likelihood of success for those applications. The HRC internal funding competitions mirrored the processes used by the prior studies and awarded over $300,000 in grants over a three-year period. Survey responses on the impact of the HRC indicated increased motivation to apply for new grant opportunities, improved grant writing skills, and overall awareness of grant opportunities.

Keywords:

internal funding program, community college, grantsmanship, grant writing, professional development

INTRODUCTION

Securing external grant funding for educational programs and research is essential in today's higher education (Leak, et al., 2015). This need is especially present at the nation's community colleges where the decrease in available funding for research and intervention-based educational programs has triggered the imperative to seek external funding to complement and support university budgets (Mitchell, et al., 2015). There are a host of well-established challenges, however, that inhibit grantsmanship success for community college faculty and staff, including a lack of time due to teaching, advising, service, and other aspects of scholarly duties; a lack of advance notice of available grants to pursue; difficulties seeking external funding sources; challenges preparing proposals and budgets; complexities in getting necessary approvals; and dealing with campus administrative staff on the distribution and management of funds (Boyer & Cockriel, 1998; Dooley, 1995; Monahan, 1993; Shuman, 2019; Walden & Bryan, 2010). Furthermore, the skills required to write and attain competitive grants were sometimes not present (Kleinfelder, et al., 2003; Walden & Bryan, 2010).

Efforts to improve grantsmanship included those that provided direct support and incentives for faculty and staff to apply for external funding (Ahn et al., 2022; Pinto & Huizinga, 2018). Goff-Arbritton et al. (2022)

reviewed faculty views on barriers and facilitators to grant success. They identified internal funding and resources provided by the university as important contributors. Helpful university resources included: funds for pilot work and manuscript submissions, funds to pay student research assistants, support for travel to attend conferences or meet with funding agencies, funds to purchase equipment, and bridge funding provided between funded projects.

In line with these findings, support for faculty and staff in the form of internal competitive grant programs has been shown to improve grantsmanship skills and increase the probability of securing external funding. A pioneering example was presented by Balaji et al. (2007) at The Ohio University College of Osteopathic Medicine. They developed a competitive grant program aimed at stimulating faculty to submit more competitive research proposals to the National Institutes of Health (NIH) more frequently. Faculty were required to submit a complete research proposal following the NIH application format to participate in the internal funding program. External reviewers with relevant expertise critiqued and scored the proposals using NIH's standard review criteria. Based on the scores, an internal review panel at the university then recommended up to three proposals for funding. In the first year of the pilot program, eight applications were received and three were selected for internal funding which were subsequently submitted to the NIH. The following year the internal funding program saw an increase to 12 applications and two were selected for an internal grant and submitted to the NIH. Additionally, over the last two years of the program, there was a 50% increase in the number of submitted applications. The authors noted several benefits to implementing the pilot program. These included: exposed novice investigators to the NIH grant writing experience, provided external reviews in a reduced time period to promote timely proposal revision and submission, and awarded grant funding to help investigators gather the preliminary data to advance their projects.

Kulage and Larson (2017) shared another example of an internal funding award program. They reported on the outcomes of a pilot grant initiative instituted at a school of nursing designed to encourage the preparation and submission of external grant applications. The authors reported that over a five-year period, the program invested $127,000 to support 14 grants. These grants ultimately yielded over $3 million in external funding, including major federal grants and foundation funding. Additionally, the funded projects contributed to the faculty's scholarly development through peer-reviewed journal articles and conference presentations. With competition for public and private sector funding ever increasing, internal grant programs are a valuable institutional resource. These programs can incentivize faculty to develop well-crafted proposals that are more likely to be funded.

The work described in this paper aimed to replicate the program models and outcomes reported by Balaji et al. (2007) and Kulage and Larson (2017). The authors created and evaluated the impact of an internal funding program on grantsmanship at an urban community college. The program was designed to consider the "truths" and "myths" for faculty about the grantsmanship process (Cook & Loadman, 1984). Truths included the need for faculty to be knowledgeable about funding sources, be able to craft clearly written funding proposals including budget preparation and documentation, and to have awareness of proposal submission deadlines. Myths included that there was a stigma associated with faculty whose proposals were not funded, who you know is more important than proposal quality, and the granting process was intentionally difficult (Daniel & Gallaher, 1990). Additionally, the program addressed the three major impediments to funded research activities: lack of procedural information, lack of information about funding sources, and lack of a clearly defined system of rewards for those who obtained external funding (Daniel & Gallaher, 1990).

Hostos Community College (HCC) of The City University of New York (CUNY) is a Hispanic Serving

Institution (HSI) community college in the South Bronx. HCC was among the public institutions of higher education leveraging grant opportunities to address the growing challenges associated with reduced funding and operating budgets. To support this effort, HCC established an internal funding program, which will be referred to as the Hostos Research Center (HRC) moving forward. The HRC was designed and implemented to train and educate faculty and staff on grantsmanship so they could develop more competitive applications and increase their likelihood of securing external funding. HRC competitions provided up to $10,000 for winning proposals that went through an application process similar to those that exist at major external and federal funding sources, such as the National Science Foundation and the National Institutes of Health. The HRC internal funding program was expected to help faculty and staff develop the skills necessary to secure funding for research, high-impact educational programs (Baker et al., 2015; Haeger et al., 2020; Kuh, 2008; Lopatto, 2003, 2010), and scholarship and mentoring programs (Rodríguez et al., 2020, 2022, 2023). Furthermore, the program could demonstrate that a community college could also be competitive in grants attainment. This would be possible if its faculty and staff were trained, and a culture of research and grants development was institutionally fostered.

Institutional Background

HCC was established in 1968 with a central mission to meet the needs of the South Bronx community and to provide access to higher education. In 2022, HCC served over 5,000 students, a largely Latinx and Black (95%) population, mainly in their twenties, and 69% female. The significant majority were 1.5 generation immigrants (children of immigrants born in the U.S. that attended U.S. high schools) and 77% spoke a language other than English at home. Students faced significant economic and educational barriers in the South Bronx. Seventy-seven percent had household incomes below $30,000, and 95% were eligible for financial aid. HCC has always provided rigorous, standards-driven learning experiences that

meet higher education expectations in a supportive, diverse, and multicultural setting. HCC faculty and staff were highly qualified and reflected the diversity of its students: 58% female and 85% non-White (Hostos Community College, Self-Study Report, internally published, 2022).

In 2021, Ms. MacKenzie Scott, philanthropist and author, recognized the transformative work HCC carried out for decades. She awarded the college $15 million, the largest donation the college had ever received. This extraordinary gift aimed to advance HCC's strategic goals that included: provide high quality education, support, and resources; help students successfully complete their education; equip students to secure higher than living wage employment; and create transfer opportunities to continue their academic pursuits. HCC leveraged this donation by allocating funds to launch several important initiatives, which were designed to: promote retention and graduation, enhance intentionality in student advisement, increase access to career development opportunities, support faculty and staff engagement in research and grants development, and advance innovation in teaching and learning strategies.

Among these initiatives was the creation of the HRC, the first research center of its kind at any of CUNY's community colleges. The mission of the HRC was to foster a culture of research and grants development and enhance students' access to professional experiences. This aligned with the HCC mission to provide opportunities for intellectual growth, socio-economic mobility, and develop the proficiencies needed for lifelong learning and success. The HRC established five main goals: (1) to promote research on teaching and learning as a vehicle to gain knowledge on the implementation of high-impact educational practices; (2) to encourage and facilitate the dissemination of faculty and staff research findings via presentation, discussion and publication; (3) to promote research including intra- and inter-departmental collaboration, external collaboration, and team building; (4) to identify institutional needs

and strengths to be translated and materialized into funding opportunities that maximize capacity building; and (5) to provide guidance and support for students' access to professional experiential activities and partnerships with external institutions. The HRC was designed to expand faculty academic identities and leverage their unique skill sets to address institutional needs and create pathways for student access to research opportunities.

The HRC Internal Grants Program

The HRC provided opportunities for faculty and staff to develop grantsmanship skills while filling in the resource gaps by offering grant writing workshops and two internal funding competitions. The IDEAS (Innovating, Developing and Executing Actions with Success) development project award was a seed grant that aimed to support proposal/project development that would be submitted for internal/external funding opportunities. The ADELANTE (ADvancing Excellence in Liberal Arts, scieNces, Technology and Engineering) project award supported research, need-based, and/or creative/transformative interventions in all disciplines including the Arts and Humanities, Behavioral and Social Sciences, and Science, Technology, Engineering and Mathematics (STEM). IDEAS grants were designed to provide short-term funding for pilot work to inform full-fledged proposal/project development, whereas ADELANTE grants supported year-long projects that allowed for more in-depth research development, evaluation, and student research engagement. Both internal funding competitions mimicked grant applications at external funding agencies and aimed to develop skills for larger external funding opportunities.

The IDEAS Call for Proposals was issued towards the end of the spring semester to encourage faculty and staff to undertake the pilot project over the summer months. The required grant narrative was no more than two pages with a project period of three to four months. The expectation was for grantees to use their IDEAS project outcomes/findings to inform a comprehensive proposal for

submission in the subsequent academic year. The ADELANTE Call for Proposals was issued in the fall semester of the academic year, and more closely mirrored the outline and requirements of a federal research grant application. The application required a five-page narrative containing: 200-word abstract, rationale, research questions/hypotheses, objectives, methodology, activities, expected outcomes, timeline, and future plans. Additional application materials included: budget following guidelines for allowable/non-allowable expenses, budget justification, and biosketches for all key project personnel. The HRC provided detailed guidance for the construction of the grant narrative along with formatting requirements. Additionally, virtual "Office Hours" sessions were offered to provide prospective applicants with an overview of the grant application process, including the preparation of application materials, and question and answer periods.

A review committee evaluated the applications. The committee consisted of faculty and staff with experience in drafting successful grant applications to external funding sources. They reviewed and scored each application following a rubric and criteria developed by the HRC Co-Director. The review committee scored all applications and then discussed the applications in a panel review format. Each committee member was assigned specific applications that they presented and provided their assessment and recommendations. The group engaged in a robust discussion of each application. The committee members made recommendations for funding based on a consensus, and grant awards were then submitted for approval by the HCC President. The review process took about two to three weeks. Applicants were notified of their application status by early March. Grant awards typically ranged between $6,000–$10,000.

After receiving awards, grantees were required to attend an orientation session with the HRC staff that detailed the grant administrative and fiscal processes. The initial grant cycle allowed for six months for project completion. However, due to

Table 1
HRC Grants Awarded 2021-2024

Grant Name and Cycle	Total Number of Applications Received	Total Number of Grants Awarded	Total Funding Awarded
IDEAS Cycle 1	8	7	$4,500
IDEAS Cycle 2	10	6	$8,500
IDEAS Cycle 3	10	9	$11,000
IDEAS Cycle 4	6	6	$9,000
ADELANTE Cycle 1	19	11	$86,525
ADELANTE Cycle 2	12	11	$98,153
ADELANTE Cycle 3	15	9	$85,793
Total	80	59	$303,471

grantees' feedback about needing more time, the project period was extended to one year during which time all proposed activities were carried out and funds expended. The Call for Proposals for IDEAS and ADELANTE are included in Appendices A and B, respectively.

Table 1 shows the program's results across four IDEAS and three ADELANTE grant award cycles. For the first grant cycle, eight IDEAS applications were received, and seven grants were awarded for a total of $4,500. In the second cycle, 10 IDEAS grants were received and six were funded for a total of $8,500; 19 ADELANTE applications were received, and 11 grants were awarded for a total of $86,525. In the third cycle, 11 of 12 ADELANTE grants were awarded for a total of $98,153, and nine of 10 IDEAS grants were awarded for a total of $11,000. In the fourth funding cycle, nine of 15 ADELANTE grants totaling $85,793 were awarded, and six IDEAS grants were awarded for a total of $9,000.

Across the four funding cycles, 60 faculty/staff members were awarded $303,471 in funding for ADELANTE and IDEAS. Additionally, the ADELANTE-funded projects engaged 50 students as research assistants across various disciplines including education, natural sciences, and the humanities, providing students with hands-on research and career-building skills development.

METHODS

The study examined the impact of the HRC's internal funding program during the initial implementation period across three academic years (AYs). The study had two main objectives: (1) to understand the extent to which faculty/staff participation in the HRC's internal funding program served as a professional development tool for developing grant applications to external funding agencies; and (2) to gain insight into faculty/staff grantsmanship experiences including: experience applying for HRC grant opportunities, level of engagement in grant seeking/grant writing efforts, and types of capacity building resources needed to enhance faculty/staff grantsmanship efforts.

Three questions guided this study:

1. What is the impact of the HRC internal funding program on faculty/staff grantsmanship development?
2. What are the grantsmanship practices of HCC faculty/staff and how often do they engage in these practices?
3. To what extent does the HRC internal funding program improve HCC's public and private grant funding prospects?

An online survey was administered to all HCC faculty and staff to explore their grantsmanship experiences and perceptions of the grantsmanship process at

HCC. The survey examined experiences for faculty/staff that participated in the HRC internal funding program and those who did not participate. This included faculty/staff who applied for HRC funding but were not selected, and those who chose not to participate. Additionally, a comparative examination of external funding secured over a six-year period was performed to quantitatively assess the impact of the initial implementation of the HRC.

Participant Recruitment and Survey Implementation

An IRB-approved recruitment email was sent to all HCC faculty and staff including those that participated in the HRC internal funding program. The email contained a description of the study's purpose, its intended goals, and a link to the survey. Surveys were completed anonymously. The online survey consisted of closed and open-ended questions. The survey items, presented in Appendix C, focused on three main areas that included: (1) faculty/staff grantsmanship activity prior to and after applying for an HRC grant opportunity, including scholarly products developed and grant applications submitted to external funders; (2) faculty/staff experience applying for and administering an HRC grant; and (3) influence of HRC grant application/administration experience on faculty/staff attitudes and views toward their grantsmanship capacity. Survey responses were analyzed and reported using descriptive statistics including response frequencies and corresponding percentages. Responses to the open-ended survey questions were grouped and categorized into topical areas that are relevant to grantsmanship capacity-building.

HRC Program Comparative Analysis

An analysis of grants applied for and secured by HCC faculty and staff was conducted to provide a baseline of HCC grantsmanship activity prior to the development of the HRC. This was compared to the level of grantsmanship activity conducted during the initial period of the HRC's development. Data was provided by the Hostos Office of Grants Research and Administration (OGRA), the administrative office that

is responsible for supporting faculty and staff with the coordination of all grant submissions to external funding initiatives and those administered through CUNY. The following indicators of grantsmanship activity were examined: the number of grant applications submitted to public and private funding sources, the number of grant applications that were approved by funding source, the total amount raised by funding source each academic year, and number of faculty and staff engaged in the grantsmanship process each academic year. The analysis also considered grantsmanship activity before, during, and recovery from the COVID-19 pandemic.

RESULTS

Survey Findings

The survey received a total of 32 respondents. Their demographics included: 59% who identified as full-time faculty and 19% who identified as staff/administrators; 38% reported that they had at least 11 years of experience at HCC and 34% reported they had no more than 10 years of experience; 38% identified as female, 31% identified as male; 31% identified as White/Caucasian, 19% as Hispanic/Latinx, 9% as Black, 6% as Mixed Race, and one as Asian/Asian American. Of the faculty respondents, 44% indicated they held a professorial rank including one Lecturer.

In terms of grantsmanship experience, 82% indicated having some level of experience with grant submissions (i.e., at least one submitted grant application) prior to applying for HRC grant opportunities. Over half (56%) of the respondents had applied for an ADELANTE/IDEAS grant, 50% of which self-identified as program awardees. Furthermore, 56% of those who were ADELANTE/IDEAS applicants reported that they were planning to submit a grant application to an external funder to support the continuation of their HRC-funded project. Fifty-six percent of ADELANTE/IDEAS grant recipients also reported that they were planning to publish an article and/or present their findings at a conference in the current or upcoming academic year.

Respondents' views on the impact of the HRC grant experience on their professional development showed increased motivation to apply for new grant opportunities (61%), improved grant writing abilities (56%), increased awareness of other grant opportunities (56%), and new project ideas were generated (56%). Some respondents provided qualitative feedback on what they valued most about the HRC grant experience including "the new skillset that I acquired in the process," "opportunities to develop several ideas," and "handling the research and administration part at the same time." Others valued the opportunity to collaborate with colleagues and were inspired to apply for additional funding to advance their work, as shared in the following example:

> *I appreciated working closely with a colleague on the grant itself for writing it and then working with the Co-PI doing the grant itself. And it motivated us to get additional funding to continue the research through a funder outside CUNY. So that was really helpful to have the boost of the IDEAS grant.*

In terms of the administration process, findings for the 18 respondents who applied for HRC grants reported satisfaction with the application process that included: awareness of the grant opportunities (89%), info sessions and office hours (61%), the application submission (78%), and award notification processes (83%). There were some (22%) who reported dissatisfaction with the fiscal administration processes due to delays in the reimbursement of travel expenses. The 14 respondents who did not apply for an HRC grant cited several factors that kept them from applying. The most salient responses included: limited time to complete an application (43%), a lack of guidance on the application process (28%), and limited grant writing experience (21%).

The survey's findings also provided additional insight into the grantsmanship activities that faculty and staff typically engaged in. Of all 32 respondents, 44% indicated that grant seeking/grant writing was not an integral component of their work responsibilities. Forty-seven percent only engaged in grant seeking/grant writing activities on an "as needed" basis (i.e., searching for grant opportunities, reviewing requests for proposals, collaborating with others to plan/write a proposal, and serving as a reviewer for internal grant competitions). This could potentially be a factor influencing their level of engagement in grantsmanship. While respondents may not be engaging in these types of activities on a consistent basis, they expressed interest in participating in future grant writing activities. Most respondents (62%) reported an interest in participating in grant writing workshops offered by the HRC, as well as meeting with Grants and Research Administration staff to get help with developing proposals (50%). Some also indicated they would participate in follow-up meetings that provide constructive guidance and support towards proposal completion. Furthermore, several respondents provided recommendations for resources to support grant development including workshops on effective budget preparation, one-on-one sessions to identify grant opportunities, faculty release time to support research, and additional resources to support writing and review of grant submissions.

Grant Applications and Awards Analysis

Figure 1 shows the number of grant applications submitted by HCC faculty and staff, and the number and percentage of grant applications that were awarded each academic year (AY) from AY 2018-2024. Grantsmanship activity was aggregated across four types of funding sources: federal funding agencies (e.g., National Science Foundation), state and city funding agencies (e.g., New York State Education Department), CUNY internal grant opportunities (e.g., PSC-CUNY and other initiatives), and private funders with collaborative grants.

In the three academic years prior to the onset of the HRC (AY 2018-21), an average of 40 grant applications per AY were submitted by HCC faculty and staff.

Figure 1
Proposals Submitted and Awarded 2018–2024
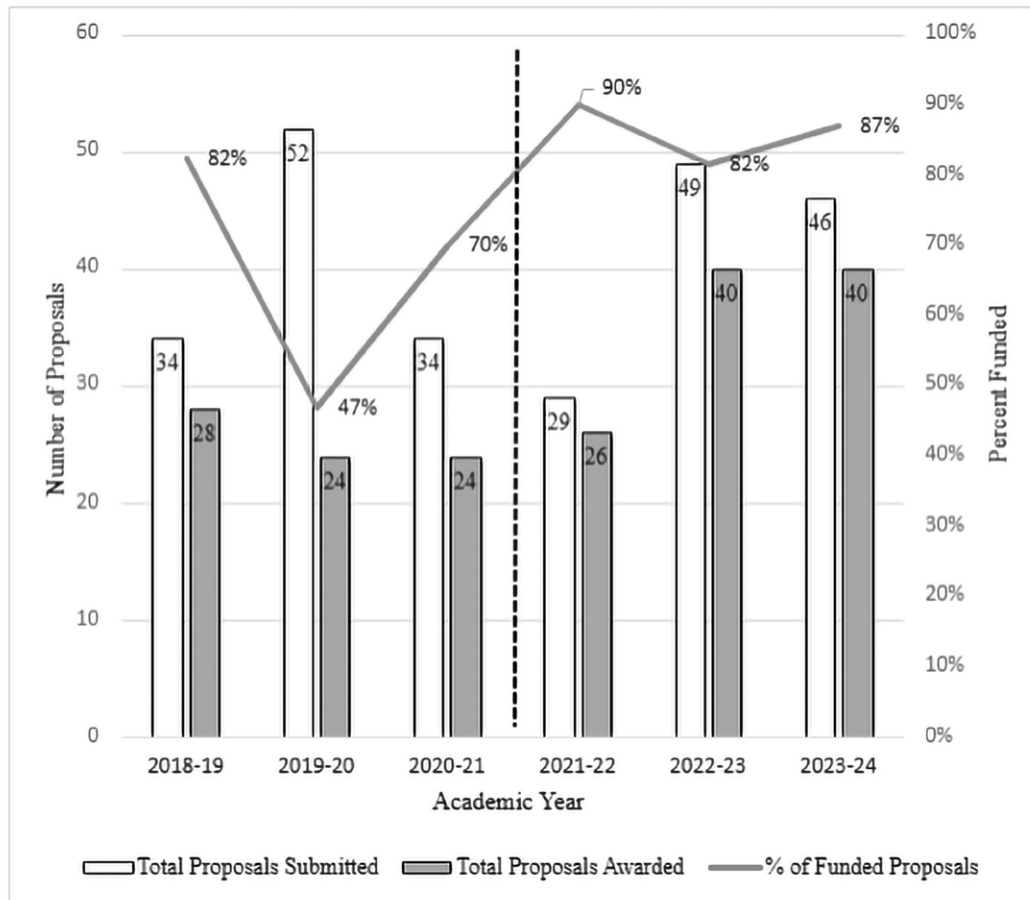
Note. The dashed line denotes the inception of the Hostos Research Center.

The number of proposal submissions ranged from a low of 34 to a high of 52, with an average success rate of 66% per AY. Interestingly, the year with the lowest success rate of 47% in AY 2019-20 was the year with the highest number of submitted proposals.

In the three academic years following the creation of the HRC and onset of the internal grant competitions (AY 2021-24), the average number of proposals submitted remained constant at 41 per academic year, which is nearly identical to the average submission rate for the three years prior. However, the proposals submitted following the creation of the HRC were funded at an 86% success rate, appreciably higher than the 63% average success rate in the three years prior.

This data should also be considered in the context of the COVID-19 pandemic which can be said to have had an impact starting in March of 2020. In the two academic years prior to 2020, 86 proposals were submitted at a success rate of 60%. In the two years immediately following the onset of the pandemic (AYs 2020-22), the number of proposals submitted fell to 63 although the success rate increased to 79%. The decline in proposal submissions is understandable. Higher education institutions faced extraordinary circumstances and major challenges as they grappled with shifting from in-person to remote modes of teaching and learning, while also addressing the acute needs of faculty, students, and staff.

A detailed breakdown of the amount of grant funding awarded by funding source, including federal grants, city/state grants, CUNY grants, and private/other grants, across this same six-year period is provided in Table 2. Overall, HCC experienced a 110% increase in grants awarded from AY 2018-19 to AY 2023-24. This dramatic growth can be attributed to the success of faculty and staff in securing major federal grants during the three-year period after the onset of the HRC, with total federal grants raised of $16.2 million.

Table 2
Grants Awarded by Funding Source 2018-2024

Academic Year	Federal Grants Awarded	City/State Grants Awarded	CUNY Grants Awarded	Private/Other Grants Awarded	Total Grants Awarded
2018-19	$1,324,291	$2,772,724	$45,793	$202,487	$4,345,295
2019-20	$256,603	$3,111,501	$45,952	$96,278	$3,510,334
2020-21	$885,183	$2,746,681	$41,114	$163,565	$3,836,543
2021-22	$3,729,401	$3,922,080	$294,487	$445,107	$8,391,076
2022-23	$8,737,493	$3,668,028	$62,145	$683,151	$13,150,817
2023-24	$3,816,297	$4,371,457	$53,966	$861,758	$9,103,478
Total	$18,749,268	$20,592,471	$543,457	$2,452,346	$42,337,542

Note. The grant award amounts have been adjusted for inflation using the National Institutes of Health Biomedical Research and Development Price Index (NIH BRDPI) with 2023 as the base year.

City and state funding awards are also important to highlight, as these demonstrated HCC's capacity to secure renewed funding by state and city agencies for ongoing academic and vocational training programs. Funding was secured from the Science and Technology Entry Program (STEP), Collegiate STEP, Liberty Partnerships Program, Vocational Education Program (Perkins), CUNY Edge, Workforce Innovation and Opportunity Act Title II, and the Welfare Education Program during this period. Additionally, funding from city and state sources increased from $2.7 million in AY 2018–19 to $4.3 million in AY 2023-24, an increase of 58%.

Grants awarded for CUNY submissions (the university's internal grants program) have remained consistent during this six-year period, ranging from $45,793 to $53,966, with decreases noted during the pandemic. But the most recent AY 2023-24 saw a resurgence in grants that were slightly higher than pre-pandemic levels of success. In the three years prior to the onset of the HRC, the total amount of funding pursued via grants from private/other sources, ranged from $202,487 in AY 2018-19 to $861,758 in AY 2023-24, an increase that bodes well for continued success in this funding area.

Table 3 presents a comparative analysis of grants awarded for the three-year period before the implementation of the HRC funding program (Period 1) and the three-year period during the initial implementation of the program (Period 2).

All funding sources showed substantial increases from Period 1 to Period 2. Federal funding showed the largest percentage increase (560.3%) and the largest increase in variability. City/State funding showed the most modest growth (38.6%) but remained the most stable funding source. The standard deviations increased for all funding categories, indicating greater funding variability in the second period. The total funding more than doubled, with an overall increase of 162.1%.

DISCUSSION

HRC Internal Funding Program

This study replicated the models of two internal funding programs at higher education institutions that sought to increase the grantsmanship capacity of faculty to secure external funding (Balaji et al., 2007; Kulage & Larson, 2017). The HRC internal

funding program integrated key elements, specifically, the use of competitive grant applications and review processes that were comparable to those of external funding agencies. Similar to these programs, the HRC internal funding program provided funding for project development and received increased numbers of grant applications over time. There were some differences noted in terms of each program's scope. The HRC program provided two distinct grants for short and long-term project development (IDEAS and ADELANTE), whereas the other programs provided only one type of grant award. HRC funded grants across broader disciplines, while Balaji et al. (2007) awarded grants for NIH-focused research, and Kulage and Larson (2017) focused on nursing research.

The HRC funded more proposals with 59 across four funding cycles, as compared to 14 proposals funded by Kulage and Larson's (2017) program, and five proposals funded by Balaji et al. (2007). In terms of investment scope, HRC awarded over $300,000 in grants over four funding cycles, which is more than double the $127,000 awarded by Kulage and Larson's program over five years. Yet Kulage and Larson's grant program reported a higher return on investment with $3 million secured in external funding. The HRC funding program operated during a very productive period that saw HCC faculty/staff secure higher amounts of external funding, but its definitive impact in leading to new external grants will require additional time to evaluate.

This study expanded on what was learned through the other programs by delving into the experiences of faculty and staff and contributing to our understanding of institutional supports that can foster a culture of grantsmanship. The study examined the impact of the HRC funding program on grantsmanship development and obtained insights into existing practices and views toward grantsmanship engagement. The HRC's survey findings indicated that the HRC internal funding program has had positive effects on faculty and staff grantsmanship development. In particular, the HRC is associated with improvements in reported grant writing skills, increased awareness of grant opportunities, motivation to apply for grants, and generating new project ideas. HRC grant recipients also identified additional benefits such as collaborating with other colleagues, gaining project management experience, and being inspired to pursue external funding. These are all important factors that contribute to grantsmanship engagement that can propel faculty and staff to secure new funding from external sources.

Table 3
Comparison Analysis of Grants Awarded 2018-2024

Funding Source	Period 1 (AY 2018-21)	Period 2 (AY 2021-24)	Change	SD Period 1	SD Period 2
Federal Funding	$2,466,077	$16,283,191	+560.3%	$536,639	$2,866,668
City/State Funding	$8,630,906	$11,961,565	+38.6%	$203,528	$356,206
CUNY Funding	$132,859	$410,598	+209%	$2,748	$136,565
Private/Other Funding	$462,330	$1,990,016	+330.4%	$53,732	$209,031
Total	$11,692,172	$30,645,370	+162.1%	—	—

Note. AY = Academic Year.
All values are adjusted to 2023 dollars using the NIH BRDPI.

