MYRESEARCHPATH: AN INTERACTIVE TOOL FOR INVESTIGATORS AND RESEARCH ADMINISTRATORS

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ABSTRACT

Research-intensive institutions rely on specialized central offices to support research administrators and investigators through various processes and requirements. This helps researchers successfully and compliantly conduct and manage research. However, when these support offices communicate their processes and resources from disparate locations, it can be challenging for research administrators and investigators to locate what they need at the time they need it, and to understand how this information relates with that provided by other research support offices. This can result in research administrators and investigators lacking a clear understanding of critical information and an underutilization of available support. Duke University sought to address this issue by developing a web-based interactive research roadmap to consolidate and organize information from research support offices around the institution. In this roadmap, all support office content is integrated by topic and organized across the research project life cycle. To achieve this, a dedicated project team 1) convened the research support offices to develop integrated content and a process for contributing their resources on the website, 2) solicited researcher feedback to determine the critical features and functionality of the site, 3) engaged a technical development partner to build the site, 4) engaged researchers for beta-testing, and 5) devised a communication strategy to raise awareness and adoption of the site. The interactive research roadmap, "myRESEARCHpath," launched in 2021, and has experienced steady growth in utilization. Initial data shows that users are accessing the site to find relevant information for research information and guidance, and research support offices are encouraged by the improved discoverability of resources and services. This model of a single location to access research support office information needed to navigate the research project life cycle could be beneficial for other research-intensive institutions.

Keywords:

Research support, research roadmap, technology solutions

INTRODUCTION

Over the past several decades, research-intensive institutions have experienced an increase in administrative and compliance-related requirements regarding the planning, conduct, and management of scientific research and scholarly activity (National Science Board, 2014; COGR, 2023). Research-intensive institutions have established specialized research support offices to assist research administrators and investigators in navigating these requirements. These support offices are essential for financial management of externally-sponsored grants and contracts, ensuring appropriate quality assurance, and providing consistency in research management and integrity (Taylor, 2006). These offices work together to support researchers, often with complex collaborative processes that can be challenging for research administrators and investigators to navigate independently.

Simultaneously, institutions are increasingly reliant upon technology for more efficient operations and to expand their support services. Therefore, use of technology to automate manual systems or complex processes is becoming more important in higher education (Rice & Miller, 2001). In addition, academic faculty seeking information to facilitate their research are, like most US adults, likely to turn to internet searches rather than making phone calls or talking with colleagues (Iskiev, 2023). While there are advantages to leveraging technologies to better support researchers, developing new technologies face challenges with implementation and adoption, including resources available, organizational culture, faculty readiness, anticipated degree of resistance, and the degree of variance from the status quo (Roberts, 2008).

As a research-intensive institution Duke University is no exception, having developed a robust research infrastructure that includes both specialized offices staffed with knowledgeable personnel, and websites and platforms with supportive resources and information. As each research support office was created, it developed its own method for surfacing the information needed to understand and navigate the specific processes relevant to their office. Typically, each office had its own standalone website or other web-based platforms. In this model, a research administrator or investigator seeking support would need to be aware of each research support office, know which are involved in the various stages throughout the research project life cycle, and ultimately access multiple websites or web-based platforms to obtain the full extent of information needed.

Table 1 indicates the areas of support at Duke University that assist the research community in each stage of the project life cycle, representing 42 unique support offices. Within each support area, there may be multiple support offices depending on the type of research or institutional area in which that office supports (e.g., one IRB that supports biomedical research and one for non-biomedical research).

Table 1: Areas of Research Support Involvement Across the Project Life Cycle

	Idea Generation	Project Planning	Proposal Development & Submission	Project Initiation	Project Activities & Management	Award Management	Project Close Out
Animal Care and Use		■		■	■		■
Audit, Compliance, and Regulatory		■		■	■	■	■
Clinical Research Support	■	■	■	■	■		■
Contracting			■	■		■	
Grants Administration			■	■		■	
Humanities Support	■	■	■				
Information Technology	■	■	■	■	■	■	■
Institutional Review Boards		■		■	■		■
International Support		■		■	■		
Libraries	■	■					■
Licensing	■	■					■
Occupational Safety		■		■	■		■
Procurement		■		■		■	■
Research Development	■	■	■				
Research Finance			■			■	
Resource Cores and Service Centers	■	■		■	■		
Scientific Integrity	■	■	■	■	■	■	■

In 2018, institutional leadership recognized that this model increases confusion and reduces the chances that critical information is accessible and understood by research administrators and investigators. In addition, the research support offices themselves shared two primary concerns: 1) support services and resources were being underutilized due to lack of awareness, and 2) frequent problems could be avoided if research administrators and investigators encountered the support office at the appropriate stage of the research process.

With both leadership and support offices recognizing the need, the Duke University School of Medicine included the development of an interactive research roadmap as a "critical enabler" to successful research in its 2018 Strategic Plan (Duke University School of Medicine, 2018). In 2019, institutional leadership determined that the interactive research roadmap could provide benefit institution-wide, and thus should not be limited to the School of Medicine. Therefore, the tool would be developed to support all research conducted at Duke University.

Ultimately, a solution to these problems was conceived: myRESEARCHpath (MRP), a lifecycle-based interactive research roadmap. At its core, the goal of MRP is to provide the research community (research administrators, investigators, and scientific staff) a single web-based platform to find the information needed for their research activities organized by the research process, as opposed to organizational unit. Key requirements for the interactive research roadmap were to: 1) harmonize the location of content available from all research support offices, 2) surface required processes, policies, and guidelines alongside tools, trainings, and resources throughout

the entirety of a research project life cycle, 3) tailor the experience as much as possible to the person seeking information, and 4) integrate with existing research support platforms and services.

