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Best Practices in Grantsmanship: A Case Study of a High-Performing Predominantly Undergraduate Institution

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BEST PRACTICES IN GRANTSMANSHIP:

A CASE STUDY OF A HIGH-PERFORMING

PREDOMINANTLY UNDERGRADUATE INSTITUTION

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The purpose of this study was to analyze and develop an in-depth understanding of the characteristics of an R3, predominantly undergraduate institution of higher education with a high-performing externally-funded research portfolio. This study used a qualitative single-bounded case study approach and utilized a focus group structure for the interviews. The research questions sought to identify the perceived factors, characteristics, and resources believed to motivate researchers to participate and succeed in externally-funded research.

Faculty researchers, the research administration staff, and the research leadership comprised the target audience and focus group participants for this study. The results revealed a cohesive infrastructure with high levels of mutual gratitude and respect among the diverse groups of individuals and the entities that constitute the research infrastructure. The collective efforts to support research, funded and unfunded, is immense and strategic at this institution. The leadership embodies the definition of transformational leadership by utilizing their personal experiences and knowledge to create positive change, motivate and encourage, and build confidence among their researchers. In addition, the leadership recognizes the need for continuous change and improvement of the research infrastructure and actively acknowledge, seek, and act on the needs of the research community. The leaders at this institution have actively

facilitated a culture shift to focus on research at a predominantly undergraduate, teaching-focused institution. Likely, the most significant resource provided by this institution and implemented by the current leadership is the course release provided to faculty to begin and remain research-active throughout their academic tenure.

This study identified and explored the myriad of resources provided to faculty researchers in the area of research and scholarship. Upon an analysis of the outcomes, the study identified the characteristics of a successful model. Specifically, it identified the perceptions and attitudes regarding infrastructural resources in support of research activities. The results of this study will help doctoral level PUIs strengthen their faculty scholarship base, develop a more robust and efficient infrastructure, and increase their externally-funded research portfolio.

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CHAPTER 1

INTRODUCTION

Prior to 2008, funding for higher education was plenty and institutions were financially healthy. However, the economic crisis and budget cuts in education caused institutions to look differently at the role external grants can play. The 2009 American Recovery and Reinvestment Act (ARRA) propelled new interest in grantsmanship (Waite, 2012). ARRA earmarked billions of dollars in federal funds for a wide variety of initiatives that were meant to reinvest in the economy by creating jobs and improving K-12 and postsecondary education. A supplement to the ARRA, the America COMPETES Act required a portion of these funds to be awarded to institutions of higher education in the form of competitive grants (Waite, 2012).

The availability and receipt of these new grant opportunities led to a realization by faculty and leadership at institutions of higher education of the significant benefits, both financially and professionally, of externally-funded grant activity (Behar-Horenstein, 2014). One of these benefits is that faculty who receive external grants can provide their students with invaluable hands-on experiences that otherwise would not be available. According to the American Council of Learned Societies, the "faculty who involve students in their research projects sharpen students' expertise in a specific area and foster discipline, independent thought, creativity, and responsibility" (2007, p. 10). In addition to student employment and experience, grant funds are commonly used to purchase expensive, specialized pieces of laboratory and simulation equipment that otherwise would be out of reach by many institutions of higher education (IHE), especially publicly-owned, predominantly undergraduate institutions (PUIs).

Institutions of higher education with large and diverse externally-funded grants portfolios, especially PUIs, have leaders and administrators who understand what it takes to be

successful and are, therefore, able to pro-actively support grantsmanship. They provide resources that help develop faculty expertise and credibility in their specific fields (Hardre, Beesley, Miller, & Pace, 2011; Waite, 2012). This additional support is necessary because many faculty, especially those teaching at PUIs, may not have had research-active faculty to provide them with extensive exposure to research during their educational tenures (Burgoon, 1988; Hardre, et al., 2011). According to a survey conducted at the University of Florida, two-thirds of faculty respondents identified grant writing as both a need and a priority when asked about their professional development goals (Behar-Horenstein, 2014). This study surveyed 125 full-time faculty at the University of Florida and focused on faculty's knowledge of teaching, scholarship, and leadership, previous research experience, participation in professional development, and their perceptions of mentoring. Half of the respondents indicated low or no participation in professional development programs, but the results did not identify the reasons for lack of participation. This study is explained in more detail in Chapter II.

Providing focused and customized professional development opportunities that specialize in grantsmanship help motivate faculty, remove roadblocks, and increase the potential for successful grant awards (Burgoon, 1988; MacFarland & Hughes, 2009; Waite, 2012). Understanding both the benefits of external funding and the various challenges faced by faculty researchers to balance their teaching with their research is essential to creating and maintaining a supportive and successful research environment (Akerlind, 2008; Behar-Horenstein, 2014; Waite, 2012). This holistic understanding recognizes that the integration of faculty members' research and scholarly activities with their teaching and service requirements is the underlying objective of academia. The successful integration of these factors creates the ultimate teacher-scholar (Akerlind, 2008; Behar-Horenstein, 2014; Simmons, 2009). Knowing the factors that

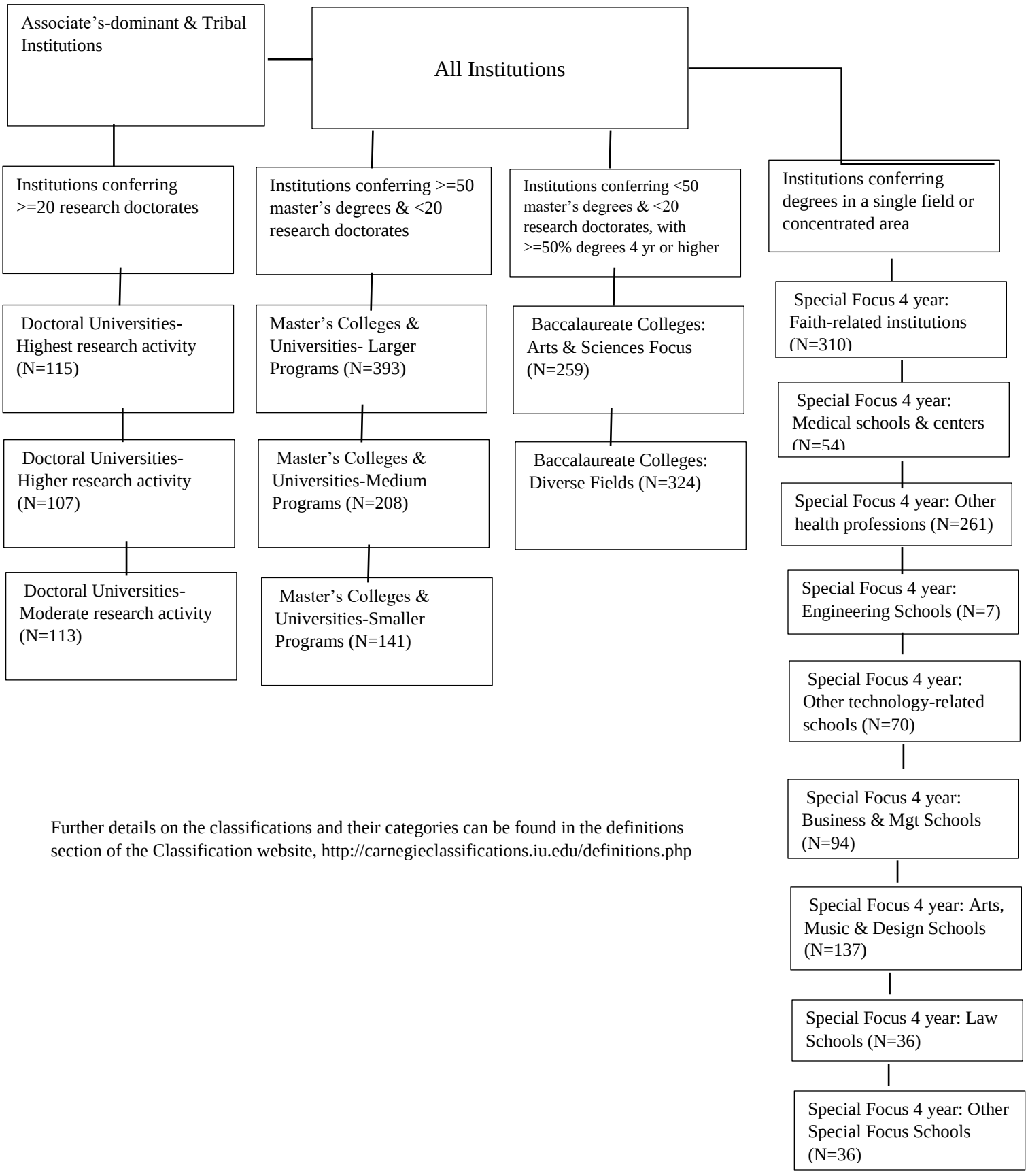
motivate faculty to participate in research and understanding best practices in the field of faculty professional development and grantsmanship will help university administrators make educated decisions regarding the use of institutional resources to help grow their externally-sponsored research portfolios (Hardre, et al., 2011).

Creating an effective infrastructure that provides resources that help address both teaching and scholarship will allow institutions to deal effectively with cyclical declines and variances in funding opportunities. According to a study by the National Science Foundation (2015), universities have reported a steady decline in available grant opportunities since 2004. This decline in available grant funding is causing a significant increase in competition. When fewer grant dollars and opportunities are available, the quality of competition becomes higher and success rates for obtaining grants becomes lower. Institutions, especially those starting at a disadvantage like PUIs, need to better prepare, position, and support their researchers to help mitigate this inequity (Waite, 2012).

Institutions of higher education are classified, among other variables, according to their research portfolios. This classification is used by the NSF specifically to assess eligibility for various grant opportunities. The Carnegie Classification System is the recognized method of classifying institutions of higher education. The Carnegie System distinguishes institutions of higher education using a multitude of variables, including but not limited to undergraduate and graduate enrollment, disciplines, location, and research activity. A doctoral granting institution can be classified in one of three levels, R1 (highest research activity), R2 (higher research activity), and R3 (moderate research activity). According to the Carnegie Classification criteria, R3 universities award at least 20 research doctoral degrees in the humanities, social sciences, and STEM fields and maintain a “moderate” level of research activity (Carnegie Foundation, 2007).

Institutions that hold an “R” classification may offer master’s or professional practice degrees in fields other than medicine, dentistry, or veterinary medicine, as well. These institutions, although classified as doctoral, may also have a predominantly undergraduate population (Carnegie Foundation, 2007). The institutions that are categorized as R3: Moderate research and considered predominately undergraduate are the focus of this study. This single case study examines the characteristics or factors perceived to influence researcher participation and success at a high-performing R3 PUI. Figure 1, below, shows the basic classification criteria used by the Carnegie Classification system.

Basic Classification: Part 1: Four-year or higher focused institutions



Further details on the classifications and their categories can be found in the definitions section of the Classification website, http://carnegieclassifications.iu.edu/definitions.php

Figure 1. Carnegie Classifications: Basic Classification Criteria

Statement of the Problem

PUIs classified as doctoral research universities are distinct because faculty at this type of institution face unique challenges. Faculty employed at a PUI commonly define themselves as teacher-scholars. Teacher-scholars have a commitment to both scholarship and teaching and they allow their scholarship to inform and improve their teaching (Akerlind, 2008; Bailey, 1999; Behar-Horenstein, 2014; Kuh, Chen, & Laird, 2007; Waite, 2012). This goal is noble, ambitious, and resource intensive. As discussed above, financial resources are dwindling in the area of education, and institutions are struggling to find alternative ways to fund these ancillary, yet necessary, activities (Waite, 2012). It is, therefore, becoming increasingly necessary for faculty to find alternate sources of funding to support their research. External grants are an ideal solution to this financial problem (Hardre, et al., 2011; Waite, 2012).

The contractual workload for faculty at PUIs is less flexible than their research-intensive counterparts or the institutions with a larger faculty base (Waite, 2012). Heavy (four courses each of the fall and spring semesters) teaching assignments, undergraduate and graduate student advising, and both institutional and community service requirements are common at PUIs (MacFarlane & Hughes, 2009). With fewer faculty and larger numbers of undergraduate students and programs, PUI faculty have little ability for an institutionally-funded reduced load. Additionally, some faculty at PUIs may have attended similar institutions as students and may lack the research mentorship needed to help prepare them for grant activity. Therefore, they may feel less confident and not have the needed Self-efficacy to best position themselves for success in grantsmanship (Hardre, et al., 2011). Faculty at PUIs are at a disadvantage because of these workload characteristics and may, subsequently, not be a successful in securing external grants as their counterparts at research-intensive institutions. Faculty at research-intensive universities

have an unfair advantage over faculty from PUIs when competing for external funds (Porter, 2007; Waite, 2012).

Purpose of the Study

The purpose of this study was to analyze and develop an in-depth understanding of the characteristics of an R3, predominantly undergraduate institution of higher education with a high-performing externally-funded research portfolio. During Fiscal Year 1617 (FY1617) (July 1, 2016 – June 30, 2017), a known R3 and predominantly undergraduate institution received approximately $14,000 per faculty member in federally funded research and serves as the "base" institution. This study, therefore, examined an R3, PUI with a research portfolio that exceeded $30,000 in federally funded research per faculty member in FY1617.

This study examined the myriad of resources and support that the purposefully selected institution of higher education provides in the area of research and scholarship. It then analyzed the outcomes and identified the characteristics and aspects of the successful model. Specifically, it identified the perceptions and attitudes regarding infrastructural resources in support of research endeavors. The results of this study will help doctoral level PUIs strengthen their faculty scholarship base, develop a more efficient, cost-effective, and robust infrastructure, and increase their externally-funded project portfolios.

The central phenomenon that was studied was the overarching research infrastructure, which includes a myriad of offices, resources, and support mechanisms. The specific component parts and the way in which they work together to support and promote research are central to this study. Researching such structures can provide exemplar models that can be replicated by other PUIs seeking to increase their research footprint.

Research Questions

The research questions of this qualitative study included:

1. What are the characteristics of an R3 PUI with a successful external grants portfolio?
2. What do faculty, leadership, and administration identify as priority resources needed to support a successful grants portfolio?

The purpose of the research questions and the in-depth, qualitative, focus group interview structure was to extract the perceived details, characteristics, specific support mechanisms, and infrastructure that promote and support participation and success in external grantsmanship. The perceptions of all key individuals and offices were integral to understanding and analyzing the high performing institution.

Theoretical Frameworks

This study is based on three influential frameworks that all provide mechanisms for developing expertise, confidence, Self-efficacy, and success. The basic principles of Ettiene Wenger's Communities of Practice, Rosabeth Moss-Kanter's Organizational Support Theory, and Albert Bandura's Theory of Self-efficacy will be applied to participation and success rates in externally-sponsored research. Specifically, these theories will be integrated into the anecdotes and responses provided by the participants to frame an effective, cost-efficient, and successful research infrastructure.

Significance of the Study

This research study is important because it identifies the characteristics of the research infrastructure of a high-performing doctoral granting PUI. The data collected will help university administrators, especially at PUIs, make educated decisions regarding the investment into professional development opportunities, resources, and the research infrastructure. This

understanding of best practices will help improve the success rates of PUIs when competing for external grant dollars.

A broader, more far reaching impact of this study deals with attracting and retaining students and faculty members. Enrollment continues to decline across the country, and institutions are struggling to reconcile the costs of doing business with increasing budget cuts and decreasing revenue streams (Bailey, 1999; Buller, 2013; Hardre, et al., 2011; Waite, 2012). The budget deficits are far-reaching and affect an institution's ability to provide up-to-date technology, laboratory facilities, libraries, graduate assistantships, and a multitude of other educational resources. Recruiting and retaining quality faculty becomes difficult when the institution is unable to provide the extrinsic motivators that top research institutions take for granted. Having quality resources and a strong research infrastructure will attract highly qualified teacher-scholars who are committed to the success of the PUI model.Faculty who are engaged in external research projects share that interest and expertise with their students, thus creating more engaged and productive students and faculty (Akerlind, 2007; Kuh, Chen, & Laird, 2007; Ware, 2006).

Although literature and studies exist that identify priority needs and desires of researchers, there is no research that identifies best practices in research support specifically for a PUI. This study will bring to light the untold stories and perceptions of the various key stakeholders at a high-performing doctoral granting PUI. It also will identify linkages between and among the various stakeholder roles, goals, obstacles, and research outcomes.

Research Design

The institution identified for this study was purposefully selected because it is classified as an R3 PUI and has a research portfolio of at least $30,000 per faculty member in federally

funded research. To identify and analyze the selected high-performing institution's sponsored research portfolio and research infrastructure, a qualitative case study design was used.

A case study was the appropriate method of research for this project, as Creswell (2013) stated:

> Case study research is a qualitative approach to which the investigator explores a real-life, contemporary bounded system (a case) …. Over time, through detailed, in-depth data collection involving multiple sources of information (e.g., observations, interviews, audiovisual material, and documents and reports) and reports a case description and case themes. (p. 97)

The intentional use of the case study approach enhanced the rigor and credibility of the research design (Creswell, 2014). The specific case study approach used was the single instrumental case study. This type of case study focuses on a specific issue or phenomena and selects a single bounded case to research (Stake, 1995). The purposefully selected institution of higher education is a prime example of a single instrumental, bounded case study.

To expound upon the phenomenon of a high-performing PUI, this case study included focus group interviews, follow up interviews, review of artifacts, and researcher observations. Multiple semi-structured focus group interviews, follow-up interviews, and analysis of relative artifacts provided beneficial insight and an in-depth understanding of the components of the entire research portfolio at the site institution. The findings are provided as anecdotes in Chapter 5.

The institution's Office of Sponsored Research served as the initial point of contact and assisted in locating relative artifacts and in identifying members of the following core groups: 1) active/top researchers; 2) nonfinancial research administration staff; and 3) leadership. Membership in each of the core groups was intentionally homogenous and provided for

discussion about which all participants were knowledgeable. The researcher obtained email addresses of individuals meeting the criteria for each of the three core groups and communicated directly with each potential participant via email and telephone. While the Office of Sponsored Research assisted with the identification and reservation of space, the scheduling and confirmations were done by the researcher. Three days of on-site campus immersion in the research infrastructure were needed to complete the data collection.

Semi-structured focus group interviews were scheduled at the convenience of each participant or subgroup. Due to various schedules and availability of participants, several sessions were needed to obtain adequate representation and participation. The size of each homogenous group varied because the size of the pools was limited. The active researcher group had the highest population, with 15 participants (out of an estimated 150 possible). Only researchers that secured external funds through competitive grants/contracts were included and the general pool was identified by the Office of Sponsored Research. Non-funded research did not qualify for this study and was intentionally excluded, as was internally (institutional) funded research. Faculty researchers who requested and/or received both external and internal research were included but the focus was on the external grants. The research administrator group had the highest percentage of participation at seven out of seven. This group included both pre- and post-award (non-financial), contracts and compliance staff responsible for most aspects of the grantsmanship lifecycle. The institutional leadership group was the most limited and, therefore, was the smallest group interviewed. Four leaders were identified and three were available and participated in the focus group. The interview questions gathered information on existing professional development resources for faculty, desired and prioritized resources, perceived challenges, and incentives to grantsmanship. While the majority of the questions were asked of

all three subgroups, there were group-specific questions based on the precise role or interest of each group. Follow up interviews were offered to all participants of the focus groups and were scheduled at the convenience of both the interviewee and the researcher. The follow up interviews were done via Skype, telephone, or E-mail at the discretion of the interviewee. The follow-up interviews allowed interviewees to expand upon discussions, provide additional information, and add descriptive details to the previous conversations. This additional information provided more depth and meaning to the results and allowed for a more acute analysis. Follow-up interviews also provided the researcher the opportunity to ask follow-up questions based on information gathered from all core groups and revisit ideas or themes that were identified by previous groups.