Anecdotally, there are also notable examples of HRC grantees that were successful in securing new grants that advanced the development of their projects. One of the funded ADELANTE research projects, led by faculty in HCC's game design unit, was a game design internship, *Other Possible Games*, that engaged 13 students over two summers in a new incubator space where they gained exposure to the professional world of game design. This was a part internship, part summer course, where students worked together with faculty to develop original games while earning credits towards the Associate in Applied Science Game Design degree. This research internship addressed critical industry-specific challenges for HCC students entering a heavily competitive industry, providing skill-building and networking opportunities while simultaneously informing critical research in this field. Building on the success of the internship, which was first funded through ADELANTE, the faculty leading this initiative were successful in securing external funding of over $90,000 from private sources. This influx of new funding provided continued sustainability for an internship program that is elevating student knowledge, building a community of practice, and promoting college innovation.

Another success story comes from two IDEAS grantees from the HCC Division of Student Development and Enrollment Management, who secured a major grant to implement the *Academic Completion Initiative*, which they piloted with an IDEAS grant of $2,000. With their initial pilot findings, they were able to submit a highly competitive proposal to a CUNY funding initiative, to secure a significant grant of $174,657 that supported an expansion of this academic intervention program. This program promoted student retention and academic improvement by engaging HCC students as peer mentors who are trained to support fellow students on academic probation with tutoring, academic guidance, and encouragement to help them achieve good academic standing.

Both examples showcased the intended outcome that the ADELANTE and IDEAS grants make possible for HRC grantees that pursue additional funding to support their pilot projects. These examples also demonstrated that the HRC is a catalyst for new programmatic ideas and interventions designed to improve the learning experience for HCC students. The development of the HRC is intended to serve as a motivating force for promoting and supporting a culture of grantsmanship, and its implementation is making positive strides in that direction. It is also serving as an incubator for HCC faculty/staff to create and test solutions to innovate learning and teaching practices in a supportive environment.

Providing a seamless grant application process and grant administration support are factors conducive to grantsmanship engagement. The implementation of the HRC internal funding awards provided an opportunity to test out the pre-award and post-award processes and make improvements as needed. Survey feedback from most of the HRC grantees was positive regarding the HRC application process including the promotion of grant opportunities, information sessions offered, and application submission. An area of dissatisfaction was noted in the fiscal administration processing due to delays in travel expense reimbursements. Establishing strong fiscal and administrative processes is vital to the continued effectiveness of the HRC. The administrative staff continues working toward improving and expediting the processing of grant related expense reimbursement.

HCC Grantsmanship Engagement

Nearly half of respondents did not view grantsmanship as a key component of their work responsibilities, which may have influenced respondents' reported level of engagement in grantsmanship activities. Most only engaged in grantsmanship when deemed necessary. Given faculty/staff members' workloads and other academic responsibilities, engaging in grantsmanship can be difficult to prioritize. As has been shown by other studies, teaching

commitments, committee service, and administrative responsibilities were cited as barriers to faculty engagement in grantsmanship activities (Goff-Albritton et al., 2022). Some survey respondents that did not apply for HRC funding noted that limited time precluded them from completing an application. Lack of time has been cited as a major barrier by previous studies as well (Sehlaoui et al., 2021).

Providing institutional support can help to facilitate grantsmanship engagement. In their study of supports and barriers to faculty persistence in grant seeking, Pinto and Huizinga (2018) found that institutional structures of support, such as internal awards for faculty research, hiring grant writers, and having dedicated staff to support faculty, facilitated faculty engagement in applying for external grants and building a culture that supports grantsmanship. Survey respondents identified activities that they would participate in such as HRC grant writing workshops and meeting with HCC grants staff to support proposal development. They also provided recommendations of additional resources to support grantsmanship engagement. The HRC's internal grant opportunities and grant writing workshops provide this vital institutional support and serve as incentives to improve motivation toward engagement in grantsmanship activities.

HRC Impact on External Funding

The development of the HRC comes at an opportune time for HCC, particularly through the influx of funding from the MacKenzie Scott grant, and the re-engagement of faculty, staff, and students to campus life after the COVID-19 pandemic. The authors' examination of grantsmanship data both before and after the inception of the HRC provides the context necessary for understanding the impact of the HRC on building a research and grants development culture that facilitates faculty/staff success in securing external funding. HCC experienced a significant increase in grants development during the three years of implementation of the HRC, during which time HCC faculty secured the highest

amount in federal funding than in the previous three years. While the authors acknowledge that the substantial increase in federal funding can be attributed to faculty commitment to developing innovative programs with the support of new federal funding, this is viewed as a positive trend that can provide encouragement to other faculty and staff to apply for grants.

HCC staff in the Division of Continuing Education and Workforce Development have also been consistently successful in securing external funding to support workforce development programs, which is an area of programmatic funding that can grow further with the support of the HRC. By providing faculty and staff access to grant opportunities and capacity building workshops, the HRC is engaging them in the grantsmanship process and supporting their grant writing efforts to achieve success. Providing increased grant opportunities through the HRC also promotes a supportive grant seeking environment where faculty and staff are encouraged to develop and submit their proposed research interventions for further study. The HRC also serves as a mentoring space where it can bring experienced faculty and staff together with those who are new to promote sharing of best practices in grants development and multi-disciplinary collaboration. This is extremely important in fomenting scholarly development and providing an exploratory space for the development and iteration of new research innovations across all disciplines.

Limitations

The study faced several limitations. First, the small sample size yielded a small return on usable responses. While the survey was disseminated broadly and received responses primarily from full-time faculty members, more targeted strategies for adjunct faculty and staff could have increased their participation and sample size. Second, data collection and analysis were also limited to the survey results. Additional insights into respondents' grantsmanship experiences, barriers, and motivating factors to grant seeking, could have been explored

in more depth through structured interviews. This will be an important component to include in future research. Third, a few respondents provided feedback on their engagement of a student research assistant, which prevented the ability to fully examine this area of inquiry. The authors deem that it will be necessary to examine the student research mentorship component through a separate evaluation process. Finally, the analysis of grants data did not include indirect costs recovered from awarded grants. The indirect costs were not tracked and could not be included in the analysis. Indirect cost recovery is an important indicator of institutional success in securing grants, as these funds support institutional infrastructure and administrative costs. Future studies of internal funding programs should include analysis of indirect cost recovery rates and total amounts to better assess the program's institutional impact.

CONCLUSION

The HRC funding program was instrumental in building faculty and staff capacity to secure grants that advance new research development and generate innovative ideas to address institutional and academic support needs. The HRC's grant awarding mechanisms showed promise for increasing faculty and staff success in securing external grants to increase the development of research that advances academic, institutional, and community priorities. The HRC has also served as a catalyst for engaging faculty and staff in the grant writing and project administration process in a systematic way, while also contributing to the engagement of students in mentored research. Amidst the continuing challenges that community colleges face to secure public and private funding, the value of the HRC internal funding program combined with the practical application of the grantsmanship process, can serve as a model for institutions of higher education seeking to revitalize grantsmanship culture and promote institutional innovation.

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REFERENCES

Ahn, S., Morgan, S. E., Mosser, A., & Bixby, J. L. (2022). Encouraging innovation: Should internal funding programs favor faculty who are already productive? *Journal of Research Administration*, 53(1), 144–161. https://files.eric.ed.gov/fulltext/EJ1348011.pdf

Baker, V. L., Pifer, M. J., Lunsford, L. G., Greer, J., & Ihas, D. (2015). Faculty as mentors in undergraduate research, scholarship, and creative work: Motivating and inhibiting factors. *Mentoring & Tutoring: Partnership in Learning, 23*(5), 394–410. https://doi.org/10.1080/13611267.2015.1126164

Balaji, R. V., Knisely, C., & Blazyk, J. (2007). Internal grant competitions: A new opportunity for research officers to build institutional funding portfolios. *Journal of Research Administration, 38*(2), 44–50. https://files.eric.ed.gov/fulltext/EJ902224.pdf

Boyer, P., & Cockriel, I. (1998). Factors influencing grant writing: Perceptions of tenured and non-tenured faculty. *SRA Journal, 29*(Spring), 61–68. https://eric.ed.gov/?id=EJ570461

Cook, D., & Loadman, W. E. (1984). Developing instrumentation to reflect perceptions and attitudes toward proposal development. *Educational and Psychological Measurement, 44*(2), 283–299.

Daniel, L. G., & Gallaher, I. (1990). Impediments to faculty involvement in grant-related activities: A case study. *Journal of the Society of Research Administrators, 22*(2), 5+.

Dooley, L. M. (1995). Barriers and inducements to grant-related activity by a college of education faculty. *Research Management Review, 7*(2), 10–24.

Goff-Albritton, R. A., Cola, P. A., Walker, J., Pierre, J., Yerra, S. D., & Garcia, I. (2022). Faculty views on the barriers and facilitators to grant activities in the USA: A systematic literature review. *Journal of Research Administration, 53*(2), 14–39. https://files.eric.ed.gov/fulltext/EJ1362093.pdf

Haeger, H., Banks, J. E., Smith, C., & Armstrong-Land, M. (2020). What we know and what we need to know about undergraduate research. *Scholarship and Practice of Undergraduate Research, 3*(4), 62–69. https://doi.org/10.18833/spur/3/4/4

Kleinfelder, J., Price, J. H., & Dake, J. A. (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

Kuh, D. (2008). *High-impact educational practices: What they are, who has access to them, and why they matter*. Association of American Colleges and Universities. https://navigate.utah.edu/_resources/documents/hips-kuh-2008.pdf

Kulage, K. M., & Larson, E. L. (2018). Intramural pilot funding and internal grant reviews increase research capacity at a school of nursing. *Nursing Outlook*, 66(1), 11–17. https://doi.org/10.1016/j.outlook.2017.06.003

Leak, R. K., O'Donnell, L. A., & Surratt, C. K. (2015). Teaching pharmacology graduate students how to write an NIH grant application. *American Journal of Pharmaceutical Education, 79*(9), 1–9. https://doi.org/10.5688/ajpe799138

Lopatto, D. (2003, March). The essential features of undergraduate research. *Council on Undergraduate Research Quarterly*, 139–142. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=8b47f05fecb485b85b17d9c371607a3422a822de

Lopatto, D. (2010). Undergraduate research as a high-impact student experience. *Peer Review, 12*(2), 27–30. https://eloncdn.blob.core.windows.net/eu3/sites/126/2020/10/Lopatto-2010.pdf

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

Mitchell, M., Palacios, V., & Leachman, M. (2015). States are still funding higher education below pre-recession levels. *Journal of Collective Bargaining in the Academy, 0*(71), 1–27. https://doi.org/10.58188/1941-8043.1524

National Institutes of Health. (2024). Biomedical Research and Development Price Index (BRDPI). U.S. Department of Health and Human Services. https://officeofbudget.od.nih.gov/gbiPriceIndexes.html

Pinto, K. M., & Huizinga, D. (2018). Institutional barriers and faculty persistence: Understanding faculty grant-seeking at a predominantly undergraduate institution. *Journal of Faculty Development, 32*(1), 65–72.

Rodríguez, Y., Angulo, N., Nieto-Wire, C., & Varelas, A. (2020). Engineering student perceptions of combined faculty and peer academic performance. *The Chronicle of Mentoring & Coaching, 1*(13), 430–436. https://par.nsf.gov/servlets/purl/10215493

Rodríguez, Y., Varelas, A., Angulo, N., Nieto-Wire, C., & DePass, A. L. (2022). The Hostos Engineering Academic Talent (HEAT) Scholarship Program: An educational model to enhance socio-economic mobility for community college students. *ASEE Annual Conference 2022,* 38361. https://peer.asee.org/the-hostos-engineering-academic-talent-heat-scholarship-program-an-educational-model-to-enhance-socio-economic-mobility-for-community-college-students.pdf

Rodríguez, Y., Angulo, N., Nieto-Wire, C., Varelas, A., & DePass, A. L. (2023). Improving engineering students' outcomes via multiple forms of mentorship. *The Chronicle of Mentoring & Coaching, 7*(16), 720–725.

Sehlaoui, A. S., Gross, E., & Ruengwatthakee, P. (2021). Motivating factors and obstacles behind grant research: The case of a teaching-focused state college. *Journal of Research Administration, 52*(1), 38–58. https://files.eric.ed.gov/fulltext/EJ1293036.pdf

Shuman, K. M. (2019). Grant proposal preparation readiness: A glimpse at the education level of higher education faculty. *Journal of Research Administration, 50*(1), 89–107. https://files.eric.ed.gov/fulltext/EJ1213259.pdf

Walden, P. R., & Bryan, V. C. (2010). Tenured and non-tenured college of education faculty motivators and barriers in grant writing: A public university in the South. *Journal of Research Administration, 41*(3), 85–98. https://files.eric.ed.gov/fulltext/EJ945950.pdf

APPENDIX A

IDEAS Call for Proposals

Hostos Research Center (HRC)
Committee on Sponsored Programs and Grants (CSPG)

2024 IDEAS Project Development Award
Innovating, Developing and Executing Actions with Success

Program Solicitation

The Hostos Research Center (HRC) and the Committee on Sponsored Programs and Grants (CSPG) invite Faculty and Staff to submit IDEAS – Innovating, Developing and Executing **A**ctions with **S**uccess Project proposals addressing institutional needs and/or current research questions with potential to be translated and materialized into external funding opportunities.

Each HRC-CSPG – IDEAS Project will receive $1,000 or $2,000 (see below Award Information) as a summer 2024 stipend / start-up funding to develop a grant proposal to be submitted to an external funding opportunity. This initiative is aligned with the HRC-CSPG's mission of fostering a sustained institutional grants culture by creating an environment to encourage everyone to apply successfully for grants. Collaborative research including intra- and inter-departmental/division collaboration, and team building initiatives are welcome.

Award Information

Anticipated Funding Amount: $10,000

Award Amount: Individual submission $1,000 and team submission (i.e., two or more individuals) up to $2,000.

Eligibility Information

Who May Submit Proposals: Full and part-time faculty and staff are eligible to apply as PI/Co-PIs. Full/part-time staff are eligible to apply/participate in a proposed project but request for salary/compensation is not allowed. Executive staff may participate as Co-PIs but are not eligible for a funding award. Previous IDEAS award recipients are eligible to apply but priority will be given to those who have not applied/received an award in prior rounds.

> **Proposal Deadline:** Friday, June 21, 2024, at 11:59 PM. See Proposal Preparation Instructions section outlined below.

> **Award Notification:** Friday, June 28, 2024. HRC-CSPG award decision will be communicated to applicants by email.

Proposal Preparation Instructions

Proposals should be no more than two pages long and should include the following sections:

1. Project Title
2. Abstract – Up to 200-word limit snapshot of the project including rationale, objectives/hypothesis, activities/methodology, expected outcomes.

3. Project Narrative | No more than two pages long and should include the following sections:

    a. Rationale for the project – What is the problem(s) / need(s) you will address? Any relationship to previous work (your work or others' work)? What is(are) the overarching goal(s)?

    b. Objectives | Hypothesis – The specific actions and measurable steps needed to achieve the goal(s). | If research component, what is the research question you will explore?

    c. Activities | Methodology – How will the problem(s) / need(s) be solved? Activities to achieve objectives and goal(s). | If research component, the Research Methods to explore the research question/hypothesis.

    d. Timeline for the work (e.g., biweekly, month by month) – Keep in mind that this is a short-term project of about 3.5 months.

    e. Future Plan – Identify potential external funding opportunities and programs (e.g., NSF, NIH, NEH, Gates Foundation). Next steps to take when funds end. Provide a brief explanation why the identified funding opportunity is appropriate for the current proposal.

4. References – Provide literature used to craft/back up project narrative.

5. Biosketch – Two-page long biosketch (NSF-style format).

Proposal Font, Spacing and Margin Requirements (NSF-style format)

The proposal should meet the following requirements:

    a. Use one of the following fonts:

    - Arial (not Arial Narrow) at a font size of 10 points or larger; or
    - Times New Roman at a font size of 11 points or larger.

    b. Margins, in all directions, must be at least an inch.

    c. Single spaced format.

    d. Paper size must be no larger than standard letter paper size (8 1/2 by 11").

Submission Portal

Please click here to access the IDEAS Project Application Template.

Please click here to submit IDEAS Project Development Award.

Expectations for Winning Awards

To make meaningful progress on the development of a grant application based on the awarded project proposal, to be submitted to an external funding source. A summary of the progress of the grant application, including any potential funding sources, is to be submitted to HRC-CSPG on or before Friday, October 18, 2024.

APPENDIX B

ADELANTE Call for Proposals

Hostos Research Center (HRC)
Committee on Sponsored Programs and Grants (CSPG)

2024 ADELANTE Project
ADvancing Excellence in Liberal Arts, scieNces, Technology and Engineering

Program Solicitation

The Hostos Research Center (HRC) and the Committee on Sponsored Programs and Grants (CSPG) invite Faculty and Staff to submit ADELANTE – ADvancing Excellence in Liberal Arts, scieNces, Technology and Engineering Project proposals for funding to address research, need-based, and/or creative/transformative interventions in all disciplines including the Arts and Humanities, Behavioral and Social Sciences, and Science, Technology, Engineering and Mathematics (STEM). A new track is seeking proposals that address issues affecting the South Bronx community. Each HRC-CSPG – ADELANTE Project awardee will receive up to $10,000 (see below Award Information) to develop their proposal research / intervention(s) and is expected to apply for external funding (i.e., outside of Hostos) during the 2024 – 2025 academic year.

HRC-CSPG's mission is aligned with the College's mission to provide opportunities for intellectual growth, socio-economic mobility and develop the proficiencies needed for lifelong learning and success. Collaborative research including intra- and inter-departmental/division collaboration, and team building initiatives are welcome. ADELANTE Project is aligned with the joined HRC-CSPG's mission to foster a culture of research and grants development, enhance student access to professional experiences, and improve student retention.

Award Information

Anticipated Funding Amount: $124,000

Estimated Number of Awards: Up to 15

Individual Award Amount: Up to $10,000 per award

The HRC-CSPG ADELANTE Project supports two types of projects:

- Track 1 | Expand Research Opportunities for Faculty and Staff in All Disciplines; each project's total funding may not exceed $10,000 including $3,000 for at least one Hostos undergraduate research student assistant (up to 12 awards).
- Track 2 | Expand Research on Issues Affecting the South Bronx Community; Research / interventions that address critical issues affecting the health and quality of life for the South Bronx community including, but not limited to, effects of gentrification such as vehicular and pedestrian traffic, excess garbage, disorder and crime; lack of affordable housing; health issues disproportionately impacting community residents; education and youth development needs. For additional background on community needs and issues affecting the South Bronx, see the Statement of Community District Needs: Bronx Community District 1. Each project's total funding may not exceed $10,000 including $3,000 for at least one Hostos undergraduate research student assistant (up to 3 awards).

Eligibility Information

Who May Submit Proposals: Full and part-time faculty and staff are eligible to apply as PI/Co-PIs. All faculty who are actively engaged in research and want to mentor undergraduate research students are eligible. Full/part-time staff are eligible to apply/participate in proposed project but request for salary/compensation is not allowed. Full/part-time staff may request reimbursement for travel expenses related to a conference presentation. Executive staff may participate as Co-PIs but are not eligible for a funding award. This call for proposals is giving priority to those who have not applied/received an award in prior rounds.

> **Proposal Deadline:** Friday, February 2, 2024, at 11:59 PM. See Proposal Preparation Instructions section outlined below.
>
> **Award Notification:** Friday, March 1, 2024. HRC-CSPG award decision will be communicated to applicants by email.
>
> **Administrative Information Session for Awardees:** All awardees will be required to attend an information session in early March to learn about the fiscal processes required for implementing the grant, reimbursement procedures for expenses, purchasing, and stipend payment processing.
>
> **Project Period:** March 15, 2024 – March 14, 2025

Proposal Preparation Instructions

1. Project Title | Track
2. Abstract – Up to 200-word limit snapshot of the project including rationale, objectives/hypothesis, activities/methodology, expected outcomes.
3. Project Narrative | No more than five pages long and should include the following sections:
   a. Rationale for the project – What is the problem(s) / need(s) the project will address? Any relationship to previous work (your work or others' work)? What is(are) the overarching goal(s)?
   b. Objectives | Hypothesis (If research component) – The specific actions and measurable steps needed to achieve the goal(s). If research component, what is the research question you will explore?
   c. Activities | Methodology – How will the problem(s) / need(s) be solved? Activities to achieve objectives and goal(s). If research component, the Research Methods to explore the research question/hypothesis.
   d. Expected Outcomes and Timeline (e.g., biweekly, month by month) – Keep in mind that this is a one-year project. If you plan to conduct research with human subjects, please include the IRB application process in the timeline.
   e. Future Plan – Next steps to take when funds end. Any sustainability plans? Provide potential external funding opportunities.
4. References – Provide literature used to craft/back up project narrative.
5. Research Mentoring Plan – Describe plan to train the undergraduate research assistant. Special consideration will be given to those projects that include working with Hostos Career Services to provide students with career professional development and transition to employment. Research assistant name is encouraged to be included if already identified.
6. Budget – Provide a detailed budget of grant expenses including 1) Personnel (e.g., full-time/part-time faculty summer salary up to $3,000, undergraduate research assistant $3,000). Full/part-time staff are eligible to apply/participate in ADELANTE projects, however, requests for staff salary/compensation including Higher Education Officer (HEO), and College Laboratory Technician (CLT) is not allowed. Full/part-time staff may

request reimbursement for travel expenses related to a conference presentation. 2) Other Than Personnel Expenses (OTPS; e.g., travel, supplies). Award is all-inclusive. Release time allocation is not allowed. Purchase of laptop/computer equipment is not allowed. Note that travel expenses will be paid by reimbursement to PI/Co-PI.

7. Budget Justification – Brief justification of budget items. Resources – As you craft your proposal, please confirm that you have access to all resources necessary to develop, implement, and complete the project or allocate the appropriate funds within the scope of the project.

8. Biosketch – Two-page long biosketch (NSF-style format).

Proposal Font, Spacing and Margin Requirements

The proposal should meet the following requirements:

a. Use one of the following fonts:
    •   Arial (not Arial Narrow) at a font size of 10 points or 11 points; or
    •   Times New Roman at a font size of 11 points or 12 points.

b. Margins, in all directions, must be at least an inch.

c. Single spaced format.

d. Paper size must be no larger than standard letter paper size (8 1/2 by 11").

Application Template and Submission Portal

Please click here to access the ADELANTE Project Application Template and here to submit ADELANTE Project Award.

Expectations for Winning Awards

To make meaningful progress on the awarded project proposal research / intervention(s), awardees are expected to apply for external funding opportunity during the 2023 – 2024 academic year. A summary of the project progress, including any dissemination, publication, exhibit, and/or potential funding sources, is to be submitted to HRC-CSPG on or before Wednesday, April 30, 2025.

APPENDIX C

Hostos Research Center Survey

The Hostos Research Center aims to provide faculty and staff with opportunities for research and grants development to increase and enhance the submission of applications for external funding. The Hostos Research Center also aims to foster faculty and student research mentorship through funded research projects that will provide Hostos students with development of research skills and engagement in professional research experiences. Your completion of this survey will help us to improve the activities and resources provided through the Hostos Research Center. Please complete this survey to provide us with feedback (your answers will be anonymous).

1. Prior to learning about/applying for a Hostos Research Center grant opportunity, how many grant applications have you written and submitted for funding from CUNY or other funding source?

    ___ None
    ___ 1 – 5 grant applications
    ___ 6 - 10 grant applications
    ___ 10+ grant application

2. Did you apply for an internal grant opportunity (ADELANTE/IDEAS) offered by the Hostos Research Center?

    ___ Yes (go to Q. # 3)   ___ No (skip to Q. 28)

3. Which Hostos Research Center grant(s) did you apply for (check as many as apply)?

    ___ ADELANTE Track 1 (not including student research mentorship)
    ___ ADELANTE Track 2 (including student research mentorship)
    ___ IDEAS

4. Were you awarded a Hostos Research Center grant?

    ___ Yes (go to Q. 5)   ___ No (skip to Q. 29)

5. Was this your first time being awarded a grant through the Hostos Research Center?

    ___ Yes   ___ No

6. Which Hostos Research Center grant(s) did you receive (check as many as apply)?

    ___ ADELANTE Track 1 (not including student research mentorship)
    ___ ADELANTE Track 2 (including student research mentorship)
    ___ IDEAS

7. What was your role in the ADELANTE/IDEAS funded project?

    ___ Principal Investigator
    ___ Co-Principal Investigator
    ___ Staff
    ___ Other: _____

8. Since completing your ADELANTE/IDEAS project, are you planning to submit a grant application to support the continuation of this project in the near future (through CUNY/external funders)?

    ___ Yes, in the current academic year (2022-23)
    ___ Yes, in the upcoming academic year (2023-24)
    ___ Not sure yet
    ___ Not yet

9. If yes, what other funders/grant opportunities will you be applying to (if known at this time)?

    _____

10. Since completing your ADELANTE/IDEAS project, are you planning to publish an article, report, or present findings at a conference?

___ Yes, in the current academic year (2022-23)
___ Yes, in the upcoming academic year (2023-24)
___ Not sure yet
___ Not yet

11. If yes, to what journals/publications do you plan to submit article/report (if known)?

    _____

12. How satisfied were you with the grant application process for ADELANTE/IDEAS?

    (Likert scale: Very dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, very satisfied)

    Statement:

    a) Advertising/promotion of grant opportunities
    b) Grant Info Session/Office Hours (if attended)
    c) Submitting grant application
    d) Award notification

13. How satisfied were you with the support/guidance received for the administration of the grant? (Likert scale: Very dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, very satisfied)

    Statement:

    a) Overall grant/project management experience
    b) Review of administrative processes for payment/reimbursement
    c) Processing/timeliness of faculty stipends
    d) Processing/timeliness of adjuncts/staff payments
    e) Processing/timeliness of student stipends
    f) Ordering supplies/materials
    g) Travel reimbursement processing

14. To better understand how the Hostos Research Center (HRC) grant experience has impacted your professional development, please indicate your level of agreement with the following statements. (Likert scale: Strongly disagree, disagree, neither agree nor disagree, somewhat agree, strongly agree)

Securing the HRC grant has...

a) Increased my confidence to apply and obtain grants in the future
b) Increased my motivation to apply for new grant opportunities
c) Helped to improve my grant writing abilities
d) Increased my awareness of other grant opportunities I might pursue
e) Increased my ability to generate new project ideas

15. Is there any aspect of the grant application/administration process that could be improved?

16. What did you value most about your experience managing a new project?

17. Do you have any other feedback/recommendations for Hostos Research Center capacity-building activities/initiatives for faculty/staff?

18. Did you engage students as research assistants in your project?

___ Yes (go to question 19)
___ No (skip to question 29)

Questions 19 - 27 pertain to faculty/staff that engaged student research assistants in their projects.

19. How many students did you engage in your research project?

___ One
___ Two
___ Three or more

20. How many weeks during the project period were students involved as research assistants?

___ Four weeks or less
___ Five to eight weeks
___ Eight to twelve weeks
___ Over 12 weeks

21. How much time did you spend training student(s) to prepare them for the assigned tasks?

___ One to two days
___ One week
___ Two weeks
___ Training was continuous during project period
Other: _____

22. Please describe the activities that the student research assistant conducted during the project period.

23. Please rate your level of satisfaction with student's progress in each of the following areas. (Likert Scale: Very dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, very satisfied)

a) Completing assigned tasks in timely manner
b) Learns new concepts, ideas, and methods easily
c) Speaks up appropriately and communicates information effectively
d) Listens for guidance and asks for clarification
e) Recognizes problems and seeks solutions
f) Resolves problems in adequate time
g) Ability to be thoughtful, show good judgment, and make reasonable decisions
h) Produces consistent, high-quality work
i) Self-motivated and can complete work in a timely manner
j) Completes work despite obstacles/problems
k) When given feedback, takes action to improve/make changes
l) Works effectively with supervisor
m) Demonstrates professional conduct

24. How often did you meet with student(s) to provide mentoring during the project period? Mentoring that focuses on student's academic progress, research skills development, career readiness, personal development.

___ Once a week
___ Once every two weeks
___ Once a month
___ Other: _____

25. Please select from the list below the topics that you and the student discussed during the mentoring sessions. (Select as many as apply)

___ Student's academic progress
___ Student's professional development (research skills, career readiness, planning)
___ Student's personal development (personal goals and how student can achieve them)
___ School/work/life balance
___ Other: _____

26. What did you value most about your experience mentoring a student(s)?

27. What supports could the Hostos Research Center provide to strengthen/improve the faculty - student research mentoring experience?

At the completion of Q. 27 skip to Q. 29.

Q. 28 pertains to faculty/staff that did not apply for a Hostos Research Center grant opportunity.

28. What were the factors/reasons that led you to decide not to apply for a Hostos Research Center grant? (select as many as apply).