METHODOLOGY

A project team was assigned to drive the development of MRP in February 2019. Development was a two-year collaborative effort between the project team (one full-time and one approximately quarter-time staff member), research support offices, an external web development vendor, and the research community. Development activities and involvement from each of the groups are described below.

Developing Content and Integrating Additional Resources from Research Support Offices

To address the goal of harmonizing the location of institutional research support content, the project team identified all research support offices and the specific topics and tasks they support throughout the project life cycle. In this initial exercise, 42 research support offices were included. The project team met individually with each of the 42 research support offices to outline which topics and tasks they support. Input from these meetings was used to determine which primary topics should be included in MRP. For a topic or task to be included as a primary topic page in MRP, at least two support offices needed to be involved in supporting that task, and there needed to be high-level guidance along with supporting resources (consultations, policies, trainings, forms, etc.). Topics that did not reach this threshold but were deemed essential for navigating the project life cycle were combined with another related topic. For example, there were not enough resources for a standalone page for research computing or for data storage, but combined these related topics had robust enough content to warrant a standalone topic page called "Determine compute and data storage solutions." Through this exercise 45 primary topics were identified.

The project team and research support offices determined early on that content in MRP would be organized from the perspective of the research community, oriented towards the tasks or topics needing consideration at each stage of a project. Each "topic-based page" would contain high-level, integrated information, along with access to related detailed information and resources including consultations and help, policies and procedures, tools and forms, and training specific to that topic. For example, a research administrator or investigator preparing a budget for an upcoming proposal could view the "Develop the budget and justification" topic-based page, accessing high-level information that generally orients them to this task (best practices on budgeting personnel effort and salary, typical budget categories that must be considered, etc.). In addition, they are presented with "related resources" that support preparing budgets or justifications. These include: 1) Consultations (meet with an expert to develop your budget); 2) Policies/Guidance (e.g., Fringe Benefit rates, Tip sheet on preparing international budgets); 3) Tools/templates (e.g., NIH salary cap worksheet); and 4) Training (Budget basics for clinical trials).

The project team convened working groups for each of the 45 topics, bringing together representatives from all research support offices involved. Office representatives discussed the most critical information and processes within that topic, how each office contributed to supporting that topic, and the integration of support between offices. From these discussions, the project team created a draft of the content for that topic's page in MRP, promoting the most critical information determined by the working group. The draft was circulated and reviewed by the working group members with the final agreed upon content built into the site.

To surface resources related to each topic and ensure accuracy, the support offices agreed to contribute and maintain their office's resources in one of two ways: 1) move their resources into MRP, and remove them from their current website to avoid duplication of the same information on multiple sites, or 2) keep resources on their current website and contribute the resources as hyperlinks. Each office named a delegate who would add, maintain, and tag their resources to each associated topic page, and would review their resources at least annually.

Development: Determining Critical Features and Functionality of the Platform

Input from research administrators and investigators was critical in determining the necessary features and functionality of the site, and in ensuring its long-term success. The project team conducted one-on-one interviews and convened focus groups. In all, 36 investigators (3 School of Arts & Science, 5 School of Engineering, 1 School of the Environment, 26 School of Medicine, 1 School of Nursing), 18 scientific staff (1 School of Engineering, 16 School of Medicine, 1 School of Nursing), and 9 research administrators (1 early-career, 5 mid-career, and 3 senior-career) participated in the interviews and/or focus groups.

The project team learned the most important elements were:

1. A simple, clean, and user-friendly interface
2. Easy navigation between relevant topics within each stage of the project life cycle
3. Robust search yielding curated results
4. Customizable to display information that is applicable and relevant
5. Assurance that the information was current and accurate

In the focus groups, attendees rated the perceived usefulness of MRP as a tool for supporting the research process on a scale from 1-10 (with 1 being no perceived usefulness and 10 being high perceived usefulness). Scientific staff saw the greatest utility (9.9), followed by investigators (9.3), and then research administrators (7.6).

Technical Development and Beta-Testing

Once the critical features and functionality were determined, the project team initiated a competitive bidding process, landing on a local agency who built MRP as a custom Drupal website.

Prior to launch, select investigators, research administrators, and scientific staff were invited to beta-test the website. Beta-testers (n=29) were given access to the website, provided with prompts for beta-testing activities, and a survey to record their responses. Beta-testing activities and associated feedback questions are outlined below:

1. Take a moment to scroll through the homepage and familiarize yourself with the site.
   a. What is your initial impression?
   b. What stands out as confusing or unclear?
   c. What draws your eye or seems initially most interesting or useful about the site?
2. Think of a research project in which you are currently involved or would like to propose in the future. Apply the filters in the “Customize Your Path” section based on this project.
   a. Are the instructions clear for what applying the filters will do?
3. Pick a life cycle stage and topic that interests you or is most applicable to your role. Review the main content for each topic or subtopic page and the Related Resources on the right-hand side. Provide your feedback for each page.
   a. How did the information provided compare to your expectations for this topic?
   b. What additional information would you expect to see on this page?
   c. Is any information unhelpful or inaccurate?
   d. Did you discover any resources you were not aware of or would have a hard time finding outside of this site?
   e. Do any resources seem irrelevant to this topic?
   f. Were there instances when the resource titles were not clear or meaningful to you?
   g. Overall, how helpful is this page in navigating what to do for this topic/task?
   h. What other suggestions do you have for improving this page?