Participation in the focus group interviews was completely voluntary. Participants had the ability to cease participation in the interview(s) at any point. In the event a participant ceased the interview, no data from that particular resource was utilized and they were not included in the participation numbers or rates. Ensuring the participants confidentiality was of primary concern throughout the process. While the Office of Sponsored Research identified the pool of candidates, the respondents and the scheduling remained confidential to administration. To further ensure confidentiality, the interview space was across campus from the administrative and sponsored research offices and pseudonyms are used throughout for both the participants and the site location.

To ensure integrity of the responses, the interviewer audio-recorded the interviews and the responses were transcribed. The transcriptions were offered to the participants for member-checking. To ensure that the data and the participants remain confidential, the verified transcripts were stripped of all identifiable data and saved both electronically and hard copy. The original

data recordings, the redacted transcriptions, and any researcher notes were saved in separate electronic and physical locations.

Physical documents and artifacts appropriate to this study were secured from the Office of Sponsored Research. Examples of physical documentation include research administration policies and procedures, researcher handbooks, relevant sections of faculty union contracts, relevant compensation policies or regulations, research administration handbooks, professional development resources, and sponsored research portfolio reports. Each artifact was reviewed and notations made for the relevant sections, topics, and facts.

The data collected were coded and analyzed using NVivo software. The researcher developed a codebook and each datum point was entered, resulting in the identification of themes. The complete transcriptions, snippets of the recorded interviews, excerpts from the physical documents, excerpts from follow up emails, and the researcher's personal observation notes were included as nodes in NVivo.

Limitations

The following limitations should be acknowledged:

1. This study involved only one institution that was purposefully selected based on restrictive criteria. Therefore, the results achieved and the analyses provided are not generalizable among all institutions of higher education.

2. Since this study was focused on research, externally-funded research specifically, it is possible that those faculty not participative in research intentionally did not respond to the study request. While this limitation does not necessarily impact the results of this particular study, the input of this subgroup may have shed differing light on the characteristics that motivate faculty to participate in externally-funded research.

3. Another limitation addresses the concern of faculty and/or staff feeling anxious about divulging information about their institution that could be seen as unfavorable for fear of identification and persecution by their institution's leadership. Participants may have been unwilling to share openly and honestly and responses may have been tempered. To control for this potential conflict, all participants were made aware that this was an educational study and all identifiable data from the collected information would be redacted before use and held in confidentiality per the Institutional Review Board Protocol Approval. Follow up interviews were also offered in an attempt to further encourage the participants to provide open and honest answers. Faculty members interviewed held a variety of experiences, expertise, and backgrounds. Some had extensive research experience from prior employment or graduate work while many had no exposure to research until becoming faculty members at the selected institution. Faculty researcher participants included assistant professors, associate professors, and full professors. This variance in expertise and experience may have resulted in outlier data.

4. Research success is partially dependent upon the availability of funds from the agencies and the political climate of the United States. The current emphasis from the federal and state governments restricts available opportunities and disenfranchises many of the academic disciplines. The limited opportunities have a direct influence on the willingness and interest of faculty to participate in sponsored research activities and may have impacted participation in the focus groups.

Definition of Terms

The following definitions are utilized within this study:

American Recovery and Reinvestment Act of 2009: The ARRA is a federally-funded and mandated regulation that was intended to serve as an economic driver to the American economy.

The Act was enacted by the Office of the President on February 17, 2009 and was intended to supplement funding for job preservation and creation. The Act invested $787 billion into the economy in the form of competitive grants.

Carnegie Classification of Institutions of Higher Education: The Carnegie Classification has been the leading framework for recognizing and describing institutional diversity in U.S. higher education since 1970. The Carnegie Commission on Higher Education developed a system to classify colleges and universities. The Carnegie Classification system was originally designed in 1973 and was developed from data reported by colleges and universities. Updated data reported by institutions of higher education prompted updated in 1976, 1987, 1994, 2000, 2005, 2010, and 2015. This classification is the accepted framework in the study of higher education and provides a method to account for and understand institutional similarities and differences. The framework is also used by researchers in the design of research studies to ensure adequate representation of sampled institutions, students or faculty. (Carnegie Foundation, 2007)

Externally-Sponsored Research: Externally-sponsored research is any research or creative activity that is funded, in part or in full, by an entity external to the university. Funding can come from federal, state, local governments, or corporate or private foundations. Non-funded research and research funded solely with institutional funds were not included in this study.

Predominantly Undergraduate Institution (PUI): A predominately undergraduate institution has more undergraduate than graduate degree programs and, on average, confers more undergraduate degrees than graduate degrees annually.

Research-Intensive University: Research-intensive universities are those institutions classified as either an R1 (highest research activity) or R2 (higher research activity) designation by the Carnegie Classification System.

Summary

Chapter 1 both introduced the purpose of this qualitative study and provided a summary of the methods used in obtaining the results. The study retrieved and analyzed the characteristics of the research infrastructure at a high-performing R3 PUI with an external research portfolio of at least $30,000 in federally funded research per faculty member. Through the use of in-depth focus group interviews, the analyses of archival documents, and researcher observations, the study uncovered characteristics, priorities, and perceptions of this high-performing PUI by three key subsets (active researchers, research administration staff, and leadership). Subsequently, Chapter 2, Review of the Literature, will provide information on supporting theories, studies, and existing literature. Specifically, it will connect the influential frameworks of Wenger's Communities of Practice, Rosabeth Moss-Kanter's Organizational Support Theory, and Albert Bandura's Theory of Self-efficacy to participation and success rates in externally-sponsored research at PUIs.

CHAPTER 2

REVIEW OF THE LITERATURE

The purpose of Chapter 2, Review of the Literature, is to identify, describe, and connect existing literature that is relevant to this study. Because this study focuses on faculty participation and success in externally-sponsored research, the literature review will include historical data on research in higher education; the benefits and challenges of participating in sponsored research; faculty motivators, incentives, and challenges; and a review and integration of pertinent theoretical frameworks. The primary influences to this study include Wenger's Communities of Practice (Social Theory of Leadership) and Rosabeth Moss-Kanter's Organizational Support Theory. These primary frameworks are supported by Bandura's Theory of Self-efficacy. This section also acknowledges studies and opinions that posture teaching should be the primary focus of institutions of higher education and that research, if done at all, should be secondary.

To best understand why the teacher-scholar model is essential to the success of higher education, it is necessary to understand how and why research originally started in the field of academia. The "nexus" of academia is reached when teaching and research overlap and become mutually dependent activities (Clark, 1997). This chapter, therefore, begins with the history of research within academia.

Higher Education Priorities: The Inclusion of Research

Higher education in America and abroad has undergone significant change since Harvard's founding in 1636 (Kane, 1999). Harvard and other early American universities held teaching (primarily of the clergy) as their core function. It was not until the nineteenth century when Germany introduced the concept of including research as a "vital component of higher

education" that research became part of academia (Gellert, 1993, pp. 3-14). Germany, therefore, can be credited for incorporating research into academia and realizing the mutually beneficial relationship between teaching and scholarship. American students being educated in Germany, upon return, gained prominence and respect within their American institutions when they influenced the expansion of their graduate programs to include research-based coursework and internship-type experiences (Kane, 1999). According to Kane, this new knowledge was the impetus to the creation of a classification system in approximately 1920. This classification system was officially named the Carnegie Classification System of Higher Education in 1970 by the Carnegie Commission on Higher Education. Originally, there were 16 institutions of higher education classified as "research universities." As of the 2015 publication of the updated Carnegie Classification matrix, 4,664 institutions are classified by the Carnegie System. Of the 4,664 institutions, 335 or 7% are classified as doctoral universities and given an "R" (research) designation.

Last updated in 2015, the Carnegie system classifies institutions of higher education into eight categories based on degree levels offered and program foci. These eight basic Carnegie classifications include doctoral institutions, master's colleges and universities, baccalaureate colleges, baccalaureate/associates, associate's colleges, special focus: two-year, special-focus: four-year, and tribal colleges. Each of these eight classifications are then segregated into 33 subcategories that further distinguish the number of degrees conferred, research activity, dominant student type (traditional, nontraditional, mixed), and more discreet, discipline specific concentrations. Then, doctoral granting institutions are subdivided into highest research activity (R1), higher research activity (R2), and moderate research activity (R3).

In Fiscal Year 2015, the National Science Foundation awarded 78% of their overall grant budget to institutions of higher education (National Science Foundation Merit Review, 2015). Table 1 below depicts the trend in proposals, awards, and success rates from 2007 through 2015 by the National Science Foundation (NSF). It is noted in the 2015 NSF Merit Review Report that the uptick seen in 2009 and 2010 is the direct result of the federally-appropriated ARRA funds. This data explains the downturn in subsequent years (2015 NSF Merit Review Report, p 9).

Table 1

National Science Foundation: Proposal, Award, and Success Rate Trends

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Proposals	44,577	44,428	45,181	55,542	51,562	48,613	48,999	48,051	49,620
Awards	11,463	11,149	14,595	12,996	11,192	11,524	10,829	10,958	12,007
Success Rates	26%	25%	32%	23%	22%	24%	22%	23%	24%

Note. Obtained from NSF's 2015 Merit Review Report

An additional point of interest is the percentage of grant awards made by NSF to single versus multi-authored (collaborative) projects. In 2015, the NSF reported that for the first time ever, multi-authored awards outnumbered those of single-authored awards (3,659 versus 3,606). The dollar value of those combined awards was significantly higher for the multi-authored (collaborative) awards ($2,523 billion versus $1,330 billion) as well. The higher success rate potential with collaborative, interdisciplinary collaborations is confirmed by the results of this study. Table 2 below shows the number of new research projects with single PIs (SPI) compared to the number of research projects with multiple PIs (MPI) while Table 3 shows the same data in

dollar value. In FY2010, a total of only 25 research projects were funded from the ARRA appropriation (including one collaborative project).

Table 2

National Science Foundation: Research Projects with Single PIs (SPI) & Multiple PIs (MPI), by Number

	2007	2008	2009	2010	2011	2012	2013	2014	2015
By SPI	3,395	3,252	9,254	7,644	3,478	3,545	3,295	3,253	3,606
By MPI	2,841	2,625	7,490	6,568	2,945	3,091	2,975	3,127	3,659

Note. Obtained from NSF's 2015 Merit Review Report

Table 3

National Science Foundation: Research Projects with Single PIs (SPI) & Multiple PIs (MPI), by Dollar Amount.

	2007	2008	2009	2010	2011	2012	2013	2014	2015
By SPI	$1,059	$1,131	$3,318	$2,703	$1,209	$1,307	$1,225	$1,250	$1,330
By MPI	$1,645	$1,489	$4,980	$4,494	$1,947	$2,061	$2,102	$2,143	$2,523

Note. Obtained from NSF's 2015 Merit Review Report

According to an article by Slocum and Scholl (2013) in the Fall 2013 Council on Undergraduate Research Quarterly, the National Science Foundation has specific competitions to support PUIs. The Faculty Early Development (CAREER) awards support junior faculty with research interests in the science, technology, engineering, and math (STEM) disciplines. The Research Experiences for Undergraduates (REU) program supports PUIs with a focus on including undergraduate students as research assistants. Additionally, the Research at Undergraduate Institutions (RUI) competition restricts submission to PUIs and supports both individual and collaborative projects.

Although the NSF have the CAREER, REU, and RUI opportunities restricted to PUIs, the disproportionate success rates between PUIs and non-PUIs are problematic. From 2002 through 2012, the NSF supported undergraduate research, with $1.24 billion in competitive grant awards (Slocum & Scholl, 2013). The study completed by Slocum and Scholl (2013) found that PUIs received only 8% of all NSF awards, equating to only 4.9% of the total award amount, while non-PUIs received 92% of the awards and 95.1% of the awarded dollars. Slocum and Scholl's (2013) study utilized the criteria developed by the Carnegie Classification System to identify eligible PUIs and then compared the results with the NSF's award data from 2002-2012. After filtering for PUI eligibility and duplicates, Slocum and Scholl (2013) utilized data from 2,104 institutions of higher education meeting the PUI criteria. They then further segregated the PUIs and identified those with "substantially greater resources" (Slocum & Scholl, 2013 p. 38). The 80 institutions (3.8% of all PUIs) that were identified as having greater resources submitted 23.5% of the total PUI proposals and received over 35% of all PUI awards (Slocum & Scholl, 2013). The inequity among the various doctoral/research classifications of institutions has been a concern for some time. Geiger (1996) and Kane (1999) called higher education steeply hierarchical and argued for improving and increasing the research activities at teaching institutions (also known as Predominantly Undergraduate Institutions). It can be posited, therefore, that the greater the resources available to PUI researchers, the more likely they will be to submit and succeed with competitive grant awards from agencies like the NSF.

It was not until the mid-2000s that the teaching-focused institutions realized the benefits of an active research faculty base. Prior to 2008, institutions were financially healthy and external research was less of a priority (Akerlind, 2008). Until the government could no longer fund institutions of higher education through federal and state allocation dollars at the levels to

which they had become accustomed, there was no need for institutions to look elsewhere for funding. The subsequent 2009 American Recovery and Reinvestment Act (ARRA) is credited for advancing an interest in grantsmanship (Waite, 2012). Billions of dollars in federal funds were allocated by the ARRA for a wide variety of initiatives that were meant to create new jobs, reinvest in the economy, and improve both the K-12 and postsecondary education. The America COMPETES Act, a supplement to the ARRA, initiated grant competitions with a small percentage of these funds for institutions of higher education who supported student engagement (Waite, 2012). The economic downturn in education and these new grant opportunities led to a realization by institutions and faculty of the significant benefits, both financially and professionally, of externally-funded grants.

Institutions of higher education have teaching (producing quality, high performing, graduates ready to enter the workforce) as their primary mission:

> The history of educational development is rooted in the improvement of teaching techniques…educational development is chiefly concerned with improving teaching practices and techniques including assessment and curriculum design; contributing to strategic policy development and implementation in relation to learning and teaching; conducting research into the student learning experience; and working in support of professional staff and student development. (MacFarlane & Hughes, 2009, p. 5)

According to Macfarlane and Hughes (2009), much of this discourse is caused by the perception that teaching and research are at opposite ends of the academic spectrum. Human Resources divisions in higher education may distinguish between teaching faculty and research faculty. Often times, these differences are accentuated by different salary scales and promotion

and tenure requirements. Members of the two groups often occupy space in completely separate areas of a university (MacFarlane & Hughes, 2009). For those research faculty, the professional development is concentrated to their specific area, discipline, or department while professional development related to teaching is more centralized and covers a wider range of disciplines. This structure does not lend itself to inclusion and further separates the research faculty from the teaching faculty (Abraham, 2012; Austin, 1996). According to MacFarlane and Hughes (2009), this "persistent demarcation" has forced faculty to identify with or choose either teaching or research (p. 12). This current demarcation underscores the need for an institution's professional development structure to be centralized, holistic, and inclusive of teaching pedagogy and research in order to unite faculty expertise for the betterment of the students' academic experiences.

MacFarlane and Hughes (2009) attempt to transform this conviction by emphasizing the similarities between teaching and research rather than the differences:

> Dissemination of ideas to appropriate audiences is necessary for teachers in the classroom and for researchers at conferences. The skills required to give a conference presentation are similar to those presenting material to learners, including features such as clear structuring and maintaining contact with the audience. Professional requirements for teaching and research also share much in common. Both activities involve reviewing and giving feedback on the knowledge production of others whether for papers for academic journals or for student assessment. (p. 11)

Still others counter that combining teaching pedagogy and research professional development is virtually impossible and doing so hinders the interests of both parties (Boughey,

2012). The only possible way the connection between research and teaching can be made strong enough to see benefits is if the integration is systematically built into the curriculum and the class assignments. As Boughey (2012) described "An active researcher might be 'good' at research yet might not even be interested in teaching with detrimental effects on practice" (p. 630). So, unless the researcher conscientiously applies the research concepts in the classroom, Boughey believed integrating research into the classroom could have negative effects on the students' learning outcomes. Therefore, if higher education is going to encourage and support research, researchers should be taught how to teach students about the practice of research, not just the science. Teaching the practice of learning, or cognition, is explained in the following way:

> This sort of ability is not based on knowing but rather on knowing how to know – on being able to make knowledge not as a matter of 'skill', but rather as a way of being. … university teachers do not teach knowledge but rather *how knowledge is made* regardless of the level at which they teach. (Boughey, 2012, p. 634)

Hardre, et al. (2011) counter this belief by emphasizing the "accumulative advantage" of employing faculty who do both research and teaching well (p. 36). Supporting the development and integration of research and teaching attracts better teachers and researchers to the institution and, in turn, improves the quality of both the individual faculty member and the institution (Hardre, et al., 2011; Waite, 2012).

Understanding the benefits of and the challenges faced by faculty researchers in the competitive game of external grants is essential to building a supportive and beneficial research infrastructure (Akerlind, 2008; Bailey, 1999; Burgoon, 1988; Fitzsimmons, 2010; Waite, 2012). This global understanding recognizes the underlying goal of all academic initiatives: the integration of the faculty members' full range of ideas, experiences, expertise, and passions with

the numerous ways teaching, service, and research (scholarship) interact to create the ultimate teacher-scholar (Colbeck, 1998; Simmons, 2009). Numerous studies, reports, and articles have been published providing long lists of incentives, benefits, disincentives, and challenges to external research. Because of the myriad of literature available, it was imperative to perform an exhaustive search of the literature but narrow the review of literature to nonresearch-intensive, public institutions. The aforementioned benefits and barriers specific to PUIs are summarized below.

The Benefits of Sponsored Research

Indirect costs, also referred to as facilities and administrative (F & A) costs, are the "costs incurred for a common or joint purpose benefitting more than one cost objective, and not readily assignable to the cost objectives specifically benefitted, without effort disproportionate to the results achieved" (Government Publishing Office, 2018, https://www.ecfr.gov/cgi-bin/text-idx?SID=f1811f133213c7b6b51c578eae22a499&mc=true&node=se2.1.200_156&rgn=div8 . . .). Indirect recovery funds are dollars received by an institution receiving an externally-funded award. The institution of higher education, by constraints of a negotiated agreement, include this expense to the funding agency to administer the grant funded activity. A simplistic example of an indirect recovery calculation is, if an institution's negotiated indirect rate is 50% of salaries and there is $100,000 in salaries in the grant budget, the institution is able to recover an additional $50,000 in indirect funds for the expenses associated with the administration of the grant activities. Indirect costs recovered are not profit; they are intended to reimburse the institutions for the "general" costs of the research projects and related activities.

Indirect costs recovered on external grant projects can (and should) be reinvested to help support the research infrastructure. This indirect recovery has a direct impact on institutions and

their faculty to support, write, and submit external grant proposals (Ware, 2006). “Consistent application of any perceived fair and equitable system will build faculty morale and confidence in the sponsored research office and the university supporting the research endeavor” (Ware, 2006, p. 17). It is essential that the perceived collection and use of indirect funds are clear, fair, and consistently applied. Examples of investments that can be made with indirect funds include the purchase of or maintenance of laboratory facilities, equipment, and the provision of start-up funds to new researchers.