___ Not aware of the funding opportunity
___ Not enough time to complete an application
___ The grant opportunity did not align with my funding needs/purposes
___ Limited grant writing experience
___ Lack of guidance/information on the application process
___ Other: _____

Questions 29 – 32 for all respondents.

The Hostos Research Center is interested in learning more about your grant seeking/grant writing experiences to inform our capacity-building offerings for faculty and staff.

29. Is grant seeking/grant writing an integral component of your work responsibilities? If yes, how many hours a month do you typically spend on grant development activities?

___ Yes ___ No
# of hours per month: ____ (enter NA if not applicable)

30. Tell us about the types of grant seeking/grant development activities that you typically engage in. (Options: Weekly, monthly, quarterly, as needed)

Activity:

a) Search for available funding opportunities in my area of expertise.
b) Review one or more Requests for Proposals.
c) Review examples of successful grant proposals i.e., that were funded.
d) Collaborate with others to think about writing a proposal.
e) Participate in grant information sessions offered by Hostos Research Center and/or CUNY/external funders.
f) Participate in grant information sessions offered by Hostos Research Center and/or CUNY/external funders.
g) Serve as a reviewer for internal/external grant competitions.
h) Write and submit grant proposals.

31. Please answer the following related to possible future developmental activities related to grant writing that might interest you. (Options: Yes, No, Maybe)

Statement:

a) I am willing to participate in a grant writing intensive workshop.
b) I am willing to participate in monthly or bimonthly follow-up meetings where ongoing assistance and instructions are provided resulting in a completed proposal after 6 months.
c) I think I am comfortable working on my own.
d) I am willing to meet with staff from the Office of Grants and Research Administration for help in developing grant proposals.
e) I am willing to attend grant writing workshops that are organized by the Hostos Research Center.

32. What additional resources/supports would be helpful to you in the preparation/submission of a grant application?

Demographic Questions:

33. What is your gender identity?

    ___ Female
    ___ Male
    ___ X (Non-binary)
    ___ Prefer not to say
    ___ Other: _____

34. Which race/ethnicity best describes you?

___ Black/African American
___ Latinx/Hispanic
___ Asian/Pacific Islander
___ Native American
___ White/Caucasian
___ Biracial
___ Prefer not to say
___ Other: _____

35. How long have you been working at Hostos?

___ One year or less
___ Two to five years
___ Six to ten years
___ 11 years or more
___ Prefer not to say
___ Other: _____

36. What is your role at Hostos?

___ Full-time faculty member
___ Adjunct/part-time faculty member
___ Administrator
___ Staff member
Other: _____

37. Faculty: Please provide your professional rank.

    ___ Lecturer
    ___ Instructor
    ___ Assistant Professor
    ___ Associate Professor
    ___ Professor
    ___ Other: _____

Thank you for taking the time to complete this survey!

GHOSTWRITING GRANTS: UNCOVERING THE EXPERIENCES OF PROFESSIONAL RESEARCH STAFF IN GRANT CAPTURE

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ABSTRACT

Universities worldwide are increasingly employing professional research staff (PRS) to support institutional research missions of driving research revenue and excellence. A primary function of PRS roles is to support faculty in grant capture, particularly as funding bodies emphasize equity, diversity, and inclusion (EDI), knowledge mobilization (KMb), and Indigenous research. Due to their growing prevalence, PRS roles have attracted attention to improve their visibility and sustainability. However, they remain underexplored in institutional research settings, particularly regarding the pre-award grant landscape. This study examines the evolving roles of PRS in Canadian universities, focusing on their contributions to grant capture and the structures influencing their recognition. Using a descriptive qualitative design, we conducted semi-structured interviews with 17 participants, including PRS and research office leaders, from 10 universities. Participants held roles spanning EDI, KMb, research development, and grant management, offering diverse perspectives on the challenges and contributions of PRS. Thematic analysis revealed four key findings: PRS play multifaceted roles that blur technical and conceptual; PRS roles are perceived to be misunderstood by those utilizing their services; recognition of PRS efforts is inconsistent and often limited to informal or interpersonal contexts; and PRS work remains undervalued. Together, these issues perpetuate the invisibility of PRS work, challenging the success of current strategies to address visibility and highlighting gaps in institutional acknowledgment. Our results suggest that undervaluing PRS contributions risks limiting their potential and undermining grant capture success. This study underscores the need for deeper engagement with PRS experiences to enhance their roles and contributions in academia.

Keywords:

Third space professionals, grant writing, research administration, research office, professional roles, research management

INTRODUCTION

Universities around the world have professional research staff (PRS) roles to provide both administrative and specialized grant capture support (de Jong & del Junco, 2024). Canada, following developments in the US and the UK, is increasingly developing domain-specific PRS roles. These roles respond to emerging emphases in research funding opportunities, such as equity, diversity, inclusion, and decolonization (EDID), knowledge mobilization (KMb), and Indigenous research, and support faculty in these areas (Coaldrake & Stedman, 1999; Poli et al., 2023; Smith et al., 2021; Whitchurch, 2013).

Research on third space professionals in higher education has explored questions of professionalization, identity, and career development, largely for individuals working in educational development (Coaldrake & Stedman, 1999; Gray, 2015; Macfarlane, 2011; Poli et al., 2023; Smith et al., 2021; Whitchurch, 2008, 2013, 2018; Yang-Yoshihara, n.d.). There is less literature related to PRS within higher education research, and even less focused on third space professionals supporting pre-award research, that is the work related to grant capture (Agostinho et al., 2020; de Jong & del Junco, 2024; Santos et al., 2021; Torti et al., 2024). This is a critical gap: contemporary funders have mandated knowledge user partnership, EDID, and KMb, which has spurred the introduction of specialized PRS roles in academia to help institutions, and their faculty, to produce competitive, responsive, and impactful research (Coaldrake & Stedman, 1999; de Jong & del Junco, 2024; Ross, 2017; Smith et al., 2021; Stoller, 2023; Whitchurch, 2013). Further underscoring the importance of these roles, there is "mounting pressure on universities to produce research and increase research capacity", (Ross, 2017, p. 20) and "research success is increasingly an indicator of a university's prestige and value" (Ross et al., 2019, p. 1). As universities respond to these funding mandates and strengthen their support for faculty applying for grants, the role and need of PRS will only grow (Whitchurch, 2022).

Third space professionals, such as PRS, occupy roles that blur the traditional divide between academic and administrative staff (Berman & Pitman, 2010; Enders & Naidoo, 2022). Studies have revealed that PRS can feel undervalued, underacknowledged and unsupported in these ambiguous roles (Ryttberg, 2022). The associated challenges of attracting and retaining PRS highlight the need for a deeper understanding of their contributions and experiences, along with calls for deeper insight into their influence on knowledge development (de Jong & del Junco, 2024; Welch & Brantmeier, 2021). Without this deeper understanding,

universities risk limiting the potential of PRS and undermining the grant capture success these roles were designed to help achieve.

This study explores the evolving roles and contributions of university PRS in the pre-award academic landscape of Canadian universities. By exploring how PRS contribute to grant capture, and the structures that shape their contributions, we aim to describe the complexities of visibility and recognition within these roles. Building on prior research (de Jong & del Junco, 2024; Santos et al., 2021; Yang-Yoshihara et al., 2023; Zink et al., 2022), this work emphasizes the need to understand the roles and contributions of PRS within academia.

Our research questions are:

- What is the nature of the contributions made by PRS—including those representing EDID and KMb portfolios, as well as general research support roles—to faculty grant applications in university research offices?
- How are these contributions recognized (or not) within grant applications and broader university structures?

METHODS

Methodological Approach

This study employed a descriptive qualitative research design (Sandelowski, 2000; Smith & Griffith, 2022). Descriptive qualitative research is well-suited for exploring complex, real-world phenomena, and it is widely recognized across disciplines for its capacity to capture detailed, context-rich descriptions of participants' lived experiences and subjective interpretations, particularly when limited prior research exists on the subject matter (Auerbach et al., 2016; Doyle et al., 2020; Sandelowski, 2000).

Data Collection and Analysis

Sample

Participants in this study were PRS working in a university in Canada. We purposefully sampled a

subset of third space professionals (Doyle et al., 2020): PRS working in research grants offices with pre-award roles. To capture multiple perspectives within this group, we included PRS from different universities, aiming for variation in organizational environments, responsibilities, and specialization (e.g., EDID, KMb, grant development). In addition, we considered personal demographics such as gender, race, academic training, career stage, and professional goals, recognizing that these factors might shape how PRS experience and navigate their roles. We also employed snowball sampling, encouraging participants to share the details of our study with other PRS who might wish to contribute their experiences.

In addition to sampling PRS, we included leaders of research offices and teams who oversee or directly manage the work of PRS in our sample. This enabled us to reach a sufficient understanding of the phenomenon from a variety of relevant perspectives. Throughout the study, our sampling strategy responded to emerging data. As new insights arose during data collection, we adapted our approach to explore the full complexity of PRS contributions to grant capture and the factors affecting their recognition.

Recruitment

To identify university-employed PRS, we used a multifaceted recruitment strategy. First, we accessed universities' research office directories, which were publicly available on their websites, allowing us to identify individuals serving in specialized research roles. Additionally, we leveraged the Canadian Association for Research Administrators (CARA) listserv, a key resource for reaching professionals involved in research administration across Canada. This recruitment approach helped to ensure that our sampling reflected a diversity of university settings, disciplinary contexts, and research support structures that PRS operate within. In addition to targeting PRS, we expanded our recruitment to include research administrative leaders who oversee PRS roles, as well as research team leads responsible for directing grant-related work.

Interviews

Consistent with qualitative descriptive inquiry, we conducted semi-structured individual interviews to gain an in-depth understanding of the roles, contributions, and recognition of PRS in the grant creation process (Auerbach et al., 2016; Doyle et al., 2020). We asked about participants' day-to-day roles, the nature of their involvement in grant capture, their perceptions of how their contributions are recognized, and the challenges they face in their work. Interviews, which lasted approximately 60 minutes, were conducted via Zoom, audio-recorded and transcribed verbatim using Zoom's automated transcription service. Transcripts were then reviewed by a member of the research team for accuracy and anonymized.

Data Analysis

Data collection and analysis took place in an iterative fashion, with insights from the analysis shaping future data collection (Mayan, 2016). Interview transcripts were analyzed using thematic analysis (Clarke & Braun, 2021), which provides a clearly articulated set of analytical steps, ideal for collaborative analysis with a research team (Clarke & Braun, 2021; Doyle et al., 2020; Kim et al., 2017). Thematic analysis also offered theoretical flexibility, encouraging us to be explicit in our use of the third space professional theoretical framing to inform the development of themes and analytical insights drawn (Clarke & Braun, 2021).

The analysis process involved multiple stages of coding to ensure sufficient rigour and consistency. Initial coding was conducted independently by several members of the research team to identify key themes and patterns in the data. Regular team meetings were held to compare codes, discuss interpretations, and reconcile any discrepancies. This process included members of the team independently coding the same transcripts and comparing their insights. Patterns across codes were discussed in detail, and themes were developed and refined based on the analysis of these patterns (Clarke & Braun, 2021).

We collected data until a level of thematic sufficiency (LaDonna et al., 2021) had been reached, that is, to the point when no new insights were being drawn from the data related to the phenomenon being explored. The nature of data collection and analysis created a deep understanding of the experiences of PRS while maintaining methodological consistency and transparency.

RESULTS

We conducted 17 interviews to explore the experiences of PRS in grant capture. The sample included participants from 10 universities: 16 participants were from 10 Ontario universities, and one participant was from a university in Alberta. Given the limited number of specialized PRS roles within individual universities, we refrain from disclosing the specific names of the universities to protect participant confidentiality.

The majority of participants held specialized research roles that focused on EDID in research (n=8). Other roles represented in our participant sample included research officers (n=3), librarians (n=2), and a specialist in KMb (n=1), all of whom contributed to the pre-award grant-capture process. Additionally, three participants held senior research leadership and management positions and provided a broader organizational perspective on the contributions and challenges faced by PRS in their work. This diversity in roles and university contexts enriched our understanding of PRS experiences and the multifaceted nature of their involvement in grant capture, which we organize below into four main findings related to contributions, roles, recognition and invisibility.

Types of Contributions

The contributions of PRS were multifaceted, spanning technical, conceptual, and project management roles. Each type of contribution played a distinct role in the development of research grants and in the implementation of research projects.

Technical Contributions

Technical contributions were foundational and involved detailed compliance checks and administrative support throughout the grant capture process. PRS were responsible for ensuring that grant applications met both funder and university guidelines, with tasks that included budget preparation, formatting checks, and pre-submission reviews. As Participant 15 described, "I receive, usually within 2 weeks in advance, a complete grant application for external research funding. And we are reviewing that application with a lens of compliance with the funders' guidelines, terms, and policies." Similarly, another participant (Participant 11) emphasized that their role often had a "certain technical part to it. Like the actual editing, writing support, making sure things are phrased clearly, but also that they align with the sponsor requirements with the stated criteria or the evaluation matrix." Participant 4 described how important these technical contributions are: "As a rule, the technical side is really important, right? Like that can throw an application out," but expressed wanting to contribute more, explaining, "I mean, as I say, if you have the time, it's great. If you're rushed, it's maddening because you can't give all the help that you need to give."

Conceptual Contributions

PRS participants consistently spoke about how sometimes their involvement not only shaped how researchers framed their grant applications but also the broader conceptualization and design of research studies. This influence began early in the grant process, where PRS provided critical input on aspects such as research design, methodology, and even the framing of research questions to better align with EDID principles and community engagement best practices. Participant 12 described how they provide feedback and guidance in the early stages of grant development that

> *... falls more on the on the conceptual side. I would define that as being driven by ideas, driven by the*

generation of content, and driven by a series of open-ended questions that don't have fixed answers... and driven by the desire to develop a clear plan that is informed by evidence and other good practices.

This type of engagement reflected how PRS advisors did more than simply ensure compliance; they actively guided researchers in designing more robust research plans. This guidance often required PRS to influence not just the content but the approach of the research. For example, Participant 1 highlighted how, by meeting with researchers early on, they were able to "rethink how [the researcher] is pitching it," which sometimes led to substantial shifts in the study's framing and objectives. In this way, PRS contributions shaped the conceptual foundation of projects. Importantly, many participants found that the boundary between technical and conceptual is blurred, suggesting an overlap that required negotiation in their work.

Project Management Contributions

In addition to their technical and conceptual work, PRS often took on project management responsibilities that supported the coordination of larger grant applications and the development of knowledge mobilization initiatives. These contributions involved coordinating multi-team projects, organizing meetings, setting timelines, managing relationships and building partnerships. Participant 17, for example, described their involvement in "knowledge mobilization, running all the social media for the Department of Research" at their respective institution, which included hosting events and connecting researchers with community stakeholders. Others assisted in organizing significant university events, like Participant 10, who shared that they were "involved in organizing workshops, doing drop-ins, and planning events like the International Women's Day event." These broader contributions amplified the impact of research and helped to bridge the gap between research findings and impactful KMb activities.

Misunderstood Roles

Perhaps because of the diverse range of contributions, PRS roles were often perceived as misunderstood. These misunderstandings created challenges and emotional burden. Participants reported wide-ranging assumptions among researchers, regardless of seniority, about the responsibilities of PRS. Some assumed that PRS were responsible for writing sections in grant applications or handling direct community engagement/partnership development, which often fell well outside their intended role. One participant noted,

They're led to believe that if there's an EDI section in the grant, someone in the research office will just write it for them. Then you meet, and it's like, no, my role is to advise—you have to take responsibility (Participant 4).

Situations like these caused frustration for PRS, who frequently found themselves needing to clarify and assert the boundaries of their roles. This lack of clarity also had an emotional impact. PRS described an emotional toll associated with continuously setting boundaries with researchers. Participant 13 captured this dynamic, describing how certain features of grant applications were considered less important by faculty, and their way of offloading these sections of the grant was by trying to delegate them to PRS:

EDI is also a dumping ground for all the crap that happens. It's like doing the work no one else wants to do... it's just like you're a city dump, right? Everyone comes with their garbage and throws it on you.

Participant 4 similarly reflected:

What's not so rewarding is people who are very difficult to work with, who don't want to do it, who feel like they're being forced to do EDI, who feel like

this is just a trend that they have to follow, and they don't really treat it seriously, and they don't treat it as part of their competency as an academic researcher.

Participants also reported ethical tensions and sensitivities when PRS roles were misunderstood, particularly around facilitating relationships with communities. Advisors often encountered researchers who, lacking an adequate understanding of role boundaries, approached sensitive relationships inappropriately. Participant 8 shared a vivid example:

And you do, unfortunately, get some non-Indigenous researchers who are maybe more advanced in their careers, who feel entitled to a certain level of support. I have been asked some truly outrageous things. One of the ones that still sticks with me is...this one researcher insisting that I introduce them to my Chief because he had a project that would solve [a local Indigenous crisis]. And I was like, nope, nope.

This account illustrated the potential for substantial ethical missteps and harm to communities when researchers were unaware of boundaries. PRS like Participant 8 found themselves in challenging positions, needing to both protect community trust and educate researchers on sustainable, respectful approaches:

I think the sticking point where we're currently experiencing some, I wouldn't say negative feedback, but I think more surprised from non-Indigenous folks is that we're not going to introduce you to people like, I'm not going to introduce you to my cousin. I'm not going to introduce you to my Chief...And we usually try to frame it in a way as like, well, you want to have a relationship with this person because that's the best and wise practice for Indigenous research.

This example highlighted the importance of clearly defining the roles of PRS, ensuring that they were empowered to work within boundaries that protected both their responsibilities and the communities involved.

Forms of Recognition

Participants shared experiences of both formal and informal recognition, emphasizing how these acknowledgments shaped their job satisfaction and motivation. From being named on grants to receiving heartfelt thank-you notes, the diversity in recognition preferences spoke to the varied ways individuals sought and received acknowledgment for their work.

Formal Recognition

Formal recognition, such as being named on grants, emerged as a contentious topic among participants. While some viewed this as an important acknowledgment of their intellectual contributions, others expressed hesitance about associating their names with projects, especially if they were not involved post-award. One participant articulated, "When I'm actually providing feedback and... making meaningful contributions, I think being named on the grant is a fair way of recognizing the work" (Participant 13). Conversely, another participant highlighted ethical concerns, stating:

I would have a problem being named on an individual grant because that, to me, is not equitable because I can't be helping one researcher and not helping others. So, I can't really be named, in my opinion. Like this is just kind of part of my personal code. I guess as an EDII [Equity, Diversity, Inclusion, and Indigenization] practitioner. Like it wouldn't be fair to other people if I'm included in somebody's individual research project, and then I'm not included in other similar projects. I should either be named on all grants or not at all" (Participant 4).

Some participants noted that being named on grants is appropriate, and the mechanisms for this are mandated by the university: "We do have an authorship policy... ensuring that contributions are recognized and framed accordingly" (Participant 14). Yet, PRS described cases where they significantly shaped the development of grant proposals or project outcomes, and such credit was not given: "There isn't that recognition of excellent work when it comes to getting the grant approved. I was never named despite doing large portions of the writing" (Participant 17). This ambivalence illustrated the complexities surrounding formal recognition.

Informal Recognition

Beyond formal recognition, many participants expressed a desire to be recognized and appreciated more informally as well. Participant 4 questioned "whether we are being appreciated in the right way" and advocated that "we should be talking about other types of acknowledgements and having strategies for the research community to really appreciate us and see us for what we are" (Participant 4). Participant 14 shared this sentiment, stating:

> I think just acknowledging and recognizing is another way that can affirm that the contributions that people are making that appear to be invisible, that may not formally require their names appearing on something, but where we are seeing them, and we're seeing the work that they're doing.

Informal recognition, particularly direct expressions of appreciation from colleagues and supervisors, emerged as highly valued among participants. As one participant noted, "A thank you email is a huge form of recognition... It drives me to go an extra mile for them because it's as simple as the most common-sense thing you can do" (Participant 13). Many participants appreciated such gestures, including verbal praise and expressions of gratitude and reflected on how they influenced their motivation and engagement.

Invisibility of the Work

The inconsistency in our findings about recognition for PRS work may be related to its invisibility. Many participants described their work as unseen or unappreciated, especially within formal university structures. Intellectual property policies, for example, often stipulated that tools, or intellectual contributions produced by staff members were owned by the university rather than credited to the individual. Participant 4 voiced their frustration with this approach: "We are brilliant, have PhDs, and create valuable tools, but everything we produce is property of the university." Participants felt an emotional impact of this ongoing lack of recognition and described being "really disappointed" to "find out through the grapevine that money had been awarded without my knowledge" (Participant 1). And emotions were not only in the moment: one participant described them "linger[ing] grossly in my mouth" (Participant 1).

Lack of visibility also posed barriers to professional development. Participant 12 explained that "recognition in the form of a job title and proper attribution of work is crucial. It's not just about visibility but also about proper acknowledgment and support". This absence of formalized recognition had potential implications for career advancement. Participant 8 highlighted these complexities:

> It doesn't help me in my performance appraisal. They don't necessarily write a letter that would go to my file that says, [Name] gets a five out of five for her contributions to X, Y, Z, project. I think there should be more conversations about how our work is recognized. I would really appreciate that... having the ability to show the depth and breadth of the work that I do... it's a lot of invisibilized work, a LOT of invisibilized work.

DISCUSSION

Our findings highlight how PRS perceive their contributions, roles, recognition and invisibility as

they work in the pre-award space of supporting grant capture. Our discussion uses these findings to advance three arguments: we challenge recent assertations that the PRS invisibility problem is resolved for formalized third space professionals (Whitchurch, 2024); we caution that the undervaluation of PRS contributions may impoverish their work and undermine institutional success and reputation; and we extend the notion of 'recognition' beyond institutional acknowledgement to include interpersonal appreciation, emphasizing that recognition is deeply tied to a sense of belonging.

Invisibility remains a problem for PRS in our study. The literature distinguishes formalized third space professionals from individuals "simply working in the third space", the latter characterized as lacking formal recognition and university support while the former enjoy more visibility and recognition (Whitchurch, 2024). However, our findings suggest that the challenges of recognition and visibility persist in pre-award settings. All our participants held formalized third space roles: they were PRS engaged in specialized areas such as EDID, KMb, and grant capture support, yet they reported feeling that their work remained invisible and unrecognized. This finding prompts us to question why PRS experiences in the pre-award space might align with individuals 'working in third space'. One reason might be the fluidity of these roles: they are formal, and specialized, but the work is poorly defined—sometimes technical, sometimes conceptual, sometimes managerial. When the boundaries of third space roles are ambiguous, it requires individuals to continuously adapt and leverage social and professional capital to effectively navigate these spaces (Whitchurch, 2024). The reliance on personal networks and informal strategies, combined with limited institutional support, contributes to the invisibility of third space professionals' work. While partnerships with academic, professional, and external stakeholders can amplify contributions (Whitchurch, 2024), the lack of institutional acknowledgment for conceptual contributions,

experienced by PRS in our study, lead them to feel that their work is undervalued and invisible.

This undervaluation of PRS contributions matters for PRS work and for institutional reputation, which is closely tied to institutional granting success. Many of the PRS in our study held advanced degrees, including PhDs, [similar to the literature on professional staff in higher education (Acker et al., 2019; Collinson, 2006; Kirkland & Stackhouse, 2011; Ryttberg & Geschwind, 2017; Szekeres, 2011)], and they brought both discipline-specific expertise and methodological rigour to the design, development and application of grants. However, much of their everyday work centered on technical contributions. This is in part due to structural influences, such as the expectation to review hundreds of grants, reflected in the popularity of research office metrics, such as the number of grants reviewed (and the absence of qualitative metrics, such as conceptual influence on grant designs). What gets counted becomes what counts, such that the technical/administrative contribution is privileged over the conceptual/intellectual work (Yang-Yoshihara et al., 2023). Driven by research revenue metrics, recognition often prioritizes quantitative metrics, such as the number of grant applications submitted, over qualitative contributions like conceptual heavy lifting (Kulakowski, 2023; Yang-Yoshihara et al., 2023). This emphasis on volume impoverishes the potential of PRS work, limiting their ability to engage deeply with intellectual aspects of grant development (Yang-Yoshihara, n.d.). Although their roles are fluid—frequently bridging technical and conceptual domains—PRS professionals often find their value-added contributions unrecognized by universities and the leaders within them (Yang-Yoshihara, n.d.). This overemphasis on metrics like grant throughput, coupled with a lack of attention to individual expertise, reflects a troubling tendency in pre-award spaces to equate "more" with "better," ultimately sidelining the rich, intellectual potential of PRS work (Yang-Yoshihara et al., 2023). In this situation, we caution that PRS work is at risk of being impoverished.

Enabling PRS to work to their full scope by leveraging both technical skills and conceptual expertise can help fulfill the mandate of research offices by enhancing research excellence at the pre-award stage. It may also help PRS to flourish; this flourishing is connected to a dynamic process of PRS identity formation and reformation, which is responsive to evolving structures (Whitchurch, 2023; Yang-Yoshihara et al., 2023). Flourishing matters, because without it, PRS neither stay nor grow in their roles. Without both, institutional research mandates suffer, and individual faculty struggle to meet these mandates due to insufficient support (Welch & Brantmeier, 2021).

Flourishing can also be supported by a refined sense of what counts as 'recognition' for PRS work. Our work suggests that PRS may feel undervalued not because their work is not recognized, but because of the nature of that recognition. To date, the focus has been on formalized institutional recognition (Whitchurch, 2024) such as being named on a grant or receiving formal awards; speaking to not only job satisfaction but also the ability to progress professionally. However, our findings highlight the value of more personalized and informal acknowledgments. Participants in our study valued expressions of respect for their expertise, acknowledgment of their contributions to university success, and a collegial appreciation for their intellectual work. For these staff members, greater visibility can pave the way toward a more inclusive and appreciative academic environment, which would have affirmed the essential work they contributed to the success of research projects and teams. This contrasts with assumptions in the literature that PRS prioritize formal recognition at institutional and departmental levels (Whitchurch, 2024). Our participants expressed not only a desire for formal recognition but also informal individualized recognition, with acts as simple as showing appreciation, listening to their insights, and demonstrating an understanding of the intellectual and conceptual value they bring to grant development and capture.

PRS working in the pre-award space do more than enhance a university's capacity to submit grants;

they have the potential to significantly elevate the quality of grant applications (Ito & Watanabe, 2020). By fostering thoughtful integration of key priorities such as EDID, KMb, and research partnerships, PRS can help universities align more effectively with the mandates of funding organizations, leading to increased grant capture (de Jong & del Junco, 2024; Ito & Watanabe, 2020). However, this potential can only be realized when the roles they occupy and the university structures that govern them provide the necessary space for meaningful contributions. It is equally critical that these contributions are both acknowledged and valued—not only at the university level but also in ways that empower PRS to work to their full scope. Recognizing and leveraging their expertise is essential for advancing the broader goals of university research funding at large, without losing sight of the individuals supporting these goals.

While this work expands on the current literature on PRS, especially those within the pre-award space, we recognize some inherent limitations in our study design. All but one of our study participants worked within universities situated in Ontario, limiting the transferability of our findings. Different provincial mandates and different funding opportunities may be present in provinces outside of Ontario, and these have not been captured in our data. However, many of our participants reflected on their roles in supporting grant applications for the national, tri-council agencies—the Social Sciences and Humanities Research Council (SSHRC), the Canadian Institute for Health Research (CIHR), and the Natural Sciences and Engineering Council of Canada (NSERC)—and we expect that their experiences related to these national funding bodies would resonate across Canada. In addition, this work focuses on the experiences of PRS representing specialized roles in EDID and KMb, but we recognize that there are many other PRS, such as research associates who support grant capture whose perceptions and experiences may not be reflected in the data. Future research is needed to both expand participation to PRS from across Canada and to those representing more general research support roles.

CONCLUSIONS

This study underscores the critical role of PRS in advancing university mandates of research excellence and research revenue. Our findings highlight the selective (in)visibility of PRS work, which has significant implications for their ability to fully realize these university mandates. When PRS work is limited to technical oversight, it undervalues PRS' conceptual contributions and the potential of PRS to flourish in these roles. While institutional recognition remains essential, our participants also emphasized the importance of interpersonal appreciation from their research colleagues. This dual need for recognition suggests that PRS value not only formal acknowledgment of their contributions but also relational validation that fosters a sense of belonging and collegiality within research teams. Such recognition—both institutional and interpersonal—validates their contributions and their capacity to contribute meaningfully to the broader goals of the university. We call for increased visibility, improved recognition, and expanded career development opportunities for PRS, urging universities and research teams to prioritize these efforts as integral to the pursuit of research excellence.