At the conclusion of the beta-testing survey, Likert scales were utilized to rate the 1) likelihood of utilizing MRP as a tool for supporting their research projects or portfolio; and 2) likelihood that they would refer MRP as a tool to someone who is new to Duke or to research. Of the 24 beta-testers who responded, 22 indicated they were likely or very likely to use MRP as a tool themselves, and all 24 indicated they were likely or very likely to refer MRP as a tool to those new to Duke or research.

Integration with Existing Platforms and Services

Since a primary goal of MRP was to consolidate information and reduce confusion, it was important to make its access as seamless as possible for researchers. Therefore, MRP would be branded alongside two existing well-known research support platforms and services: 1) myRESEARCHhome (MRH) - a personalized portal for researchers to manage their portfolios; and 2) myRESEARCHnavigators (MRN) - a team of experts with research backgrounds providing consultations and a research help hotline. With the addition of MRP, the full set of services and tools fell under a new umbrella: myRESEARCHsuite.

To fully realize the new myRESEARCHsuite, two important issues were considered. First, was access to the new tool. Duke's MRH platform launched in 2016 and has become a central hub for managing research portfolios. Given that MRH is now well-established, it was important to ensure that users could easily discover and launch MRP directly from the well-known MRH portal, allowing access to both MRH and MRP from one familiar location. Second, web tools are of great benefit for those who seek to find information on their own; however, sometimes a researcher needs a human to help wade through the myriad of details. Therefore, to ensure complementary support from the MRN team, access to their services was included throughout MRP. The MRN intake form and contact information were made easily accessible throughout the MRP topic-based pages, thereby allowing researchers to connect with experts for questions, or to request a consultation if they needed additional guidance or more personalized assistance.

Communication Strategy for Adoption of MRP

Duke leadership agreed that adoption of the tool, to be monitored via site metrics data, was the most important measure of success. To encourage adoption, a communication strategy was employed to ensure awareness of the new tool. This included:

1. Sharing a small communication kit with offices and departments (e.g., standard language and graphics for newsletters, websites, and listservs)
2. Providing virtual presentations demonstrating the features and functionality of the site
3. Asking support offices to ensure that their websites appropriately direct users to MRP
4. Integrating an overview of MRP in new researcher onboarding
5. Integrating access to MRP into other existing research support tools
6. Encouraging support offices to reference relevant MRP pages when giving presentations

Much attention was paid to ensuring effective and timely communication about the interactive roadmap. Prior to the tool's launch, presentations were delivered to over 1,200 attendees and in its first year after go-live, 83 presentations were delivered to an estimated 2,860 attendees. The project team did not track any official measurements on the efficacy of these strategies.

RESULTS

MRP launched as a publicly accessible website in January 2021 (https://myresearchpath.duke.edu/).

Developing and Maintaining Content

All 45 topic-based pages were constructed to integrate the information agreed upon by each of the working groups, organized by the stages of the project life cycle. The delegates from the 42 research support offices were given access to the site's backend and provided with training on how to add their offices' resources to display on the applicable topic-based pages. Delegates were provided with a dashboard for viewing and maintaining the resources they contributed, with automated annual reminders to review and update their resources. This collaborative ownership and maintenance of content is monitored by the project team, who is alerted to the addition of or changes to content.

Determining Critical Features and Functionality of the Platform

Based on the feedback received during development, key features of the site included:

1. An easy-to-navigate homepage, with all topic-based pages organized by life cycle stage. Users click into topic-based pages to view 1) content developed by working groups, and 2) related resources contributed by the research support offices (see Figure 1).
2. Topic-based page content that can be displayed in different formats depending on the communication needs. Content types included basic formats such as text, tables, images, or videos. More interactive content types include card displays that a user can filter based on a dropdown selection, and interactive matrices, which allow the user to select multiple inclusions to receive a table of refined results (see Figure 2).
3. A curated search function, displaying topic-based pages and related resources relevant to the search term.
4. The ability to "Customize Your Path," which allows users to select global parameters specific to their role and project inclusions. When parameters are applied, topic-based pages and resources that are not relevant to the user are hidden (see Figure 3).
5. Automated annual reminders for the research support office delegates to review and update contributed resources.