Faculty benefit financially from externally-funded grant projects as well (Fitzsimmons, 2010; Ware, 2006). Grant budgets are often times able to provide course releases, summer contracts, supplemental pay, and other means of compensation. Release time allows the faculty member to be bought out from a course, thus providing additional time to participate and perform research activities. Summer contracts can replace a course or provide additional compensation otherwise not available. Depending on the institution’s compensation policies and/or procedures, supplemental compensation (in addition to the base teaching salary) can be quite lucrative.

Additionally, external grant funds can be used to purchase high-end or specialized equipment that otherwise would be unattainable by most PUIs. This equipment can then be used to attract and retain higher quality students, faculty, and administrators. In addition to equipment, faculty often need to travel to collect their data and then present their research findings at conferences. Travel to conduct the research as well as to conferences to present the results are often funded by grant dollars (Hardre, et al., 2011). Grant funds, essentially, can be used for any purpose provided the expense is reasonably associated with the grant project and the expense is approved by the funding agency.

The benefits of a lucrative research portfolio extends beyond the individual faculty members to include students' achievements, experiences, and recruitment. External grants can help fund libraries and technology and allow universities to purchase expensive, high-end laboratory equipment necessary for many academic majors, assignments, and courses. The benefits of external grants are especially crucial, considering the difficulties that some institutions currently face. As enrollment continues to decline, institutions struggle to recruit and retain students (Bailey, 1999; Buller, 2013; Hardre, et al., 2011; Waite, 2012). Increasing budget cuts and decreasing revenue streams cause budget deficits that affect an institution's ability to provide the up-to-date technology, laboratory facilities, graduate assistantships, and a multitude of other resources that affect students' choice of institution (Akerlind, 2007; Kuh, Chen, & Laird, 2007; Ware, 2006). A quality faculty base is a cornerstone to a healthy institution and without it student retention becomes even more difficult (Ware, 2006). External grant dollars help supplement the financial strains and improve the financial health of the institution (Hardre, et al., 2011).

Barriers and Challenges to Participating in Sponsored Research

There are many challenges that preclude faculty from succeeding in grantsmanship. Grant dollars are competitive and not easily achievable for faculty at either research-intensive universities or PUIs. However, PUI faculty face a unique set of challenges. For example, faculty at PUIs often teach four courses each of the two semesters, are required to perform student advising, and participate in both institutional and community service activites (Porter, 2007; Waite, 2012). Additionally, some faculty at PUIs may be less confident in their ability to pursue external funding and may need assistance to develop the necessary skill sets. This assistance will better position PUI faculty for success in grantsmanship (Hardre, et al., 2011). The heavy

teaching assignments, advising, and service requirements in addition to the variances in experience give research-intensive faculty an advantage when competing for external grants (Porter, 2007).

Barriers to research are not unique to PUIs and many of the identified barriers are the same for both types of universities. Kane reported that studies have concluded that the following factors are the biggest barriers to research for faculty (as cited in Stahler, 1992): inadequate space and facilities, insufficient (or no) start-up funds, heavy (4-4) teaching load, alternate administrative duties, lack of understanding of grant opportunities, processes, and grant writing (Hardre, et al., 2011; Monahan, 1993). Understanding faculty's perceptions of challenges faced and motivators presented when participating in research is essential in the development of an effective research infrastructure (Fitzsimmons, 2010; Walden & Bryan, 2010).

Institutions of higher education with large and diverse externally-funded grant portfolios have administrators who understand both the benefits and the challenges and they know how to pro-actively support faculty. They provide strategic resources and support that they know will help faculty develop the needed expertise to become credible with their peers in specific fields (Waite, 2012). In Weimer (as cited in Fitzsimmons, 2010) "If improvement is expected, its pursuit must be supported" (p. 139). Developing a research strategy under which decisions are made will help administrators identify and support six common elements of the research infrastructure. According to Haley and Champagne (2017), these six common elements are "research faculty, research infrastructure and space, research organizations, research focus areas, research teams, and research partnerships" (p 1). Many faculty, especially those teaching at PUIs, likely did not have extensive exposure to research during their educational tenures and may need additional support to develop within these areas. When asked about professional

development, faculty at the University of Florida identified grant writing as both a need and a priority (Behar-Horenstein, 2014). This study surveyed 125 full time faculty at the University of Florida and was intended to address four primary points: 1) determine faculty's knowledge of teaching, scholarship, and leadership, 2) previous experience, 3) participation in professional development, and 4) perceptions of mentoring. The survey yielded a 58.4% response rate, or 73 out of the 125 purposefully selected faculty. Half of the respondents indicated low or no participation in professional development programs related to teaching, scholarship, and leadership but no data was provided regarding why they did not participate. Faculty development, publishing and conducting research, mentoring, grant proposal writing, and leadership were the top needs identified by the survey.

Identifying the needs and desires of faculty with respect to their research endeavors and then providing customized professional development opportunities that address these needs help motivate faculty, remove roadblocks, and increase the potential for successful grant awards (Burgoon, 1988; MacFarland & Hughes, 2009; Waite, 2012). Knowing the desires of faculty scholars and understanding best practices in the field of faculty professional development and grantsmanship will help university administrators make educated decisions regarding the use of institutional resources to help grow their externally-sponsored research portfolios (Sterner, 1999). This is an explanation of faculty professional development:

> The aim of faculty development is to impart skills and knowledge that promote growth in regard to institutional and individual vitality, to foster understanding of the science of learning, and to build capacity towards providing state of the art instructional practices. (Behar-Horenstein, 2014, p. 1)

Fitzsimmon's (2010) study on faculty professional development programs identified seven characteristics of effective staff development: 1) good leadership, 2) institutional support, 3) collaboration, 4) research-based development, 5) program integration, 6) developmental perspective, and 7) relevant learning activities. In addition, professional development programs that include faculty input during the development stage are more likely to be successful and sustainable.

In 1982, Muffo and Coccari performed a survey of the institutional members of the American Association of State Colleges and Universities (AASCU) that identified several variables considered predictors of success in external research. The predictors identified were: past success with grants, an institutional emphasis on graduate (doctoral) programs, large student and faculty populations, internal grant competitions, grants administration offices, and an institutional commitment to research for promotion and tenure purposes (Muffo & Coccari, 1982). This survey was sent to 338 institutions who were members of the AASCU. A response rate of 63% was achieved. Follow-up phone calls were made to the non-respondents that offered the common explanation of general disinterest in research. Muffo and Coccari's (1982) study re-confirmed the results of a study performed by Ellyson and Krueger (1980). Ellyson and Krueger's (1980) study compared institutional characteristics with levels of federal funding from 60 research institutions. Kane (1999) confirms the results of the above studies by finding that the number of doctoral degrees awarded and the level and amount of institutional support were most strongly correlated to higher external funds awarded to an institution.

A third study performed by Snyder, McLaughlin, and Montgomery (1991) (as cited in Kane, 1999) surveyed research-intensive universities and found three characteristics that were "most" responsible for research success: 1) identifying and supporting research specific goals, 2)

actively recruiting faculty with research experience and interests, and 3) setting and monitoring periodic expectations relative to the established goals. Interestingly, factors identified as "less important" included increases in research support budgets for match, research assistantships, and postdoctoral positions (Kane, 1999). A subsequent study performed by Hardre, et al. (2011) further validated these same theories and added reward and recognition to the top reasons faculty continue to participate in external research. Hardre, et al.'s (2011) study included 28 research-intensive universities that represented 17 states within the United States. Participation was comprised of 781 faculty members in four different academic divisions (a 65% response rate). The study accounted for and identified the following characteristics of each respondent: academic discipline, gender, race/ethnicity, rank, tenure/untenured, and having (or not having) family commitments (spouse, partner, children). This study provides much detail and differentiates among the various characteristics. Together, these studies provide significant data in support of beneficial and cost-effective professional development.

Research-intensive universities struggle with the opposite issue. These institutions actively and specifically recruit faculty who will strengthen their already lucrative and well-established research portfolios. Many of these individuals graduated from research-intensive institutions and were taught the importance of research and external funding. Those who attain faculty positions within the R-1 classification are often experts in their field but have little to no actual knowledge of learning theory or teaching pedagogy:

> Faculty members come to us strong in content and blissfully ignorant of anything having to do with theories of learning and strategies of teaching rooted in pedagogical knowledge. In their knowledge of their disciplines… they stand on the shoulders of giants; in their knowledge of teaching, they

stand on the ground. (Fitzsimmons, 2010, p. 2)

Faculty hired at research-intensive institutions know teaching is important but see their research productive colleagues being rewarded and highly publicized (Fitzsimmons, 2010). As the non-research-intensive universities attempt to change the culture to promote more research, their research-intensive counterparts are putting more emphasis on pedagogy and the quality of learning outcomes (Fitzsimmons, 2010).

Although the priorities vary between teaching pedagogy and research, there are strong similarities among the faculty and the perceptions of professional development. Research findings support this connection (Akerlind, 2007). Akerlind's (2007) study, which included a variety of institutional classifications, found four consistent themes or levels of development as a researcher: 1) becoming confident as a researcher, 2) becoming recognized as a researcher, 3) becoming more productive as a researcher, and 4) becoming more sophisticated as a researcher. Subsequent studies by Akerlind (2007) found a "strong link between how academics experience their growth and development as a teacher and researcher" (p. 253).

The primary or level 1, becoming confident as a researcher, refers to their individual levels of confidence, competence, and Self-efficacy. As can be the case at PUIs, faculty members who did not attend a research-intensive university may be hesitant to participate in research, fearing the unknown. They may not fully understand or possess the skills required to secure and manage a research project. The first stage is characterized by conference attendance and, if available, possible participation in internal (university-sponsored) development activities. Faculty new to research may be hesitant to share their work with colleagues or administrators for fear of criticism or judgement (Hardre, et al., 2011). Universities can mitigate this fear by providing consistent feedback and recognition to their researchers. Consistent and clear

communication of the expectations in regard to research is key to creating a research-supportive infrastructure (Hardre, et al., 2011).

Once faculty have developed the confidence and skill sets necessary and secure a grant project, they become more focused on their reputation within the discipline and move toward becoming recognized as researchers. In the second stage, they seek the respect and recognition of their peer researchers. They move toward what Wenger (1998) called a research community of practice and become more active in their professional organizations that have research as a commonality. Faculty at this stage of development still focus on conference attendance but now actively engage in networking opportunities and begin to seek collaborative ventures with colleagues (Akerlind, 2007).

As they gain expertise, recognition, and build a strong network of colleagues, faculty move to wanting to become even more productive as researchers. The third level of development focuses on the quantity of externally-funded research projects and begins to consider student participation and community impact as important. Faculty at this stage of development begin to cultivate efficient methods of integrating their research into their teaching and are more easily able to balance the teaching and research aspects of their careers. Conference attendance now becomes primarily about showcasing their personal research endeavors and successes. In addition to presentations and networking, publications move to the top of the priority list.

Finally, Akerlind (2007) identified the most productive and sophisticated level of researcher development. At this fourth and final level, faculty move away from the quantity of projects and concentrate solely on the impact and qualitative benefits of their research. It is explained as: "…the focus of academics' awareness of development moves beyond simply doing more of the same to include doing it differently, in a qualitatively better way" (Akerlind, 2007, p.

249). The fourth and final level finds faculty seeking criticisms from their peers to further improve their research and expand their interests (and expertise) into other areas.

This study identifies and utilizes three primary theoretical frameworks to support and explain the effects of a research infrastructure on the participation and success in sponsored research at a PUI. Etienne Wenger's Communities of Practice, Rosabeth Moss-Kanter's Organizational Support Theory, and Albert Bandura's Theory of Self-efficacy are explained in detail in the next section of this chapter.

Communities of Practice

Wenger's (1998) Communities of Practice (CoP) is a social learning theory that supports group or team learning. Developed originally by Jean Lave and Etienne Wenger in 1991, it continues to be further developed and more widely utilized by scholars (Wenger, McDermott, & Snyder, 1998).

Wenger, et al. (1998) defined Communities of Practice as:

> groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis… These people don't necessarily work together every day, but they meet because they find value in their interactions. (p. 4)

Wenger (1998) put few constraints on CoP and intentionally allows the theory to be modified to fit the purpose. At a minimum, Wenger (1998) stated that there need to be three components required to fit his definition:

1) A domain – there has to be a commonality among the participants (teachers, researchers, athletes, gamers, etc.).

2) A community – the individuals must participate in regular activities and interact with each other. These activities can be formal or informal but they must support the domain and allow the participants to share experiences, challenges, questions, and expertise so they learn from one another.
3) A practice – the community must consist of practitioners within the domain. Individuals must not just be interested in the domain but actually work and/or practice in the field. A teaching CoP must include practicing teachers and the research CoP must include active researchers.

Members of the CoP will be motivated to be integral and central members of a group with which they share common interests and respect for the membership. This shared interest motivates, encourages, and supports the cause and, subsequently, its members. Therefore, researchers at a PUI would benefit from such a community within their institution (Wenger, et al., 1998).

Organized and structured by discipline, institutions of higher education already model Wenger's Communities of Practice by grouping common interests. The "Biglan Model" explains and emphasizes the importance of the structure of universities (Roskens & Creswell, 1981). As summarized in the Roskens and Creswell article, Biglan surveyed faculty at the University of Illinois at Urbana-Champaign to identify the similarities, differences, and perceptions of the benefits of the department or college structures. He found general differences in focus between the hard and soft sciences, the pure and applied sciences, and the life and non-life disciplines. As a whole, the hard sciences were more focused on research and shorter publications (in peer-reviewed journals and research reports), a higher number of collaborative efforts (in research and publication), and spent more quality time with colleagues discussing their research efforts

(Roskens & Creswell, 1981). Alternatively, the soft sciences focused primarily on teaching pedagogy, manuscripts, monographs (or longer publications), and presentations. Faculty in the soft sciences reported fewer collaborative efforts and less interaction with their colleagues (Roskens, 1981). PUIs could replicate this proven model with a research community that includes all disciplines and encourages multidisciplinary collaborations.

Organizational Support Theory

To develop effective CoPs, the institutional infrastructure must support the collective needs of the researchers. Rosabeth Moss-Kanter's Organizational Support Theory discusses how to build a beneficial and sustainable ethos of institutional support around the existing communities. It is based on the assumption that organizational leaders do not question whether or not change needs to happen but rather how to make the change happen successfully (Kanter & Brinkerhoff, 1981). Higher education leaders are no different than corporate leaders in this regard. Moss-Kanter (2006) supported the philosophy that managers need to effectively and appropriately measure effectiveness of all parts of the organization in order to best support its constituents. "Managers need to differentiate parts of organizations, to spot trouble areas, and to compare this year's overall performance to that of previous years" (Kanter & Brinkerhoff, 1981, p. 326). This understanding of the trouble spots allows managers to allocate support (financial and strategic) to the area before it becomes truly troublesome (Kanter & Brinkerhoff, 1981). Moss-Kanter (2006) also realizes that organizations will have a variety of goals, all of which may contradict one another. Institutions of higher education often send inconsistent messages regarding the importance of both teaching and research. True effective leadership includes "the balanced attainment of many goals" (Kanter & Brinkerhoff, 1981, p. 327). Helping faculty

balance their teaching with their research is essential in developing the knowledge, skills, and attitudes that promote and produce a successful research portfolio at a PUI.

In addition to the imbalance between teaching and research, institutions of higher education also fall subject to complex and sometimes inconsistent leadership. Academia has been described as an "organized anarchy" due to its multi-level substructures of colleges, departments, units, and complicated hierarchy (Kanter & Brinkerhoff, 1981). Leaders must ensure that all colleges, departments, and units measure effectiveness in the same way and that goals at all levels are defined and accepted by all involved. To account for this imbalance and develop effective support structures, Kanter (2006) suggested addressing three bottlenecks: 1) theoretical bottlenecks—make sure people know how to do the task (research); 2) resource bottlenecks – make sure people have the resources required; and 3) organizational bottlenecks – make sure people can put the resources together. To mitigate the "organized anarchy" and address the bottlenecks in the realm of research in higher education, leaders must provide adequate and appropriate professional development to ensure faculty have the knowledge to perform research. They must then ensure the appropriate resources are available (adequate laboratory space, policies, procedures, and a research infrastructure). Empowering the stakeholders involved in the research endeavors to create a robust, communicative, and viable research enterprise that stimulates a balance between teaching and research is the ultimate goal. Hardre, et al.'s (2011) study found that faculty prioritize their personal research projects in the same way the institution established their tenure and promotion processes. If the institution puts more weight on teaching expectations and student evaluations, that is where the faculty will devote the majority of their time. This inequity in worth is at the detriment of the research

portfolio (Hardre, et al., 2011). Finding a manageable balance among teaching, research, and service must be a priority of administration.

Moss-Kanter (2006) stressed confidence as the primary factor in success in any field. Confidence is defined as: "Confidence is the bridge connecting expectations and performance, investment and results" (Moss-Kanter, 2006, p. 3). Confidence in self, colleagues, leaders, and the overall structure are imperative for continued participation and success. Researchers must have confidence in their own abilities, believe in the importance of their research topic, and be assured that their leaders and infrastructure will support them in their quest.

To develop confidence in research and the researchers, administrators should invest in the researchers' expertise and the research infrastructure. According to Moss-Kanter (2006) "confidence influences the willingness to invest - to commit money, time, reputation, emotional energy, or other resources—or to withhold or hedge investment. This investment, or its absence, shapes the ability to perform" (p. 7). Researchers who have leaders who believe in their abilities enough to invest precious institutional resources are more likely to invest their own precious time to help achieve the institutional goals. Moss-Kanter (2006) also addressed the problem of relying too heavily on just a few lucrative researchers. She uses the analogy of a sports team relying on just a few superstars. When the superstars get hurt or retire, the team scrambles to replace their talent. Relying on just a few individuals to carry the team, or the research enterprise, is sabotage to the rest of the team. Not only does leadership need to invest in the current researchers but they need to develop new researchers at the same time:

> Winning on the playing field is influenced heavily by what goes on off the field—the nature of the system to attract people, develop people, build bonds among team members,

> gather external support, and do all the other behind the scenes work, before and after each game, before and after each season. (Moss-Kanter, 2006, p. 24)

Investing in the researchers, continuously, and showing recognition and thanks for their efforts will help maintain and grow the research enterprise. “Leaders of high-performing organizations don’t count on impulse or emotions alone to produce the behavior of winners. They establish disciplines and embed them in formal structures” (Moss-Kanter, 2006, p. 47). Informed decisions and proven best practices in grantsmanship will allow leaders to use their limited resources in the most cost-effective and beneficial ways.

Theory of Self-efficacy

There has been much discussed on the knowledge, skills, and abilities of faculty to perform research. Albert Bandura’s Theory of Self-efficacy is a relevant framework for this study because it defines an individual’s ability (or inability) to perform certain tasks (in this case, research) successfully. Self-efficacy defined by Bandura and cited in Weibell (2011) states:

> “People’s beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives” and is considered a theoretical framework “in which the concept of Self-efficacy is assigned a central role, for analyzing change achieved in fearful and avoidant behavior” (chapter 3).

People who possess positive Self-efficacy have the following characteristics in common:

1. They see difficult or new tasks as challenges (not threats or obstacles).
2. They intentionally set goals that are challenging and outside their comfort zone.
3. They use failure as motivation and maintain a commitment to achieving their goal(s).
4. They see failure as inadequate effort or lack of skills that can be overcome.