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REFERENCES

Acker, S., McGinn, M. K., & Campisi, C. (2019). The work of university research administrators: Praxis and professionalization. *Journal of Praxis in Higher Education, 1*(1), 61-85. https://doi.org/10.47989/kpdc67

Agostinho, M., Moniz Alves, C., Aresta, S., Borrego, F., Borlido-Santos, J., Cortez, J., Santos, J., Costa, T. L., Lopes, J. A., Moreira, S., Trindade, M., Varela, C., & Vidal, S. (2020). The interface of science: The case for a broader definition of research management. *Perspectives: Policy and Practice in Higher Education, 24*(1), 19-27. https://doi.org/10.1080/13603108.2018.1543215

Auerbach, A. D., Kripalani, S., Vasilevskis, E. E., Sehgal, N., Lindenauer, P. K., Metlay, J. P., Fletcher, G., Ruhnke, G. W., Flanders, S. A., Williams, M. V., Thomas, L., Giang, V., Herzig, S. J., Patel, K., Boscardin, W. J., Robinson, E. J., Schnipper, J. L., & Kim, C. (2016). Preventability and causes of readmissions in a national cohort of general medicine patients. *JAMA Internal Medicine, 176*(4), 484-493. https://doi.org/10.1001/jamainternmed.2015.7863

Berman, J. E., & Pitman, T. (2010). Occupying a 'third space': Research trained professional staff in Australian universities. *Higher Education, 60*, 157-169. https://doi.org/10.1007/s10734-009-9292-z

Clarke, V., & Braun, V. (2021). *Thematic analysis: A practical guide.* Sage Publications.

Coaldrake, P., & Stedman, L. R. (1999, September). Academic work in the twenty-first century: Changing roles and policies. *Occasional Paper Series*, 99H. Higher Education Division,

Department of Education, Training and Youth Affairs. https://vital.voced.edu.au/vital/access/services/Download/ngv:21859/SOURCE2

Collinson, J. A. (2006). Just 'non-academics'? Research administrators and contested occupational identity. *Work, Employment and Society, 20*(2), 267-288. https://doi.org/10.1177/0950017006064114

de Jong, S., & del Junco, C. (2024). How do professional staff influence academic knowledge development? A literature review and research agenda. *Studies in Higher Education, 49*(6), 1042-1065. https://doi.org/10.1080/03075079.2023.2258155

Doyle, L., McCabe, C., Keogh, B., Brady, A., & McCann, M. (2020). An overview of the qualitative descriptive design within nursing research. *Journal of Research in Nursing, 25*(5), 443-455. https://doi.org/10.1177/1744987119880234

Enders, J., & Naidoo, R. (2022). The rise and work of new professionals in higher education. In *Research handbook on academic careers and managing academics* (pp. 89-98). Edward Elgar Publishing.

Gray, S. (2015). Culture clash or ties that bind? What Australian academics think of professional staff. *Journal of Higher Education Policy and Management, 37*(5), 545-557. https://doi.org/10.1080/1360080X.2015.1079397

Ito, S., & Watanabe, T. (2020). Multilevel analysis of research management professionals and external funding at universities: Empirical evidence from Japan. *Science and Public Policy, 47*(6), 747-757. https://doi.org/10.1093/scipol/scaa074

Kim, H., Sefcik, J. S., & Bradway, C. (2017). Characteristics of qualitative descriptive studies: A systematic review. *Research in Nursing & Health, 40*(1), 23-42. https://doi.org/10.1002/nur.21768

Kirkland, J., & Stackhouse, J. (2011). Guarding the gatekeeper: University research managers in a triple helix environment. In *Theory and practice of the Triple Helix Model in developing countries* (pp. 87-97). Routledge.

Kulakowski, E. (2023). The establishment and history of the international network of research management societies. In *The Emerald handbook of research management and administration around the world* (pp. 83-95). Emerald Publishing Limited.

LaDonna, K. A., Artino Jr., A. R., & Balmer, D. F. (2021). Beyond the guise of saturation: Rigor and qualitative interview data. *Journal of Graduate Medical Education*, *13*(5), 607–611. https://doi.org/10.4300/JGME-D-21-00752.1

Macfarlane, B. (2011). The morphing of academic practice: Unbundling and the rise of the para-academic. *Higher Education Quarterly, 65*(1), 59-73. https://doi.org/10.1111/j.1468-2273.2010.00467.x

Mayan, M. J. (2016). *Essentials of qualitative inquiry*. Routledge.

Poli, S., Oliveira, C., & Zsár, V. (2023). From conceptualisation to action–The quest for understanding attitudes of research managers and administrators in the wider world. In *The Emerald handbook of research management and administration around the world* (pp. 201-220). Emerald Publishing Limited.

Ross, R. (2017). *University research development offices: Perceptions and experiences of research university administrators* [Doctoral dissertation, Nova Southeastern University]. https://www.proquest.com/dissertations-theses/university-research-development-offices/docview/2050632416/se-2?accountid=11411

Ross, R., Reeves, J., Scarpinato, K., & Pelham, M. (2019). Success factors for university research development offices and activities. *Journal of Research Administration, 50*(3), 107-124. https://files.eric.ed.gov/fulltext/EJ1237840.pdf

Ryttberg, M. (2022). Legitimacy dynamics of professional support staff at higher education institutions. *Higher Education Policy, 35*(1), 218-233. https://doi.org/10.1057/s41307-020-00206-w

Ryttberg, M., & Geschwind, L. (2017). Professional support staff at higher education institutions in Sweden: Roles and success factors for the job. *Tertiary Education and Management, 23*, 334-346. https://doi.org/10.1080/13583883.2017.1322631

Sandelowski, M. (2000). Whatever happened to qualitative description? *Research in Nursing & Health, 23*(4), 334-340. https://doi.org/10.1002/1098-240x(200008)23:4%3C334::aid-nur9%3E3.0.co;2-g

Santos, J. M., Varela, C., & Kerridge, S. (2021). Professionals at the interface of science: Is there more than meets the eye? *Perspectives: Policy and Practice in Higher Education, 25*(3), 100-105. https://doi.org/10.1080/13603108.2021.1881842

Smith, C., Holden, M., Yu, E., & Hanlon, P. (2021). 'So what do you do?': Third space professionals navigating a Canadian university context. *Journal of Higher Education Policy and Management, 43*(5), 505-519. https://doi.org/10.1080/1360080X.2021.1884513

Smith, D. E., & Griffith, A. I. (2022). *Simply institutional ethnography: Creating a sociology for people*. University of Toronto Press.

Stoller, A. (2023). Academic labour in the third space. *Workplace: A Journal for Academic Labor, 34*, 19-22. https://ices.library.ubc.ca/index.php/workplace/article/view/186833/185675

Szekeres, J. (2011). Professional staff carve out a new space. *Journal of Higher Education Policy and Management, 33*(6), 679-691. https://doi.org/10.1080/1360080X.2011.621193

Torti, J., Hayward, M., Friesen, F., & Lingard, L. (2024). Ghostwriting grants: A critical conversation about the invisible contributions to health professions education research grants. In L. Varpio & A. McLeod (Eds.), *A thunderous chorus of silent voices: The invisible work of medical education.* University of Toronto Press.

Welch, L., & Brantmeier, N. K. (2021). Examining employee retention and motivation trends in research administration. *Journal of Research Administration, 52*(2), 70-86. https://files.eric.ed.gov/fulltext/EJ1325462.pdf

Whitchurch, C. (2008). Shifting identities and blurring boundaries: The emergence of third space professionals in UK higher education. *Higher Education Quarterly, 62*(4), 377-396. https://doi.org/10.1111/j.1468-2273.2008.00387.x

Whitchurch, C. (2013). *Reconstructing identities in higher education: The rise of third space professionals*. Routledge.

Whitchurch, C. (2018). Being a higher education professional today: Working in a third space. In C. Bossu & N. Brown (Eds.), *Professional and support staff in higher education*. Springer. https://doi.org/10.1007/978-981-10-1607-3_31-1

Whitchurch, C. (2022, September). From 'working in third space' to 'third space professionals' [Blog post]. *Third Space Perspectives - Exploring Integrated Practice*. https://www.thirdspaceperspectives.com/blog/tothirdspaceprofessionals

Whitchurch, C. (2023). Rehabilitating third space professionals in contemporary higher education institutions. *Workplace: A Journal for Academic Labor, 33*, 24-35. https://ices.library.ubc.ca/index.php/workplace/article/view/186839/185674

Whitchurch, C. (2024). From 'service'to 'partnership': Harnessing social capital in support of activity in third space environments. *Journal of Higher Education Policy and Management, 46*(3), 243-256. https://doi.org/10.1080/1360080X.2024.2344132

Yang-Yoshihara, M. (n.d.). An emerging profession for doctorate degree holders as Research Managers and Administrators (DRMAs). https://srhe.ac.uk/arc/22/0247.pdf

Yang-Yoshihara, M., Poli, S., & Kerridge, S. (2023). Evolution of professional identity in research management and administration. In *The Emerald handbook of research management and administration around the world* (pp. 297-308). Emerald Publishing Limited.

Zink, H. R., Hughes, D., & Vanderford, N. L. (2022). Reconfiguring the research administration workforce: A qualitative study explaining the increasingly diverse professional roles in research administration. *Journal of Research Administration, 53*(2), 119-140. https://files.eric.ed.gov/fulltext/EJ1362090.pdf

IMPROVING POST-AWARD GRANT MANAGEMENT EFFICIENCY THROUGH PROCESS MAPPING AND ACTIVITY-BASED COSTING

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ABSTRACT

This case study details how the University of Pretoria's Grant Management Unit improved post-award grant management efficiency and compliance. Using process mapping and Activity-Based Costing, the Unit identified and addressed inefficiencies, high compliance costs, and process bottlenecks. Activity-Based Costing provides valuable insights into resource allocation and cost optimization. This integrated approach offers a practical model for enhancing efficiency and compliance in resource-constrained universities.

Keywords:

Process mapping; grant management; research management; activity-based costing; governance framework; compliance; systematic approach; workflow

INTRODUCTION

Efficient grant management is crucial for research institutions, enabling them to secure funding and successfully execute research projects. At South African universities, a single department often handles the entire spectrum of grant management services, encompassing pre- and post-award phases. These present unique challenges, especially when dealing with major international funding agencies like the U.S. federal government and the European Union, which impose rigorous, diverse, and often conflicting compliance requirements. These demands necessitate robust internal controls, specialised teams, and incur significant costs for institutions (Schiller & LeMire, 2023; Temples et al., 2012; Greer, 2015).

This case study focuses on the UP's Grant Management Unit's experience in implementing a comprehensive approach to post-award grant management. This approach, utilising process mapping and Activity-Based Costing, aims to enhance efficiency and compliance, initially benchmarking against the stringent U.S. federal regulations but with the goal of creating a more robust and consistent grant management process across all funding sources. This study seeks to answer the following research question: **To what extent does the combined application of processing mapping and Activity-Based Costing improve the efficiency and compliance of post-award grant management processes in a resource-constrained higher education institution?**

The study explores how these tools were used to revise and implement post-award grant management processes at UP, providing insights into improving post-award grant management practices within resource-constrained settings.

This paper is structured as follows: following this introduction, we provide the context of the study within the University of Pretoria's Grant Management Unit, followed by a review of the relevant literature, and the theoretical framework guiding this research. We then detail the methodology employed, present the findings of the process mapping and Activity-Based Costing analysis, discuss their implications, and conclude with key takeaways and recommendations.

CONTEXT OF THE STUDY: GRANT MANAGEMENT UNIT AT THE UNIVERSITY OF PRETORIA

The University of Pretoria's (UP) Grant Management Unit (GMU), a division within the Department of Research and Innovation (DRI), provides comprehensive support for research grants. While pre-award processes were well-established, post-award support was historically limited due to human resource constraints. This limitation, coupled with an external audit funding highlighting non-compliance, underscored the urgent need for improved post-award grant management processes.

To address these challenges, the GMU secured funding from the National Institute of Allergies and Infectious Diseases (NIAID) to enhance its research management capabilities. This involved training sessions focusing on US National Institutes of Health (NIH) Grant Policy Statement (GPS) compliance requirements, especially for foreign entities, and benchmarking against practices at the U.S. universities (Michigan State University and University of Washington). The project ultimately aimed to systematically review and improve UP's post-award processes, using the U.S. Department of Health and Human Services (HHS) compliance requirements as a benchmark due to their comprehensive nature and UP's increasing funding from HHS. This provided a starting point for improving post-award processes and addressing the audit fundings. The initiative also intended to establish a standardised approach to grant management across all funding sources.

Aside from process mapping which was the backbone of the case study, and which is discussed in detail in the literature review, there are various key terms that are hereby clarified.

Activity-Based Costing (ABC): A costing method that assigns costs to specific activities or processes within an organisation, providing more accurate understanding of costs and enabling efficient resource allocation (Drury, 2013).

Capacity assessment: Evaluating an organisation's, department's, or individual's ability to effectively and efficiently perform specific tasks, activities or responsibilities.

Compliance: Adherence to the rules, regulations and standards established by funding agencies. In this study, it specifically refers to meeting the grant-awarding agencies' requirements and ensuring the institution, researchers, and subrecipients adhere to these requirements.

Cost centre: An internal accounting unit on the institutional financial management software used to track and accumulate costs for a specific project.

Cost driver: A factor that causes a change in the cost of an activity. In Activity-Based Costing, cost drivers are used to allocate costs to activities for example labour hours, numbers of transactions, numbers of reports, etc.

Cost-to-company salaries: The total cost incurred by an employer for an employee, including salary, benefits, and other related expenses.

Facilities and administration (F&A): Expenses associated with an institution's general operations, not directly tied to specific projects or grants; often included in grant budgets (Greer, 2015).

Financial conflict of interest: A situation where an individual or organisation's financial interest could compromise objectivity, integrity, or decision-making in grant management.

Funding agency or *award agency*: The organisation or entity providing financial support for research projects or institutions. In this study, it refers specifically to U.S. federal agencies and departments.

Grant management: The administration and oversight of grants, encompassing identification, application, securing, and management of funds, with a focus on compliance with awarding agency terms and conditions.

Grant Policy Statement (GPS): The U.S. Department of Health and Human Services' policy statement outlining grant administration policies and procedures, including compliance requirements.

Handover points: Junctures in a process where responsibility for a task or activity transfers between individuals or departments, potentially impacting efficiency and effectiveness.

Internal controls: Policies, procedures, and practices ensuring accurate financial reporting and compliance within an organization; crucial for effective grant fund management and fraud prevention (Greer, 2015).

Mentoring: A more experienced individual (mentor) providing guidance and support to a less experienced individual or organization to foster their professional development.

Non-value adding activity: A process step or task that consumes resources but does not directly contribute to the final outcome or is not required; often considered waste.

Post-award grant management: The administrative phase of managing a research grant that begins after the funding has been awarded and accepted. It involves financial management compliance monitoring, reporting, and project closeout.

Pre-award grant management: The phase of identifying funding opportunities, proposal writing, budget development, and submission before a grant is awarded.

Process mapping: A management tool that provides a visual representation of workflows to analyse and improve business processes, helping make work visible (Damelio, 2011).

Standard Operating Procedures (SOP): Documented guidelines describing standard processes and activities within an organization, promoting consistency and compliance.

Swim lanes: In process mapping or flowcharts, these are visual containers that represent different individuals, roles, or departments responsible for specific steps or activities within a process.

Workflow diagrams: Visual representations depicting the sequence of tasks, actions, and decisions in a process, aiding in visualization and understanding of workflow.

Value-adding activity: A process step or task that contributes directly to the final desired outcome or is required by the customer (in this case, fulfilling grant objectives or compliance needs).

LITERATURE REVIEW

The purpose of this literature review is to systematically explore the applications of process mapping within the context of grant management. Process mapping serves as a crucial tool for organisations seeking to enhance their operational efficiency, improving compliance with regulatory standards and streamlining their workflows. In an increasingly complex and resource-constrained environment, effective grant management has become essential for institutions to secure funding and undertake impactful research initiatives. By providing a clear visual representation of the steps involved in grant management processes, process mapping enables organisations to identify inefficiencies, eliminate redundancies, and clarify roles and responsibilities among team members. Consequently, this review aims to distill best practices derived from case studies that illustrate successful process mapping implementation in grant management. By doing so, it not only contributes to the existing body of knowledge but also offers practical insights that can be replicated in various organizational contexts. Understanding the significance of process mapping is vital for institutions seeking to enhance their grant management practices, optimize resource allocation, and respond effectively to changing compliance requirements.

To frame the literature review, a thematic analysis was conducted to examine the existing applications of process mapping and focused exclusively on case studies that are related to research management or grant management. For this analysis, we used Atlas.ti as a tool for systematic evaluation, using a combination of inductive and deductive coding approaches. This approach enabled the identification of six key cycles commonly used across the reviewed case studies when using process mapping, namely:

1. Planning and preparation
2. Stakeholder engagement
3. Process mapping and analysis
4. Iterative design and implementation
5. Evaluation and monitoring
6. Documentation and knowledge sharing

This structured approach emphasizes that process mapping is not merely about following steps but involves comprehensive cycles that facilitate continuous improvement.

While process mapping is a well-established technique commonly employed in the manufacturing sector, with an extensive body of literature and resources available, there is a noticeable gap in studies that delve into its application within grants management. This literature review focuses on examining relevant case studies in research management and grant management to gain insights into effective practices. The decision to concentrate on case studies arises from their practical nature, providing contextualised examples of process mapping implementation that can inform our own projects. While we also reviewed books exploring the technicalities of process mapping, the literature review prioritizes the insights gleaned from these case studies to address the existing gaps and contribute to the body of knowledge with applied benefits.

When defining process mapping for this article, it is characterized as the systematic visualisation and analysis of the steps involved in a process to identify areas for efficiency and improvement, focusing on

the flow of tasks, resources and information. The following section will discuss the specific activities undertaken in the various case studies corresponding to each of the major cycles identified in the thematic analysis. While all the case studies adhered to the overarching framework outlined in the literature review, the activities demonstrated notable variations. Some case studies emphasized certain activities more than others, reflecting diverse institutional context and priorities. By examining these differences, we can gain insights into the adaptability of process mapping practices in grant management, allowing us to determine the most effective strategy for our own project implementation.

Beginning with the **planning and preparation** cycle, all case studies emphasised the importance of gaining a thorough understanding of the existing context and identifying areas for improvement. The Institute of Clinical Physiology (IFC), part of the Italian National Research Council (CNR), exemplifies this approach by initiating its process with a comprehensive analysis and redefinition of its institutional strategy. According to the management at IFC, they "started with the formalisation of the strategy in the strategic plan that indicates the way to go on to achieve concrete goals, reducing the risk of uncoordinated decisions" (Poli et al., 2020, p. 7). Notably, this case study was one of the few that began with a strategic focus, utilising a simple SWOT analysis to pinpoint areas of improvement. This approach may work particularly well for institutions that recognize a problem but struggle to identify the specific business process that requires enhancement. In contrast, other institutions may have refrained from adopting this method because they already know which processes need improvement. For example, if an audit finding explicitly identifies the area for enhancement, such an analysis may be unnecessary. Nonetheless, the SWOT analysis can serve as a valuable tool for continuous improvement, fostering a proactive mindset towards ongoing organizational development.

Following the results of the SWOT analysis, alongside the strategic lines set by the national research body

and stakeholder requests, IFC defined its strategic actions including orientation of issues towards high social health impact, the development of an internationalisation approach, and the reinforcement of collaboration with other public institutions and private companies (Poli et al., 2020, p. 876).

Most of the cases analysed engaged in mapping the "as-is" business process, which reflects the current operational workflow of the organisation prior to any improvements. In her thesis titled "Awarding Equitably: A Process Design Framework for City Grantmakers," Sarah Kalish presents a case study within the City of Boston focused on enhancing grant administration amidst increasing funding and digital transformation efforts. She describes her original task as rather mechanical: "to evaluate internal operations and map out the step-by-step grants process" (Kalish, 2023, p. 32).

These case studies also employed some form of document analysis to establish the contextual background for their research. Gibson et al. (2019, p. 342) highlighted that their "initial discovery was synthesized from a variety of [Queensland University of Technology] corporate documents, including service catalogues, organizational hierarchies, artifacts and more." Similarly, Kalish (2023, p. 3) utilised documents from various grant programmes administered by the City of Boston; however, instead of organising these documents by programme, she chose to "re-group them by document type: application forms, rubrics, and reporting." This method enabled her to review documents serving similar purposes and analyse them across like categories. Through this approach, she was able to identify and understand the inputs required by the process and arrange them in a logical manner. Kalish followed this systematic approach to map the existing end-to-end grants process in a user-friendly visual format, thus facilitating a clearer understanding of the workflow and its components.

Finally, most of these cases indicated that they conducted some form of benchmarking. While the initial explorative focus remains on understanding

the internal context of the institution, benchmarking shifts the emphasis outward to identify best practices from other institutions. However, the case studies did not deeply report on their benchmarking efforts. For instance, the Institute of Clinical Physiology (IFC) simply stated that they "benchmark[ed] with analogous Italian and international institutions" to mitigate the risk of self-referencing (Poli et al., 2020, p. 878). Similarly, Queensland University of Technology engaged in benchmarking by examining a variety of research management systems. They "conducted a market scan and, through that, were exposed to a wide variety of research management systems, allowing them to draw on the processes these systems supported and map it to the context of the institution" (Gibson et al., 2019, p. 342). This external benchmarking provided valuable insights that informed their processes and enhancement in research management practices.

During the **stakeholder engagement** cycle, several key stakeholders are highlighted in the case studies, including internal stakeholders, management, and the client. The primary purpose of stakeholder engagement is to foster collaboration and to identify stakeholders for communication purposes such as gathering feedback, building consensus, and ensuring buy-in for proposed changes. Throughout the process, collaboration and communication with all relevant internal and external stakeholders are consistently emphasised as essential. This step is particularly crucial, as noted in the Institute of Clinical Physiology (IFC) study which states that "grant management processes [do not] originate from any one office; grant-making [touches] multiple teams" (Poli et al., 2020, p. 19). Furthermore, they point out that the internal organisation of large institutions such as government departments and research entities often face challenges in defining roles, responsibilities, objectives, and targets, making it critical to clarify these aspects for effective quality management of the process.

Kalish (2023) also addressed a common occurrence in large organisations, where different departments

tend to operate in silos. She observes that while the "stay in your lane" mentality may be effective for less cross-functional processes, many internal processes are multi-step and involve several departments and both internal and external stakeholders. In these cases, she warns that "staying in your lane" risks becoming territorial, uncollaborative, and unproductive, underlining the importance of understanding the complexities of the process at hand (Kalish, 2023, p. 44).

Identifying internal stakeholders also involves recognising that a grant management process consists of various sub processes, which is potentially led by different process owners (Poli et al., 2020, p. 877). To improve and standardise the overall grant management process, gaining buy-in from these other process owners is essential.

Some case studies described the formation of working groups tasked with data collection, mapping the "as-is" process, evaluating the process based on additional data, prioritising improvements, and conducting self-assessments (Poli et al., 2020, p. 14). Other case studies indicated that the primary means of engagement involved the PI conducting detailed structured walkthroughs, which allowed direct feedback from experts as well as observations (Kalish, 2023, p. 4) or conducting interviews with key stakeholders.

Most case studies also identified management as a crucial stakeholder group. They emphasised the importance of management's commitment to continuous performance improvement, noting that this commitment facilitates staff involvement by raising awareness of the role and significance of performance evaluation processes for both organizational results and the achievement of individual researchers' strategic objectives (Poli et al., 2020, p. 14).

Surprisingly, few case studies explicitly identified the clients that the process intends to serve. For example, Holbrook et al. (2016) describe their experience implementing medication reconciliation

(MedRec) procedures in three reaching hospitals in Canada, outlining four essential steps, one of which includes defining the patient values to ensure patient satisfaction. Kalish (2023, p. 23) also expressed her surprise at discovering a new perspective that an internal process infrastructure must be in place for effective engagement with community members, emphasising the importance of identifying the client who will be served by the process.

During the planning and preparation cycle, the reviewed case studies involved mapping the "as-is" process to gain a clearer understanding of the existing context in which the process operates. In the subsequent **process mapping and analysis cycle**, the project teams analysed the "as-is" process using additional data gathered through document analysis, interviews, and benchmarking to recommend improvements.

Several studies opted that process mapping is not necessarily a linear process. For example, in the case study conducted at the Queensland University of Technology, it was observed that "the linear presentation of the model caused some people to assume it meant that all research projects must follow this path." To address this misconception the model was framed as indicative rather than perspective for every project (Gibson et al., 2019, p. 6).

Interestingly, many case studies highlighted the mapping of processes across various hierarchies or levels. The Institute of Clinical Physiology (IFC), for instance, categorised its processes based on Institutional Performance (IP) and Organizational Performance (OP). As noted by Poli et al. (2020, p. 874), "while the primary processes contribute directly to the final output (products and series) and represent Institutional Performance (IP), intended as the competitiveness of the institute, the secondary processes represent Organizational Performance (OP), reflecting the internal organizational systems' ability to respond to the needs of internal and external stakeholders." To achieve the desired outputs and effectively meet the needs of all

stakeholders, the primary processes must be supported by secondary processes.

Similarly, the Queensland University of Technology embarked on a project to develop a process reference model for research management, recognising the overall flow of research management activities and categorising them into groups. This process was structured into a three-tier hierarchy consisting of domains, areas, facilities, and specific processes, and efforts were made to create visual representation of this hierarchy (Gibson et al., 2019, p. 342).

Steel et al. (2005) provide a less detailed account of the steps involved in process mapping but also emphasised the importance of categorising processes into different levels, recommending a hierarchy that includes macro processes and sub processes. The article also presents an overview of the symbols commonly used in process mapping, highlighting that the universal nature of these symbols allows for the easy replication of process maps across different organisations. The similarities and differences identified through mapping gives visual cues for generalising processes to another context.

Each project team used different approaches to evaluate and improve processes. Some teams discussed identifying inefficiencies, bottlenecks and general areas of improvement through comprehensive analysis of the processes. Strasser et al. (2013, p. 317) summarise discussions from the 2012 Clinical Translational Science Award Clinical Research Management Workshop, focusing mainly on clinical research processes. Notably, they emphasised the use of "process mapping to collect data and identify unnecessary steps and steps that could be run in parallel" to enhance the contract review and approval process at the Mayo Clinic.

Poli et al. (2020, p. 9) employed a risk assessment procedure to identify and prioritise improvements. They considered the strengths and weaknesses of the process during their risk analysis, introducing control points to mitigate various risks related to legislative aspects, policies, staff training, organizational

structure, job descriptions, change in control and management of non-conformities. Their risk assessment is based on the probability of occurrence (e.g., unlikely, likely, very likely) compared to the risk classification (e.g., tolerable, moderate, actual and intolerable), and then identifying required actions for each situation. Holbrook (2016) and Damelio (2011) suggest evaluation processes based on value-adding, non-value adding, wasteful and hindering activities.

Several studies emphasize the importance of paying special attention to handover points within the processes, specifically where activities transition from one support department to another. These points are often identified as the greatest weaknesses within the process due to overlapping responsibilities (Kalish, 2023; Holbrook, 2016; Damelio, 2011). Ultimately, the aim of the process analysis is to standardise activities and identify suitable performance indicators (Kalish, 2023).

In all these case studies, process mapping is presented not as a one-time fix, but as a phased approach to implement that begins with a pilot test and incorporates continuous feedback loops to iteratively refine the design and enhance the process. This **iterative design and implementation** cycle aligns well with the grant management landscape, where compliance requirements frequently change. Kalish (2023) emphasizes that improvements do not necessitate overhauling the entire process at once; instead, small interventions and incremental changes can lead to significant advancements.

Among the case studies, the one that most effectively utilised iterative process design was conducted by Gibson et al. (2019). They based their entire project plan on the Action Design Research (ADR) approach, which typically involves multiple cycles. Each cycle consists of the following steps: (1) problem formulation; (2) building, intervention, and evaluation; (3) reflection and learning; and (4) formation of learning (Gibson et al., 2019). This structured methodology allows for continual adjustments and improvements ensuring that the process remains relevant and effective over time.

Once the process is officially implemented, the case studies stress the importance of regular **evaluation and monitoring** as key components for tracking progress, assessing the impact of changes, and making further adjustments as needed. This cyclical assessment sustains improvements and ensures the process remains relevant over time. Poli et al. (2019) implemented feedback procedures throughout the process to provide immediate assessments of results and monitor the outcomes of decisions and actions taken.

Additionally, they circulated a questionnaire among relevant stakeholders and employed a self-assessment group to review the results, gathering further evidence to prepare a self-assessment report. They noted that "the self-assessment process produced an improvement plan that reflected the risk assessment feedback and identified four transversal improvement projects" (Poli et al., 2019, p. 13). This comprehensive approach to evaluation and monitoring underscores the importance of stakeholder involvement in the continuous improvement of processes.