Figure 1: MRP Homepage - Topic-Based Pages Organized by Life Cycle Stage

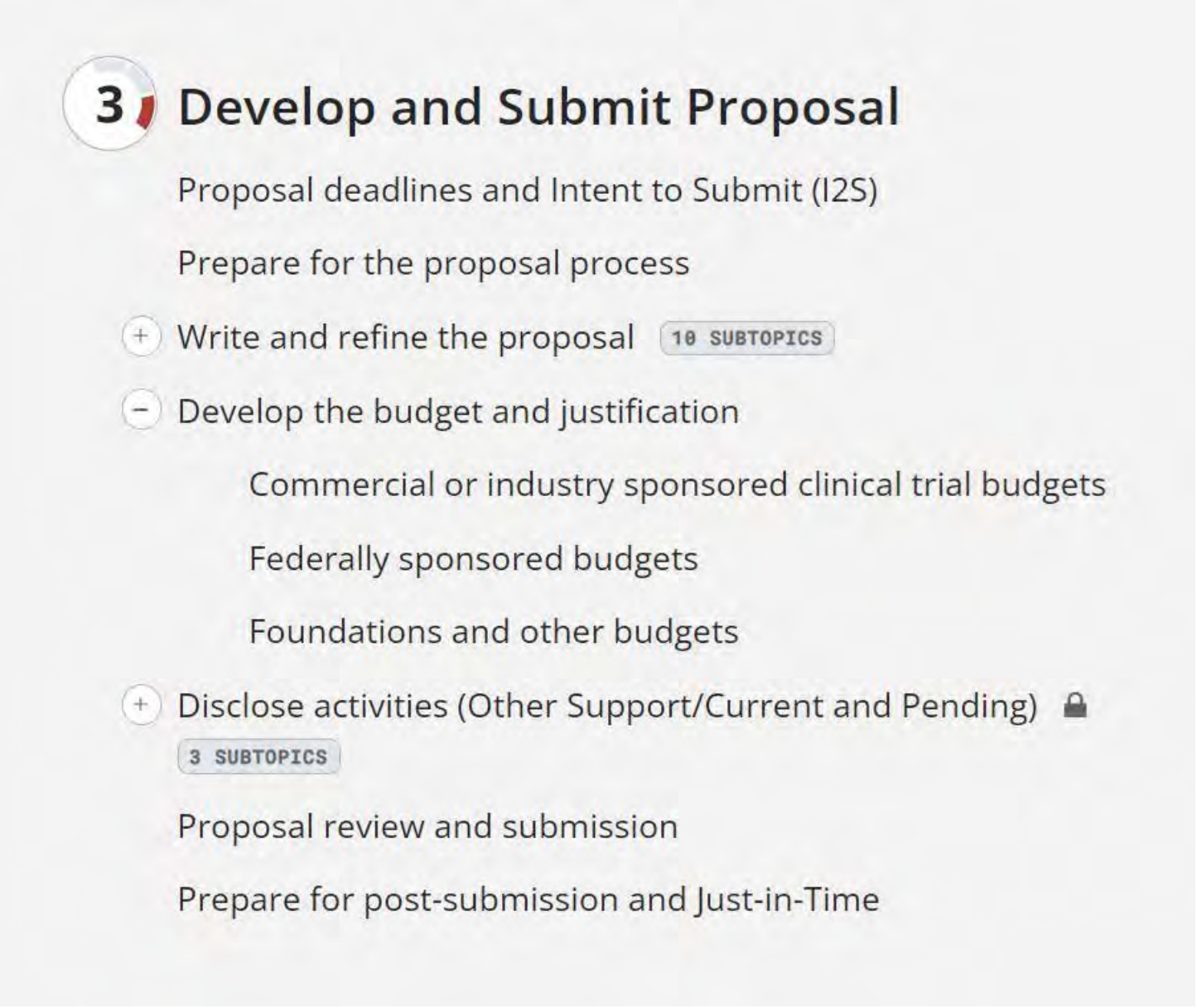