5. They acknowledge fear or hesitation with the difficult (or threatening) task but are confident in their ability to succeed. (Weibell, 2011, Chapter 3)

To account for these characteristics, Bandura identified four factors that influence our level of Self-efficacy: 1) Prior accomplishments or experiences, 2) vicarious experiences, 3) persuasion, and 4) physiological and emotional states.

Bandura (1986) argued that succeeding personally with a task that was originally viewed as difficult or threatening is the best way to build Self-efficacy and confidence in your ability to grow in a particular area. Seeing others succeed or master skills desired increases your confidence and develops a stronger interest and commitment to the task at hand. External or social persuasion is another strong aspect of one's level of Self-efficacy. The power of persuasion is stated this way: "People who are persuaded verbally that they possess the capabilities to master given activities are likely to mobilize greater effort and sustain it than if they harbor self-doubts and dwell on personal deficiencies when problems arise" (Weibell, 2011, Chapter 3). The final characteristics, one's physiological and emotional states, are inert traits that are more difficult to explain. Although Self-efficacy has little or no effect on one's physiological health, Bandura insisted that those with higher levels of Self-efficacy view their health challenges as less impactful and work harder to overcome these challenges:

> Inasmuch as a person has both the component skills needed to succeed, and the incentive to engage, Self-efficacy plays an important role in determining what activities a person will choose to engage in, how much effort they will expend, and how long that effort will be sustained when things get tough. (Weibell, 2011, Chapter 3)

This quote and Bandura's Theory of Self-efficacy epitomize the benefits of a solid research infrastructure that provides professional development opportunities and resources. The more faculty that are prepared, understand, and have the knowledge needed to succeed in grantsmanship, the more likely they are to succeed early in their career. Not only is this early success dependent upon adequate preparation and training, but it will further strengthen the Self-efficacy level and interest in continued participation in external research (Sterner, 1999).

Bandura's Theory of Self-efficacy is consistent with and supports Wenger's (1998) communities of practice as it suggests teamwork and continuity with colleagues possessing similar interests. In addition, the four factors influencing Self-efficacy can be directly related to Akerlind's (2007) levels of faculty development discussed above. Moss-Kanter's (2006) Organizational Support Theory further enhances the administrators' ability to develop and implement strategic and focused resources.

These theories, collectively, support the overarching implications of academic leaders' commitment and explicit support of faculty research endeavors. To assist faculty in reaching the highest level of efficacy, administrators should recognize faculty at all stages of development and for all the efforts expended, not just the successes achieved. Proposal submissions should be recognized as well as awards received because extending appreciation for the attempts (proposals submitted) will encourage researchers to keep trying. This recognition for effort will equate to a more robust, stable, and successful research portfolio (Hardre, et al., 2011; Waite, 2012).

Summary

Chapter 2 provided a history of the literature related to the integration of research into academia and the benefits and challenges faced, specifically, by faculty at predominantly undergraduate institutions. It also provided insight into the broader impacts of a robust research

infrastructure that extends to recruitment and retention of both students and faculty. Supporting theories were presented to underscore the importance of the basic elements included in such a research infrastructure and how leadership can help improve the overall success rates in sponsored research. Four levels of researcher development were identified and, subsequently, connected to the supporting theories of Wenger, Moss-Kanter, and Bandura.

Chapter 3 provides information on the methodology utilized in this study. It includes the population selected and studied, the research design and data collection methods, and the basic interview questions used in the focus groups.

CHAPTER 3

METHODOLOGY

This research study assessed the influence administrative resources and professional development activities have on faculty confidence levels, participation, and success rates in securing external grants. Specifically, it identified the characteristics of an R3 PUI that is also high-performing in terms of sponsored research. The target audiences for this study were comprised of active faculty researchers, research administrators, and the research leadership at this purposefully selected institution within the United States. The institution was selected because it was identified as a high-performing R3: Moderate research institution and PUI. This distinction was made by analyzing the Carnegie Classification Doctoral Institutions: Moderate Research activity and comparing comparable institutions' external research portfolios. The selected institution is included in the Carnegie Classification Doctoral Institutions: Moderate Research or "R3" and produced at least $30,000 per faculty member in federally sponsored research during Fiscal Year 1617.

The selection process began by analyzing data collected and available by The Integrated Postsecondary Education Data System (IPEDS). While some data within IPEDS is restricted by user-role, much of the data is open-source and available to the public. The open-source data were utilized to filter and identify institutions meeting the criteria. The filter first excluded data on external research and accounted for academic similarities only. Application of the initial filter resulted in a list of 54 institutions across the United States and Puerto Rico. Adding federal and state research expenditure data and filtering for those receiving in excess of $30,000 per faculty member resulted in a different subset (with some overlap) of 18 institutions. Upon further filtering by only federal expenditure data, the results showed 11 institutions meeting the criteria

for this study. A review of the Offices of Sponsored Research websites and subsequent emails and phone conversations occurred with 10 of the 11 institutions to verify comparability and provide preliminary information regarding the study. The selected site was chosen based on comparability (demographically and academically) and preliminary interest in the study. The chosen site very closely resembles the "base" institution in terms of academic programs, faculty-student base and ratio, and enrollment trends. The site institution, like the base institution, prides itself on its wide range of academic offerings, smaller class sizes, "teacher-focused" faculty, and a rural demographic setting.

Faculty at comparable institutions face similar challenges such as limited financial resources, heavy teaching and student advising loads, an expectation of both university and community service, and required scholarship. While research is an option, it is not usually a primary focus. Many institutions are struggling to find alternative ways to fund ancillary yet necessary aspects of academia like laboratory equipment, graduate assistantships, and technologically-advanced library services. It is, therefore, becoming vital for faculty to seek and secure external funding to support these types of initiatives in addition to their own personal scholarship and research interests (Waite, 2012).

These extensive and time-consuming job expectations of PUI faculty make it difficult for them to develop and maintain a successful and lucrative research agenda. Additionally, some faculty may feel less ready to pursue external funding and not have the confidence needed for success in grantsmanship. These workload characteristics combined with inequities in preparation can create seemingly monumental obstacles for PUI and/or R3 faculty to overcome and compete successfully with faculty from R1 or R2 institutions for external grants. This study clarifies how a PUI can mitigate these barriers and perform better in sponsored research.

Research, the topic of this dissertation, can take include externally funded, internally funded by the institution, or even unfunded research. This dissertation focuses solely on competitive externally-funded research grants awarded to faculty. For the purposes of this study, external research refers to funding received by an institution of higher education from a source external to the university. These awards can take the form of grants, contracts, or cooperative agreements and can come from any federal, state, local government, or corporate or private foundation. The term research is also used very loosely and includes, for the purpose of this study, all activities undertaken by an institution of higher education that are competitive and externally funded. Activities can include research and development, public service, creative activities, and fee-for-service. There were no distinctions made by dollar value or among funding agencies during the focus group interviews. Many faculty are active in both funded and unfunded research and scholarly activity. While essential to faculty and their research efforts, unfunded research was not a consideration of this study.

Statement of the Problem

This study, using in-depth focus groups, interviewed relevant factions of a purposefully selected institution of higher education to determine what motivates faculty to compete for external grants and identifies common themes and characteristics of a high-performing PUI. The results reveal preferred institutional resources, confidence levels, and characteristics of success in securing external grant funds by an R3 PUI. In addition, this study also identified the top challenges faced by the researchers, the leadership, and the staff members charged with assisting and facilitating the research endeavors.

Research Questions

The research questions of this qualitative case study include:

1. What are the characteristics of an R3 PUI with a successful external grants portfolio?
2. What do faculty, leadership, and administration identify as priority resources needed to support a successful grants portfolio?

Population

In this study, focus group interviews (core questions included as appendices) were performed at the purposefully selected institution of higher education identified as a high-performing PUI in external research. Focus groups were the primary structure of the interviews and three separate subsets of the research division were included. Membership in each subset was purposefully selected and intentionally homogenous. The subsets included successful or active researchers, research administrators, and members of the institutional leadership. One focus group each was completed for the leadership and the research administrators. The active researcher subset was divided into three focus groups for purposes of scheduling and to limit the size and length of the focus groups. The interview questions were designed to better understand the characteristics that make up this institution, ascertain what professional development activities and/or resources motivate and influence interest in and success in obtaining external grants, and what challenges or barriers are identified as impacting the ability to successfully secure and manage external grant projects.

The Office of Sponsored Research provided email addresses of faculty and assisted in reserving space. Potential participants were contacted via email and focus groups were scheduled as appropriate with those responding in the affirmative for the active researchers, the research administrators, and the leadership. An attempt to reach a fourth subgroup, inactive researchers,

was made, but the multiple efforts resulted in no responses. Individual follow-up interviews were offered and scheduled at the convenience of all parties and allowed for expansion of the results. In totality, 21 individuals participated in the focus groups (three in the leadership subset, seven in the research administrators' subset, and 11 in the active researcher subset). Three of the 11 participants in the active researcher subset responded to the invite for a follow-up interview and participated in subsequent telephone calls and/or email communication. Four active researchers not available at the time of the on-site focus groups participated in individually scheduled phone call interviews. The additional telephone interviews brought the active researcher participation to 15 and the total participation to 25 individuals. The active researcher subset can be further categorized into seven male and eight female faculty participants, six of whom consider themselves senior researchers. Four classified themselves as junior researchers while the remaining five placed themselves somewhere in the middle. Interview questions and observations allowed for the differentiation of the results by rank, gender, and confidence level. Table 4 below summarizes the 15 researchers' demographics.

Table 4

Active Researcher Study Participant Demographics

Gender	Rank as a Researcher (self reported)	Confidence Level in Securing (self reported)	Confidence Level in Managing (self-reported)
F (8)	Jr Researcher (3) Sr Researcher (3) Middle (2)	Jr & High = 1 Jr & Neutral/Low=2 Sr & High = 1 Sr & Neutral/Low = 2 Mid & High = 1 Mid & Neutral/Low = 1	Jr &High = 2 Jr & Neutral/Low = 1 Sr & High = 1 Sr & Neutral/Low = 2 Mid & High = 0 Mid & Neutral/Low = 2
M (7)	Jr Researcher (1) Sr Researcher (3) Middle (3)	Jr & High = 1 Sr & High = 0 Sr & Neutral/Low = 3 Mid & High = 2 Mid & Neutral/Low = 1	Jr & High = 1 Sr & High = 3 Mid & High = 3

Research Setting

This qualitative case study was conducted at a purposefully selected institution. The selected university is a mid-sized institution with approximately 15,000 students and a tenure/tenured track faculty base of approximately 400. It is situated in the central United States. According to its website, it is a doctoral granting institution classified as an R3, Moderate research activity by the Carnegie Classification system and has over 200 degree programs at the bachelor's, master's, and doctoral levels. The institution has six colleges, a 17:1 undergraduate student-to-faculty ratio, and 13:1 graduate ratio. This institution boasts over 3,000 graduate students from 44 different countries.

Table 5 further expands on the selection process by providing data on the base site and the selected site. It breaks down each institution by federal (only) grants and contracts received by faculty member (as reported in the FY16 IPEDS data report) and emphasizes the comparability between the selected site and the base site. While there is a significant level of comparability between the two institutions, a closer review of the specific data is curious. The site institution has a smaller faculty base, more students and yet are able to provide an additional on-going course release specifically for research that has resulted in a substantially more robust grant portfolio. Figure 2 provides the five-year trends in *total* external funding for the selected site and the base site. The data in Figure 2 includes all types of funding agencies, not just federal and state as Table 5 provides.

Table 5

Institutional Study-Relevant Demographics (IPEDS data).

	Full-time Faculty Tenure and Tenure Track	Enrollment	FY1617 Sponsored Grant Portfolio (Federal only)	Grant $ per faculty
Base Site	522	13,500	$3,922,769	$7,515
Selected Site	400	15,000	$13,486,610	$33,717

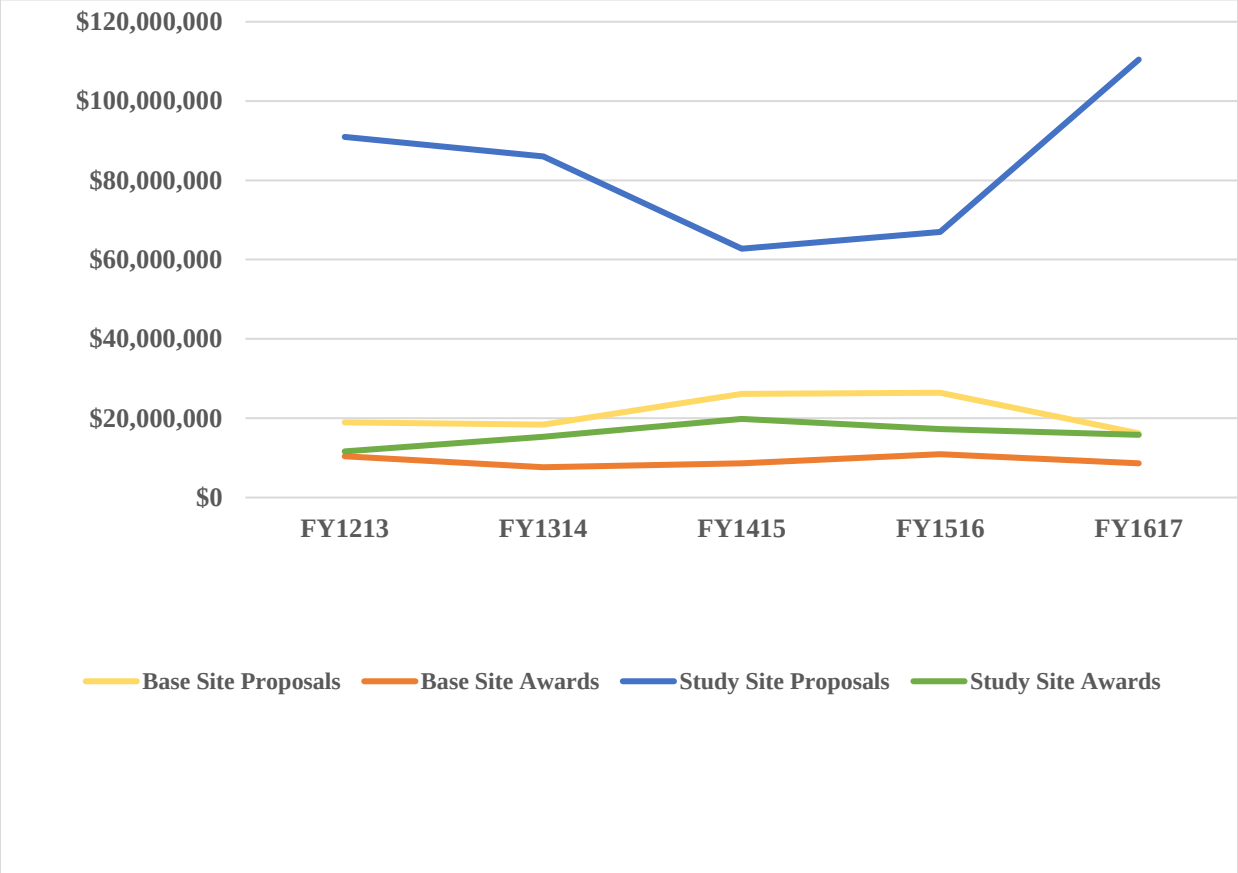


Figure 2. Five-year trends of externally-funded proposals and awards at the base institution and the study site institution. This data reflects proposal and awards from all sources, not just federal as depicted in Table 5 above.

Data Collection and Piloting the Instruments

A pilot study was conducted at a PUI (the "base" institution) and was used to practice and polish the interview questions and the data collection, coding, and analyses skills. The process also tested the effectiveness of responses to the interview questions. It allowed for improvement of the questions and to better anticipate needed follow up or exploratory questions. The pilot study consisted of interviews with four participants, including two active faculty researchers, one research administrator, and one leader. The pilot study mirrored the study site subsets to enhance the rigor and value of the pilot study. The faculty members who participated in the pilot study had external research portfolios of at least one active award and a minimum of three external awards totaling a minimum of $25,000 in the past three years. The research administrator has experience in both pre and post (non-financial) areas and has in excess of three years of experience in research administration. The leader holds a position of authority within the sponsored research division and has a strong ability to direct both financial and infrastructure resources to the research endeavors. This individual has the authority within the institution to commit financial resources to space, professional development opportunities, and match project expenses and directly influence the strategic research plan. The pilot group participants were identified by reviewing the FY1617 Sponsored Research Report on the pilot institution's website. Appendix B was emailed to the participants along with an explanation of the study and a request to participate.

The interview questions addressed the participants' perceptions of incentives and challenges associated with participation and success in external funded research endeavors. While the study site was purposefully selected, individual focus group participants were done on

a volunteer basis. Focus group membership was done on a random basis. No factors were considered when scheduling the various focus group sessions.

As the focus groups were conducted, great attention was given to both the words being spoken and the nonverbal body language presented by the participants. Recording the interviews allowed the researcher to focus on the interview interactions without missing the specifics. This method is integral to obtaining and understanding the full and complete story being told (Lightfoot & Davis, 1997).

At the conclusion of each focus group, the sessions were transcribed in as much detail as possible. As recommended by Lightfoot and Davis (1997), varying inflections, pauses, and any nonverbal observations made were noted in the transcription. This process is designed to better capture the "texture" of the responses and creates a more interesting and believable story (Lightfoot & Davis, 1997 p. 122). Interview questions captured the activities and types of support believed to be beneficial and the perceived challenges associated with submitting and managing an external grant project. The questions also elicited personal stories of successes and struggles in external grantsmanship which are revealed in some detail in Chapter 4.

The qualitative interviews were conducted with focus groups and individual follow up interviews. The focus groups and interviews were audio-recorded and the responses coded utilizing the software, NVivo. Coding is a widely accepted practice and as taken from Lightfoot and Davis (1997), Miles and Huberman stated:

> Coding is not just something you do to 'get the data ready' for analysis, but …something that drives ongoing data collection. It's a form of early (and continuing) analysis. It typically leads to a reshaping of your perspective and of your instrumentation for the next

pass. At the same time, ongoing coding uncovers real or potential sources of bias, and surfaces incomplete or equivocal data that can be clarified next time out. (p. 188)

Using the mass data, the transcripts were read (and re-read) to find common categorical denominators identified by the individual participants and across the three subsets. These categories were then used as labels or classifications to organize the details of the transcript results in NVivo. This method helped mitigate any preconceived ideas of the categories or themes that may have arisen from the researcher's personal involvement in the field of research administration. This type of coding enabled each sentence or group of words to be analyzed individually and coded into the categories identified. Through these coding exercises, categories and themes emerged and the data were summarized (Strauss & Corbin, 1990). Memoing was used throughout the data collection and analysis process which also assisted in identifying and developing themes. Memoing is defined by Creswell (2013) as the process of writing down ideas, comments, and thoughts about the evolving theory throughout the interview and debriefing processes.

Knowing this information will help PUIs make smarter, more effective decisions regarding investments in the research infrastructure when strategizing and working toward a more successful and lucrative external research portfolio.

Summary

Chapter 3 provided the background and justifications necessary to support the relevancy and reliability of this qualitative case study. This study examined the perceptions and attitudes of faculty researchers at a high-performing PUI and identified perceived characteristics and best practices across three subsets of the university research community. This study also contributed to the body of knowledge by focusing on the research infrastructure at an R3 PUI. Although the

literature is saturated with information on research success at research-intensive institutions of higher education, little literature exists about research at institutions with a large undergraduate population. Therefore, this particular study helps diminish the gap in the existing research. By exploring a high-performing R3 PUI, characteristics, themes, best practices, and faculty perceptions were identified. The results of this study help mitigate the disparity in the literature between research-intensive institutions and PUIs. This data can be used by PUIs to strategically support research and scholarship thereby developing a larger research base. The following chapter presents the stories told by faculty researchers, research administrators, and the leadership of an R3 high-performing predominantly undergraduate institution of higher education.