In the **final documentation and knowledge** sharing cycle, most of the case studies created user-friendly guides, standard operating procedures (SOPs) and formalised learnings from each iteration to ensure consistent practices and facilitate knowledge transfer within the organisation. These documents were not only instructional materials but also foundational resources that promote effective training and onboarding of staff.

In examining the internal context, one case study highlighted that the greatest weakness of the process stemmed from overlapping responsibilities among team members (Kalish, 2023). The drafting of SOPs significantly mitigated this risk by clarifying roles and responsibilities. Additionally, a communication strategy was implemented to maintain staff awareness about the application and revision of the business processes, thus reinforcing compliance and best practices.

Another important aspect of the documentation process is that the documentation developed from these initiatives served as a communication tool, especially for those unfamiliar with research management. This approach proved to be highly effective in providing an initial grounding for stakeholders (Gibson et al., 2019). By fostering a clearer understanding of processes through documentation, organisations can enhance collaboration, reduce ambiguity, and support ongoing development within research management.

This literature review examined the use of process mapping in research and grant management, highlighting major cycles in the case studies for process mapping implementation. These cycles are described as cycles rather than steps to underscore the iterative and interdependent nature of the process. The review also revealed several findings that emphasised the significance of process mapping in enhancing organizational efficiency.

Despite the valuable insights gathered, several areas warrant further research to fully understand the application of process mapping within grant and research management. One such area is a deeper exploration of benchmarking, which is a common practice in research management. However, the most crucial gap in the case studies concerns the financial and resource implications of implementing and revising a business process. Understanding these implications is essential for evaluating the efficiency of grant management processes. In this article, we will specifically address this gap by utilising Activity-Based Costing (ABC) to determine the financial implications associated with a new or revised process, assess the capacity of the research team, and explore other resource considerations. This focus aims to bridge the gap between process efficiency and the financial realities organisations face in grant management.

THEORETICAL FRAMEWORK: OPERATIONAL PROCESS THEORY IN GRANT MANAGEMENT

This study employs operational process theory as a theoretical framework for analysing and improving

the efficiency and compliance for post-award grant management processes at UP. Operational process theory provides a valuable lens for understanding how work flows through an organisation, identifying areas for implementation and measuring the effectiveness of implemented changes (Wong et al., 2016). This theoretical framework guides the analysis of the "as-is" process, the identification of inefficiencies, and the evaluation of the revised processes, providing a foundation for interpreting the results and drawing meaningful conclusions.

Several perspectives within operational process theory can be applied to analyse grant management processes. This study primarily adopts the "process-as-flow" perspective. This perspective is particularly relevant because it allows for a focused analysis of how information and resources move through the various stages of the post-award grant management process at UP. By visualising the grant management process as a continuous flow, we can effectively identify bottlenecks, redundancies, and areas where delays or inefficiencies occur. This approach is crucial for optimising the movement of work through the system, ultimately reducing processing times, improving resource allocation, and enhancing overall efficiency. The "process-as-flow" lens enables a systematic identification and prioritisation of areas requiring improvement, leading to the development of more streamlined and effective grant management workflows.

The core concepts of operational process theory, namely process decomposition, workflow analysis, resource allocation, and performance measurements, provide the foundational framework for this study's methodology. Process decomposition, a key tenant of operational process theory, is achieved through process mapping, a core tool in this research. By systematically breaking down the complex grant management process into individual steps and sub-processes, we can identify areas of inefficiency and bottlenecks. This detailed analysis allows for a granular understanding of the process flow and facilitates the identification of specific targets for improvement, aligning with the principle of

systematically decomposing complete processes into manageable components for more effective analysis and optimization (Wong et al., 2016).

Furthermore, workflow analysis is applied through the detailed examination of workflow diagrams and process maps. This analysis reveals inefficiencies, redundancies, and potential conflicts within the grant management process, pinpointing areas where modification can enhance efficiency and resource utilisation. By visualising the flow of information and resources, we identify points of congestion or disruption and can implement targeted interventions to streamline the process and improve its overall effectiveness (Wong et al., 2016).

Resource allocation is addressed through the use of Activity-Based Costing (ABC). ABC allows us to assess the cost of each activity and sub-process, providing valuable data for informed decisions on resource allocation. This approach is directly relevant to the resource optimisation principle within operational process theory, helping us identify areas where resources can be reallocated for greater efficiency and impact (Drury, 2013).

Finally, performance measurement is central to evaluating the impact of implemented changes. By establishing clear performance indicators for each state of the revised process, we can systematically evaluate the effectiveness of our interventions. This data-driven approach aligns with the core principles of operational process theory, which emphasises the need for rigorous performance measurement to guide continuous improvement and inform future process adjustments (Wong et al., 2016).

By applying this theoretical framework, this study moves beyond purely descriptive case study to provide a theoretically grounded analysis for grant management processes, offering partial insights and actionable recommendations for improving efficiency and compliance in a resource-constrained university setting. This contributes to the growing body of knowledge on applying operational process theory within higher education or research administration contexts.

METHODOLOGY: CASE STUDY DESIGN WITH TRADITIONAL BUSINESS PROCESS ANALYSIS

This study employs a methodological framework that integrates a case study design with traditional business process analysis and improvement techniques. The aim is to comprehensively understand grant management processes within a specific research institution, yielding insights that are both detailed and broadly applicable.

The methodology encompasses several key approaches namely, Process Mapping and Activity-Based Costing (ABC).

Process mapping is a well-established management tool that provides a visual representation of workflows, enabling organisations to analyse and improve their business processes According to Damelio (2011, p. 31), process mapping "helps make work visible," allowing stakeholders to define the architectural framework of their work to ultimately "improve, measure, monitor, or execute the work". This visual tool is particularly useful in complex environments, such as higher education institutions, where multiple functions and compliance requirements must be navigated.

The need for effective process mapping arises from the inherent complexity of grant management, especially in a resource-constrained university setting. With the involvement of various support departments and the necessity to comply with differing requirements from multiple funding agencies, process mapping provides clarity by delineating roles, responsibilities, and the flow of information. By visualising the interactions and dependencies within the grant management workflow, institutions can identify inefficiencies and areas for improvement, thus enhancing overall operational effectiveness.

In this project, we employed process mapping as a structured approach to evaluate existing post-award grant management processes and develop new workflows that promote improved internal controls.

The evolution of compliance requirements from different awarding agencies necessitates a dynamic and adaptive approach. By using process mapping, we could continuously assess and revise our practices in response to these compliance demands and address findings from prior audits.

In summary, process mapping serves as an essential methodology for our project by enhancing the visibility of grant management processes, facilitating compliance with varying requirements, and enabling continuous improvement through systematic evaluation. By clearly depicting workflows, process mapping allows the GMU to redefine its practices, ultimately leading to improved efficiency and effectiveness in managing grant activities.

Introducing new compliance processes invariably incurs financial costs for the university. Most funding agencies permit an overhead charge, typically referred to as Facilities and Administration (F&A), to cover institutional compliance requirements. This charge is often calculated as a percentage of the grant, with U.S federal agencies usually imposing rates that range from 8% to 10% for foreign entities lacking a negotiated rate. A crucial consideration in this context is how much the recovered indirect costs align with the expenses incurred to ensure compliance. Universities are increasingly expected to supplement operational funding to expand research-related support, creating an additional financial burden (Kamensky, 2020; Mosley et al., 2020).

In this project we opted to use Activity-Based Costing (ABC) rather than traditional costing methods for allocation indirect costs. Traditional costing methods often rely on simplistic measurements such as labour hours and machine hours for distributing overhead costs. While labour hours remain the primary cost driver in this project, the ABC framework offers a more nuanced and detailed approach compared to traditional methods (Drury, 2018). Traditional systems typically apply labour hours as a broad-based and somewhat indiscriminate measure across all operations. In contract, ABC uses labour hours (or minutes) to

reflect the specific time invested in each distinct activity and sub-process.

This methodology allows for the identification of the exact time spent on each granular activity as documented in the process mapping phase, resulting in a more detailed and accurate cost analysis. Through ABC, labour hours are directly linked to specific activities, enhancing the alignment of cost assignments with actual resource consumption. Furthermore, the hours allocated are not simply distributed proportionately based on time; they also account for the intensity and complexity of the work involved in each activity. The principal distinction between traditional costing methods and ABC is that ABC provides a flexible and detailed approach to cost allocation. This flexibility enables adjustments based on varying complexities, compliance requirements of grants, and the improved proficiency of administrators.

ABC quantifies the impact of each process step within the grant management operations, thereby providing a clear picture of cost efficiency. By assessing costs associated with various activities, ABC aids in identifying areas where resource allocation can be optimized and suggests potential enhancements to operational efficiency in grant management.

By integrating operational and financial analyses with qualitative insights derived from the case study, we achieve a holistic perspective on the grant management processes (Eisenhardt, 1989). Although the insights from this study are specific to one institution, they serve to inform general practices and establish benchmarks for other institutions (George & Bennett, 2005).

Data for this study was primarily collected through a mixed-method approach, integrating qualitative and quantitative elements. Key data sources included semi-structured interviews with university staff and researchers, analysis of compliance requirements from funding agencies (notably NIAID) and internal audit findings, review of procedural documentation from mentoring institutions (Michigan State University

and the University of Washington), and collaborative working sessions with a project team composed of grant management and finance personnel.

The impetus for this project emerged from a series of compliance audit findings received in 2017 from the U.S. National Institute for Allergies and Infectious Diseases (NIAID), which provided a five-year timeline for responses. The audit contained several compliance and management recommendations, prompting the need for significant process improvements. This included establishing oversights and enhancing grant management protocols as detailed below:

Audit Findings and Recommendations

Key compliance recommendations from the audit included:

- Establishing a process to assess compliance threshold based on federal grant expenditure.
- Implementing a Financial Conflict of Interest Policy
- Documenting procedures for drawing down payments from the Payment Management System
- Creating and documenting processes for budget modifications
- Expanding travel and per diem guidelines in accordance with U.S. federal regulations
- Preparing guides to ensure researchers remain informed about compliance with publication terms and conditions
- Implementing grant close out procedures.

Management recommendations included:

- Implementing procedures for proper asset tagging as specified by the Grant Policy Statement
- Continuously evaluating and improving overall grant management, encompassing both financial and non-financial administration

Given the limited capacity of the core grant management team at the time—comprising only three administrators—the institution encountered challenges in addressing these audit findings.

In 2019, the award of a grant from NIAID aimed at strengthening research management capacity provided an opportunity to approach the audit findings as a structured project focusing on compliance and process enhancement. A two-week training programme in New Bethesda and mentoring from Michigan State University and the University of Washington were essential components of this capacity-building effort.

Ethical Considerations

This project was conducted as an internal operational analysis and process improvement imitative within the University of Pretoria. According to current institutional practices for this type of internal study, formal review by the Institutional Review Board was not required. Nevertheless, the project fully adhered to ethical principles regarding human participants. All individuals who provided information through interviews were fully informed of the study's purpose and the intended use of the data. While participation in process improvement initiatives aligns with employee responsibilities, each individual's contribution to the interviews was treated as voluntary. Participants were aware that their input would be used to improve institutional processes and were assured that their individual responses would be kept confidential and presented in an anonymized format to project their identity and encourage open feedback.

Methodological Timeline

To systematically align our research with the NIAID audit findings, the timeline of the methodology comprises the following key phases:

Phase 1: Preliminary Planning and Initial Interviews (3 months)

We developed the initial project plan to respond to the audit findings, which included mapping the "as-is" post-award processes. At the time, these mainly consisted of the Contracts and Intellectual Property Division and the Department of Finance. To gather this preliminary data, we conducted interviews with UP researchers with active U.S. federal grants, financial administrators, and the legal personnel (four UP researchers, four finance individuals and two legal team members) to assess existing activities and compliance oversight gaps.

These initial interviews revealed significant frustration among researchers regarding the limited and fragmented nature of post-award grant management support. This was compounded by a perception among many support personnel that the majority of compliance monitoring was primarily the responsibility of the Primary Investigator, rather than a shared institutional function. Findings indicated that post-award support often siloed within different support departments, lacking an overall seamless process across these support departments. Furthermore, the existing processes were often not well-documented within the institution, contributing to inconsistencies.

Phase 2: Initial Data Collection (18 months)

Most of the data collection occurred within the framework of the NIAID mentorship and training programme associated with the grant. NIAID personnel offered two weeks of in-person training focused on compliance requirements, with specific emphasis on foreign entities and a variety of essential topics, including financial audits, federal financial reporting and grant management protocols.

In addition to this training that provided insight from the funder's perspective, two UP grant administrators and one finance person participated in a week-long mentoring and benchmarking experience at Michigan State University and the University of Washington, allowing for practical insights into effective compliance processes.

The two weeks of in-person training proceed critical insights from the funder's perspective, while the week-long mentoring experience at Michigan State University and the University of Washington was particularly impactful, generating both excitement about potential efficiencies and a clearer understanding of the significant effort required for successful implementation.

Phase 3: Comprehensive Data Analysis (3 months)

During this phase we conducted extensive document analysis to review both compliance requirements from NIAID and best practices from the mentoring institutions. Comparisons were drawn with the mentoring institutions' procedural and policy guides to ensure that we develop policy and procedural guides that comply with established standards.

Phase 4: Process Mapping and Revision (13 months)

We convened a project team that consisted of grant administrators and finance personnel to improve the "as-is" post-award process by incorporating numerous compliance activities previously lacking in the initial planning phase. Weekly project team meetings facilitated robust discussions on real-time data and challenges encountered during the mapping process. Team members openly shared frustrations with existing bottlenecks, and collaborative sessions often led to 'aha!' moments as more efficient future processes were designed.

During the process mapping phase, workflows were segmented into macro and sub-processes through facilitated project team workshops. The project team evaluated activities within these processes, identifying value-adding versus non-value adding activities based on their contribution to fulfilling grant requirements and achieving institutional objectives, informed by insights from mentoring institutions and compliance audits.

Phase 5: Cost Analysis (2 months)

For the purpose of Activity-Based Costing (ABC), labour time, specifically the time spent by personnel on each defined task within the post-award process, was identified as the primary cost driver. Time estimates for each task were primarily determined through a combination of structured interviews with the personnel performing these tasks, the duration indicated during our benchmarking visits to the U.S. universities and reference to existing institutional time allocation data where available. These time estimates were recorded in minutes per task.

Human Resource costs were defined to include personnel salaries and standard institutional benefits. An hourly cost rate for relevant personnel categories (e.g., Grant Administrator, Research Manager, etc.) was calculated based on average salary and benefit data provided by the University's Human Resource Department. These rates were then applied to the time estimates for each task to determine the labour cost per activity.

Phase 6: Implementation of New Processes (10 months and ongoing)

Gradual implementation of new processes began, focusing on developing Standard Operating Procedures (SOPs), updating the microsites with the new procedures, conducting training for researchers and research administrators, and hosting roadshows to communicate changes effectively across faculties.

Roadshow communicating changes across faculties were met with mixed reactions; while the potential or increased efficiency was welcomed by many, others expressed concern about the impact of the revised compliance steps on their existing workflows.

Phase 7: Continuous Monitoring

The post-award process is under ongoing review to adapt to new compliance requirements and address evolving Human Resource challenges, with a focus on efficiency both in operational and resource allocations.

By following these seven steps, we aimed to address the identified gaps in grant management processes and enhance compliance efficiency within the University.

Institutional Selection and Researcher's Perspective

The institution for this study was chosen due to its direct relevance to the audit findings from the NIAID, providing a unique opportunity to explore the implicated grant management processes. As the Research Manager, the researcher possesses

firsthand experience with these processes, enriching the analysis through an insider's perspective.

While this insider position allows for deeper insights, potential biases were mitigated through data triangulation and actively cultivating an environment during stakeholder interactions that encouraged open and critical feedback on existing processes and proposed changes, irrespective of the reporting lines. Furthermore, external validation from mentors at U.S. universities was sought through the research process. These measures served to enhance the validity and reliability of the fundings, ensuring that solutions proposed are not solely reflective of an insider perspective.

FINDINGS

This findings section is organised according to the principles of operational process theory, highlighting the decomposition of the grant management process, workflow analysis, resource allocation, and performance indicators. Each component provides insights into the current state and potential areas for improvement in the institution's grant management practices.

Decomposition of the Process

In the post-award grant management processes at UP, we identified three macro processes: *A-0 Setting up a Grant*; *B-0 Compliance Monitoring*; and *C-0 Close Out*. The Appendix provides a detailed table format of the post-award process map, outlining these three macro processes, their sub-processes, and the individual tasks within each sub-process. This table also clearly indicates the responsible Grant Administrator and support department responsible for each task. The involvement of the GMU in post-award management begins only after the Notification of the Award (NoA) or grant agreement has been successfully executed by Contracts and IP Division and the Department of Finance has created a unique cost centre number for the specific project. Once the Department of Finance disseminates an email that contains the cost centre

data to the Principal Investigator (PI), the faculty accountant, and the GMU, the grant management team initiates the process of setting up the grant.

Each of the macro processes contains several sub-processes, identified as A-1, A-2, B-1, B-2 and so forth under the respective macros. The macro processes A-0 (Setting up a Grant) and C-0 (Close Out) comprise specific activities. In contrast, the macro process B-0 (Compliance Monitoring) does not have explicitly defined activities, but instead includes a series of sub-processes, each encompassing detailed activities necessary for the project or compliance management.

It is important to note that not all sub-processes are mandatory. For example, sub-processes A-5.1 (UP as a Sub-Recipient) and A-5.2 (Sub-Recipient Management on UP Grants) depend on whether UP serves as a sub-recipient or has a sub-recipient involved in a grant. According to the GPS compliance requirements, a sub-recipient is unable to appoint another sub-recipient, leading to three possible scenarios:

Scenario 1: UP acts as the Principal Investigator (PI) with no sub-recipients, in which case neither sub-processes A-5.1 nor A-5.2 is necessary.

Scenario 2: UP functions as the sub-recipient alongside another institution, thereby necessitating adherence to sub-process A-5.1.

Scenario 3: UP is the prime awardee with sub-recipients, requiring compliance with sub-process A-5.2.

These scenarios cannot coexist simultaneously; thus, the relevant scenario must be selected based on specific project and grant requirements. Throughout mapping the post-award grant management activities, the project team mapped these alternative scenarios.

The depiction of the post-award grant management process from the perspective of GMU illustrates

that involvement in post-award management commences only after the grant agreement is finalised by the Contract and Intellectual Property Division and the cost centre has been established by the Department of Finance. Consequently, many compliance requirements outlined in the macro and sub-processes were not handled by any support department prior to the commencement of this project. Instead, the explanation was that compliance would primarily fall under the PI's responsibility. This issue is especially relevant concerning compliance requirements for Financial Conflict of Interest, sub-recipient management, and close out procedures.

Despite the audit findings indicating several areas for improvement, further analysis revealed additional aspects of the grant management processes that do not adequately support UP researchers or provide sufficient institutional oversight. The exception to this is sub-process A-2, which involves the request for institutional facilities, particularly for U.S. federal grants. This process is designed to avoid interest accrual on unspent funds by submitting or preparing invoices based on actual expenses incurred. A-2 is an established process, primarily executed by personnel from the Department of Finance.

A difference identified between the U.S. universities and our office pertains to the administration of grant-holder linked bursaries, which are allowable costs included in the awarded budget. The sponsored program offices at our U.S. mentors' institutions did not manage grant-holder linked bursaries. However, due to limited capacity the responsibility for administering and overseeing these bursaries rests with GMU. This encompasses developing a policy, procedural guides, and bursary agreements, ensuring that students' eligibility criteria are met (particularly in relation to the eligibility criteria of other student support), obtaining necessary agreement signatures, and monitoring the student throughout report submission and necessary renewals based on supervisor evaluations.

Importantly, we found that we could not benchmark best practices from the U.S. universities' sponsored programs office regarding bursary administration. Instead, we drew insights from best practices established within our own bursary office. Currently, GMU administers grant-holder linked bursaries related to grants other than those awarded by the South African National Research Foundation and freestanding bursaries. On average, GMU manages 24 grant-holder linked bursaries per year, and there is a growing trend in the number of grants that include postgraduate bursaries, reflecting an increasing demand for such support within our institution's grant management framework.

Workflow Analysis

To optimize the identified processes within the grant management framework, we plotted the ideal workflow based on insights gathered from interviews with our U.S. mentoring institutions and the compliance requirements stipulated by funding agencies. Figure 1 illustrates the hierarchical structure of these processes, beginning with the three macro processes, which are further broken down into sub-processes. While this figure presents a high-level overview, detailed flowcharts for each sub-process exist, breaking down the steps to a task level and utilizing "swim lanes" to indicate the responsible grant administration function within GMU or other support department.

In the high-level as well as detailed flowcharts, activities that are required to be performed are represented as rectangles, each accompanied by a brief description that begins with a verb (e.g., "Request," "Review," "Approve"). This format allows for immediate clarity regarding the purpose of each activity. To denote the need for specific documents associated with particular activities, we created a designated symbol, ensuring that participants can easily identify where documentation is necessary. Additionally, decision points within the workflow are indicated by diamond shapes, emphasising that not all steps within a sub-process are requisite.

Figure 1
High-Level Post-Award Grant Management Process Map
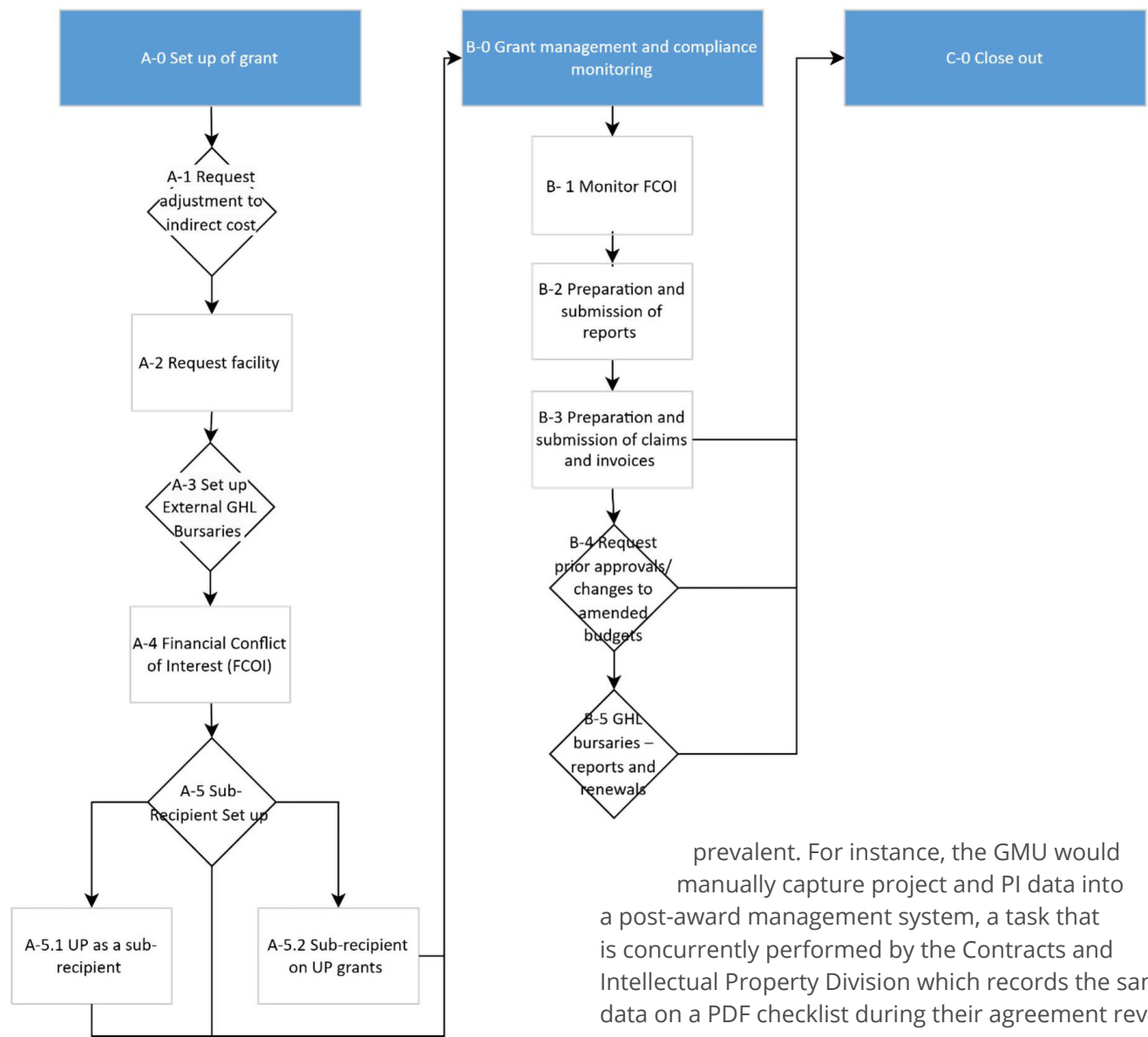
Each of these symbols was positioned within the relevant "swim lane" of the corresponding support department or GMU function responsible for that specific activity. By logically connecting these elements, we established a coherent workflow that visually represents the interaction between various activities and the corresponding departments or functions.

The examination of the workflows uncovered significant areas where duplicative activities are prevalent. For instance, the GMU would manually capture project and PI data into a post-award management system, a task that is concurrently performed by the Contracts and Intellectual Property Division which records the same data on a PDF checklist during their agreement review process. This redundancy arises from the lack of an integrated management system across supporting departments and reflects a broader institutional challenge—namely, the absence of a cohesive system to oversee the entire grant management process.

The lack of an integrated approach has led to numerous delays. Specifically, when requesting institutional facilities, which is conducted via an Excel form that is circulated for approval, there is often confusion regarding the current status of the approval process.

Another critical finding was that the GMU performs certain sub-processes aimed at monitoring activities from other support departments. For example, *sub-process A-1,* which involves requesting adjustments to indirect costs, ideally should either be confirmed prior to submission or before finalising the agreement. However, the GMU frequently identifies discrepancies between the indirect cost listed in the agreement and that documented in the checklist completed by the legal office. There is a separate sub-process to rectify discrepancies in the indirect cost listed in the agreement in an accompanying checklist.

By clarifying these workflows and emphasising their interconnected nature through analysis, the GMU can target specific areas for process improvement while enhancing efficiency across grant management operations.

Resource Allocation

The adoption of ABC principles in this project commenced with the identification and listing of all activities and sub-processes as documented in the process map. This step is crucial in ABC, emphasising the need to recognise all activities that consume resources, thus contributing to the final cost. The subsequent step involved allocating costs according to the time dedicated to each activity by grant administrators (refer to the Appendix).

With ABC, cost allocation is driven by specific factors known as cost drivers; in this case, the minutes allocated to an activity by an administrator. Costs related to personnel from other support departments were excluded due to data unavailability. Nonetheless, this approach still provides detailed insights regarding the time invested by GMU administrators.

ABC can effectively determine activity levels attributed to specific administrators and can also inform how many grants can be actively managed within a year. Assuming approximately 260 working days annually and those administrators work eight hours per day, this amounts to a total of 10,400 working hours each

year. The process mapping showed that, on average, administrators spend 33.42 hours per grant (more details in the Appendix). This calculation indicates that the GMU team could manage up to 311 grants annually before the need for additional staffing arises. The process map and accompanying ABC calculations further reveal disparities in hours worked by different staff.

Moreover, the observation that the average grant incurs administrative fees of R11,111.71 facilitates a more straightforward assessment of whether the overhead rate (as a percentage of the grant) is appropriate for the level of services provided.

ABC also allows for differentiating service levels, recognising that various grants necessitate differing intensities of support. This principle ensures precise attribution of costs according to actual resource consumption, significantly enhancing the accuracy of cost allocation. The ethos of continuous improvement, the cornerstone of ABC, is embodied in the expectations of potential cost reductions as the team becomes more proficient in their processes. ABC fosters an environment conducive to analysing activities.

Additionally, ABC enables comprehensive cost assessments for new implementations, capturing the entire spectrum of activity, including the development of templates and conducting roadshows. This holistic approach to costing is integral to the ABC model, ensuring that one-time costs associated with the development and implementation of grant management processes are thoughtfully accounted for.

Performance Indicators

In assessing the effectiveness of the post-award grant management processes at UP, a range of performance indicators were established to provide measurable insights into efficiency and cost-efficiency. These indicators not only facilitate evaluation of current practices but also reveal opportunities for significant improvements throughout the grant management lifecycle.

The performance indicators identified include the following:

- **Cost per Grant:** This indicator measures the total administrative cost associated with each managing each grant. It serves as a management indicator that assesses the effectiveness and efficiency of the post-award management process overall. By analysing this cost, the GMU can identify areas where improvements can be made thereby fostering a focus on continuous process enhancements. A lower cost per grant reflects not only better resource management but also improved operational practices.