Figure 2: Interactive Features within Topic-Based Pages

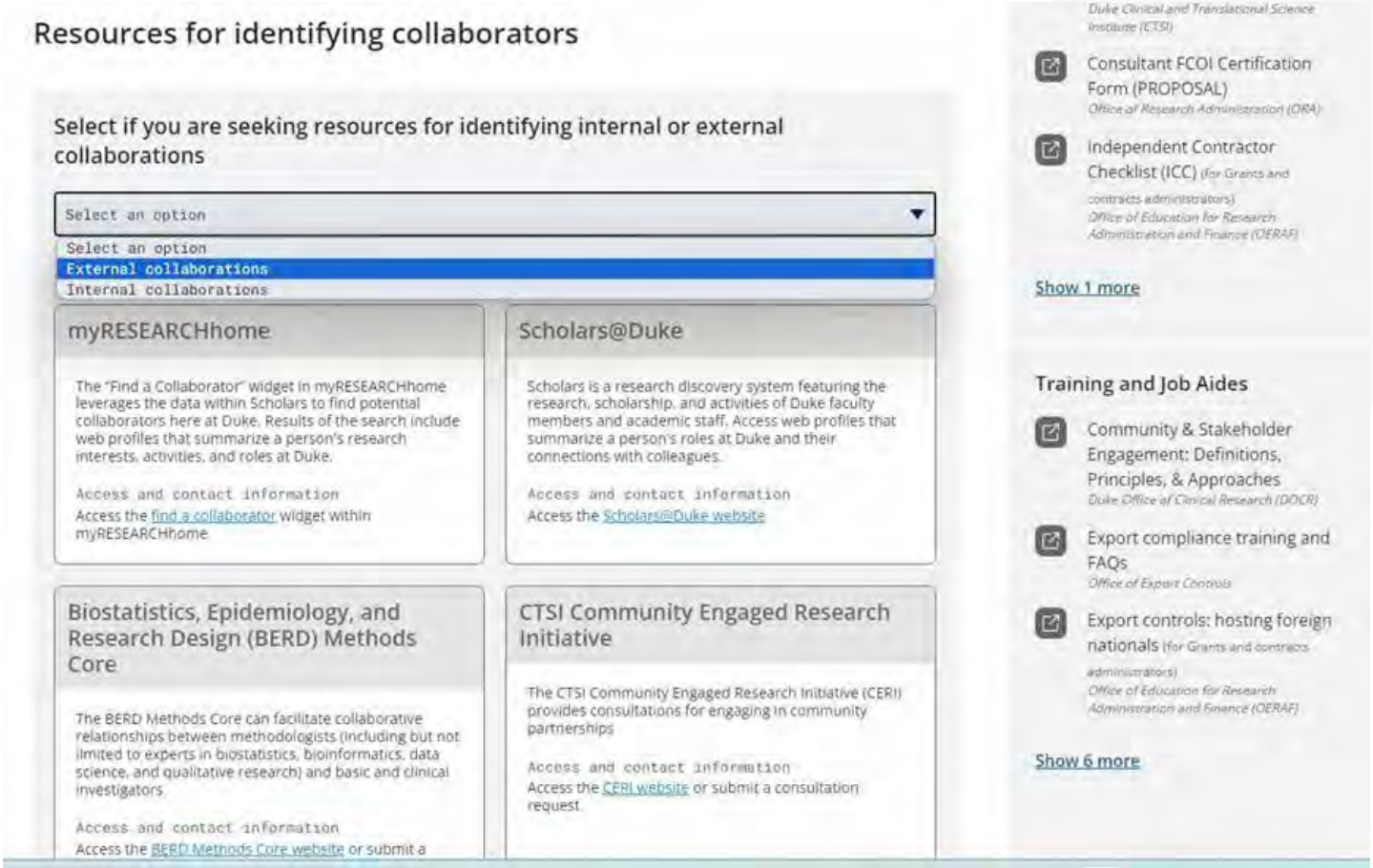
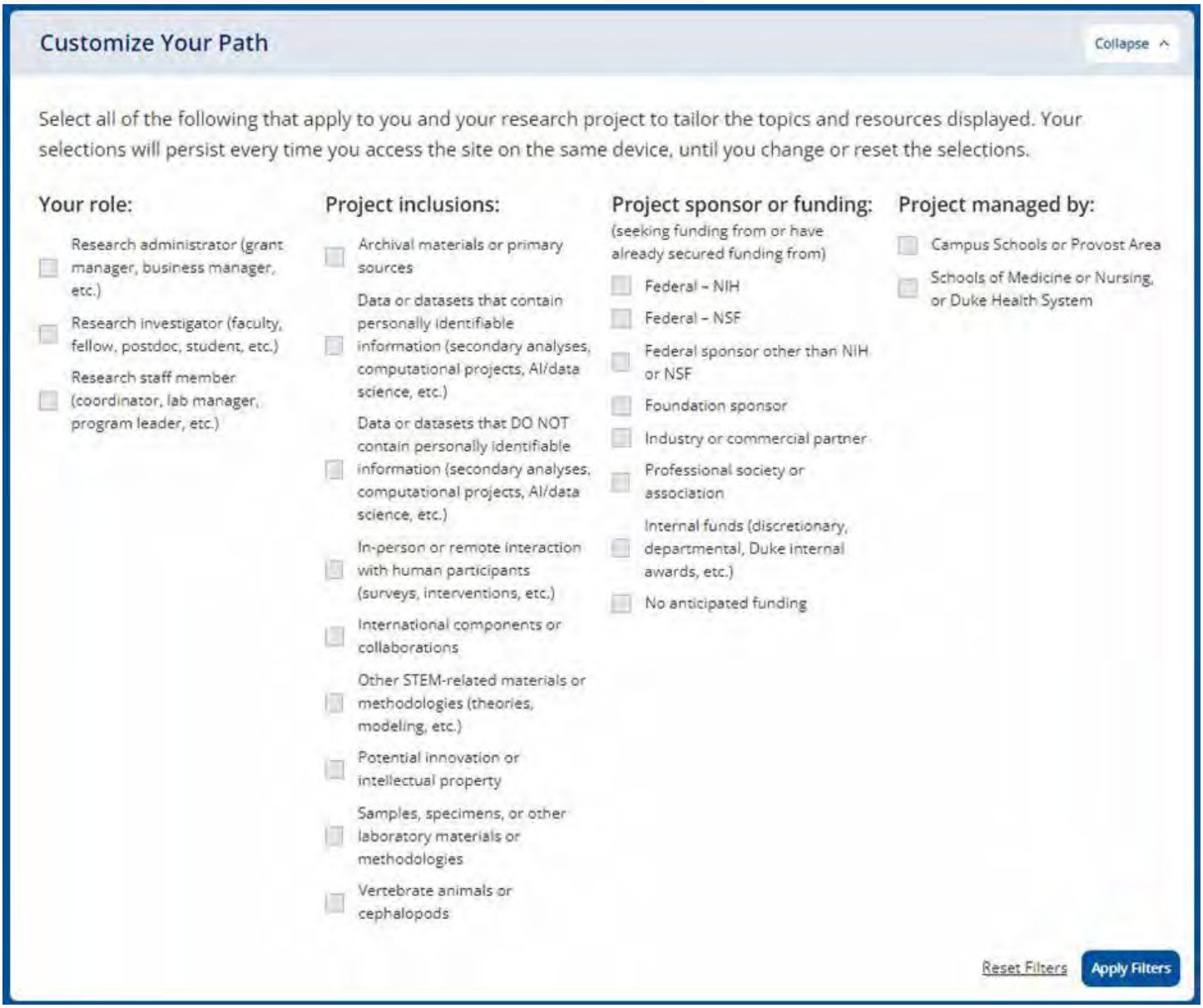