Chapter 4 is organized by the two research questions this study is intended to answer. The first section reveals the characteristics of the site institution as reported by the three subsets interviewed, personal observations, and review of archival data. The second section answers research question number two by identifying and overviewing the resources and support opportunities available within the research infrastructure. Integrated within the two questions are the primary themes and beliefs that emerged from the analysis. These themes are divided by focus group membership (active researchers, research administration staff, and leadership). Themes are further distinguished, where appropriate, by gender, research classification (junior or senior level) and confidence levels. Research classification and confidence levels are self-reported data. The aggregate data, as collected, is shown in Table 3 above. Several subthemes are integrated throughout the chapter to expound upon and better articulate the beliefs of those interviewed. The stories told below are meant to capture the culture of the research infrastructure

and all those who are encapsulated within it. For the sake of anonymity, pseudonyms for the institution and the individuals interviewed are used.

CHAPTER 4

ANALYSIS OF THE FINDINGS

From the onset of telephone conversations with the Assistant Vice Chancellor for Research to the personal, face-to-face interactions with faculty, staff, leadership, and even student assistants, there was immense pride for the research portfolio and the work being done. Not once was there any hesitation to invite a stranger to campus to ask questions about the research infrastructure. My request was not answered with a simple yes or out of guilt to help a doctoral student. The response was an enthusiastic, "Yes, please!" The leadership wanted to know what their faculty researchers thought of the resources and support, and they insisted that I identify the challenges and suggestions for improvements. The atmosphere was extremely welcoming and positive.

As I stepped out of the taxi that first morning and started wandering around campus, I had an uncanny sense of déjà vu. It was as though I was in a familiar place. I had never been to this campus, yet the buildings and surroundings were eerily similar to that of my home institution. The buildings, the campus settings, and the parking garage all had a familiarity about them. The students were walking hurriedly across campus due to final exam week. Every person I passed waved or smiled pleasantly. I was told by the taxi drivers and the hotel staff that this town was "the friendliest place in the country." Many asked if I needed assistance, and the door was held open wide as I approached the building that housed the Office of Sponsored Research. This feeling of familiarity quickly subsided as I entered the building. Cathedral ceilings, an electric fireplace, and a large formal placard indicating the open, spiral staircase would take me to the Office of Sponsored Research. The offices had been recently renovated and located in a building central to campus. There were even extra offices dedicated for researchers to utilize to

write a proposal or work on a grant-funded project. When I remarked at the ostentatious space, I was told the university recently moved them to this space so they were more accessible and more visible to the university community.

The researchers were grateful for the support and commitment to their research, and the leadership took pride in the research that was being accomplished. There are still challenges and areas to be improved upon, but all were proud of the progress that has been made over the last decade. A period of ten years was identified as the period in which significant change has occurred with respect to the research infrastructure and a culture of research has developed. This decade of time was referenced by many participants in a variety of ways throughout the interviews.

The premise of this study was to identify the characteristics, skills, and overall climate of the research infrastructure at this high-performing PUI. The ultimate goal of this study was to identify the specific resources, professional development opportunities, and reasons that the faculty researchers at this PUI are so much more successful than the base institution. To accomplish this goal, two research questions were developed and subsequent focus group questions were designed to stimulate appropriate responses. The next section of this chapter answers the research questions.

Research Question 1: What are the characteristics of an R3 PUI with a successful external grants portfolio?

Research question number one addressed the overall characteristics of the research infrastructure. The characteristics that were perceived to be fundamental to the ability, desire, and success rates of university researchers as reported by the participants are included in the below sections. The responses are organized by the subgroups that were central to this study: the

active researchers, the research administration staff, and the leadership. Subheadings within each subgroup provide further detail relative to the responses of each group

The Active Researchers' Perspectives

The active researcher subgroup was divided into three separate focus groups to account for size and schedule conflicts of the participants. Four researchers, not available at the time of the focus groups, participated in phone interviews. The active researcher pool was identified by the Office of Sponsored Research, with a total population of approximately 150 faculty researchers. The subcategories or themes identified by the active researchers include respect and admiration for the sponsored research office, inclusion of students in research projects, tenure and promotion, time to research and the expectation to produce, and mutual gratitude. A closer review of the researcher demographics as they relate to gender and self-reported research experience and confidence levels concludes the section on characteristics.

The Relationship with the Sponsored Research Office

There were several aspects of the interview questions that all 15 participants in the researcher groups answered consistently and unanimously. For example, all 15 were adamant that they could not "do what they do" without the Office of Sponsored Research. Without exception, each researcher was extremely positive about the support and the relationships with the Office of Sponsored Research staff and leadership. Because the specific question was not asked, it is essential to note that each of the faculty interviewed volunteered gratitude and respect for the staff members in the Office of Sponsored Research and the research leadership. Many comments were made about the extensive efforts and kindness exuded by the entire research administrative team. Four of the researchers commented specifically on the office's ability and desire to help researchers turn "fuzzy ideas" into a fundable, coherent grant proposals. The

respect for the Office's knowledge and expertise with funding agency guidelines, submission requirements, and budgetary guidelines was expressed by seven individual faculty but observable agreements were made by all. One faculty member expressed it this way:

> There is a culture of gratitude here that many of my faculty friends at research intensive universities don't have. Our leadership is sincerely thankful for what we do and they are always trying to support us in whatever way possible. The Office of Sponsored Research is a very valuable resource. We could not do what we do without them. (Participant 3, personal communication, December 11, 2017).

The theme of gratitude was integrated into every conversation and interview. Extensive respect and admiration for all and by all was evident by the many similar comments.

Because faculty (even the top researchers) are teacher-oriented, finding ways to balance teaching with research is essential to the overall success of both activities. Including students in their research projects is one of the best ways to accomplish this balance.

Student Inclusion in Research

Students were unanimously cited as a reason faculty should and do participate in research, both funded and unfunded. The study site, historically, was a teacher-education institution and much of the faculty base (until recently) was hired primarily as teachers, not researchers. Because the faculty had positive experiences with research-focused mentors they want to provide these same experiences to their own students. Many of the interviewees told stories about their own graduate experiences as student research assistants and how extremely valuable they found this mentorship. Many remarked that the mentorship they were given as graduate student research assistants was a large contributor to their success as researchers and

teachers (teacher-scholars) today. One of the more seasoned researchers and a self-reported senior researcher explained why they feel research is an important part of academia:

> If our research doesn't benefit students our work is going to vain, right? I teach Intro to Research and being able to say 'here is a research project I did that illustrates X and here's another research project that illustrates Y gets the students more involved and the class just seems to go better. (Participant 9, personal communication, December 12, 2017).

While all interviewees agreed that research benefits the students, not everyone included students in their research projects as paid assistants. Eight of the researchers indicated that they do include students in their research project, while the remaining seven had not done so. It was unanimous among all faculty participants that the specific discipline in which they teach coupled with the lack of graduate programs is the largest single factor determining the inclusion of students in their research agendas. One faculty member explained it in the following way:

> …research is important because I feel like I can bring much more relevant examples in the classroom. If I can give them a real-life example and a relevant story, I feel like that makes me a better teacher. It helps to bring some more applicable, real life things into the classroom. I've tried to hire students on a few of my grant projects but I've just not been successful. I think if we had a master's or doctoral program in my field I would be more likely to use students. (Participant 12, personal communication, December 12, 2017).

This example was followed by multiple nods of agreement within the focus group. Yet, another researcher who did not include students directly in research projects interjected and reemphasized the belief that research improves the teaching and teaching sometimes drives their research:

> While I don't include or compensate students on my research projects, I think it's really important to be able to find those synergies where research informs your teaching. But teaching can also generate interesting research ideas. Students ask 'why' and we love to ask 'why'. Sometimes those 'whys' that come from our students are new research projects for us. (Participant 8, personal communication, December 12, 2017).

Of the eight active researchers who indicated their inclusion of students in their research, three considered themselves senior researchers, while the remaining felt they were either junior researchers or somewhere in the middle. The seven who did not include students in their research were from disciplines that offer strictly undergraduate degree programs. Because all 15 active researchers thought that students would benefit greatly from the experience, a follow-up question was asked about how the institution as a whole could provide more research opportunities to more students. A faculty participant responded and talked about the distribution/selection of graduate assistants across campus:

> There is, sort of, a disparity of distribution of those graduate assistants across programs because there's just not been realignment and whatever. But there are opportunities for those who have grants to be able to perhaps hire another GA under that grant. But it's not permanent money, so it's grant-based and that's a challenge in that regard. Because you just can't always promise that student that the money will last long enough for them to graduate. (Participant 10, personal communication, December 12, 2017).

Yet another researcher in a solely undergraduate discipline stated:

> Just because my department doesn't have graduate degrees should not preclude me from having a graduate assistant available to assist me with my research. This hinders my

> ability to be successful because undergraduate students simply are not as qualified or dependable. (Participant 8, personal communication, December 12, 2017).

A recommendation to modify the current distribution of institutionally-funded graduate assistantships to more fairly include the solely-undergraduate programs was discussed within one of the researcher focus groups. While they recognized and acknowledged the likely significant challenges (both fiscal and political) of such a suggestion, all felt it would be valuable to the research efforts of the disciplines without graduate students of their own.

Teaching, service, and scholarly activity are the three tenets of tenure and promotion within academia. Research, funded or unfunded, falls within the scholarly activity definition. Tenure and promotion was a topic of discussion in all three of the researcher focus groups and the four individual phone interviews. A specific question addressed the importance of research on the tenure and promotion process. Responses were mixed, varied, and consistently inconsistent among the groups.

Tenure and Promotion

Several of the interview questions elicited responses about how administration both expects and provides support to its faculty with respect to participation in external research. The level or type of expectation was mixed among the faculty participants and seemed to vary rather significantly at the departmental and college levels. While everyone agreed that grant awards are a consideration of tenure, the weight that was allocated to the awards was not consistent nor clear. Many of the participants felt the dollar value of the award and the “notoriety” of the funding agency made a difference to the committee. One researcher, looking at a colleague, stated:

> My $10,000 award from an unknown agency does not hold as much weight as the $500,000 award from, like, NSF that someone in your department recently got. It's more about the prestige of the grant and the agency than the effort and success. (Participant 1, personal communication, December 11, 2017).

Participant 2 responded to this comment by adding, "And, sometimes, the smaller dollar proposals are harder and take more time than the larger, federal ones." Without exception, the faculty researchers who participated in this study expressed strong desires for a better and consistent understanding of the value of grants.

Although not unanimous, there was a noticeable belief that attempts (proposals submitted but not funded) are not considered equally (or at all) for tenure and promotion. This belief of varying consideration was consistent among all three of the researcher focus groups and voiced to be a common frustration among all of the researcher participants. One participant stated that in their department, faculty do not even include attempts or proposals in their portfolio packages submitted to the tenure and promotion committee. However, another faculty participant had the opposite response:

> I know that in our college, even if you're unsuccessful in applying for grants, just the application is counted. It's listed and you know how much weight is given to it. Of course, it depends on view of the personnel committees. But it's certainly in the material the person submits. (Participant 3, personal communication, December 11, 2017).

This comment was countered by Participant 4 with a groan of frustration and a muttered "must be nice." There was consensus among all participants that a more consistent and clear understanding of the weight held by both unsuccessful grant proposals and awards would be helpful.

While it was clear that the tenure and promotion criteria vary (greatly) among the departments/colleges, there is a strong understanding that research is an expectation of the institution as a whole. Based on responses received, leadership has been successful in communicating this message. One hundred percent of the participants thought that the institutional leadership is extremely supportive and recognizes the efforts put forth and the overarching challenges faced by active researchers.

The Expectation for Research

Because of the strong expectation to participate in research, all faculty are offered an ongoing three-credit course release each semester to stay engaged and active in their research. Undergraduate programs offer faculty a three-three load while graduate programs provide a two-two load to their faculty. This course release for research is on-going throughout the faculty member's academic career at the institution and is in addition to other course releases such as serving as departmental chairperson. This course release is intended to allow the faculty to start, maintain, or increase their efforts in their personal research agendas. There is no specific requirement that the research be externally funded but outcomes are a clear expectation. If a faculty member does not produce, they are eventually required to increase their teaching load. The decision to rescind the course release is at the discretion of the academic chairperson and/or college dean. None of the faculty participants could explain or provide an example of a faculty member losing the course release, as they did not have personal experience.

Faculty are given the resources, the support, and the encouragement to participate in external research, but they are also given the option to not take advantage of these opportunities and focus solely on teaching. It was nearly unanimous among the study participants that there should not be an option and that all faculty should be active in scholarly research. It did not

matter if the research was funded or unfunded, but it was clear that they felt strongly about the need to be research-active. One faculty participant stated it this way:

> I'm extremely surprised to learn that people get away with NOT engaging in some type of research and creative activity. I think it's not only important but it's in our contract. In my college if you don't publish and remain active in some type of scholarship, they've instituted I guess you'd call it punishment, you have to teach four classes the next year. (Participant 12, personal communication, December 12, 2017).

This comment elicited intense conversation among the focus group participants. Most disagreed with the use of the word "punishment," and there was significant discussion about the differences between scholarship and funded research activity. There was agreement that funded research is not for everyone and that respect and support should be given to those faculty who choose not to participate in funded research. This group believed that the leadership does an excellent job of supporting all types of research and scholarly activity by providing the course release. Not making the course release dependent on external funds was seen as favorable by this group of active researchers. One of the more successful researchers summarized this philosophy well. "What's nice here is the people that are doing externally-funded research really want to be doing it and love to do it. I think that builds that excitement all the way up through the leadership" (Participant 11, personal communication, December 12, 2017). While all of the faculty researchers agreed that scholarship is important, two of the fifteen commented that external research should be a requirement.

Although there is expectation to participate in some type of research, it was reported that the pressure to secure external funding has increased over the past ten years and continues to

increase. Faculty reported more communication from the Office of Sponsored Research, more recognition of proposals and awards, and overall increased attention on funding opportunities.

Increased Pressure to Research

Although participants respected their colleagues who do not participate in funded research and appreciate that the institution provides the option, conversations revolved around the importance and support provided for funded research activities. With the change in leadership over the last decade, faculty have noticed the increased attention given to external funding. This comment by a faculty researcher received nods of agreement and consensus within the focus group:

> I really get the impression that across the university the pressure to research has increased a lot and we are on an upswing around the pressure to do research and bring in external funds and to publish the results. Whereas we used to be more teaching focused. So, I think that's coming down from the top. (Participant 2, personal communication, December 11, 2017).

Yet another stated it this way: "I know it is generating a lot more interest in my area. People see it as another way to get recognized or get exposure. You know, to kind of get your name out there". (Participant 5, personal communication, December 11, 2017).

Some of this top down change was credited to the current research leadership having first-hand experience and knowledge of the benefits and the challenges faced by researchers. The top three administrators (whose responses are addressed later in this chapter) have, collectively, a myriad of research experiences and countless external grant projects on their Curriculum Vitae. According to one faculty researcher, "Having leadership that actually understands what it means

to apply for an NSF grant and how to do that and giving me the kind of support that is needed is extremely helpful" (Participant 9, personal communication, December 12, 2017).

Professional level support within the colleges was expressed as extremely helpful by one researcher. Although, the realization that only one college has a professional position dedicated to the support of research occurred during the conversation. The position, the associate dean for research, is responsible for assisting faculty in all areas of their research agendas, including post award assistance and grant management. The associate dean for research works closely with the Sponsored Research Office and both supplements and complements their services. This individual knows the college's faculty well and understands their research goals, agendas, and challenges. The leadership acknowledged that this level of support and intimate knowledge of the faculty interests is not possible at the higher levels and wishes the other colleges would invest in a similar position. All members of this focus group concluded that if the university wants to increase research that having this level of professional support within each college would be a significant benefit.

Faculty researchers, collectively, articulated gratitude for and satisfaction with the research infrastructure. The researchers reported belief that the leadership provide high levels of quality support over the long-term, not just as the beginning of their career.

Gratitude

The faculty researcher participants communicated immense gratitude for the support received at the beginning of their careers. Strong belief was expressed that the early support enabled them to continue and eventually be successful in securing external funds. One faculty participant's remark caused chuckling agreement in one focus group:

> I see support not just if you're getting that funding, but if you're going after it, even. I think that gets you these little gold stars on your chart on the refrigerator that you can build up to trade in for some ice cream. (Participant 6, personal communication, December 12, 2017).

Interviewees participated actively in a conversation about the way in which start-up funds are provided to faculty. Unanimous agreement and appreciation was expressed that the support, albeit not large in terms of dollars, was more ongoing and distributed over a longer period of time than at some research-intensive universities. Several faculty noted that they could have accepted faculty positions at more "research prestigious" institutions but that they appreciate the more consistent and patient support received. This comment by a researcher sums the sentiment well:

> I think of us as a little different compared to some other universities where I have other colleagues. A lot of those places you're going to come in and they'll throw you this big start-up package on the front end and say 'All right, I supported you now go for it'. It's different here….it's, like, you prove yourself a little bit and then once they see that you are committed to that research culture, then you start getting more and more benefits. It then snowballs. (Participant 15, personal communication, December 12, 2017).

Although support is important, research has concluded that confidence influences the desire, willingness, and success potential with everything individuals attempt to accomplish (Moss-Kanter, 2006). Therefore, analyzing the data in Table 3, above, is both interesting and useful. The aggregate data should be more closely analyzed to determine any significant difference among the variables by gender, research classification, and confidence levels.

A Closer Review of the Researchers' Data

Of the eight female researcher participants, three considered themselves senior researchers, three junior researchers, and the remaining two were somewhere in the middle. Overall, the female participants reported mostly neutral to low confidence levels in both writing/securing and managing a grant project. Only three of the eight ranked themselves high in both of these areas. One each of the senior, junior, and middle classifications considered themselves extremely confident or confident in securing a grant. Although not the same three, these results look similar for the female participants with respect to managing a grant. One of three seniors and two of the three juniors considered themselves extremely confident or confident in managing the grants. Both females in the middle classification felt they had neutral to low confidence levels in managing the grants.

The male distribution looks a bit differently. Of the seven male participants, three reported feeling extremely confident or confident in securing a grant while all seven, regardless of classification, felt extremely confident in the management of the award.

Overall, only 37.5 % of females considered themselves confident in both securing and managing a grant, while 43% of the males ranked themselves as confident in securing and 100% were confident in managing the grant. The observable behavior that elicits a stronger understanding of this data is that the female participants took more time to answer and seemed to think about their responses much more than the male participants. While most of the focus groups were of mixed-genders, one was comprised of all female participants. This group spent an inordinate amount of time deliberating their confidence levels. There was extreme uneasiness about ranking themselves and some changed their minds several times during the conversation. A follow up interview with a female participant provided a heartfelt explanation of her struggles

and how she feels they differ from her male colleagues. She summarized her perception by saying:

> I would have to say that as a woman, I have been very challenged by the need to balance life and profession. So by default, I cannot have the motivation and time that the men have. Nor do I have the professional strength (we are not Stanford after all). So, I can only do that much in research. On the other hand, most of the rules in academia are set from the point of view of the 'male warrior'. I had to prove myself much more than my male counterparts as I was working on my tenure and promotion. And although I reached full professor, I feel that I am not in the right crowd. My interest is more in having a good work environment rather than reaching high level research goals that have eluded me so far and have consumed most of my professional time to point of exhaustion and sickness. At this time, I am protecting myself and my health by saying NO a lot more than I used to. I would rather spend my time on my strengths rather than my weaknesses in terms of profession. (Participant 8, personal communication, January 10, 2018).