- **Compliance Error Rate:** This measures the frequency of compliance-related errors identified during audits or reviews. Specifically, we use the number of audit findings as listed within the auditor's reports to quantify this rate. Tacking this compliance error rate helps highlight areas that may require additional training or clearer processes to reduce instances of non-compliance.

- **Time to Complete Grant Setup:** This indicator tracks the average time required to onboard grants, which is critical for optimising resource allocation and ensuring timely compliance with funder requirements. Timely grant setup enhances overall compliance by making the Principal Investigator (PI) aware of the compliance requirements that may not be explicitly listed in the NoA. Reducing this timeframe not only accelerates the distribution of funds to the researchers but also improves overall stakeholder satisfaction. By ensuring that the PIs are informed early in the process, the GMU fosters a greater understanding of compliance obligations, ultimately leading to improved adherence to requirements.

- **Percentage of Unclaimed Funding:** This indicator measures the proportion of available funding that was not claimed. A high percentage of unclaimed funding may serve as an indirect measure of compliance, reflecting potential barriers faced by researchers in executing their projects. Moreover, high levels of unclaimed funding can also indicate underperformance in research activities, which necessitates further investigation into the procession of these activities and overall compliance. Unclaimed

funding can also suggest that the administrator failed to prepare invoices and submit payment claims in a timely manner to ensure continuous cashflow to fund research activities.

When selecting these performance indicators, it is crucial to consider the data sources required for monitoring performance. This includes determining whether data will need to be collected manually or if an existing system can generate the necessary information. For instance, for a significant period, we utilised a shared Excel drive among administrators to track the date the Department of Finance disseminates the cost centre email and compared it to the date that GMU completed the grant set up. However, since this Excel list was not consistently maintained, it often resulted in incorrect data. To improve the accuracy, we developed a report from our post-award system that tracks this information effectively, enhancing the reliability of our performance measurement.

Importantly, these performance indicators are integrated into the administrators' key performance agreements (KPAs). These indicators are monitored quarterly and assessed to ensure that the GMU meets its operational goals. This structured evaluation not only drives accountability among staff members but also encourages continuous improvements in grant management practices.

In conclusion, by closely monitoring these performance indicators, UP can identify specific areas for improvement. The insights gained from this analysis will inform strategies to enhance overall process efficiency, thereby improving both cost management and stakeholder experiences.

DISCUSSION

The primary research question guiding this study was: **To what extent does the combined application of process mapping and Activity-Based Costing improve the efficiency and compliance of post-award grant management processes in a resource-constrained higher education institution?**

The findings of this study suggest that the integration of process mapping and Activity-Based Costing (ABC) significantly enhances the efficiency and compliance of post-award grant management processes at UP. By employing process mapping, we gained a comprehensive visual representation of the existing grant management workflows, enabling us to identify inefficiencies, redundancies, and areas for improvement. Through this visual analysis, we systematically broke down the macro processes involved in grant management, specifically setting up a grant, compliance monitoring and the close out process, into detailed sub-processes. This decomposition revealed specific activities that needed to be streamlined or enhanced, allowing for a more efficient allocation of resources.

Importantly, ABC serves as another means to evaluate process efficiency. Previous case studies that employ process mapping often overlooked the cost aspect in their evaluations. This gap is significant, as compliance in grant management carries inherent costs for institutions. While some funding agencies allocate resources toward compliance costs, these funds frequently do not cover the actual costs incurred by the institution. By integrating ABC into our process analysis, we took a critical step toward determining the cost-effectiveness of the process. This approach not only assessed how much funding was necessary to ensure compliance but also highlighted potential avenues for reducing costs to improve overall funding efficiency.

A question that may arise is how this cost calculation differs from the methodologies that institutions use to determine their indirect costs. Higher education institutions often utilize different methodologies for this purpose. For example, universities in the UK frequently employ Activity-Based Costing to determine their indirect costs, allowing for a more nuanced and accurate assessment of resource utilisation. In contrast, South African universities tend to use estimates, which can result in less precise calculations. The use of ABC in this context provides a clearer indication of the actual costs required by the grant management team, enabling comparison with the indirect cost claimed from grants. This comparison can reveal discrepancies and further inform decision-making regarding resource allocation and compliance strategies.

The implementation of ABC augmented efficiency by facilitating a nuanced understanding of the costs associated with each grant-related activity. Traditional costing methods often fail to accurately capture the complexities of resource consumption; however, ABC allowed us to link labour hours directly to specific tasks, accurately reflecting the true cost of administrative efforts. By identifying where resources were underutilised or misallocated, we could target improvements in efficiency and effectiveness within the grant management system.

Our findings also indicate that by closely monitoring specific performance indicators, including the cost per grant, time to complete grant setups, and the percentage of unclaimed funding, the GMU can proactively manage and improve compliance and operational efficiency. For example, addressing discrepancies in indirect cost rates during the pre-award phase not only reduces the administrative costs, but also fosters a culture of continuous improvement, enabling the institution to adapt more effectively to the resource constraints typically faced by higher education institutions.

In summary, the combination of process mapping and Activity-Based Costing has demonstrably improved both the efficiency and compliance of post-award grant management processes at UP. This integrated approach provides a valuable framework that other resource-constrained universities may adopt to enhance their grant management practices. Consequently, this study underscores the potential benefits of employing systematic and analytical methods to streamline administrative processes within higher education, paving the way for further research and application in similar contexts.

RECOMMENDATIONS

In light of the findings from this study, it is recommended that resource-constrained institutions adopt a combined methodology of Activity-Based Costing (ABC) and process mapping as a systematic approach to implementing or revising grant management processes. This integration is essential for ensuring compliance with funders' requirements while effectively managing limited resources.

Process mapping alone is invaluable for institutions needing to revise or establish new grant management processes, as it enables clear visualisation of workflows and accountability. This practice becomes particularly crucial for institutions with a single grant management team that is responsible for meeting varying compliance requirements from multiple funding agencies.

Utilising ABC in conjunction with process mapping allows resource-constrained universities to refine their processes and minimise the inevitable losses associated with recouping compliance costs from indirect cost claims. For these institutions, it is vital to focus on both the operational effectiveness of their process and the cost efficiency of their operations. By evaluating the process map through the lens of ABC, universities can identify specific resource allocations per activity, allowing them to reduce waste, enhance productivity, and ensure that compliance efforts remain sustainable from a financial perspective.

A crucial aspect of this improvement strategy is the establishment of effective benchmarking practices. It is imperative to recognise and address subtle compliance differences between foreign institutions, such as UP, and their U.S. counterparts. Different institutions may have distinct compliance requirements, and it is erroneous to assume that the hosting institution is inherently familiar with the specific compliance necessities of the foreign institution. Thus, having a thorough understanding of these variances is crucial before embarking on benchmarking sessions.

Furthermore, disparities in human resource capacity must be acknowledged. While most U.S universities boast specialized research professionals, institutions with fewer resources, such as UP, often require a broader skill set within their administrative teams. This distinction significantly influences the articulation of processes and may pose challenges in comprehending the intricacies of the entire institutional process. Therefore, a diligent approach is paramount in preparation for benchmarking sessions. This involves systematically studying compliance and resource disparities between institutions and avoiding feelings of being overwhelmed. Taking manageable steps and effectively utilising available resources can help draft a roadmap for future improvements, even if those improvements are incremental.

An important recommendation during the process evaluation involves paying particular attention to the handover points within the grant management processes. In process mapping, the handover point is defined as a specific juncture where responsibilities, tasks, or information transfer from one function or individual to another. These handover points represent crucial intersections in the workflow that warrant particular attention, as they are potential sources of hindrances and delays. Optimising these handovers can help reduce duplicative requests and data entry, thereby improving overall efficiency. System developments should pay close attention to these points to ensure that work flows seamlessly between functions and enhances transparency.

Finally, institutions seeking to acquire or develop grant management systems should prioritise the combination of process mapping and ABC. A thorough understanding of compliance requirements, alongside an accurate mapping of existing operational processes, is crucial prior to implementing any new system. This approach will enable institutions to better align their system with specific compliance goals and operational needs. Additionally, ABC can help identify areas within the grant management processes where automation could be advantageous,

potentially leading to reduced costs or eliminating unnecessary activities or sub-processes altogether.

By following these recommendations, resource-constrained institutions can significantly strengthen their grant management practices, ensuring compliance while optimising resource allocation. The integration of Activity-Based Costing and process mapping not only aligns operational processes with compliance requirements but also establishes a framework for continuous improvement in the management of research funds.

CONCLUSION

In conclusion, this study demonstrates that a combined approach of process mapping and Activity-Based Costing significantly enhances the efficiency and compliance of post-award grant management, particularly within resource-constrained settings. By systematically identifying and addressing inefficiencies, optimising resource allocation, and establishing clear performance indicators, institutions can create effective and suitable grant management practices. The integrated methodology presented here provides a valuable framework for continuous improvement and better alignment with funding agencies' requirements.

AUTHORS' NOTE

Originality note

This manuscript reflects the original work of Ninette Kotzee and Elda du Toit. Any references used in developing the manuscript are cited.

Funding

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REFERENCES

Damelio, R. (2011). *The basics of process mapping* (2nd ed.). CRC Press.

Drury, C. M. (2013). *Management and cost accounting*. Springer.

Drury, C. M. (2018). *Cost and management accounting*. Cengage Learning.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review, 14*(4), 532-550. https://doi.org/10.2307/258557

George, A. L., & Bennett, A. (2005). *Case studies and theory development in the social sciences*. MIT Press.

Gibson, J., Goel, K., Barnes, J., & Bandara, W. (2019). Towards a process reference model for research management: An action design research effort at an Australian university. In T. Hildebrandt, B. van Dongen, M. Röglinger, & J. Mendling, (Eds.), *Business process management: BPM 2019* (pp. 338-353). Springer, Cham. https://doi.org/10.1007/978-3-030-26619-6_22

Greer, D. (2015). *Federal grant management and controls select assessments.* Nova Publisher.

Holbrook, A., Bowen, J. M., Patel, H., O'Brien, C., You, J. J., Tahavori, R., Doleweerd, J., Berezny, T., Perri, D., Nieuwstraten, C., Troyan, S., & Patel, A. (2016). Process mapping evaluation of medication reconciliation in academic teaching hospitals: A crucial step in quality improvement. *BJM Open, 6*(12), e013663. https://doi.org/10.1136/bmjopen-2016-013663

Kalish, S. (2023). Awarding equitably: A process design framework for city grantmakers [Master's thesis, Massachusetts Institute of Technology]. https://hdl.handle.net/1721.1/152509

Kamensky, J. (2020, January 30). *Reducing administrative burden* [Blog post]. IBM Center for the Business of Government. http://www.businessofgovernment.org/blog/reducing-administrative-burden

Mosley, L., Forsberg, J., & Ngo, D. (2020). *Reducing administrative burden in federal research grants to universities* [Report]. IBM Center for the Business of Government. http://www.businessofgovernment.org/report/reducing-administrative-burden-federal-research-grantsuniversities

Poli, M., Bianchini, E., Cornolti, D., Pardini, S., Pisano, E., Simi, E., Tedeschi, L., & Iervasi, G. (2020). How does it work a quality/performance management system in a biomedical research institution? Lights and shadows. *International Journal for Quality Research, 15*(3), 871–888. https://www.doi.org/10.24874/IJQR15.03-12

Schiller, J. L., & LeMire, S. D. (2023). A survey of research administrators: Identifying administrative burden in post-award federal research grant management. *Journal of Research Administration, 55*(3), 9-28. https://files.eric.ed.gov/fulltext/EJ1412033.pdf

Steel, M. (2005, December 5-7). Process mapping techniques to investigate the implementation of customer relation programs. *ANZMAC 2005: Conference proceedings: broadening the boundaries.* Freemantle, WA. http://smib.vuw.ac.nz:8081/WWW/ANZMAC2005/cd-site/pdfs/11-MR-Qualitative/11-Steel.pdf

Strasser, J. E., Cola, P. A., & Rosenblum, D. (2013). Evaluating various areas of process improvement in an effort to improve clinical research: Discussions from the 2012 Clinical Translational Science Award (CTSA) Clinical Research Management Workshop. *CTS Journal, 6*(4), 317-320. https://doi.org/10.1111/cts.12051

Temples, B., Simons, P., & Atkinson, T. N. (2012). Case study: Research administration training and compliance at the department level for a predominantly undergraduate institution. *Research Administration Review, 19*(1), 1-21. https://files.eric.ed.gov/fulltext/EJ1002155.pdf

Wong, I., Bishopp, S. A., & Schlager, M. (2016). Costs of policing: An examination of jail efficiency related to medical intake procedures. *Criminal Justice Review, 41*(3), 278–293. https://doi.org/10.1177/0734016816648187

APPENDIX

Post-Award Process Map

GRANT MANAGEMENT PERSONNEL	Activity performed by other support departments*	GMU Admin 1	GMU Admin 2	GMU Admin 3	GMU Admin 4	Total
Annual cost to company salary		R90 000.00	R489 147.00	R1 164 612.00	R372 141.00	R2 115 900.00
Salary per month		R7 500.00	R40 762.25	R97 051.00	R31 011.75	R176 325.00
Salary rate per hour		R43.40	R235.89	R561.64	R179.47	R1 020.40
Salary per minute		R0.72	R3.93	R9.36	R2.99	R17.01

A-0 Setting up a grant						
Create a cost centre	x					0
Update PAGMS		20				20
Load agreement to P-GAMA			45			45
Create claim form					30	30
Verify/ set up funding agency/ prime recipient as a customer on procurement			10			10
Review P-GAMA and docs				45		45
Briefing meeting with PI			30			30
PI signs off grant set up and claim form	x					0
Update P-GAMA with additional			30			30
Sub-Total (minutes)		**20**	**115**	**45**	**30**	**210**
Calculation of cost and time for A-0 Setting up a grant						
Total minutes per award		20	115	45	30	210
Activity cost per administrator		R14.47	R452.13	R421.23	R89.73	R977.56

A-1 Request an adjustment to indirect cost						
PI prepares motivation for adjustment	x					0
Verify documents for adjustments request				20		20
Waiver committee convenes	x			60		60
Communicate feedback to PI, request adjustments on a checklist, inform faculty Administrator				20		20
Faculty Administrator adjust the indirect rate on UP Finance	x					0
Sub-Total (minutes)		0	0	100	0	100
Calculation of cost and time for A-1 Request and adjustment to indirect cost						
Total minutes per award		0	0	100	0	100
Activity cost per administrator		R0.00	R0.00	R936.06	R0.00	R936.06
A-2 Request facility						
Calculate facility required			10			10
Complete facility form			15			15
Verify facility calculation				20		20
Request Finance for approval			10			10
Monitor release of facility in cost centre			20			20
Update facility renewal reminder on P-GAMA			10			10
Sub-Total		0	65	20	0	85
Calculation of cost and time for A-2 Request a facility						
Total minutes per award		0	65	20	0	85
Activity cost per administrator		R0.00	R255.55	R187.21	R0.00	R442.76

A-3 Set up of external grant-holder-linked bursaries						
Obtain and verify a list of postgraduate students					15	15
Monitor if the proposed student has existing bursaries and/or other eligibility requirements					15	15
Address any conflict of interests				20		20
Prepare draft bursary agreement/ use an existing template					20	20
Review and approve the draft bursar agreement				20		20
Sign off on the agreement	x					0
Request bursar code from Finance					10	10
Student Finance creates a Bursar Code	x					0
Request and monitor that student signs bursar agreement					10	10
Load Financial Aid					20	20
Schedule payments					20	20
Update the control list with student report dates					10	10
Sub-Total		0	0	40	120	160
Calculation of cost and time for A-3 Set up of external GHL bursaries						
Total minutes per award		0	0	40	120	160
Activity cost per administrator		R0.00	R0.00	R374.43	R358.93	R733.36

A-4 Financial Conflict of Interest (FCOI) annual declaration and 5-Y training on all US Federal grants					
Review proposal, draft list of key personnel and request PI to confirm			20			20
PI prepares a list of key personnel	x					0
Request key personnel to complete declaration and training			15			15
PI and key personnel to complete FCOI declaration and training	x					0
Follow up and monitor compliance			30			30
Update control list			10			10
Sub-Total		**0**	**75**	**0**	**0**	**75**
Calculation of cost and time for A-4 Financial Conflict of Interest (FCOI) annual declaration and 5-Y training on all US Federal grants					
Total minutes per award		0	75	0	0	75
Activity cost per administrator		R0.00	R294.87	R0.00	R0.00	R294.87
A-5.1 UP as sub-recipient					
Submit request to complete sub-recipient forms	x					0
Verify grant on PAGMS					15	15
Verify allowable indirect cost					15	15
Address any errors in indirect cost				30		30
Inform KK of FCOI training if required					15	15
Complete due diligence forms and obtain relevant signatures					60	60
Update PAGMS status					15	15
Sub-Total		**0**	**0**	**30**	**120**	**150**

Calculation of cost and time for A-5.1 UP as sub-recipient					
Total minutes per award		0	0	30	120	150
Activity cost per administrator		R0.00	R0.00	R280.82	R358.93	R639.75
A-5.2 Sub-recipient on UP grant					
Verify debarment and suspension					15	15
Verify indirect cost					15	15
Address any errors in indirect or debarment				30		30
Request sub-recipient to complete due diligence					15	15
Follow up and monitor					20	20
Review completeness					20	20
Review due diligence and claim form (Committee)	x			30		30
Draft management plan	x			45		45
Update PAGMS with sub-recipient documents					15	15
Register sub recipient on UP supplier database					15	15
Draft and execute sub-award agreement						0
Sub-Total		**0**	**0**	**105**	**115**	**220**
Calculation of cost and time for A-5.2 Sub-recipient on UP grant					
Total minutes per award		0	0	105	115	220
Activity cost per administrator		R0.00	R0.00	R982.87	R343.98	R1 326.84
B-1 Monitor FCOI compliance					
Draw a report from the control list of key personnel who need to complete FCOI			15			15
PI confirm key personnel and status of FCOI declaration and training	x					0

Contact key personnel members for annual FCOI declaration and 5-year training			30			30
Follow up and monitor			30			30
Update control list for audit compliance			30			30
Sub-Total		**0**	**105**	**0**	**0**	**105**
Calculation of cost and time for B-1 Monitor FCOI compliance						
Total minutes per award		0	105	0	0	105
Activity cost per administrator		R0.00	R412.81	R0.00	R0.00	R412.81
B-2 Preparation and submission of reports						
Draw report each month from P_GAMA of upcoming reports due			15			15
Identify which reports submitted via systems and directly			15			15
Confirm if report is required for the release of funds			15			15
Request FA to complete financial report			15			15
UP Finance completes finance report and signs off	x					0
Follow up and monitor on financial report			15			15
Request PI to complete narrative report			15			15
PI completes narrative report	x					0
Follow up and monitor on narrative l report			15			15
Submit report to funding agency via email			15			15
Review and submit report as institutional authority				30		30

Update PAGMS with the final reports			15			15
Update report status on P-GAMA			15			15
Sub-Total		**0**	**150**	**30**	**0**	**180**
Calculation of cost and time for B-2 Preparation and submission of reports						
Total minutes per award		0	150	30	0	180
Activity cost per administrator		R0.00	R589.73	R280.82	R0.00	R870.55
B-3 Preparation and submission of claims and invoices						
Draw report from P-GAMA of upcoming reports due					15	15
Request faculty accountant to complete claim form					15	15
Monitor deviation from awarded budgets and, if applicable, inform RGM					15	15
Address any deviations				30		30
Prepare invoice based on the updated claim form					30	30
Approve submitted invoice	x					0
Send invoice and supporting documents to funding agency/ primary awardee					20	20
Submit claim on payment systems					30	30
Follow up and monitor of payments received/from finance of payment allocation					20	20
Review indirect cost claim				30		30
Update invoice status on P-GAMA					15	15
Update payment received status on P-GAMA					15	15
Upload invoice to PAGMS					15	15
Sub-Total		**0**	**0**	**60**	**190**	**250**

Calculation of cost and time for B-3 Preparation and submission of claims and invoices						
Total minutes per award		0	0	60	190	250
Activity cost per administrator		R0.00	R0.00	R561.64	R568.31	R1 129.95
B-4 Request prior approvals / changes to amended budget						
Inform DRI of intent to request prior approval	x					0
Verify whether prior approval request is permitted			20			20
Inform PI of the allowability of prior approval request			15			15
Request updated claim form from FA			15			15
Update claim form and send a cost centre print out	x					0
Request PI to update budget changes on the claim form			15			15
PI updates claim form with prior approval request	x					0
Review prior approval docs and monitor changes for possible agreement amendments				20		20
Submit prior approval request via email			15			15
Follow up with Funding agency			15			15
Update grant management system and inform relevant faculty accountant			15			15
Sub-Total		**0**	**110**	**20**	**0**	**130**
Calculation of cost and time for B-4 Request prior approvals / changes to amended budget						
Total minutes per award		0	110	20	0	130
Activity cost per administrator		R0.00	R432.47	R187.21	R0.00	R619.68

B-5 GHL Bursaries - Reports and renewals					
Send reminders to students to submit reports					15	15
Student completes report and PI signs off	x					0
Review PI comments on the submitted reports					15	15
Confirm with PI if bursary must be renewed ad, if so, review budget					20	20
Update grant management system with student reports					15	15
Confirm with post awards if budget is available for bursaries / verify budget					20	20
Sub-Total		**0**	**0**	**0**	**85**	**85**
Calculation of cost and time for B-5 GHL Bursaries - Reports and renewals					
Total minutes per award		0	0	0	85	85
Activity cost per administrator		R0.00	R0.00	R0.00	R254.24	R254.24
C-0 Closeout					
Monitor spending on cost centre (90 days)			15			15
Less than 75% sending, inform RGM			15			15
Remedial action				30		30
Request PI to complete the project expiration form			15			15
PI completes project expiration form	x					0
Follow up and monitor			15			15
Update project expiration form on PAGMS			15			15

Request no-cost extensions (if required) from funding agency				30		30
Amend agreement for no-cost extension (if required)	x					0
Monitor spending on cost centre (30 days after)				30		30
Request FA to update the claim from			15			15
FA updates the claim form and processes incumbent payments	x					0
Inform FA not to process any more			15			15
Request PI to complete the project close-out form			15			15
PI completes project close-out	x					0
Follow up and monitor			15			15
Review and sign off on the project close-out form				30		30
Sub-Total			**135**	**120**	**0**	**255**
Calculation of cost and time for C-0 Close out						
Total minutes per award		0	135	120	0	255
Activity cost per administrator		R0.00	R1 350.00	R1 123.28	R0.00	R2 473.28
Calculation of cost and time for all administrators		**GMU Admin 1**	**GMU Admin 2**	**GMU Admin 3**	**GMU Admin 4**	**Total**
Total minutes per award		20	755	570	660	2005
Total hours per award		0.33	12.58	9.50	11.00	33.42
Activity cost per administrator		R14.47	R3 787.56	R5 335.56	R1 974.13	R11 111.71

* Including University Executive, University Finance, DRI Legal, and PI

RESEARCH AUTHORIZATION AND PROTOCOL REVIEW (RAPR): A CENTRALIZED RESEARCH REVIEW MODEL FOR ADVOCATE HEALTH MIDWEST.

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ABSTRACT

Advocate Aurora Research Institute (AARI) has implemented a Research Authorization and Protocol Review (RAPR) process to streamline the review and authorization of research conducted within Advocate Health (AH) Midwest. RAPR aims to facilitate the submission and review of various types of research, coordinates scientific and administrative reviews, ensures proposals are compliant with AH policies and procedures, and, when applicable, authorizes research support services to studies that are meritorious as well as operationally and financially feasible. The process uses a Research Electronic Data Capture (REDCap) platform for submission, review, scoring, and tracking of clinical research requests. Unique REDCap workflows were customized for Academic Research, Graduate Medical Education Research, Nursing Research, and Sponsored Clinical Trials. Research studies are reviewed by scientific and clinical experts, as well as research administrators, and are evaluated based on standard scoring criteria, including organizational priority, patient impact, qualifications of the study team, funding, resource availability, research quality, contracting/legal support, and cybersecurity considerations. RAPR determinations are communicated to the study team and key personnel through REDCap notifications. RAPR authorization is a mandatory requirement at AH Midwest and a prerequisite for submitting a research study to the Institutional Review Board.

Keywords:

INTRODUCTION

Effective research administration is crucial for facilitating research activities that advance healthcare and is an important goal of academic health centers. Research administration involves managing several aspects of research, including but not limited to compliance with institutional policies and applicable state and federal regulations, scientific merit and feasibility, contracting, cybersecurity risk assessment, grant administration, investigator training, resource allocation and utilization, dissemination of results, and ultimately, the potential impact on the organization and the medical field.

The Institutional Review Board (IRB) is responsible for overseeing the ethical and regulatory aspects of human subject research (HSR). However, their focus is on the protection of human subjects and the confidentiality of their data, which means that the responsibility for other aspects of research administration is often scattered among various departments. Furthermore, the IRB does not oversee research activities that are deemed non-HSR, though these projects require

research administration oversight. This creates a need for a centralized review process to authorize research studies, that align with organizational priorities, support graduate medical education (GME) programs, have a scientifically valid study design, and are operationally and financially feasible before undergoing IRB review.

The Clinical and Translational Science Awards (CTSA) Consensus Working Group (National Center for Advancing Translational Sciences, n.d.) has proposed the establishment of Scientific Review Committees (SRCs) to evaluate the scientific quality and operational feasibility of research projects before they are reviewed by the IRB (Selker et al., 2015, 2020)analytic plan, and be operationally feasible in order to be successfully completed and thus to have translational impact. To ensure this, institutions that conduct clinical research should have a scientific review process prior to submission to the Institutional Review Committee (IRB. The Working Group has recommended the implementation of a project management system that would support the SRCs' workflow, allowing for effective communication among key stakeholders, protocol submission, and review. Additionally, a data management system is recommended to support data entry, quality control, and collection of research-related metrics (Selker et al., 2015, 2020)analytic plan, and be operationally feasible in order to be successfully completed and thus to have translational impact. To ensure this, institutions that conduct clinical research should have a scientific review process prior to submission to the Institutional Review Committee (IRB.

Aligned with the recommendations of the CTSA Consensus Working Group, Advocate Aurora Research Institute (AARI) implemented a Research Authorization and Protocol Review (RAPR) process to ensure transparency and efficiency in research operations. RAPR is the mandatory, centralized process for reviewing and authorizing research at Advocate Health (AH) Midwest (Illinois and Wisconsin) prior to IRB submission. The purpose of this article is to provide an overview of the RAPR process across different research areas within the Midwest.

TECHNICAL REPORT

Objectives of RAPR

RAPR is the mandatory, centralized process for reviewing and authorizing proposed research for which AH Midwest will be engaged, regardless of project origin, funding, or resource need. RAPR is independent and required prior to protocol submission to the Advocate Health-Wake Forest University School of Medicine (WFUSM) IRB or external IRB. Specific goals of RAPR include, but are not limited to:

- Ensure proposals are compliant with AH Midwest policies and procedures.
- Coordinate the administrative and scientific review of proposals in a timely manner.
- Serve as a liaison among AH Midwest departments, research support areas, and investigators.
- Facilitate the request and assignment of research support services to proposals that are meritorious, feasible, and have well-defined outcomes.
- Develop, customize, and maintain a user-friendly electronic platform for research submission, review, and notification of RAPR determinations.
- Develop unique electronic workflows for different research areas, including Academic Research, Graduate Medical Education Research (GMER), Sponsored Clinical Trials (CTs), and Nursing Research.
- Develop and maintain standard scorecard criteria evaluation forms for different types of research and research areas.
- Notify investigators and key personnel of RAPR determinations and provide feedback to improve proposals as needed.
- Follow-up research projects after RAPR authorization to identify delays in study start-up.
- Generate and report periodic operational metrics.
- Update and add RAPR workflows, as needed, based on users' feedback and institutional requirements.

Research Electronic Data Capture (REDCap) Functionality

RAPR utilizes REDCap (Patridge & Bardyn, 2018; REDCap, n.d.) a web-based application to receive, review, and authorize research studies submitted to RAPR. REDCap is a well-established tool within the research community and has gained broad acceptance within AH as a toolset for providing secure, web-based data collection services. In May 2023, the REDCap interface for AH was upgraded to include the *Alerts & Notifications*, and *Project Dashboards* features (Patridge & Bardyn, 2018), which allowed RAPR to switch on November 1, 2023, from a less nimble application to the more advanced REDCap platform.