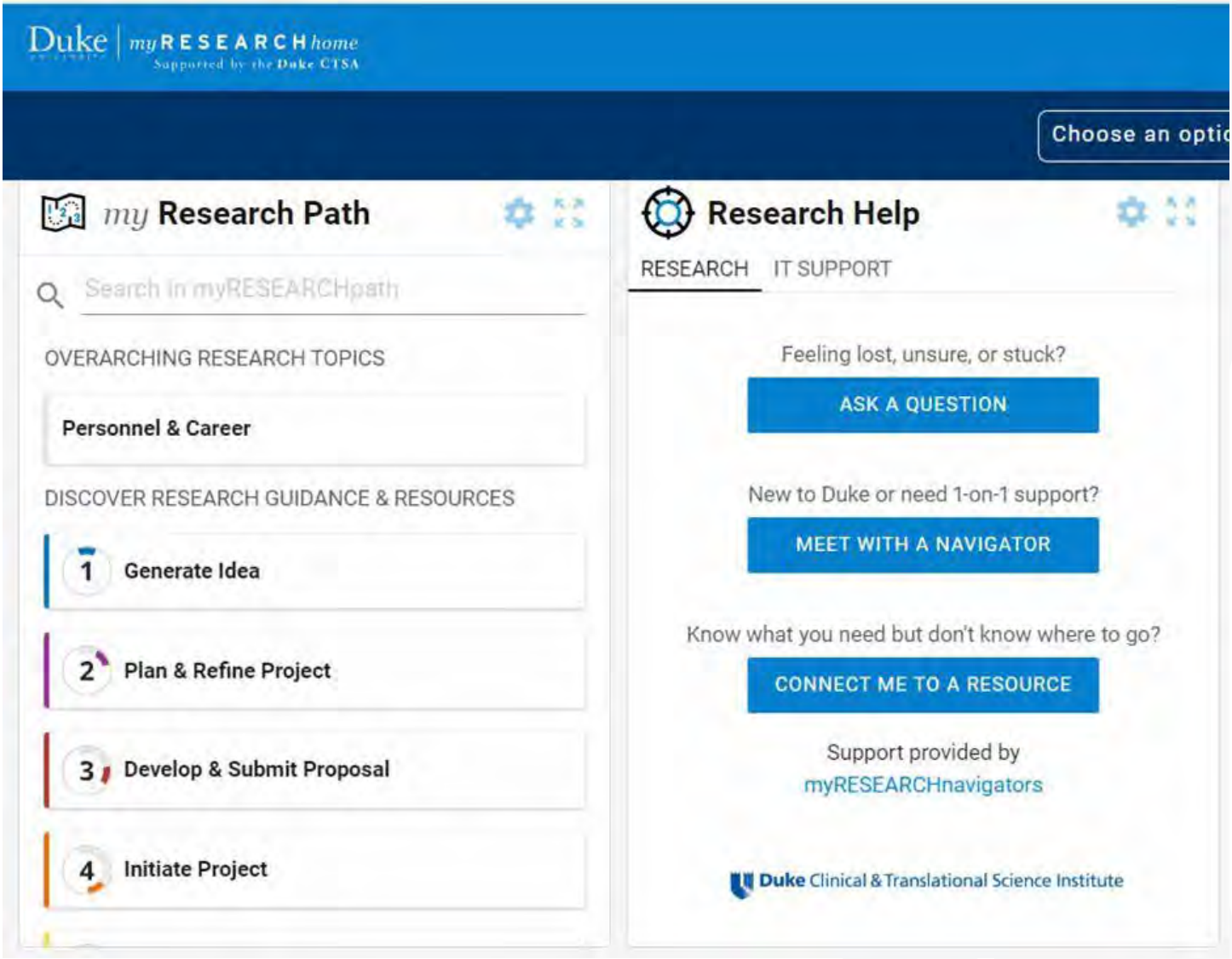
Figure 3: "Customize Your Path" Feature - Refinement of Topic-Based Pages and Resources



Integration with Existing Platforms and Services

MRP, MRH, and MRN were well integrated prior to launch of the site to be able to brand the three tools together as myRESEARCHsuite. In MRH, a new widget was added to the portal that allowed users to directly access MRP through clicking into the stages of the project life cycle or utilizing the search function. Figure 4 shows how this was integrated into the MRH platform, alongside access to the MRN services. The MRN intake form was included on 30 of the 45 topic-based pages, promoting the services to users of MRP needing more personalized guidance or assistance.