This individual was the only female participant in her original focus group and communicated thanks when given the opportunity for a follow up interview and the ability to voice these considerations. This particular researcher expressed passion and frustration with the lack of understanding from her male colleagues. Although only expressed by one researcher, it is important to note the significance and passion that was noted in her voice. The fact that she was unwilling to share her feelings of frustration during the focus group is extremely telling. It would be beneficial to expand on this topic with faculty researchers.

The male participants, on the other hand, seemed sure of their responses to both parts of the question and did not deliberate or expound upon their answers. The reasons for their answers

differed in context as well. The female participants cited personal reasons for their answers, while their male counterparts cited the current funding climate as a reason to not be as confident in their ability to secure a grant. One male participant said it this way:

> To write and secure grant, I'd say I'm neutral. Some of that is based on individual abilities, but the secure part is partly, probably a lot, based on the funding climate and that really provides uncertainty no matter even with an established research agenda. (Participant 4, personal communication, December 11, 2017).

Table 6 provides a visualization of the self-reported confidence levels in writing and securing and managing an external grant by gender.

Table 6

Researcher Gender Differences by Confidence Level

Gender	Confidence in Writing/Securing	Confidence in Managing
F= 8	Mid/High = 3 (37.5%)	Mid/High = 3 (37.5%)
M = 7	Mid/High = 3 (43%)	Mid/High = 7 (100%

The comparison of the researcher classification (junior versus senior) and confidence levels in securing/writing and managing a grant variables is interesting, as well. Of the six researchers who classified themselves as senior researchers, only one indicated high confidence in writing/securing while four felt they could easily manage a grant project once received. The self-reported junior researchers had two of four respondents feeling extremely confident in writing/securing and three of the four extremely confident in managing the award. Of the five neutral or middle of the road researchers, three were extremely confident in both writing/securing and managing a grant project.

In summary, only one in six senior researchers reported being at least confident in writing/securing while four in six felt confident managing the grant. Two of four junior researchers reported feeling confident in writing/securing and three-fourths are confident in managing the grant. The neutral researchers reported confidence by three out five respondents in both writing/securing and managing. Therefore, six out of the 15 (or 40%) reported high levels of confidence in writing/securing and ten of the 15 (or 67%) reported high confidence in managing the grant once awarded.

This group of researchers, by definition of their interest in this study and significant research endeavors and scholarly activity (funded or unfunded), epitomizes the definition of a teacher-scholar. The consistent and unanimous desire to use their research to influence their teaching and their teaching to influence their research is impressive. The overarching support network at this institution includes the researchers, the sponsored research staff, and the leadership. The collaboration among these groups is a factor in the success of this institution's grants portfolio.

The Sponsored Research Office is an integral piece of the research infrastructure at any institution of higher education. The Sponsored Research Office is primarily responsible for the compliant development of proposal narratives and budgets and the identification of any objectionable terms and conditions in the notice of awards.

The Sponsored Research Office Perspective

A single focus group that included all seven members of the Sponsored Research Office team was held on the final day of the visit. While the participants were cordial and respectful, they did not easily accept the interview process. They were hesitant to answer and were uneasy at first. The questions were extremely similar in context to those asked of the faculty researchers,

so this section addresses some similar topics but from the administrative viewpoint of the research infrastructure. The Sponsored Research Office, from their perspectives, believe their primary role is pre-award. After some prodding, one of the team members expressed their role this way:

> A lot of our work is proposal development for PIs. Then processing the awards and subawards. We also have research compliance as part of the office. So the whole thing includes helping them to identify funding opportunities that fit their idea, understanding and communicating the requirements and guidelines of the proposal to them. Basically, we have to make sure that all aspects of the proposed project are compliant with federal and state laws and regulations. Oh, and university policies as well. That's important. We try really hard to make sure the proposed budget is reasonable and includes all costs associated with the project. It's important that we make sure that the proposal doesn't include something that is not reflected in the budget. Then, when we get an award we are responsible for review, negotiation, and acceptance of all terms and conditions. It is also important that we protect the university from nasty terms. (Participant 18, personal communication, December 12, 2017).

It is important that the sponsored research staff understand the roles and responsibilities of all parties involved in the support of research at the institution so they can facilitate the relationships. This description of the role of the Office of Sponsored Research shows a clear understanding of the importance policy and procedural compliance plays in the success of grants administration. Without skilled and competent research administrators the faculty researchers will struggle with the administrative burdens.

While this group was less talkative than the others at first, they were extremely knowledgeable about federal laws and institutional policies and statistics. They exuded a humbleness that articulated their admiration for those they help and an intense desire to support them in whatever way possible. The research staff answered the questions quietly and with reserved caution. Many questions were answered with pause and significant time for thought. The research staff did not recognize the positive impact they have on the research culture. The question inquiring as to the relationship with the researchers was received with quiet, down-tilted heads and shrugging shoulders.

The Relationship with the Researchers

The research staff provided a statistic of 150 discrete or unique researchers on campus who actively seek external funding. That is nearly 38% of their faculty base. The average participation in external research at the base institution is only 13%. At 25% more participation than the base institution, the study site institution is definitely on the right track. A common timeline of ten years was again cited by a member of the research staff as the impetus for change in the research culture. The participant stated:

> Within the past decade, we have hired a permanent chief research officer, added a faculty position within the office to work directly with the chief research officer, and is changing the emphasis on sponsored research across the university. (Participant 20, personal communication, December 12, 2017).

In addition to these additional leadership positions, the sponsored research office also added full time positions in contract and subaward negotiation and compliance within the last 10 years. Previously, these roles were only a small part of another staff member's role and were not given individual or specialized attention. While the belief by the sponsored research team was

unanimous that the research office still "has a very long way to go to get a good infrastructure in place," there was a lot of momentum and desire by the staff to "make the lives of the researchers just a little bit easier." (Participant 22, personal communication, December 12, 2017). Staff members feel that the researchers respect and are thankful for what they do and believe they are being successful with their support. According to one member:

> Once you demystify the whole compliance thing and make them not as uneasy about the whole process, then they say 'yeah, I can do that' because they know we have people here who can look at the whole proposal and make them more at ease. It helps, I think, that they know they can focus on the science and we will focus on the administrative stuff. (Participant 20, personal communication, December 12, 2017).

The lack of departmental or college level research support was identified by the researchers and reemphasized by the research administration staff. The majority of those interviewed believed that the researchers and the overall research enterprise would be strengthened by professional level staff housed within each of the academic colleges. A research administrator explained it this way:

> They (faculty) have almost no middle level support for research. Out of six academic colleges only one of them has someone in that college whose title includes the word grant. So, it's a big challenge for faculty to get and do the work and then also pay their bills and hire their students. But, they have to do it because there aren't people devoted at either the department of the college levels to help out. We are really under resourced in that sense. (Participant 18, personal communication, December 12, 2017).

Universities, even the smaller ones, are hierarchical and divisions by role often occur in silo-type structures. Outreach to the institution as a whole is necessary to ensure the efforts and services are known and utilized across the campus community.

Outreach and Communication

The staff talked with much pride about their outreach and communication efforts. The internal funding mechanisms within the institution are fairly robust and include opportunities for undergraduate and graduate students to showcase their work and compete for internal dollars and recognition for their research endeavors. The staff believed these internal funding competitions and opportunities for students are part of the reason a large number of undergraduates move directly into graduate programs at the institution and not go elsewhere for their post-baccalaureate education. Although stated by a single team member, the following comment was acknowledged by unanimous nods of agreement:

> Our internal funding sources provide resources and, obviously, it's an experience for the undergraduates and we see a lot of undergraduates move into the graduate program, so the longevity of keeping and building a student researcher and staying with the university and also allowing these researchers to mentor and share their experience, is a really great opportunity that I don't think many campuses offer. (Participant 18, personal communication, December 12, 2017).

The funding for undergraduate research experiences is provided by the student fees. The research staff unanimously agreed that the stewardship of these dollars was extremely important and well-managed by the research leadership.

In addition to the financial support provided by the Sponsored Research Office, the staff was eager to share some of the unique ways they acknowledge and reward faculty for their

research. The staff sends a note to all faculty who submit a proposal that includes a pack of gum for "going the extra mile" and a candy bar to all award recipients wishing them "mounds of success." (Participant 17, personal communication, December 12, 2017). For federal awards, researchers receive a leather-bound journal embossed with the Sponsored Research Office logo. These incentives were mentioned in two of the three researcher focus groups but did not seem to be integral to their motivation.

As noted previously, confidence has been proven a significant factor in the motivation and subsequent success achieved with any undertaking. It is essential, according to Moss-Kanter (2006), for the institution to convey confidence in themselves, their infrastructure, and their researchers by investing and recognizing the efforts.

Confidence of the Researchers

The research staff unanimously believed that the active researchers would and should rate themselves as extremely confident or confident in both writing/securing and managing a grant. When pushed (slightly), they stated they were probably more confident in their abilities to write and secure a grant than to manage a grant once awarded. The staff believed the management to be more complex and the university support network for post award assistance to be less centralized. Based on the confidence data reported above, there are notable disconnects between the staff beliefs and the beliefs of the researchers. As explained in more detail above, collectively, faculty researchers felt they were more confident in managing a grant award than in writing and securing one. Six of the total 15 faculty participants felt they were, at a minimum, confident in their abilities to write a successful grant proposal while ten rated themselves highly confident in managing a grant award.

When asked about the reasons the staff believed faculty do (or should) participate in externally-funded research, the common theme of students emerged again. The faculty researchers thought student engagement in research and the benefits of their own research to the student experience as indispensable to their academic success. The research staff unanimously cited student engagement and improved teaching as the key reasons faculty should and do participate in research as well. A member of the research team stated it this way:

> Because they are genuinely interested in what they do and benefitting the students. I think they do that because they care about the students and the university…And, the fiscal reality is that they can't really do anything else without some external funding. (Participant 20, personal communication, December 12, 2017).

Financial need, altruism, and the simple desire to increase knowledge and advance their respective fields were also identified themes by the Sponsored Research Office.

The discussion revealed that the research staff has immense pride and respect for the researchers with whom they work. They enjoy learning about the research endeavors and are proud to be a part of the good work being done.

The leadership is essential to the research infrastructure and the success rates of the researchers. The leadership, as identified by their abilities to commit institutional resources to the research endeavors, is the cornerstone of this institution's successful enterprise. Those with the responsibility and authority to commit resources, manage the sponsored research office, and implement effective initiatives is what drives the research agenda forward and motivates the researchers to spend the time and energy needed for success. The research leadership is strong, experienced, and committed to helping advance the research agendas of the faculty and the institution as a whole.

The Leadership's Perspective

The leadership focus group included the top three administrators at the institution responsible for the research infrastructure. Two of the three administrators have been in their respective positions for approximately 10 years. The third, a faculty position, was added to the leadership team only two years ago. All three have fairly robust personal research agendas with vast experiences. This understanding of the attributes needed to be a successful researcher was identified as a strength by the faculty researchers as discussed above. The leadership described the research infrastructure and culture in similar ways and were exceptionally positive and grateful for the research activity that occurs on campus. They understand, first hand, that it can be difficult to initiate and maintain a research agenda at a predominately undergraduate teaching institution. A reduced course load was an initiative that began approximately ten years ago when the current chancellor for research began his tenure. The reduced load, given to all faculty upon hire, provides undergraduate faculty with a three-three load and graduate faculty a two-two load. According to a member of the leadership,

> The reduced course load is essential to a successful research infrastructure. Faculty cannot be active scholars and researchers while teaching a four-four load. I tried. It is, simply, too difficult. (Participant 23, personal communication, December 11, 2017).

The reduction in load, funded by upper administration, was identified by multiple participants in all three subgroups as an important element that increased the ability, interest, and success of externally funded projects. Providing researchers with dedicated time for research will strengthen their interest and participation in grantsmanship. Additional time also allows for a more structured review of the proposal resulting in a better quality proposal with a higher chance of success.

The general description of the research infrastructure, as summarized by the leadership, is "collaborative, supportive, and decentralized." The decentralization of resources is a common thread among all three subgroups in this study.

A Decentralized Structure

Much of the research financial support is delegated to the departments and colleges. It is within the chair's and/or dean's authority to determine the best return on the investment of institutional resources toward the research infrastructure. The Office of Sponsored Research has one primary initiative to provide financial support to the researchers. Approximately $80,000 is allocated annually. This initiative is funded through the Facilities and Administrative revenue from contractual agreements across campus. Ten percent of the Facilities and Administrative costs generated by service contracts is used to support research initiatives across campus and is managed by the Chancellor for Research. These dollars are used for match, start-up funds, graduate students, and some seed or pilot projects that are believed to have significant potential with external agencies. While there is no formalized process or structured competition to access these funds, there are parameters and prerequisites to which the researchers must adhere. A member of the leadership stated:

> We fund things out of this office on an ad hoc basis. If you ask me for money to fund your research, I'm going to ask you for a proposal and tell me what this money will enable you to do that you can't do otherwise. What are the outcomes and deliverables? How is this money going to enable you to do more? To get external grants? Then, you better show me the results. We keep a file here on all the researchers that we support and if you're ever going to come to me again for money you better be able to demonstrate that you've done what you said you were going to do before. I also expect to have some

> demonstrated effort to find external funds before I will consider giving them more money. (Participant 23, personal communication, December 11, 2017).

Since a significant amount of the resources are housed and managed by the colleges and departments, the deans and chairpersons are integral to the overall support and management of the research infrastructure. Researchers are expected to include their deans and chairpersons in all aspects of their research agenda and projects. To emphasize and support this structure, another member of the leadership stated:

> Generally when faculty come to me for support, I turn it back on their chair and their dean and say 'Yeah, I'll kick in but I need to have some kind of commitment from them. It doesn't necessarily have to be an exact match but they are really the only ones that can hold a faculty member's feet to the fire so to say. There needs to be investment from all involved. (Participant 24, personal communication, December 11, 2017).

Requiring an investment from all relevant parties (researchers, chairs, deans) helps encourage collaboration and ensure success. Faculty are accountable to their chairs and deans, not upper administration. Therefore, a financial commitment from the departments and colleges in support of an externally-funded project will help ensure the researcher adheres to institutional and agency guidelines. Subsequently, the chairpersons and the deans are also more involved and more knowledgeable of the grant projects occurring within their disciplines. This knowledge allows them to publicize the efforts and to advocate more strongly for additional resources when needed.

The leadership talked a bit about how they have been able to change the culture and increase the sponsored research portfolio over the course of the past ten years. Much, they

believe, has been by being the "squeaky wheel." Members of the leadership take every advantage possible to talk about research needs, benefits, and success stories.

The Culture Shift

Many of the participants mentioned the shift to a more research-focused and research-inclusive culture that gradually occurred over the past ten years. This culture shift can be connected to the change in leadership that also occurred ten years ago. One of the leaders, when discussing the culture shift and increase in expectations, said:

> I see this (change in expectation) starting to infiltrate down to the faculty lines. When new hires are made, we are no longer just looking at their teaching experience or capabilities. We are changing, or at least trying to change, the expectations of our faculty, especially the new ones coming in. (Participant 23, personal communication, December 11, 2017).

Participant 23 also stated that the transition is not yet complete and that research efforts will continue to increase as new faculty are hired. Emphasis will be placed on the increased expectations to participate in research during interviews and verbiage explaining the expectation of research will be added to the faculty hire letters.

This campus is one of several universities within a larger state system infrastructure and is, therefore, governed by the "parent" institution. Over the past ten years, the institution has also changed the way it is viewed by the governing body. The governing institution has the financial resources to sponsor grant competitions for all universities within the state system. According to the leadership interviewed, prior to the culture change, the campus was fortunate to receive even one small grant from the state system. Over the past decade, the leadership has been able to increase the success rate with these competitions, now receiving in excess of $1 million annually

from the state system competitions. These funds, according to the leadership, have helped immensely with the procurement of major equipment. A member of the leadership team believed that:

> Having these pieces of equipment on hand allows us to go after grant opportunities that focus more on hands on projects rather than purchasing the equipment. It also helps with match requirements because we can claim the use of the equipment as match. We need to start leveraging these resources to go after grant opportunities from sources other than federal. We had a push to submit to federal agencies and have been successful. Now we need to focus the same attention on other agencies. (Participant 25, personal communication, December 11, 2017).

Having the equipment on campus allows other faculty to use the equipment as leverage when applying for other grants. The leadership group unanimously believed that having the equipment already on campus has been a key element in the success of many external grant proposals.

It should be noted that although not consistent among focus groups, one researcher voiced a perception of bias against the campus by the state system competition categories, stating:

> There is research funding from the state system office which we haven't gotten a lot of those funds. And, I've heard varying accounts as to why. Maybe it's because our proposals aren't strong enough, maybe there's a bias against us. I would say, I've noticed that the topics they picked oftentimes are topics that we don't have any departments in. So, I would say there's something of a bias there, which then leads to disinterest. It kind of reinforces itself. I think a lot of people at this institution don't even bother applying for it anymore. (Participant 12, personal communication, December 12, 2017).

Campus leadership communicated extreme interest in building more collaborative research clusters around particular niches or areas of expertise. This institution of higher education is slowly making progress. Although the following comment was made by one member of the leadership team, it was acknowledged and agreed upon vehemently by the other two:

> If we're going to grow and find the niche, find the gaps that exist, and grow regional or national prominence in the field, we've got to start asking 'what do we want to be when we grow up and how are we going to use our resources to get there? I see this starting to infiltrate down to the faculty lines. When new hires are made, we are no longer just looking at their teaching experience or capabilities. We are changing, or at least trying to change, the expectations of our faculty, especially the new ones coming in. We want them to know and understand that research isn't something you do in your spare time but that you can, even if you're teaching, make it a priority and do it with your teaching. You can find ways through partnerships or whatever to get external funding. We are looking at their research agendas and what they bring with them. (Participant 24, personal communication, December 11, 2017).

The leadership believed strongly that all faculty should be doing research and they intend to continue actively recruiting faculty with a research interest and experience, not just teaching. Given this focus on research, it is interesting that the leadership made a point to note that the campus is not trying and does not want to become an R1 or research-intensive university, stating:

> We're not out to be an R1. That's not us. We are developing ourselves with our strategic plan, a research and creative activity strategic plan, to encourage reputational excellence across the fields. We want our faculty to be boundary spanners and find the creative way

> to be successful but we are not, and I hope we never are measured just by these metrics. Because it can't be all about external funding all of the time. (Participant 23, personal communication, December 11, 2017).

It is important to note the benefit of understanding, acknowledging, and accepting the institution for its strengths and not expecting unreasonable growth. This institution was founded as a teaching institution and its leadership is not interested in changing or losing its foundation.

Although not an original question for the leadership, the researchers commented several times that having leadership with personal research experience is valuable and allows the leadership to make more strategic decisions that better serve the needs of the researchers. The comments by the researchers prompted a follow up question to the leadership about their specific research experiences. The leaders provided the following snippets of information regarding their personal research experiences:

> My view (on my research) was, how do I take work I'm doing in the classroom, work I'm doing in the community, and then figure out how to build a research portfolio out of that? It really paid significant dividends for me in terms of publications, books, and in many cases, external funding. In terms of productivity, we only have so many hours in the day, so you have to figure out how to piece those things together and leverage them in a way that moves everything forward. (Participant 24, personal communication, December 11, 2017).