The *Alerts & Notifications* feature enables RAPR administrators to construct alerts and send customized email notifications to scientific and feasibility reviewers. Notifications can be sent to one or more reviewers and can be triggered when the administrative review form has been completed and saved. The notification customization requires defining alert triggers, when and how many times the notification should be sent, attaching multiple study documents, and specifying the recipient, sender, and message text. A personalized message is sent to reviewers including the message piped in field variable (e.g. referenced data entered in previous fields in the REDCap project) such as the review deadline, date of the PRC meeting, and study considerations. Additionally, each reviewer receives a unique evaluation form link embedded in the text, eliminating the need to log in to REDCap to complete their review.

The *Online Designer* feature was used to customize data collection instruments (i.e., forms), allowing the capture of feedback from different stakeholders, including investigator (Intake forms), reviewers' scorecard criteria evaluation (Evaluation forms), research support managers (Feasibility forms), and service line directors (Leader forms).

RAPR uses *branching logic* to design the intake form. This feature allows RAPR to show different parts of the form based on specific answers given to certain questions. For instance, if a submitter answers "yes" to the question "Do you plan to use Advocate Aurora Research Institute resources?", the field "Select the AARI resource(s) needed" will appear.

The *file uploading* feature is an integral part of the intake form, used to request various study documents such as protocol templates, data collection tools, delegation of authority logs, department support letters, budgets, and other relevant attachments. The *rich text editor* feature allows the hyperlinking of required document templates, enabling submitters to conveniently download the necessary templates directly from the intake form.

Project Dashboards are web pages that display dynamic content and can be customized to provide a high-level summary of the project. To build a dashboard, data can be imported directly from a form or a customized report. The *rich text editor* and the *wizard tool* were used to streamline the writing of smart variables and obtain aggregated data, pie charts, bar graphs, and tables for metric purposes. Once a dashboard is customized, it is automatically updated whenever forms are completed and saved. The dashboard is accessible only to RAPR administrators but can be shared via a public link. Additionally, dashboards can be exported as PDF or CSV files.

RAPR Workflows

Given the diverse administrative and scientific requirements for different types of research, separate RAPR areas were established for Academic Research, GMER, Nursing Research, and Sponsored CTs.

The diversity of research areas and study types precludes a one-size-fits-all RAPR process. Different workflows were developed, in collaboration with respective administrative leaders, for academic research, GMER, sponsored CTs, and nursing research, while still allowing for alignment and overlap when necessary. Scientific and clinical reviewers are expected to assess protocols

for scientific merit and operational feasibility based on the definitions given for the evaluation criteria (**Table 1**). Criteria for evaluation include organizational priority, research strategy, patient impact, qualifications of the PI and study team, funding, resource availability, research quality, Diversity, Equity, and Inclusion (DEI) component, and contracting/legal considerations. Each criterion is scored on a scale of 1-5 where 5 = Exceptional, exceptionally strong with negligible to no weaknesses, 4 = Excellent, very strong with only some minor weaknesses, 3 = Good, strong but with numerous minor or one moderate weakness, 2 = Fair, some strengths also some moderate weaknesses or one major weakness and 1 = Weak, minimal or no strengths and a few major weaknesses.

RAPR - Academic Research

Academic Research (i.e., Investigator-Initiated Research) corresponds to research developed, initiated, and managed by AH-employed clinician investigators or research scientists or research developed in partnership with external academic or industry sponsors. Academic research studies include retrospective studies and prospective studies, industry data science projects, and biorepository and specimen projects. The Academic Research workflow is illustrated in Figure 2.

Once the research proposal is received, the RAPR manager will check for completeness and conduct an administrative review before proceeding with the scientific review. Elements to consider for the administrative review include confirmation of research affiliation agreements, data management, health technology requiring

Information Technology (IT) risk review, Epic services, Principal Investigator (PI) eligibility, and compliance with applicable AH policies and procedures. If additional information is required, the PI will be notified and given 30 business days to respond. Once the administrative concerns have been addressed, the proposal moves to scientific review.

The scientific evaluation can be conducted through either a fast-track review for observational studies or a PRC review for interventional clinical trials and biorepository and specimen research. Evaluation forms for retrospective or prospective studies (Table 1) are sent to clinical and scientific experts via REDCap. The fast-track review requires the completion of the evaluation forms by one or three reviewers for retrospective or prospective studies, respectively. The PRC review requires the completion of the evaluation form by three reviewers and a PRC meeting to make a RAPR determination. Regardless of the type of review, the study must have a minimum score of 70% out of 100% or an approved exception to receive RAPR authorization.

Figure 1
Schematic listing of the areas of Research Authorization and Protocol Review (RAPR) and the types of studies overseen by each area.
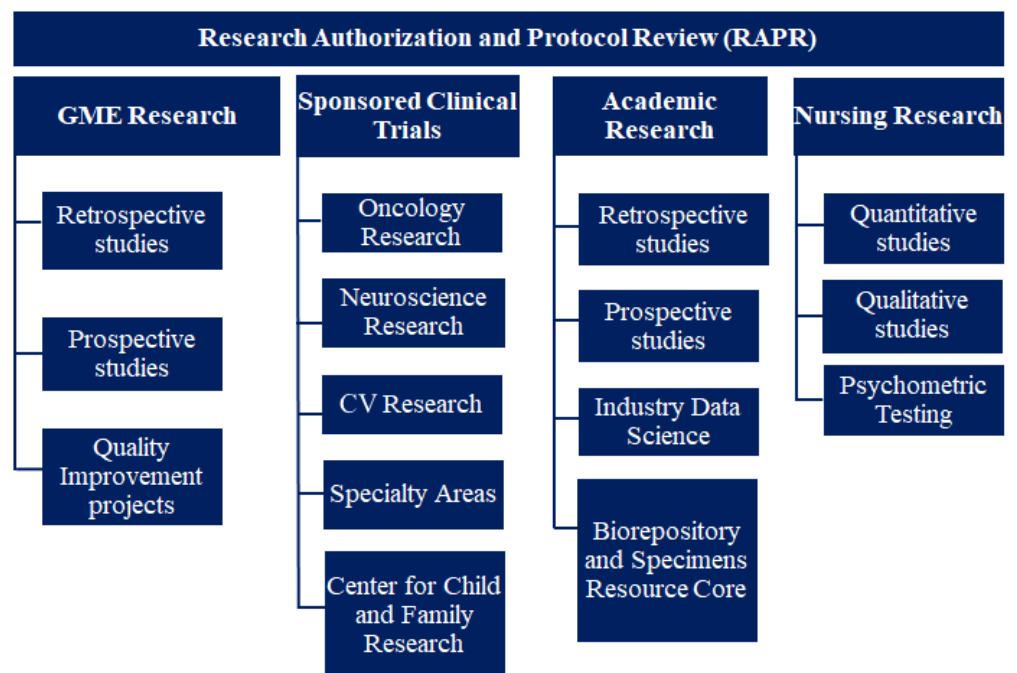
Table 1
Research Authorization and Protocol Review (RAPR) scorecard criteria per research areas

Academic Research		Graduate Medical Education Research	
Category	Criteria	Category	Criteria
Patient Impact	Health impact - Will the proposed research have a significant health impact? Consider: scope of problem, degree of patient health impact, potential to impact related conditions, impact on AH care practices, cost implications (e.g., prevalence, # of individuals affected across, cost of health care, unmet medical need, health care disparities)	Patient Impact	Significance of health impact - Scope of problem, degree of patient health/quality impact, potential to impact related conditions, cost implications (e.g., prevalence, # of individuals affected across, cost of health care, unmet medical need, health care disparities)
	Turnaround and Feasibility - How quickly and feasibly could the results from this study be translated to practice? Consider: feasibility to implement in practice setting(s) and projected timeline to publish results and advance patient care.	GME Priority	The project is fellow or resident driven or is driven by faculty with meaningful fellow or resident involvement. Ideally, the project would be both resident/fellow and faculty driven.
Sample	Available subjects - Are sufficient patients available to meet enrollment target based on eligibility criteria? Consider: adequacy of patient enrollment pool based on how the information was obtained such as data analytics, cancer registry, etc.		Does the resident/fellow need this project to fulfill their scholarly activity/quality requirements?
	Sample size - Will the study achieve an appropriate sample size? Consider: appropriateness of sample size estimation / power calculation, any competing studies, timeline projected to achieve sample size.	Research Strategy	Study Justification: Do the background and rationale provide sufficient information to justify the study and do they demonstrate that it has not already been done by others? What is the significance of the proposed study relative to the state of the science? Are there references and data to support the hypothesis (as appropriate)?
Research Strategy	Background / Study Justification: Do the background and rationale provide sufficient information to support / justify the study? Consider: the significance of the proposed study relative to the state of the science, whether the study addresses an important question, and quality of references.		Aims, Hypotheses and Outcomes: Are study aims, hypotheses (as appropriate) and outcomes clearly defined, reasonable and attainable?
	Aims, Hypotheses and Outcomes: Are study aims, hypotheses (as appropriate) and outcomes clearly defined, reasonable and attainable?		Study Design: Will the study design achieve the study aims? Are the methods appropriate and clearly articulated? Are controls sufficient and appropriate?

Nursing Research		Sponsored Clinical Trials	
Category	Criteria	Category	Criteria
Patient/Nurse Impact	Health impact: - Will the proposed research have a significant health/ nursing impact? Consider scope of the problem, degree of patient health/nurse impact, the potential to impact related conditions, impact on AH care practices, cost implications (e.g., prevalence, # of individuals affected across, cost of health care, unmet medical need, health care disparities).	Patient Impact	Health impact - Will the proposed research have a significant health impact? Consider: scope of problem, degree of patient health impact, impact on AAH care practices, cost implications (e.g., prevalence, # of individuals affected across, cost of health care, unmet medical need, health care disparities)
	Dissemination- Are there clear plans for dissemination?	Sample	Available subjects - Are sufficient patients available to meet enrollment target projected by sponsor? Consider: adequacy of patient enrollment pool and how the information was obtained such as data analytics, cancer registry, etc.
CNO Support	The Chief Nursing Officer at the study site has signed a letter of support stating the importance of the study to the site and what resources will be provided from the site budget.		Enrollment Period - Will the study allow an adequate amount of time to enroll patients to trial? Consider: Length of time for enrollment of subjects to the trial, available sample at the disposal of the investigator, any competing studies, timeline projected to achieve site or overall trial enrollment goal.
Sample	Available subjects - Are sufficient patients available to meet the enrollment target based on eligibility criteria? Consider the adequacy of the patient enrollment pool based on how the information was obtained, such as data analytics, cancer registry, etc.	Financial / Contracting	Budget / Cost Analysis: Is there a favorable projected cost analysis? Consider: whether the study budget covers all study-related expenses, including indirect expenses, support services and resources.
	Sample size - Will the study achieve an appropriate sample size? Consider: appropriateness of sample size estimation / power calculation, any competing studies, timeline projected to achieve sample size.		Contracting Considerations: Are the complexities in the negotiation process that would impact our ability to successfully launch this study? Consider: experience w/sponsor, complexity of the contract negotiation, significant budget variation from AARI standard rates.
Research Strategy	Background / Study Justification - Do the background and rationale provide sufficient information to support/justify the study? Consider the significance of the proposed study relative to the state of the science, whether the study addresses an important question, and quality of references.	Resources	Resource Needs: Are the proposed resources detailed, reasonable and available? Consider: staff time and relevant expertise, equipment, supplies, and facilities. (Note: Higher Score reflects less needs) *(Table continued on next page)*

	Study Design and Methods: Are the study design and methods appropriate and feasible? Consider: ability to achieve study aims; methods that are detailed, appropriate and feasible; whether controls are sufficient and appropriate; data management and analysis plans; IT risk review (if applicable).		Feasibility: Are the procedures feasible? Are potential difficulties and/or limitations adequately discussed?
	Innovation/Novelty: Is the study novel? Consider: innovation associated with study population, aims and/or methods.		Data Acquisition: Is it clearly laid out where data is coming from? It is clear what variables of interest will be collected and why? Does the data being collected seem reasonable enough to answer the research or quality question?
	Research Trajectory: Will this research provide the information required to develop a larger study? Consider: potential for future grant submission or industry partnership.		Data Management: Is there an adequate data management plan in place?
Funding / Resources	Budget / Cost Analysis: Is there a favorable projected cost analysis? Consider: whether the study budget covers all study-related expenses, including indirect expenses, support services and resources.		Available subjects: Are sufficient patients available to meet enrollment target based on eligibility criteria? Consider: adequacy of patient enrollment pool based on how the information was obtained such as data analytics, cancer registry, etc.
	Resource Needs: Are the proposed expenditures and resources detailed, reasonable and available? Consider staff time and relevant expertise, equipment, supplies, and facilities.		Sample size: Will the study achieve an appropriate sample size? Consider: appropriateness of sample size estimation / power calculation, any competing studies, timeline projected to achieve sample size.
	Use of Advocate Health and/or AARI Assets: Does the project utilize unique AH assets or AARI investment? Consider: clinical expertise, patient population, EMR, biorepository, pre-clinical labs, purchased data, specialty equipment, extending work from intramural award.		Analysis Plan: Does the statistical analysis plan (including sample size) adequately address the study objective(s)? Are potential confounders to the study accounted for?
Qualifications of Research Team	PI Qualifications: Is the PI adequately qualified and motivated to conduct the research? Consider: the experience and qualifications of the PI, with particular reference to his/her engagement, prior research track record, and ability to carry out the proposed research.	Funding	Is internal or external funding available to support the research or scholarly activity/quality described by the application? (highest priority for external funds)

|			
	Aims, Hypotheses, and Outcomes - Are study aims, hypotheses (as appropriate), and outcomes clearly defined, reasonable, and attainable?		IT Resource Needs: Will the study require a IT technical review? Consider: study specific device usage, type of edc and storage of research data. (Note: Higher Score reflects less needs)
	Study Design and Methods - Are the study design and methods appropriate and feasible? Consider ability to achieve study aims; methods that are detailed, appropriate and feasible; whether controls are sufficient and appropriate; data management and analysis plans; IT risk review (if applicable).	Qualifications of Research Team	PI Qualifications: Is the PI adequately qualified and motivated to conduct the research? Consider: prior PI's clinical trial experience and ability to lead the proposed research, his/her engagement, and engagement of clinicians and other collaborator including referring physicians.
	Innovation / Novelty - Is the study novel? Consider innovation associated with the study population, aims, and/or methods.		Research Team: For the project to be successful, does the study team include all needed clinical and research expertise? Consider: whether research team includes the appropriate individuals on the research team to ensure success.
	Research Trajectory - Will this research provide the information required to develop a larger study? Consider: potential for future grant submission, industry partnership, multi-site opportunities	Organizational Priority	Service Line Alignment: Does the research relate to a service line where AH has established clinical strengths (e.g., cardiology, neuroscience, oncology, pediatrics) or where AH seeks to differentiate itself clinically in the future (e.g., behavioral health)?
Funding / Resources	Budget / Cost Analysis - Is there a favorable projected cost analysis? Consider whether the study budget covers all study-related expenses, including indirect expenses, support services, and resources.		Potential to Raise AH and/or AARI Brand: Does the research have a high potential to raise the AAH and/or AARI brand? Consider whether PI is likely to be on the resulting publication and/or other ways this trial could lead to enhanced standing of AH.
	Resource Needs - Are the proposed expenditures and resources detailed, reasonable, and available? Consider staff time and relevant expertise, equipment, supplies, and facilities.		
	Use of Advocate Aurora and/or AARI Assets: Does the project utilize unique AAH assets or AARI investment? Consider: clinical expertise, patient population, EMR, biorepository, pre-clinical labs, purchased data, specialty equipment, extending work from intramural award		

	Research Team: For the project to be successful, does the study team include all needed clinical and research expertise? Consider: whether research team includes the appropriate individuals on the research team to ensure success, whether research represents an interdisciplinary / team science approach (between scientist(s), physician(s), nurses(s), etc.); whether external collaborators are included that strengthen the proposal.		Is there a budget? Is this project feasible to be completed within the stated budget?
Organizational Priority	AH Alignment: Does the proposed research advance health equity and/or diversity?	Timeline	What is the project timeline including proposed conferences, publication dates and estimated time to completion? Is study completion feasible within the stated timeframe?
	Potential to Raise AH Brand: Does the research have high potential to lead to high impact publication and/or other favorable attention to AH? Consider: high impact publication potential and other ways research could lead to enhanced standing of AH.	Resources	Are the proposed expenditures and resources (i.e. staff, equipment, supplies, facilities) requested clearly stated and reasonable? Do the expenditures/resources strongly correlate with the achievement of the research objectives? Are the resources needed to complete the project available?
	Potential to Generate External Revenue or Cost Savings: Does the research have high potential to lead to new revenue or cost savings? Consider: potential to win extramural funding, generate cost savings or innovation / commercialization potential.		
	Service Line Alignment: Does the research relate to a service line where AH has established clinical strengths (e.g., cardiology, neuroscience, oncology, pediatrics)?		

AARI=Advocate Aurora Research Institute. PI=Principal Investigator. AH=Advocate Health. IT=Information Technology. CNO=Chief Nursing office

Qualifications of Research Team	PI Qualifications - Is the PI adequately qualified and motivated to conduct the research? Consider the experience and qualifications of the PI, with particular reference to his/her engagement, prior research track record, and ability to carry out the proposed research.		
	Research Team - For the project to be successful, does the study team include all needed clinical and research expertise? Consider whether the research team includes the appropriate individuals on the research team to ensure success, whether the research represents an interdisciplinary / team science approach (between scientist(s), physician(s), nurses(s), etc.), whether external collaborators are included that strengthen the proposal.		
Organizational Priority	AH Alignment - Does the proposed research have a clear connection to AH strategic goals and/or priorities? Consider whether research has a clear connection to AH strategic goals and/or priorities, and advancing health equity.		
	Potential to Raise AH and/or Nursing Research Brand: Does the research have a high potential to lead to high-impact publication and/or other favorable attention to AH? Consider the high impact of publication potential and other ways research could lead to enhanced standing of AH. Magnet, consulting opportunities		
	Potential to Generate External Revenue or Cost Savings: Does the research have a high potential to lead to new revenue or cost savings? Consider: potential to win extramural funding, generate cost savings or innovation/ commercialization potential.		
	Multi-site studies are preferred over single-site studies and are eligible for 5 points. Single-site studies will not be awarded points.		

(End of table)

Figure 2
Flowchart depicting the academic research workflow from study submission to follow-up.
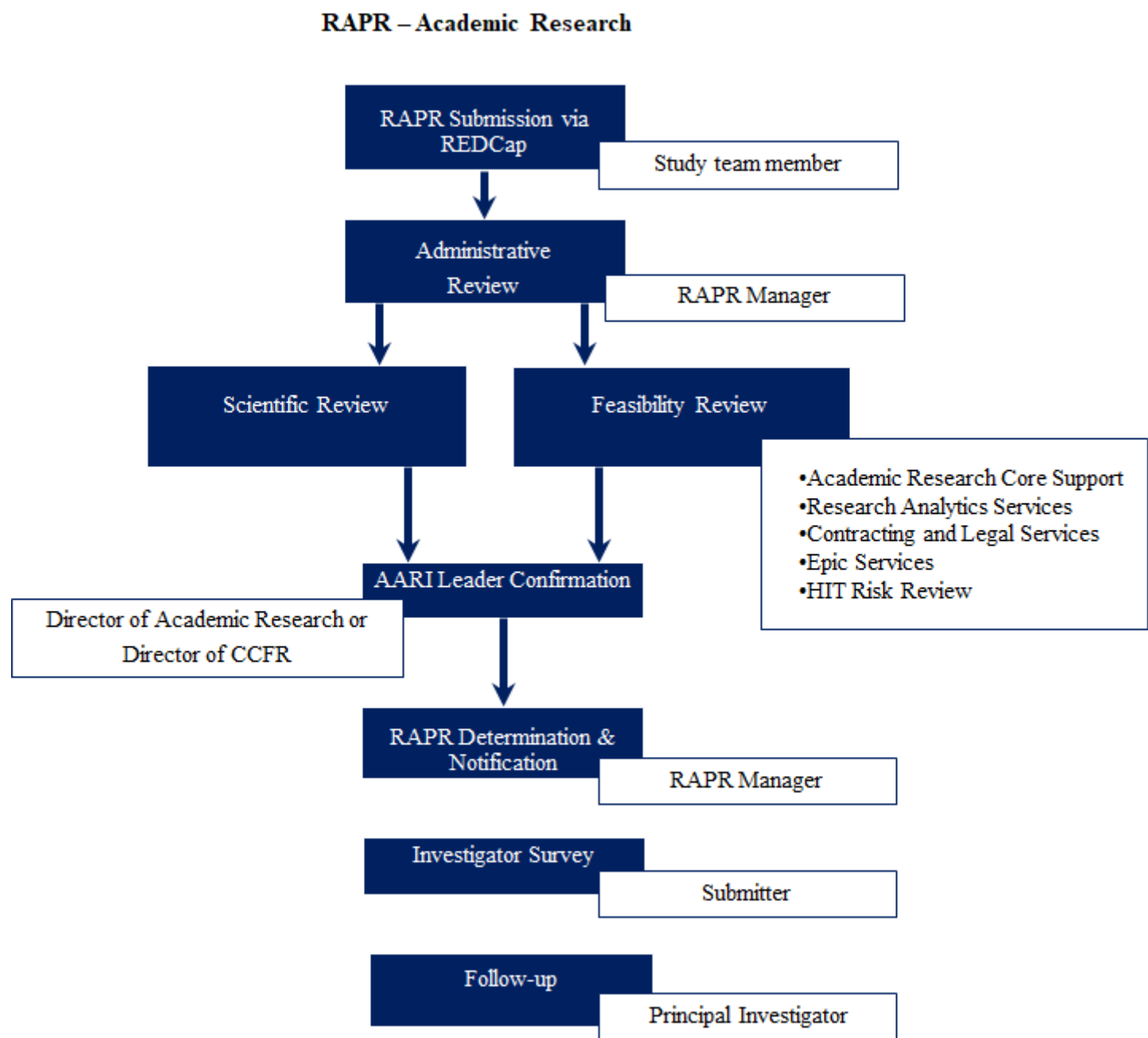
Flowchart depicting the academic research workflow from study submission to follow-up. Following the administrative review, the proposal receives scientific review. The feasibility and scientific review are simultaneous. The corresponding Advocate Aurora Research Institute (AARI) leader must confirm study authorization before proceeding with the REDCap notification to the Principal Investigator (PI) and key personnel. The study submitter receives an automatic REDCap survey to inquire about Research Authorization and Protocol Review (RAPR) submission. Automatic REDCap follow-up surveys are deployed 60, 90 days, and one year after RAPR authorization to inquire about study status and dissemination of results.

Concurrently with the scientific review, notifications via REDCap are sent to applicable research support areas including the Office of Research Analytics and Systems Computing (ORASC), academic research core, IT and the Office of Sponsored Programs (OSP) to complete the feasibility evaluation, assessment of research support services' effort and budget. If the proposal requires PRC review, research support managers provide their review and feedback as ad hoc members to the PRC meeting.

Once the scientific and feasibility review has been completed, the corresponding AARI leader confirms the RAPR decision to either authorize or decline a study. A decision notification is sent via REDCap to the PI and key personnel.

RAPR - Graduate Medical Education Research (GMER)

GMER corresponds to research or quality improvement projects that either primarily or significantly involve residents and fellows participating in an AH-sponsored GME program (i.e., medical residencies, podiatry, dental, and chiropractic) or faculty research or quality improvement projects as designated by the respective program directors. The GMER workflow is illustrated in **Figure 3.**

Research teams can receive guidance from the GMER support team during the project's planning phase. This team is composed of an administrative director, medical director, research coordinators, research associates, biostatisticians, and a research liaison. During the consultation, the GMER support team can provide project direction and evaluate the feasibility of providing GMER support throughout the study. GMER support is prioritized in the following order: 1) projects driven primarily by residents and fellows with faculty mentorship, 2) funded and unfunded projects of core faculty as designated by the program directors in which resident and fellow involvement is highly encouraged, and 3) other funded faculty project support based on the level and type of support requested.

Once the study documents are finalized, the project can be submitted by completing a unique GMER REDCap intake form. The GMER liaison will review the submission to ensure it is complete and complies with all applicable policies and procedures. If any information is missing, the study team will be contacted before proceeding with the scientific review.

The scientific review can be either 1) a fast-track review for quality improvement studies requiring resources, 2) a fast-track review for most retrospective studies, or 3) an expanded review for prospective observational or interventional clinical trials. Scorecard evaluation forms for retrospective and prospective studies (*Table 1*) are sent to three or four clinical and non-clinical experts via REDCap. Two of the reviewers are GMER office leaders (unless otherwise designated). The study must have at least a score of 70% to receive RAPR authorization. The PRC review requires discussing the project at a PRC meeting, where scientific reviewers, GMER support team members, service line leaders, and research support managers may be invited to provide feedback and reach a consensus decision. Concurrently with the scientific review, the research liaison notifies research support managers via REDCap to complete the feasibility evaluation, including assessing available resources and the study budget if applicable. Once the scientific and feasibility reviews have been completed, the GMER office will authorize or decline a study. A notification is sent via REDCap to the PI and key personnel. Given the educational lens of GME, regardless of authorizing or declining a study, the GMER office will provide all feedback from reviewers to study teams for study improvements.

RAPR - Nursing Research

Nursing research corresponds to studies in which the PI is a nurse. The studies are conducted to fill a gap in nursing knowledge addressing national nursing issues, key strategic nursing priorities, and patient clinical outcomes. Protocols for nursing research include quantitative, qualitative, mixed methods studies, or psychometric testing of a research instrument. Nurse researchers submit their protocols through a unique REDCap link posted on the AH MW nursing intranet page (Nursing Hub SharePoint site). The nursing research workflow is illustrated in **Figure 4.**

Figure 3
Flowchart depicting the Graduate Medical Education Research (GMER) workflow from study submission to follow-up.
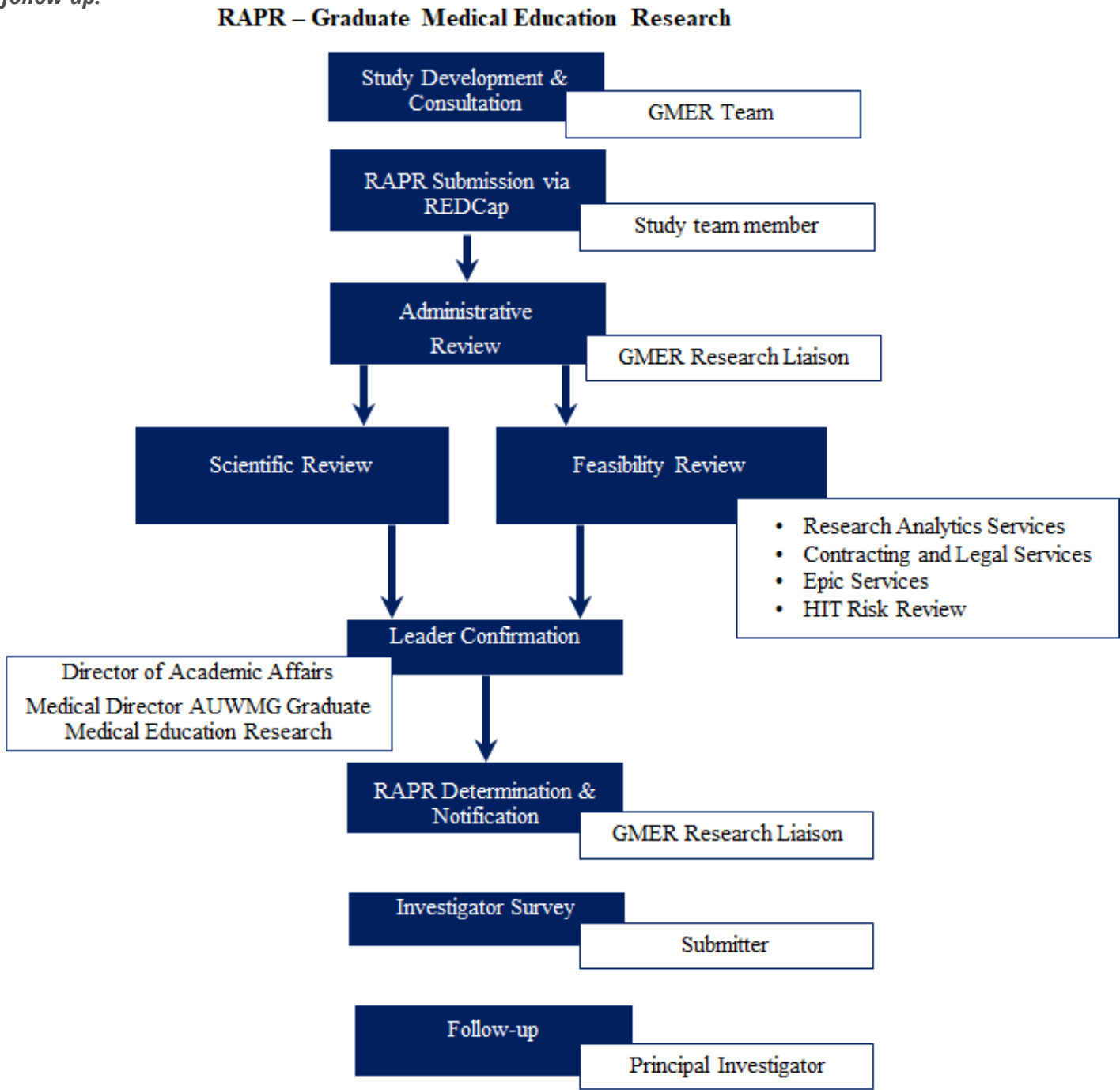
Flowchart depicting the Graduate Medical Education Research (GMER) workflow from study submission to follow-up. The study team may consult with the GMER team (research associate, research liaison, statisticians) to assess the effort required to support the study. After study submission, the research liaison conducts an administrative review and selects scientific reviewers. The scientific review is concurrent with the feasibility review. The corresponding GMER leader must confirm study authorization before proceeding with the REDCap notification to the Principal Investigator (PI) and key personnel. The study submitter receives an automatic REDCap survey to inquire about the Research Authorization and Protocol Review (RAPR) submission. Automatic REDCap follow-up surveys are deployed 60, 90 days, and one year after RAPR authorization to inquire about study status and dissemination of results.