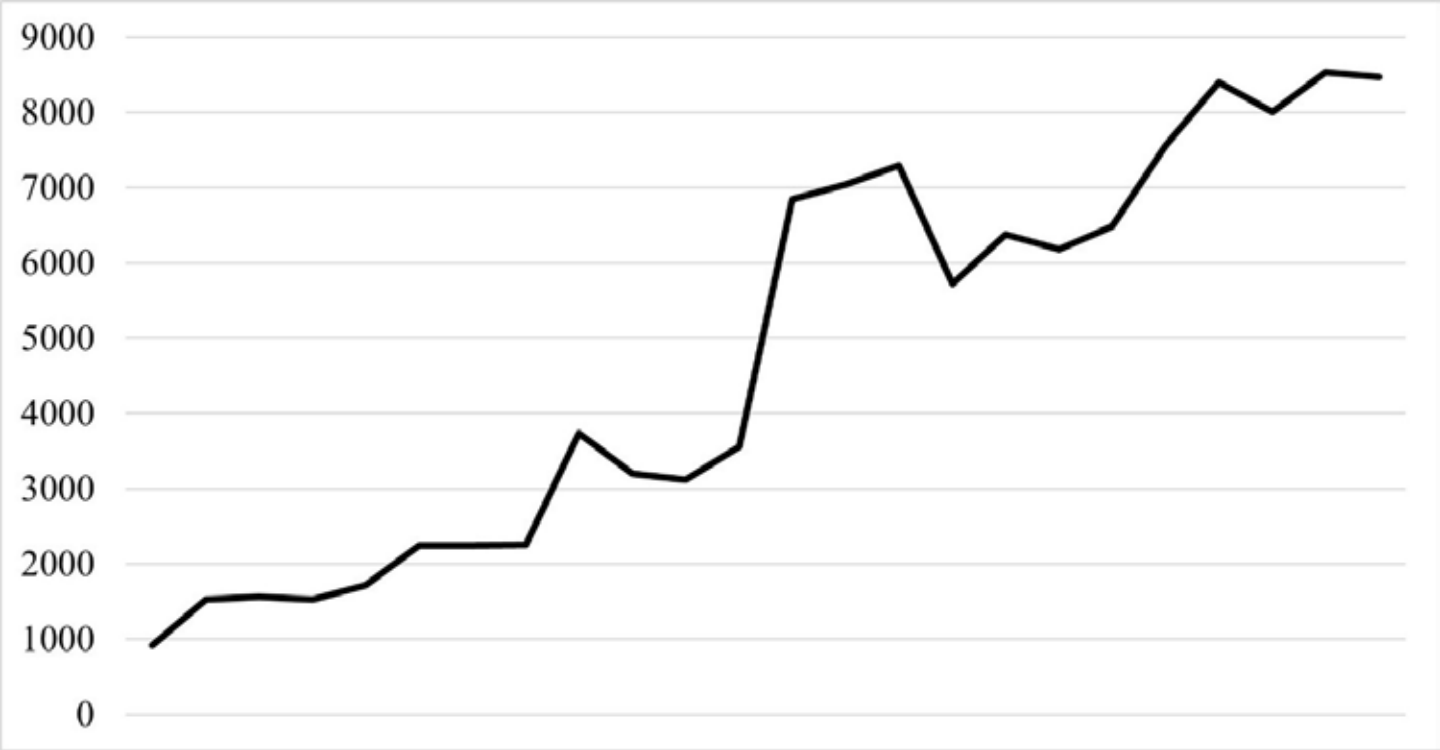
Figure 4: Integration of MRP into MRH



Adoption of MRP and User Feedback

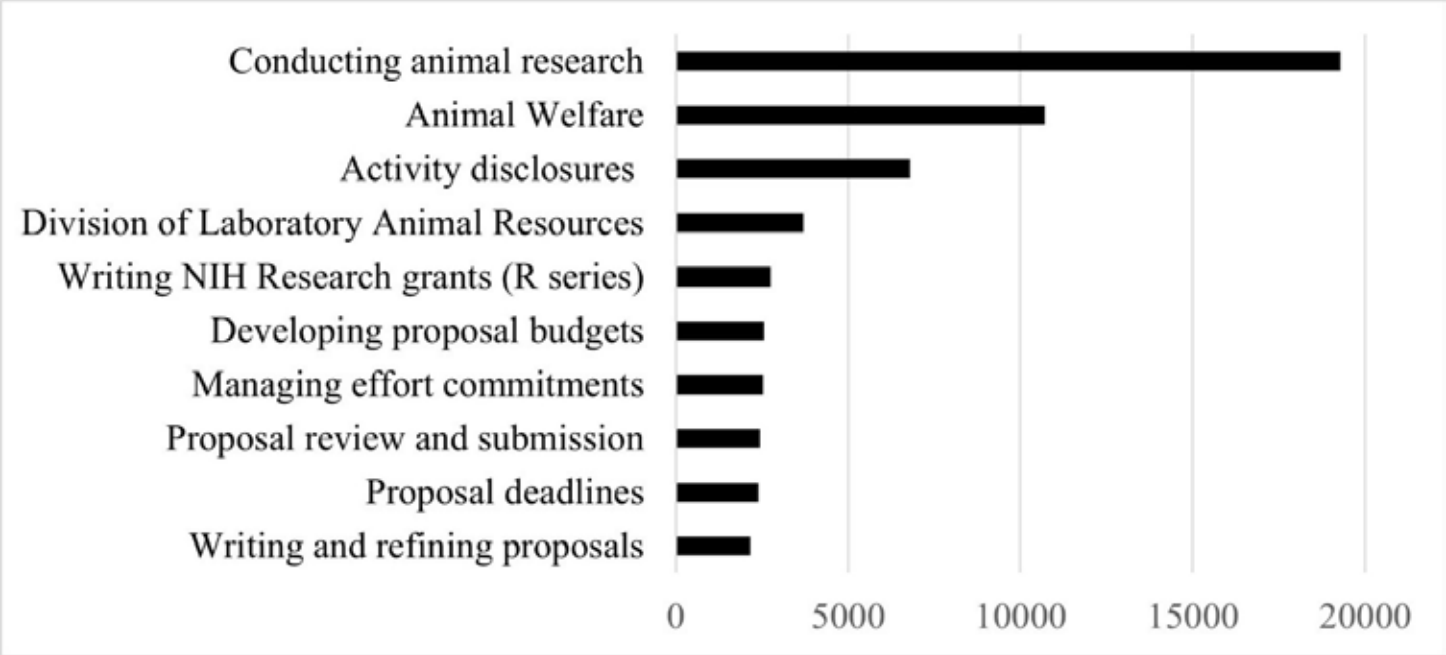
Google Analytics tracks site metrics, including total site sessions (number of times any user is actively engaged with the website), and pageviews for each topic-based page. In the first year, there was a steady increase in total monthly sessions from 917 in January 2021 to 3,555 in December 2021. Total sessions significantly increased in 2022, with a monthly average of 7,245 compared to 2,301 in 2021, a 215% increase (Figure 5). The significant increase in total sessions over the first two years of the site indicated researcher adoption of the site, with Duke leadership deeming this a successful launch and an essential tool for research support.