A second member of the leadership emphasized collaboration as the key to his personal research success.

> A lot of collaboration. That is how I built by research career. I had several different academic positions at different institutions before landing here. I did a lot of traveling

> across the country and around the world to build the collaborative partnerships that I needed to be successful. I got a lot of multi-authored papers out that too. (Participant 23, personal communication, December 11, 2017).

The third leader interviewed was a doctoral student at the campus and faculty member in the same discipline and has been able to continue the same research. An excess of $10 million in externally-funded research can be attributed to this leader's research portfolio.

These three leaders all had successful research careers prior to their tenures in administration. With an emphasis on integration of teaching and research and collaboration, their comments echo much of what has already been discussed and the key skills identified below by the faculty researchers.

The first research question of this study identified the primary characteristics of a successful grants portfolio as perceived by the three main subgroups of a PUIs research collective team. The active researchers, the research administration staff, and the leadership were interviewed to determine the characteristics perceived to influence the research culture and success. Common themes identified by the three groups include student inclusion, release time dedicated for research, a strong expectation to research, and a desire for more consistent implementation of related practices across the institution. All three groups were grateful for the efforts of the other two groups and respect for expertise was strong among all of the groups.

The second section of Chapter IV and the second research question of this study identifies the key resources and skills perceived to be integral to a successful externally-funded research portfolio. The questions addressed these resources at both the institutional level and that of the individual researcher. What resources should be made available by an institution of higher education to ensure their researchers are prepared and have the structure within which to be

successful? What are the key skills and abilities that an individual researcher must possess to initiate, maintain, and grow their personal research agenda? These are the subquestions addressed in this section. As above, summaries will be explored from data collected from each of the three subset focus groups.

Research Question 2: What do faculty, leadership, and administration identify as priority resources needed to support a successful grants portfolio?

The resources that could be discussed in this section would be repetitive from above with respect to the characteristics. However, this section will speak succinctly to the conceptual and somewhat intangible component of the infrastructure that was embedded in nearly every interview and every conversation. The most valuable infrastructural resource identified by researchers is somewhat obscure. There were no specific comments made during the interviews to support this idea and there is no noun that can be attributed to it. The collective comments from researchers revolve around the feeling of support and understanding of their needs by leadership and is an immeasurable piece of the infrastructural support. The anecdotal stories and examples provided by researchers all point to the culture of respect and gratitude for the efforts in support of external research.

A question that addressed the key skills felt to be essential for success in external research received very specific answers. While there are many skills that would be helpful in writing/securing and managing a grant, faculty researchers easily identified those skills they felt absolutely essential. Table 7 provides a visualization of the necessary skills for success in research as identified by all three subsets interviewed. The remaining sections of this chapter provide additional detail and explanations of these skill sets.

Table 7

Identified Skills Necessary for Success in Research

Active Researchers	Sponsored Research Office	Leadership
Time Management/Ability to Prioritize	Time Management/Ability to Prioritize	Collaboration
Known Expertise/Publications	Known Expertise	Boundary Spanners (Curiosity and Inquisitiveness)
Perseverance/No Fear of Rejection		
Ability and Desire to Collaborate		
Inquisitiveness and Intellectual Curiosity		

Active Researchers' Perception of Key Skills

After very little thought or deliberation, the faculty participants identified the following as their collective top five key skills needed for success in grantsmanship. Each of the five skills were stated by a minimum of three separate individuals participating in the active researcher subgroup.

1. Time Management/Ability to prioritize
2. Known Expertise/Publications
3. Perseverance/No Fear of Rejection
4. Ability and Desire to Collaborate
5. Inquisitiveness and Intellectual Curiosity

Time management and the ability to prioritize among all of the tasks on the "to do" list were identified by all researchers involved in this study as the top necessary and most relevant skills. Regardless of the teaching load reduction available, time remains constant. One researcher

explained the need for both time management and prioritization as going hand in hand with one another:

> What has priority and what's important or urgent don't always match up with one another. Because this one thing HAS to be done today because it's urgent, or at least it seems urgent, but it may not have as big an impact and be as important as this other thing. You need to be able to manage your priorities in terms of urgency and impact all within the same time frame. So, to me, it's more about managing priorities than it is managing my time but it all goes hand in hand. (Participant 1, personal communication, December 11, 2017).

Researchers also identified expertise as another necessary skill. Expertise should be proven with a history of publications and prior relative research. A faculty researcher with some self-reported success said:

> If it's funded research, you're being hired because of what you know and/or your ability to find it out. So I think that, as a somewhat senior researcher, I have a good reputation and people know in certain areas that I have something credible to say about that. I think that has certainly helped me a lot. (Participant 15, personal communication, December 12, 2017).

A researcher with minimal success in external research stated her need to participate more in scholarly activities to build her credentials this way:

> I think part of the reason I have not been as successful as I would like is that I don't have the reputation in the field or with the agencies that I'm submitting to. I was just talking to a colleague this morning and I think I am going to submit for a small internal grant that will allow me to gather some data and get some publications or presentations. Then,

> maybe I'll be more successful. (Participant 10, personal communication, December 12, 2017).

Agencies are more likely to fund proposals by researchers with experience and expertise in the discipline or field. Researchers can gain credibility by conducting preliminary or pilot research and publishing the results. Institutional resources are often used to fund the collection of pilot data to build the researchers confidence and credibility.

The third most popular skill believed to be integral to a successful research career is perseverance. As cited above, the success rate with competitive (federal) grant proposals is, at best, 34% (NSF Merit Review Process Report, 2015). This statistic includes all proposal submissions by faculty at all levels of their careers and from a wide variety of institutions. Being told "no" and not having one's proposal funded is common in grantsmanship because of the low success rate. Researchers must become accustomed to not having successful proposals and be prepared and willing to look closely at the feedback provided and integrate the comments into a revised re-submission. One researcher cleverly associated the determination with that of writing one's dissertation:

> It's just the determination. Like we all did in our dissertations. You're going to wrestle that damn thing to the ground before it kills you. So I think there's some of that that's important. Just never give up on your idea. You submit a proposal to an agency, they give you feedback, and you make the changes they want and resubmit it again and again until you get it right. (Participant 17, personal communication, December 12, 2017).

This determination was evident in review of the sponsored projects reports that indicated a high percentage of resubmissions of the same grant proposal over the course of several years. A member of the leadership also stated that the role of the Sponsored Research Office is to review

feedback provided by the grant reviewers and assist the researchers in addressing the feedback and improving the quality of resubmissions.

The fourth most important skill perceived to be integral to grantsmanship success is collaboration. Collaboration was also addressed by the National Science Foundation and cited in Chapter 1. Collaboration with other researchers and/or other entities produces a more competitive proposal. No one individual, regardless of how intelligent and how hard working, can be an expert in every area, discipline, or activity. If researchers want to be successful with a large, complex grant proposal, they must ensure that they have the capabilities in place to perform the myriad of required tasks. For example, many (if not all) grant projects require some level of evaluation and assessment. Not all faculty are experts in evaluation and, therefore, would benefit greatly from partnering or collaborating with colleagues who hold this expertise. While collaborations were always encouraged, this greater emphasis on collaboration, as cited by the NSF (2015), is fairly new. In 2015, NSF, for the first time, made more grant awards to collaborative or partnership efforts. The value associated with the multi-authored awards greatly surpassed the single authored awards by more than $1 billion. This difference is definitely significant enough to warrant the push to collaborate with colleagues. Figures 2 and 3 above provide citation and additional detail from the NSF.

Curiosity and inquisitiveness is the fifth skill cited as essential to successful research by the active researcher subgroup. This skill reverts to the conversation with researchers about how the question “why” prompts a specific research idea or topic. Whether it is the researcher or the students in their classroom who asks the question, the question “why” drives new research.

Because the leadership has extensive experience and vast personal research agendas, it is not surprising that they identified similar skills as essential to successful research as the active

researcher subgroup. This question elicited a lengthy conversation among the members of the leadership subgroup.

The Sponsored Research Office's Perspective of Key Skills

The team of research administrators unanimously selected two skills, time and the ability to prioritize (or focus) on their research, as essential to a successful research agenda. The course release provided by the leadership was cited as the most advantageous incentive. The research team believed the majority of the faculty use this time wisely and productively.

The next essential skill set identified by the research administration group is expertise and reputation in the specific discipline or field of research. This group stated unanimously that the majority of faculty are active in research and that many of them are considered experts in their field with a national or international reputation. The research administration group believed that this dedication and prominence are primary reasons for success in externally-funded research.

The Leadership's Perspective of Key Skills

The top three leaders in the research division were asked to each choose a skill they feel essential to develop and maintain a successful research agenda. Two of the three individuals were able to identify a unique skill. There was overlap with the idea and importance of collaboration and two of the three intentionally and vehemently chose the same answer. One of the leaders defined collaboration as, "Collaboration in the sense of working with and partnering with others but also in terms of collaborating and communicating within the infrastructure itself" (Participant 24, personal communication, December 11, 2017). The institution and those with authority to support the research initiatives of the faculty are unable to provide beneficial

assistance if they are unaware of the activities, needs, and research agendas. A leader in the research division explained the importance of awareness this way:

> If we (the research leadership) are aware of what they are doing, and their deans and chairs are aware of what they are doing, we can help them find folks to collaborate with. The STEM efforts on campus prove our ability to do this. And the requirements by many funding agencies to have collaborative proposals probably demonstrates this need. We've got to get people to do that communication better because we can only do so much and go so far. They've got to communicate what they're doing and why they're doing it so we can help. (Participant 25, personal communication, December 11, 2017).

The third member of the leadership group chose the term "boundary spanners" as the most significant skill that can be possessed by a researcher. Boundary spanner could be another term for collaboration but this particular member of the leadership thought the term and its meaning deserved specific attention. He defined the term by saying:

> If they're boundary spanners, they'll get there. That ties to communication and it ties to looking over the fence to see who else is doing what and in what area. That's the only way they'll know that their research isn't redundant or obsolete. It's the only way they'll truly know what the 'hot' topic is in their field. It's the only way they'll know who they need to collaborate with. It's beginning to connect dots, again across disciplines or across fields or across institutions. If they're boundary spanners, they're going to be successful. It's a pretty critical skill. (Participant 23, personal communication, December 11, 2017).

The term boundary spanners is similar in context to the fifth skill (curiosity and inquisitiveness) identified by the researchers.

In addition to the focus group interviews, several archival documents were reviewed during this study that supported and reinforced the research infrastructure. Archival resources utilized in this study include the institutional and sponsored research pages of the university website, the sponsored research annual reports, the faculty collective bargaining agreement, and the draft researcher handbook. The annual reports provided initial data by which this institution was selected and the external research data included previously. Supplemented by the annual reports data, the researcher handbook and the institution's website assisted in gaining a stronger understanding of the elements of the research infrastructure and aided in the development of the interview questions. The website was particularly beneficial and provided substantial information that proved constructive to this study.

The Sponsored Research Office's Website

A review of the university's website was the first introduction to this university. The website was inviting and well-organized. The research page of the institution's website is easily visible and accessible with one click from the homepage. The Sponsored Research Office's pages are clearly labeled and provide all of the pertinent information needed by researchers. There is a clear indication of the services the office provides and whom to contact with questions. Several institutions' websites were reviewed during the selection process and the selected site's was found to be among the most well-organized with complete and detailed information. Several of the factors identified above by all three subsets are also evident on the website. The most interesting and strongest connection is that of the inclusion of students and the benefits of integrating research and teaching. The institution's website states that their students "thrive" because of the resources and research opportunities provided to both undergraduate and graduate students that may not be available elsewhere.

In addition to the focus on students, there is a letter of introduction from the Office of Sponsored Research that reinforces the support and culture evident in the focus group conversations. Although it was not a direct question in the focus groups or follow up interviews, one researcher and one member of the sponsored research office team commented on the information available and use of the website as a valuable resource. The sponsored research office team member believed the information provided on the website is essential for a seamless experience in writing, submitting, and managing a grant project. All of the resources, including training, professional development, match funds, and a detailed explanation of the lifecycle (including the required steps before submission), are easily accessible on the website. A member of the leadership subgroup stated:

> It is the goal of the Sponsored Research Office to continue adding information and improving the usability of the website with a goal of making research seamless, transparent, and complete. (Participant 23, personal communication, December 11, 2017).

Although the research infrastructure is already strong, leadership understands that in order to continue to grow the research portfolio and increase the participation and success rates of the researchers, support must continue to increase and improve.

Success is not just dependent upon the support infrastructure. Researchers must possess adequate and appropriate knowledge, skills, and abilities. The second research question of this study identified the key skills successful researchers had in common, as perceived by the three subsets of the collective research team. All three groups (active researchers, the research administration team, and the leadership) thought time was an essential element. The research administration team and the leadership thought that the course release was sufficient and was

likely a key reason this institution has seen an increase in grantsmanship. The researchers, while acknowledging the course release with gratitude, believed a two course release or half-time is ideal.

Summary

Chapter 4 identified and discussed the key characteristics and essential researcher skills of a high-performing predominantly undergraduate institution of higher education classified by the Carnegie Classification System as a moderate-research (R3) institution. A variety of characteristics and factors that encompass the research enterprise were reviewed and analyzed. The three subgroups involved in this study all had significant overlap in their comments and perceptions.

Student involvement in research and the integration of the research endeavors into the classroom were identified as integral to the success of students, faculty, and the research portfolio. The benefits of a true teacher-scholar are thought to improve both student and faculty recruitment and retention, as well as produce more competent, metacognitive graduates. Researchers participate in external research because of their innate and altruistic desire to advance their field and to help their institution and their students thrive.

The leadership augments the research infrastructure by staying current with their own research, thus better understanding the challenges and the needs of today. They stay ahead of the data and understand from an economic perspective how the culture of research needs to change to remain successful and continue the growth pattern established over the past 10 years. The culture is intentionally one of gratitude and respect for the infrastructure, and that culture has been built and nourished and continues to grow from the top down.

The leadership, as stated above, are established and experienced researchers themselves. They understand the benefits, the reasons for, and the challenges faced by faculty researchers. Time is always too little. There is never enough time in the day to complete the "to do" lists. The current leadership, beginning approximately 10 years ago, offer every faculty member a three-credit release from teaching to provide more time for research. While the release is welcomed and acknowledged by the faculty, it does not, in the faculty's opinion provide enough time. The automatic and standard course release is a unique and rare approach to research support. Of the many institutions reviewed in preparation and support of this study, the selected site is the only one found to offer such an incentive. The normal load for a predominantly undergraduate institution is for undergraduate faculty to teach four classes and graduate faculty to teach three classes in each of fall and spring semesters. The leadership believes that the course release for research activity is essential and likely was the impetus to increasing research activity and success and achieving the "high-performance" standard (Participant 24, personal communication, December 11, 2017).

Chapter 5 will make connections among the respondents' answers, the common themes discussed, and the theoretical frameworks that were discussed in Chapter 2. It will also provide insights from the three subgroups on how this already successful, high-performing PUI can continue to grow and expand its research portfolio. Chapter 5 is divided into three primary sections: a summary, a discussion, and recommendations. The recommendations section includes specific ideas expressed by the participants of this study and are addressed, specifically, to the study site.

CHAPTER 5

SUMMARY

The previous chapters examined and revealed the benefits of a successful and lucrative research portfolio within institutions of higher education. This specific study addressed the characteristics of a successful, high-performing Predominantly Undergraduate Institution (PUI) and provides best practices that can be modeled by other PUIs. As institutions of higher education across the country continue to struggle with financial health and stability, PUIs must continue to seek ways to supplement the declining tuition revenue, recruit, and retain high-performing students and faculty (Bailey, 1999; Buller, 2013; Hardre, et al., 2011; Waite, 2012). Developing the credibility and expertise of researchers will aid in increasing the success rate of externally-funded research and provide additional revenue to the institution. Research has suggested that institutions and administrators who have faculty who feel prepared, are well-positioned, and have the infrastructural support needed are more productive and more successful (Akerlind, 2008; Hardre et al., 2011; Waite, 2012). The greater the resources available to researchers, the more likely they will embrace the teacher-scholar role and, therefore, become more active and more successful with external funding (Akerlind, 2007; Kuh, Chen, & Laird, 2007; Ware, 2006). Now is the time for institutions, especially PUIs, to formalize and implement a strategic plan for the future of their research endeavors. The institution chosen for this study embraces these ideals. The leadership intentionally and strategically commits institutional resources that encourages research while building the capacity of both the researchers and the research infrastructure. A continuous review of the research portfolio and the resources available allows the leadership to change their approach and make improvements on a regular basis.

This study identified the characteristics and elements of the research infrastructure that three groups, integral to the success of the research portfolio, believed to be key to the success in external research. The research questions addressed by this study identified the characteristics of a high-performing PUI as perceived by the active researchers, the research administration staff, and the research leadership. Chapter II, Review of the Literature, examined literature relevant to this goal and established a framework within which institutional leadership can find best practices in grantsmanship. Chapter III explained the methodology used and the population examined. Chapter IV, Analysis of the Findings, summarized the responses of three integral subgroups to the research infrastructure at a high-performing PUI. An analysis of the results discovered many similarities and consistencies among the three subgroups interviewed. These findings support the research cited in this study in many ways. Chapter V makes connections among the previous four chapters and addresses the recommendations or suggestions to further strengthen and improve the research infrastructure at the site institution and at other PUIs interested in growing their research portfolio. Chapter V also recognizes the activities and resources that were found to be most beneficial and motivational by the researchers and should be maintained or enhanced.

Discussion

The theoretical frameworks, as presented in Chapter II, collectively support and help further explain the characteristics and infrastructural foundation that is inherent within the study site. There are several themes and notable remarks made by the participants of this study that directly or indirectly imply a community of practice theory. Leadership emphatically confirmed that they are beginning to place more emphasis and weight on the research expectations of all faculty, including new hires. Hardre et al. (2011) stated emphatically that institutions must hire

faculty who do both teaching and research well if they want to increase their research portfolios. More faculty with interest, expertise, and credibility in specific research endeavors will strengthen the research Community of Practice and generate even more exposure. This exposure will further improve the credibility and reputation of the faculty and the institution which, in turn, will increase the success rate even more. Increasing the volume of active researchers at an institution will strengthen the infrastructure, increase the award portfolio, and encourage more participation. The effect of additional resources concurs with the results of the study performed by Slocum and Scholl (2013), with respect to the level of administrative support as it relates to research participation and success. The Slocum and Scholl (2013) study showed that the PUIs with the greatest resource availability submitted and received significantly more grant awards from the NSF than their less resource attentive counterparts. This dissertation study reinforced the results of the Slocum and Scholl (2013) study by identifying the myriad of resources made available to researchers at this high-performing PUI.

Since the principle foundation of a Community of Practice is one of commonality, the more faculty with similar interests, needs, and potential, the stronger the shared voice will be to advocate for additional resources. Therefore, the more attention given to research-focused new hires, the stronger the research Community of Practice will become. The strategic efforts put forth by the administration at the site institution is fostering growth, interest, and success in external research.