Figure 4
Flowchart depicting the nursing research workflow from study submission to follow-up.
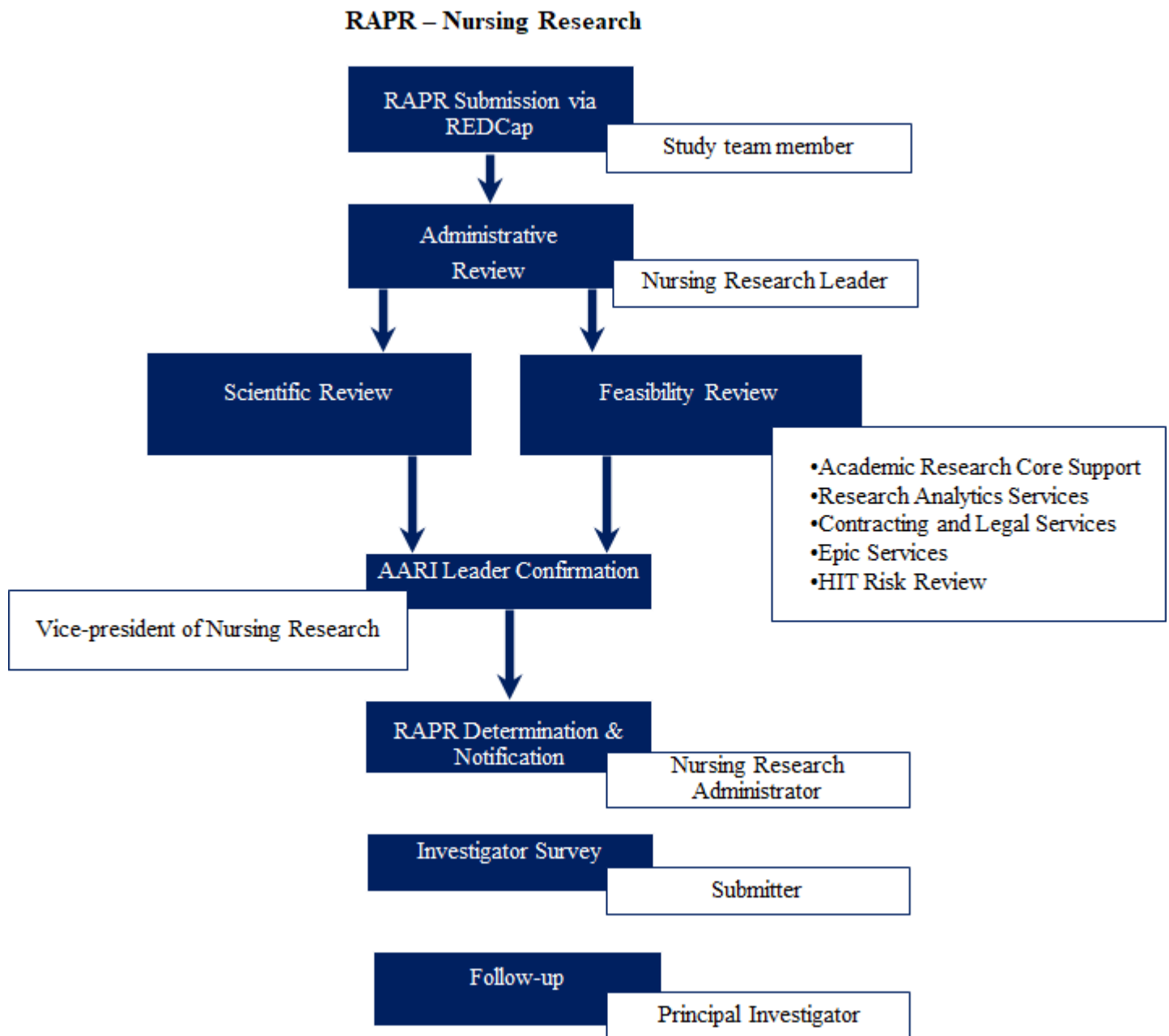

RAPR – Nursing Research

Flowchart depicting the nursing research workflow from study submission to follow-up. Following the administrative review conducted by the nursing research leader, the proposal receives scientific review. The feasibility and scientific review are simultaneous. The corresponding vice-president of nursing research must confirm study authorization before proceeding with the REDCap notification to the Principal Investigator (PI) and key personnel. The study submitter receives an automatic REDCap survey to inquire about Research Authorization and Protocol Review (RAPR) submission. Automatic REDCap follow-up surveys are deployed 60, 90 days, and one year after RAPR authorization to inquire about study status and dissemination of results.

The Vice-President of Nursing Research (VP Nursing Research) or their designee conducts the administrative review of the research proposal to evaluate its completeness and feasibility, confirm PI eligibility, request IT risk review or contracting services (if applicable), and select scientific reviewers.

Like the other RAPR workflows, the scientific evaluation utilizes a PRC review for all proposals submitted to the nursing RAPR. Three reviewers score the proposal using the standard evaluation criteria form (Table 1). Concurrently with the scientific review, the VP Nursing Research or designee notifies research support managers via REDCap to complete the feasibility evaluation, including assessing need for research support resources and study budget specifications. All completed reviews are discussed with final authorization or declination of the research study determined by a formal PRC meeting including the VP Nursing Research, scientific reviewers, and ad-hoc research support managers when needed. The PI is notified of the final study disposition decision

Figure 5
Flowchart depicting the Sponsored Clinical Trials (CT) workflow from study submission to Research Authorization and Protocol Review (RAPR) notification.
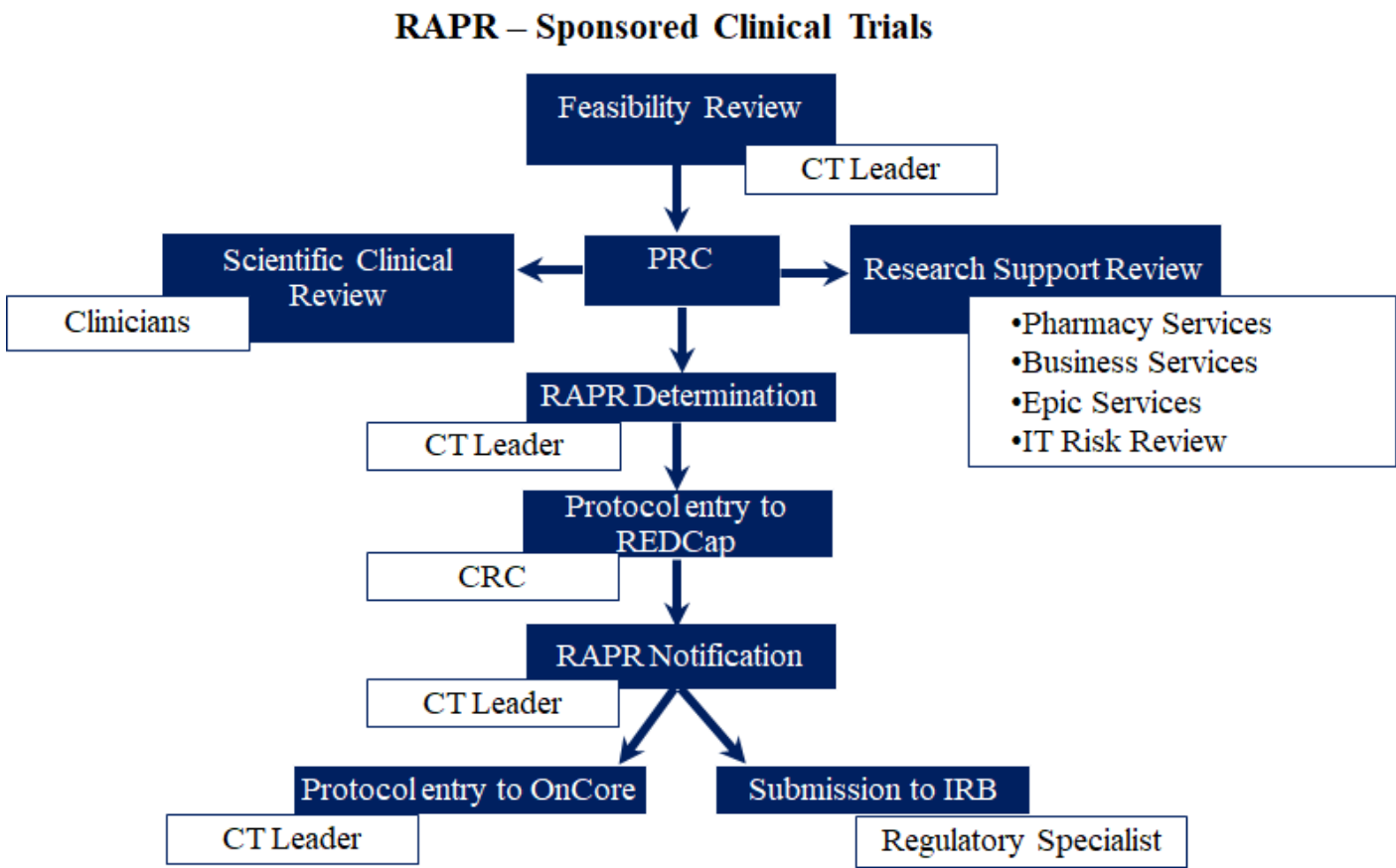
Flowchart depicting the Sponsored Clinical Trials (CT) workflow from study submission to Research Authorization and Protocol Review (RAPR) notification. Following the feasibility review conducted by the service line leader, the proposal receives a Protocol Review Committee (PRC) review. The study is discussed at a PRC meeting via Microsoft Teams with research leaders, clinical reviewers, and research support managers from Pharmacy, Business and Epic services as well as Information technology (IT). Once a RAPR determination has been made, the proposal is submitted to REDCap by a clinical research coordinator (CRC), and a REDCap notification is sent to the Principal Investigator (PI) and key personnel. After the PI has secured IRB authorization, the project is managed in OnCore as the Clinical Trials Management Software.

by the VP Nursing Research. An approved study is authorized for submission to the IRB whereas declined studies can be revised according to the reviewers' guidance and resubmitted for review by the nursing RAPR. The AH Midwest Nursing RAPR process meets one of the newest (2023) American Nurses Credentialing Center's (ANCC) Magnet requirements that an infrastructure exists supporting nursing research within the organization seeking Magnet designation for nursing excellence (Center, 2021; Lal, 2021).

RAPR- Sponsored Clinical Trials (CTs)

CTs correspond to projects designed, directed, and funded by proprietary organizations. Research leaders aligned with oncology, neuroscience, cardiovascular, specialty areas, pediatrics or maternal health service lines perform RAPR for applicable CTs. The sponsored CT workflow is shown in Figure 5.

The CT research leader will work with the PI and team members to conduct an initial feasibility assessment. This assessment will consider various factors, including, but not limited to, patient impact and potential for enrollment, availability of facility, staff, and services, financial impact, potential study start-up challenges, and alignment with AH Midwest's priorities.

If a CT is deemed feasible, the research leader or delegate will upload the study documents to a Microsoft® Teams folder and provide access to reviewers, including clinical experts and research support managers, as applicable. The CT is discussed at a PRC meeting and scored using standard criteria (Table 1). Once a determination has been made, relevant study information is submitted to REDCap by a clinical research coordinator (CRC). The REDCap Sponsored CT intake form captures information such as the AARI study number, sponsor protocol, National CT number, date of the PRC review, PRC scorecard evaluation form, and key personnel information. Once this form is completed and saved, REDCap triggers an automatic decision notification to authorize the CT, and an accompanying message is sent to the PI.

For all the RAPR areas, the RAPR authorization notification is set up in REDCap and includes a customized message that includes: 1) Study number, 2) Study title, 3) Principal Investigator name and degree, 4) Confirmation of RAPR authorization and PI eligibility, 5) Contingencies, if applicable, 6) Reviewers' recommendations, if applicable, and 7) Instructions to submit the project to the IRB office. The recipients of the RAPR notification include the PI, study submitter, corresponding AARI leader, research support managers, and additional personnel, as applicable.

If a study is not authorized, the leader of the corresponding research area will customize the decision notification detailing the reasons the proposal was not authorized. The leader may contact the PI personally and provide additional feedback.

Following the feasibility review conducted by the service line leader, the proposal receives a Protocol Review Committee (PRC) review. The study is discussed at a PRC meeting via Microsoft Teams with research leaders, clinical reviewers, and research support managers from Pharmacy, Business and Epic services as well as Information technology (IT). Once a RAPR determination has been made, the proposal is submitted to REDCap by a clinical research coordinator (CRC), and a REDCap notification is sent to the Principal Investigator (PI) and key personnel. After the PI has secured IRB authorization, the project is managed in OnCore as the Clinical Trials Management Software.

DISCUSSION

The primary goal of AH is to advance care and to help our patients and the communities we serve to live well. Research embedded in our system serves as a catalyst to achieve this goal. RAPR was designed not only to create consistent processes across Illinois and Wisconsin, but also to ensure selection and authorization are transparent, awarded to sponsored and investigator-initiated studies of the highest quality and impact, and projects are feasible to support scholarly activity of institutionally sponsored GME programs. The nursing specific RAPR process is an

important component of the AH Nursing Research infrastructure and strategy for advancing nursing research and dissemination thereby supporting Magnet recognition of nursing excellence (Lancaster et al., 2023).

REDCap implementation creates a robust workflow for each research area, a standardized and transparent review process, and a continuous report of institutional research portfolio metrics. To the best of our knowledge, this is the first report of an academic or research institution using REDCap (Harris et al., 2019; Patridge & Bardyn, 2018; *REDCap*, n.d.) as the web-based management software for submitting, reviewing, and authorizing studies requiring institutional approval before IRB review.

RAPR Implementation

The National Institutes of Health (NIH) mission is to "seek fundamental knowledge about the nature and behavior of living systems and to apply that knowledge to enhance health, lengthen life, and reduce illness and disability" (National Institutes of Health, n.d.). To accelerate translational research, efficient research administration and continuous improvement efforts are crucial for adapting to the ever-evolving research landscape.

Historically, AARI and other research areas had a semi-structured, but less robust, research review process prior to IRB submission. While this was beneficial for resource allocation and other ancillary reviews, a more robust and standardized process was needed. The AARI launched RAPR in February 2022 after two years of planning and piloting. Multidisciplinary teams, including scientists, clinicians, leaders, resource managers, and administrative personnel, developed the RAPR workflows and specific forms. As a result, the process was widely accepted from inception by all responsible areas.

The implementation of RAPR was done simultaneously across research areas. Investigators and key personnel were notified in advance of the new submission and review process via group emails and various research communications. Additionally, relevant RAPR submission processes and links were posted on the

corresponding research areas' SharePoint sites. RAPR is a mandatory prerequisite for IRB submission. If an investigator circumvents RAPR, the IRB will not begin their review until after the proposal is routed back through the RAPR process.

Critical facilitators for a successful RAPR implementation included: 1) clear mandate from institutional leaders that RAPR is a mandatory requirement for research studies, 2) available RAPR consultation for investigators to assess the operational and financial feasibility of sponsored and investigator-initiated research, 3) experienced and committed reviewers, including clinical and scientific experts, epidemiologists, statisticians, research associates, and research liaisons that can offer valuable insight and recommendations for protocol improvement, 4) improved quality of the research project after RAPR review, which facilitates subsequent IRB review and authorization, and 5) a RAPR Policy and Standard Operating Procedure (SOP) that outlines the submission, review, and authorization process across research areas.

REDCap Features

REDCap is a web-based application developed by Vanderbilt University to capture data for clinical research and create databases for projects (Harris et al., 2019; REDCap, n.d.). Although other web-based systems have been reported to be used by healthcare systems to streamline research administrative approvals (Bian et al., 2014; Murphy et al., 2012; Wood & Campion, 2022) and manage clinical trials (Campion et al., 2014; Mullen et al., 2023; Wood & Campion, 2022), these platforms are commercially available for a fee and require training before implementation. In contrast, REDCap offers a secure, customizable, intuitive, user-friendly, and compliant web-based interface without an institutional licensing fee. REDCap has key features that make it a suitable platform for RAPR:

Reliable: REDCap offers a secure and reliable web connection, allowing the RAPR office to streamline the research review process without glitches since its implementation in November 2023.

Accessible: The REDCap Intake Form is publicly accessible to researchers through survey links available on the AARI Investigator Hub SharePoint site and other corresponding research areas' SharePoint sites. Submitters can complete the intake and submit their proposal to the RAPR from anywhere at any time. No login is required.

Intuitive: REDCap is a user-friendly tool for investigators, reviewers, and administrators. Intuitive data entry ensures that team members with little computer experience can quickly learn REDCap. No technical knowledge or prior experience is needed.

Autonomous utilization: The RAPR office has complete autonomy and control over customization and functionality without the need for a programmer. REDCap can quickly adapt to changes in policy, process, and requirements without disrupting existing system services.

Customizable: REDCap allows administrators to customize intake form questions and scorecard evaluation forms, track projects, and deploy feedback surveys by using advanced features such as file uploading, data validation, branching logic, calculated fields, smart variables, and piping.

Informative: REDCap provides reports and statistics for any data collection instrument in the workflow, including study information, scientific review, resource utilization, RAPR determinations, and follow-up.

Compliant: REDCap is compliant with the Health Insurance Portability and Accountability Act (HIPAA), federal regulations, and international standards. Most importantly, REDCap has institutional technological support to meet AH security policies and user needs.

To evaluate the efficiency and utility of REDCap for RAPR, it is essential to analyze metrics for all workflow steps.

Table 2
Summary of studies submitted to REDCap since implementation (November 1, 2023 - January 30, 2025)

RESEARCH AREAS	STUDY TYPE/SERVICE LINE	AUTHORIZED STUDIES (N)	AVERAGE SCORE (%)	TIMELINE FOR AUTHORIZATION (AVERAGE DAYS)	STUDIES REQUIRING AARI RESOURCES (N, %)
Academic Research (Investigator-Initiated Research)	Oncology	1	85.5	4.8^	24 (58.5%)
	Neurology	1			
	Cardiovascular	3			
	Pediatrics and Maternal Health	16			
	Specialty Areas	20			
Graduate Medical Education Research	Research Studies	59	76.6	16.5^	29 (40.3%)
	Quality Improvements projects	13	N/A		
Nursing Research	Quantitative/Qualititave studies	6	83.7	19.5^	2 (50%)
Sponsored Clinical Trials	Oncology	52	81.1	14.7*	132 (100%)
	Neurology	19			
	Cardiovascular	48			
	Pediatrics and Maternal Health	10			
	Specialty Areas	3			
TOTAL REDCap projects	All types	251	81.7	13.8	187 (74.75%)

*Timeline from PRC review to RAPR notification. ^Timeline from completed administrative review to RAPR authorization. N/A = Not Applicable

Table 2 provides a summary of relevant metrics for studies authorized by RAPR using REDCap. Since its implementation on November 1, 2023, through January 30, 2025, a total of 251 studies have been authorized by RAPR, with an average approval timeline of 13.8 days.

REDCap has proven to be user-friendly, placing a minimal burden on investigators. Once a study is approved, REDCap sends an automatic notification to the submitters along with a brief survey link. This survey asks about their satisfaction with REDCap's functionality. The available options are very unsatisfied, unsatisfied, somewhat satisfied, satisfied, and very satisfied. To date, 55% of investigators reported being very satisfied, while 45% indicated they were satisfied with REDCap's functionality.

From an enterprise perspective, REDCap has enhanced communication among key stakeholders while reducing administrative burdens by automating notifications to scientific reviewers, research support managers, leaders, and investigators. The customization of REDCap was accomplished by the RAPR project manager within 30 days, without the need for additional personnel for implementation. Finally, REDCap is available at no cost for REDCap Consortium partners worldwide. The cost savings of utilizing REDCap as the management software for RAPR is estimated at $36,000 per year, demonstrating that the use of REDCap is both efficient and cost-effective.

RAPR Strengths

Human Subject Research (HSR) must comply with ethical and regulatory requirements (United States Department of Health and Human Services, n.d.). An important ethical requirement is that HSR must have a scientifically sound design and statistical plan while being operationally feasible to provide a reasonable chance of generating new knowledge. RAPR ensures that HSR complies with accepted standards of scientific quality and operational feasibility prior to IRB submission.

Scientific and clinical reviewers are expected to assess protocols based on the definitions given for the evaluation criteria (Table 1). RAPR aligns with the recommendations outlined in the CTSA Consortium

Scientific Review Committee (SRC) Consensus Working Group Report on the scientific review (Selker et al., 2015, 2020)analytic plan, and be operationally feasible in order to be successfully completed and thus to have translational impact. To ensure this, institutions that conduct clinical research should have a scientific review process prior to submission to the Institutional Review Committee (IRB, which recommends a framework for protocol assessment that precedes IRB review. However, RAPR has been adapted to comply with institutional priorities, internal policies, and GME scholarly activity requirements.

One of the strengths of RAPR is the availability of ad honorem clinical and scientific reviewers. To serve as a reviewer, the following requirements must be met: 1) have the relevant scientific or clinical expertise to review the project, 2) not be members of the study team, 3) have no conflict of interest, and 4) be available and willing to review the study in a timely manner.

The goal of the RAPR is to ensure the clinical significance, scientific merit, feasibility, and well-defined outcomes of research conducted within the organization. Implementing a RAPR process or a similar approach could help manage a diverse range of research projects within academic or research institutions. It offers an opportunity to establish a centralized process to review various research projects, develop a standardized review across the organization, streamline the authorization of studies that are feasible and align with institutional priorities, create a comprehensive database of authorized studies and track periodic operational metrics across the institution.

RAPR Limitations

Although RAPR has been fully implemented across research areas, there are some limitations to the process including: 1) lack of responsiveness from PIs to the reviewers' recommendations, 2) limited resources available to unfunded proposals as support is prioritized to funded research, 3) RAPR has no control over the negotiation and execution of contracts that occurs after RAPR authorization which may lead to potential delays in study start-up, and 4) proposals including health technology such as

wearables, software, websites, medical and mobile devices, and Electronic Data Capture (EDC) Systems require Information Technology (IT) risk review, which also may lead to potential delays in study start-up.

CONCLUSION

This article outlines the successful implementation of RAPR by AH Midwest. RAPR provides a centralized process for the submission and review of research studies across several research areas; coordinates study reviews in a sequential or parallel manner; serves as a liaison among investigators, reviewers, and research administrators; selects studies that are feasible and meritorious; and provides metrics to enable continuous reassessment and quality improvement. Customization of REDCap has enabled RAPR to develop a robust workflow for tracking study authorization and guiding process improvement.

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REFERENCES

Bian, J., Xie, M., Hogan, W., Hutchins, L., Topaloglu, U., Lane, C., Holland, J., Wells, T., Fan, Y., Baker, M., & Jiawei, Y. (2014). CLARA: An integrated clinical research administration system. *Journal of the American Medical Informatics Association*, *21*(e2), e369–e373. https://doi.org/10.1136/amiajnl-2013-002616

Campion, T. R., Blau, V. L., Brown, S. W., Izcovich, D., & Cole, C. L. (2014). Implementing a clinical research management system: One institution's successful approach following previous failures. *AMIA Joint Summits on Translational Science Proceedings.* AMIA Joint Summits on Translational Science, 2014, 12–17.

Center, A. N. C. (2021). *2023 Magnet® Application Manual*. American Nurses Association.

Harris, P. A., Taylor, R., Minor, B. L., Elliott, V., Fernandez, M., O'Neal, L., McLeod, L., Delacqua, G., Delacqua, F., Kirby, J., & Duda, S. N. (2019, July). The REDCap consortium: Building an international community of software platform partners. *Journal of Biomedical Informatics*, *95*, 103208. https://doi.org/10.1016/j.jbi.2019.103208

Lal, M. M. (2021). Introducing the 2023 Magnet Application Manual®. *JONA: The Journal of Nursing Administration*, *51*(12), 593–594. https://doi.org/10.1097/NNA.0000000000001090

Lancaster, R. J., Gentile, D. L., Hlebichuk, J. L., Cleary, M. B., Hook, M. L., & Vizgirda, V. M. (2023). Building research infrastructure and multisite studies in merged health care settings: A framework for nurse scientists and health care leaders. *Nursing Outlook*, *71*(6), 102083. https://doi.org/10.1016/j.outlook.2023.102083

Mullen, C. G., Houlihan, J. Y., Stroo, M., Deeter, C. E., Freel, S. A., Padget, A. M., & Snyder, D. C. (2023). Leveraging retooled clinical research infrastructure for Clinical Research Management System implementation at a large academic medical center. *Journal of Clinical and Translational Science*, *7*(1), e127. https://doi.org/10.1017/cts.2023.550

Murphy, S. N., Dubey, A., Embi, P. J., Harris, P. A., Richter, B. G., Turisco, F., Weber, G. M., Tcheng, J. E., & Keogh, D. (2012). Current state of information technologies for the clinical research enterprise across academic medical centers. *Clinical and Translational Science*, *5*(3), 281–284. https://doi.org/10.1111/j.1752-8062.2011.00387.x

National Center for Advancing Translational Sciences. (n.d.). *Clinical and Translational Science Awards (CTSA) program.* Retrieved March 18, 2024, from https://ncats.nih.gov/research/research-activities/ctsa

National Institutes of Health (NIH). (n.d.). About the NIH. Retrieved March 18, 2024, from https://www.nih.gov/about-nih/what-we-do/nih-almanac/about-nih

Patridge, E. F., & Bardyn, T. P. (2018). Research Electronic Data Capture (REDCap). *Journal of the Medical Library Association*, *106*(1). https://doi.org/10.5195/jmla.2018.319

REDCap. (n.d.). Retrieved March 18, 2024, from https://www.project-redcap.org/

Selker, H. P., Buse, J. B., Califf, R. M., Carter, R., Cooper, D. M., Davis, J., Ford, D. E., Galassetti, P., Guay-Woodford, L., Huggins, G. S., Kasper, A., Kieburtz, K., Kirby, A., Klein, A. K., Kline, J., O' Neill, R. T., Rape, M., Reichgott, D. J., Rojevsky, S., … Welch, L. (2015). CTSA Consortium Consensus Scientific Review Committee (SRC) Working Group report on the SRC processes. *Clinical and Translational Science*, *8*(6), 623–631. https://doi.org/10.1111/cts.12306

Selker, H. P., Welch, L. C., Patchen-Fowler, E., Breeze, J. L., Terrin, N., Parajulee, A., LeClair, A., Naeim, A., Marnocha, R., Morelli Novak, J., Caldwell, C. S., Cola, P. A., Croker, J. A., Cifu, D. X., Williams, K. M., Snyder, D. C., & Kitterman, D. (2020). Scientific Review Committees as part of institutional review of human participant research: Initial implementation at institutions with Clinical and Translational Science Awards. *Journal of Clinical and Translational Science*, *4*(2), 115–124. https://doi.org/10.1017/cts.2019.439

United States Department of Health and Human Services. (n.d.). 45 CFR 46. Retrieved March 18, 2024, from https://www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/index.html

Wood, E. A., & Campion, T. R. (2022). Design and implementation of an integrated data model to support clinical and translational research administration. *Journal of the American Medical Informatics Association*, *29*(9), 1559–1566. https://doi.org/10.1093/jamia/ocac100