Figure 5: Monthly Site Sessions January 2021 through December 2022



The most accessed topic-based pages for January 2021 through December 2022 are displayed in Figure 6.

Figure 6. Total Pageviews of Most Accessed Topic-Based Pages January 2021 through December 2022



Users of MRP have the opportunity to provide unsolicited feedback via a feedback survey available in the main navigation menu. In the first two years, the team received 64 responses, with 37% suggesting content, 33% offering minor edits, 22% requesting assistance locating information, and 8% providing general feedback on the tool.

Below are excerpts from selected general site feedback responses received:

1. "I appreciate all the work that's gone into this and all the progress you've made in centralizing access to Duke and outside resources." (Duke Research Administrator)
2. "There's lots of good information here but it can be hard to find unless you know just what keywords to use. I stumble on useful pages all the time and then can't find them again. Is it possible to put internal bookmarks so we can tag pages we want to find again?" (Duke Research Staff)
3. "It is [a] very helpful research site. Thanks!" (Duke Investigator)
4. "I stumbled upon this page and just want to commend you all for creating it. It looks excellent. I wish our institution had something like this. I forwarded the link to our Sponsored Research group and asked if we could have something similar. It's clear that a ton of thought went into this, and the way it's designed to help investigators and grants/contracts managers is really outstanding. Very well done." (External Investigator)
5. "Difficult to find the appropriate forms for my study. Much of the sidebar is not pertinent." (Duke Research Fellow)

DISCUSSION

The data from site sessions for the first two years of MRP indicate that while site access steadily grew over the first year, greater adoption of the tool was experienced in the second year. Recent trends suggest that usage of the site continues to grow.

In post-launch meetings with the contributing research support offices, anecdotal evidence suggests that MRP has helped increase awareness of resources and processes. Having all research support office resources in one location has made it easier for research administrators and investigators to discover the variety of services and resources available. Additionally, having the resources organized by the project lifecycle increases the likelihood that research administrators and investigators are discovering these services and resources at the appropriate time in the research project lifecycle. The project team will continue to evaluate the success of MRP through regular analysis of the Google Analytics site metrics, and review of responses to the feedback survey provided on the site.

The project team and institutional leadership are encouraged by the generally positive feedback, and the user engagement. Research community feedback underscores the importance of ensuring that content is well maintained and accurate. The MRP project team routinely convenes the research support office working groups for content review and enhancements for existing topic-based pages, as well as discussing any new topic-based pages that may be needed. As of December 2022, MRP now houses 80 topic pages, an increase of 35 since its inception.

While the launch of MRP has been generally successful, limitations have been discovered via the feedback survey, direct requests from users, and from the experiences of the support offices involved in the site. Below are some of the limitations and how they were addressed.

1. Having all topics organized into one stage of the project lifecycle. There are topics and tasks that can occur throughout the project lifecycle (e.g., training, professional development, conflict of interest). To address this, the project team worked with the site developers to create a new section on the homepage to display overarching research topics that do not occur solely within one lifecycle stage.
2. Not enough options with the "Customize Your Path" feature. It did not provide sufficient refinement given the

amount of content that was ultimately included in MRP and the breadth of research projects at Duke University. In 2022, the project team worked with research administrators, investigators, and support office personnel to determine and deploy refined customization options.

3. Search functionality displaying too many results and not in a relevant order. Users provided feedback that they were overwhelmed with the search results and felt like they were displayed in an order that was not relevant to the use. The project team worked with the vendor to adjust the weighting of elements that impact the search return order (e.g. title, words in the text, keywords, etc.) and eliminating results that were not directly relevant.

CONCLUSION

The success of MRP indicates that other research-intensive institutions may benefit from utilizing a similar tool to support their researchers and research administrators in navigating the complex regulations and processes involved in academic research. To develop a similar resource, an institution will need:

1. Financial support for dedicated, knowledgeable personnel to coordinate the research support offices for content creation and integration.
2. Financial support for initial technical development.
3. Dedicated project personnel to coordinate content creation and integration, research community input, technical development, and communication strategies.
4. Support from research leadership and agreement amongst the institutional research support offices to integrate their content into the site, and to participate in applicable working groups. Without an "all-in" approach, this tool would be minimally useful.
5. Long-term project personnel effort and financial support for maintenance and enhancement of the site content and technical features.

The long-term support for such a tool is critical. Other institutions considering developing a similar resource should consider the long-term personnel and technical needs to maintain the platform beyond initial development. Duke University plans to continue to leverage MRP in supporting research administrators and investigators across the institution. Funds have been allocated for ongoing hosting and maintenance associated with the site, an annual budget for technical enhancements needed to improve user experience, and a dedicated project manager to elicit research community feedback, edit site content, convene the research support office working groups, and ensure research office support delegates are maintaining their contributed resources.

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