Moss-Kanter's Organizational Support Theory builds an ethos of institutional support around these Communities of Practice. Organizational support, to be successful, must address the specific needs of the community it intends to support (Moss-Kanter, 2006). Therefore, having leaders who are in touch and understand the needs, challenges, and motivations behind external

research is critical to developing a beneficial infrastructure. Findings by Akerlind (2007), Hardre, et al., (2011), Simmons (2009), and Waite (2012) all emphasized that having research-knowledgeable leadership is essential to a successful research enterprise. The leadership group interviewed are well-experienced and have strong personal research agendas. It was evident from conversations that faculty researchers have a strong level of respect for the leadership and that the leaders use their personal experiences to drive a successful support network.

Moss-Kanter (2006) promotes that consistency, clarity, and transparency will build trust in and, therefore, strengthen the community. All three subgroups in this study identified inconsistencies in the tenure and promotion requirements as problematic. The majority of faculty researchers interviewed were uncertain as to the weight and importance placed on grant proposals and awards. Only faculty researchers in one discipline shared a sense of understanding the weight given to proposals and awards with respect to tenure and promotion. Faculty researchers from all remaining disciplines represented expressed frustration. If the study site had consistent expectations and requirements for tenure and promotion with respect to research, it would strengthen the overall research portfolio by encouraging more participation.

Confidence is Moss-Kanter's primary factor for success in any field. "Confidence is the bridge connecting expectations and performance, investment and results" (p. 3). Moss-Kanter underscores the need for administration to reinforce the institution's confidence in their researchers by investing in them (2006). Given the self-reported confidence levels by the researchers participating in this study, the study site could benefit even more from additional workshops, trainings, or professional development activities to further increase the confidence levels of their researchers of all levels.

Recognition of a job well-done builds confidence, as well. The leadership and the research administration staff do an excellent job of recognizing both the efforts and the successes of their faculty researchers. The leadership understands the struggles faced by the researchers and combine this understanding with financial assistance to help offset the barriers. The course release helps the researchers achieve more of a balance between their teaching and research expectations. The course release, provided to all faculty, is likely a large factor in the overall success of the research portfolio.

The leadership's recognition of the challenges faced and the success achieved by the researchers supports Bandura's Theory of Self-efficacy. Bandura defines his Theory of Self-efficacy as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (1986). Bandura found four factors that influence our Self-efficacy or confidence: prior accomplishments, vicarious experiences, persuasion, and physiological and emotional states. The leadership works diligently to support the researchers both financially and psychologically. There is a developed culture of understanding, respect, and confidence in the abilities of both the researchers and the research infrastructure that promotes success. The institution studied ensures that all research efforts are recognized, rewarded, and promoted within the institution.

A study done by Akerlind (2007) supported and reinforced Albert Bandura's Theory of Self-efficacy. Akerlind (2007) found four primary levels of researcher development that are similar to the four factors of influence of Bandura's theory. Akerlind's four levels of researcher development are: becoming confident as a researcher, becoming recognized as a researcher, becoming more productive as a researcher, and becoming more sophisticated as a researcher. According to Akerlind (2007), when a researcher reaches this fourth level, they will seek

criticisms from their peers to improve their scholarship. They are able to ask more questions and widen their knowledge base into new areas. This understanding was evident in the responses received from the leadership of the study site institution. Specifically, a member of the leadership used the term "boundary spanners" when asked how he characterized a top researcher. This definition is congruent with Akerlind's (2007) definition of a sophisticated researcher.

Chapter 2 discussed several previous studies performed in the areas of grantsmanship, research in higher education, and faculty/academic professional development. Many of the findings in this study further support and reinforce the findings in many of these studies. The first, Fitzsimmons (2010), identified seven characteristics of effective staff development. These seven characteristics are: good leadership, institutional support, collaboration, research-based development, program integration, developmental perspective, and relevant learning activities. Although the Fitzsimmons study was generically focused on staff development and not faculty researchers, some overlap was found. The top three characteristics in Fitzsimmons' (2010) study were also identified in this study. Good leadership, institutional support, and collaboration are common denominators found in the results of this study. The active researcher subgroup had the highest levels of respect, trust, and gratitude for the support from the sponsored research office staff and its leadership. Mutual respect and trust are essential components of a successful infrastructure. No entity, faculty, or staff, can create a research enterprise alone. It takes concerted and collective efforts by all involved. A researcher participant in this study stated, "There is a culture of gratitude here…Our leadership is sincerely thankful for what we do" (Participant 4, personal communication, December 11, 2017).

This mutual respect is, likely, the catalyst for the collaborative culture that has been developed. The leadership expressed the need to collaborate within the institution, as well.

Financial support for the research endeavors is decentralized and requires the commitment of the researcher, the department and/or college, and the leadership. The research leadership provides financial support to many research projects on campus but requires "an investment from all involved" (Participant 24, personal communication, December 11, 2017). Collaboration with other faculty researchers across disciplines and institutions is a current recognized strength that participants across subgroups voiced as a continued driver to their future growth. Identified as number four on the list of identified skills necessary for research success by the researchers, collaboration was also an identified strength by the leadership and reinforced by data from the NSF. Statistically, proposals by multiple PIs are increasing both in number and in total value of the awards. Multi-authored or collaborative awards are valued at more than $2.5 billion dollars, over $1 billion more than the single authored awards in 2015 (2015 NSF Merit Review Report). The value differential is significant and, obviously, confirms the need by researchers and institutions to encourage collaborative efforts within and among institutions.

The survey done by Muffo and Coccari (1982) identified seven variables considered to be predictors of success in external research. Four of these seven were also identified by the participants in this study as key characteristics and reasons they are successful in external funding: 1) past success with grants (experience and expertise), 2) internal grant competitions, 3) grants administration offices, and 4) an institutional commitment to research. Past success with grants equates to expertise and experience, identified as the second most important skill or characteristic by the active researchers. One successful, senior researcher believed that personal success with external grants is because, "I have a good reputation and people know in certain areas that I have something credible to say…I think that has certainly helped me a lot"

(Participant 15, personal communication, December 12, 2017). This belief supports the number one predictor of success identified in the study by Muffo and Coccari (1982) study, past success. The remaining predictors, according to Muffo and Coccari (1982), internal grant competitions, grants administration offices, and an institutional commitment to research, are all strong components of the research infrastructure of the study site and can easily be attributed to the overall success of their sponsored research portfolio.

A third study, by Snyder, McLaughlin, and Montgomery (1991), found three characteristics that were most responsible for success in external research. All three were also identified by the participants in this study's focus groups. The top three characteristics identified by the Snyder, McLaughlin, and Montgomery (1991) study and reiterated by the participants in this study are: 1) Identifying and supporting research specific goals; 2) actively recruiting faculty with research experience and expertise and 3) setting and monitoring periodic expectations relative to the established goals. An additional finding in the Snyder, McLaughlin, and Montgomery (1991) study that is consistent with the responses in this study was the benefit to researchers of additional support provided by research graduate assistants.

The need for more qualified graduate assistants was identified by the researchers. As a PUI, there are fewer graduate programs than at the research-intensive institutions and, therefore, fewer graduate students from which to choose and include in research projects. The only researchers who reported including students in their research projects were those in departments offering graduate programs. Not having this added resource of competent and qualified students adds to the burdens faced by the researchers and may de-incentivize faculty from participating in external research.

While the study site has improvements that can be made, the leadership has been able to tightly integrate all three of the theoretical frameworks that shaped this study. There has been and continues to be more emphasis placed on the research expertise of new faculty hires to ensure the faculty base is one of the teacher-scholar mentality. This increase in the expectation to participate in research will grow the base and strengthen the Community of Practice. Empowering the research enterprise by ensuring the leadership is experienced, knowledgeable, and active is the key to a successful organization support structure and further builds the research community. Leadership with the first-hand knowledge of research and the ability to commit resources appropriately equates to a trusting, collaborative, and confident research base.

As reported by the participants of this study, the past decade has been one of culture change with respect to the entire research enterprise. In an attempt to increase research, positions have been added, roles have been adapted to fit the new expectations, and resources have been reviewed and strategically implemented. The following section highlights the areas the site is doing well and should sustain.

Areas of Success at the Site Institution

There were many identified resources believed to be strong and instrumental in the success of the research endeavors at the study site. The research staff and the leadership, specifically, were recognized by the researchers for their support, gratitude, and expertise. The following resources or strengths were recognized by the researchers as key to their success and should be maintained as the institution continues to grow its research portfolio.

The first reason believed to impact the success in sponsored research is the increase in expectations of research and the shift to a research-focused culture at the institution. Researchers believe this shift to an expectation of research as opposed to general support by the leadership

has been integral to the increase in grants activity. As reported in Chapter IV, a researcher stated that the increased expectation has "…generated more interest in my area. People see it as another way to get recognized or get exposure" (Participant 5, personal communication, December 11, 2017). Integral to the culture shift and expectation of research, is the strategic and intentional seeking of faculty candidates with interest and experience in research. Hiring teacher-scholars as opposed to just teachers will continue to build the research capabilities of this institution and reinforce the expectation of research.

Another current successful attribute of this institution is the expertise and experience of the leadership and the sponsored research staff. All three of the leaders interviewed have active and successful research agendas. These individuals clearly understand the benefits of research as well as the challenges faced by the researchers. The research administration staff and the researcher subgroups commented on the expertise of the current leadership. One researcher summed it up well by stating: "Having leadership that actually understands what it means to apply for an NSF grant and how to do that … is extremely helpful" (Participant 9, personal communication, December 12, 2017). This working knowledge of the challenges and barriers promotes a stronger level of trust between the researchers and the leadership and results in better communication between the two entities.

The provision of support on an ongoing basis was also articulated as a positive practice. Faculty researchers expressed gratitude and agreement in the way the administration stretches the financial support across the institution and across a longer period of time. Faculty at the site institution reported smaller start-up packages than colleagues at research-intensive institutions but felt this allowed them to more strategically plan for success. The expectation of a collective network of support was seen as fair and beneficial. The leadership provides financial support for

research projects but expects and requires the colleges and departments to support the initiative, as well. Researchers reported agreement with this practice and were appreciative of the circle of support available to them.

The researchers view the members of the research staff as professionals and experts in the administration of sponsored research. The staff was reported to be extremely knowledgeable, patient, and grateful for the efforts of the researchers. This level of professionalism builds trust and the willingness by researchers to communicate with and utilize the resources of the sponsored research office. The sponsored research office should continue to provide the outreach, educational opportunities, and recognition activities currently in place while continuously staying updated on new regulations and policies effecting the management of sponsored funds.

The relationship among the three primary entities involved in the sponsored research endeavors at the site institution is based on mutual respect and gratitude. This reverential relationship is likely, fundamental to the overall success. Researchers revealed no hesitation in communicating with, asking questions of, or trusting the answers provided by the sponsored research staff. Additionally, leadership was believed to be trustworthy and knowledgeable with respect to decisions, policies, and investments in the research infrastructure.

The overarching success of the site institution can be translated into an equation that allows each factor to build upon another resulting in higher participation and success rates in research. An experienced and expert leadership allows for the addition of appropriate and beneficial resources. This simple equation results in higher expectations to participate and succeed in research. Then, add stronger more vocal recognition and reward practices to the equation and faculty will become more actively engaged in research activities, including the

utilization of the resources provided. The more professional development activities utilized, the higher the success rate becomes for not only the individual researchers but for the institution as a whole. As the researchers gain prominence and reputations in specific disciplines, the institution's reputation will simultaneously improve with the various funding agencies. The cycle of research success will continue to grow as the research base develops and the reputation continues to expand.

As indicated above, the participants of this study identified areas of success as well as areas for improvement. In addition to those areas cited by the participants, this section includes general recommendations based on the theoretical frameworks and studies cited within this dissertation.

Recommendations for the Site Institution

Although it was unanimously reported that the researchers, leadership, and staff are proud and more than satisfied with the environment and infrastructure within which they work, there is always room for improvement. This section summarizes the, albeit few, gaps or recommendations for improvement that were identified during this study.

The first area of improvement that was identified is the consistent implementation of evaluative methods with respect to research. All three subgroups expressed frustration with the inconsistent value given to external research in the current tenure and promotion process. The value of and weight attributed by the tenure and promotion committees varied greatly by department and/or discipline. Some disciplines weighted both proposals and awards and some weighted only awards, while others were unsure of the value placed on either proposals or awards. More consistent evaluative could clarify this confusion and provide additional incentive for participation in externally-funded research. Consistent, clear, and fair evaluative methods are

essential to encourage faculty to put more effort toward research. This finding supports results identified by Moss-Kanter (2006) and Hardre, et al, (2011). Moss-Kanter (2006) stressed that leaders must ensure that all areas of academia measure effectiveness in the same way and that the goals are clearly defined and communicated to all divisions. Hardre, et al, (2011) further encourages academic leaders to place higher value on the tenet they want to develop. Faculty will prioritize the tasks that will afford them the highest reward. Therefore, if administration places high value on teaching and lower value on research, research will suffer.

Researchers also identified a lack of understanding of the repercussions if the course release provided for research is not utilized. The researchers who participated in this study were purposefully selected because of their active research agenda. Therefore, there was no knowledge or ability to provide a scenario that would cause the institution to revoke the course release. Neither the researchers nor the leadership could provide an example of when the research release was revoked for lack of being research-active. A better understanding of the expectations and enforcement of the repercussions of not being research active could likely increase the research across the institution. Faculty currently inactive in research could be persuaded to participate if the release was in jeopardy.

As mentioned previously, the small number of graduate degree programs at a PUI also negatively impacts the accessibility of graduate research assistants available to researchers. This idea was recognized by the study participants, as well. Researchers suggested a more consistent and fair way of distributing the graduate assistantships among the disciplines who do not offer graduate programs. Providing more knowledgeable and dependable research assistants to faculty in non-graduate degree granting disciplines would encourage more research activity. Students were noted as the number one reason faculty are active researchers. Faculty want to impart

knowledge and experience on their students. Therefore, by providing graduate assistants to all disciplines would further encourage participation in research by less active disciplines.

Another gap in the current infrastructure that was identified is the lack of professional staff housed in each of the academic colleges. While the sponsored research office is well-regarded, both researchers and members of the research administration staff identified this additional support as a much-needed resource. Personnel with the knowledge and expertise within a given discipline could more effectively assist researchers in developing their ideas into fundable projects, identifying funding sources and collaborators, and managing the college-level financial support.

The relationship with the governing state system office was also recognized as an area for potential improvement. Although the communicated bias against the site institution by the governing body with respect to research topics was articulated by just one researcher, it was stated emphatically and with passion. The leadership may want to consider facilitating better communications between the governing body and the researchers. A better understanding of the reasons specific research topics are chosen for state system competitions could be achieved by having state leadership visit campus and meet with the faculty researchers directly. Even if the topics cannot change and this campus does not see an increase in funding from the state system, the transparency and interest shown by the state system representatives may diminish the feelings of bias.

The final suggestion for further improvement identified by those interviewed was mentorship. Researchers believed more structured mentorship with respect to research and scholarly activity would be extremely helpful to many, especially the new hires or junior

researchers. According to one researcher, a mentor could be helpful in many ways, including reviewing a grant proposal and providing feedback prior to submission:

> …the potential for grant reviewers or someone to provide some type of feedback. It could be a senior mentorship thing on campus where they would be willing to review a proposal. Even if it's not in your field. I feel like it's hard for me to ask my peers because of how busy everyone is and then it's like asking or calling in a favor. It would be nice to know that they're doing this for others too and they're like good at it and have more experience. Getting some additional feedback would be really helpful. (Participant 8, personal communication, December 12, 2017).

The study conducted by Behar-Horenstein (2014) identified mentorship as one of the top needs of successful researchers. Creating a structure in which successful researchers help, mentor, and guide new researchers will strengthen the stability of the infrastructure and ensure ongoing future success. A structured initiative that revolves around the mentor-mentee relationship strengthens the relationships, encourages collaboration, and promotes long-term interest and participation in research. This type of initiative also provides researchers the ability to interact regularly with others with common interests, providing a support network.

Communities of Practice, a theory used to help frame this study, was not directly identified or addressed by the participants. However, based on the collective results of this study and observations, the study site would likely benefit from a more structured or centralized support network utilizing Etienne Wenger's Communities of Practice or social learning theory. A formalized community of practice would further strengthen the communication, understanding, and advocacy for research practices. The researchers who participated in the focus groups learned new information from their colleagues, met colleagues with similar interests for the first

time, and gained a better understanding of research within other disciplines, departments, and colleges on campus. Developing a community of practice around research may help clarify inconsistencies and promote collaborative research endeavors across the entire university campus.

Because the purpose of this study is to provide institutions of higher education, specifically PUIs, with recommended best practices that can be replicated and implemented to increase externally-funded research, this section provides an overall compilation of the characteristics of a high-performing research infrastructure. Institutions across the country can benefit from understanding best practices and reviewing examples of successful models. This holistic understanding will help university administrators and research leadership make educated and informed decisions regarding the use of institutional resources to help grow their research portfolios (Hardre, et al., 2011).

Recommendations for Predominantly Undergraduate Institutions

There are a myriad of recommended activities, practices, initiatives, and resources that institutional leadership can develop and provide to their researchers to support and encourage grantsmanship within institutions of higher education. Regardless of the research-level classification, faculty need support and recognition to be successful researchers. PUIs, as established earlier in this dissertation, start at a disadvantage as compared to their research-intensive counterparts. PUIs do not have the financial capabilities that the R1 and R2 institutions enjoy. Leadership at PUIs, therefore, must be more strategic, resourceful, and diligent in assessing the outcomes of the research infrastructure.

A fundamental and vital resource that has been identified in many studies, including this one, is the provision of adequate time for research. Ensuring faculty have adequate time for

research is essential to their success. A leader at the site of this study and successful researcher understands the importance of allocating time for research. He stated, emphatically, "…faculty cannot be active scholars and researchers while teaching a four-four load. I tried. It is, simply, too difficult" (Participant 23, personal communication, December 11, 2017). This first-hand understanding of the challenging workload and the effect a four-four load has on faculty's research agendas allows this leader to design, implement, and execute a beneficial and successful research infrastructure. While the site institution provides a course release for research, there are other alternatives. Summer contracts, supplemental compensation, a modified course load (a reduction in just one semester), a strategic course schedule (Tuesday/Thursday schedule), or the reduction in preparatory requirements would help faculty better manage their time and allow time for research.

Another resource that will reduce the effort needed by the faculty researchers is the availability of qualified personnel to assist with grant or research efforts. Graduate assistants are essential to a successful research portfolio. Not only are graduate students qualified, experienced, and dependable as research assistants, but including students in grant projects (and grant budgets) often make the proposals more competitive. Funding agencies often require or "strongly suggest" the inclusion of students in the research projects. Institutions should consider providing graduate assistantships for research projects to further enhance the competitiveness and alleviate some of the burden from the faculty members. Offering research opportunities to graduate students may also increase the recruitment and retention efforts because of the experiences gained.

Another opportunity to mitigate the challenge of lack of time for research is to have professional level research support positions housed within the academic colleges. These

positions would likely be mid-management level and qualified individuals would have the ability and expertise to collaborate effectively with the faculty researchers. The primary responsibilities of this position would include facilitating collaborations, developing ideas into fundable projects, identifying funding sources, and connecting research opportunities with qualified researchers. In addition, this position would assist with post-award management of grant projects by ensuring compliant and appropriate expenditures.

Leaders must build a culture of mutual trust and respect with the faculty researchers. Transparent, consistent, and clear execution of practices, procedures, and policies are essential in developing and maintain trust between the leadership and the researchers. There are several ways to ensure a strong, positive, and respectful relationship between the administrative leadership and the faculty researchers that can help grow the research activities at a PUI.

One characteristic of a relationship built on trust is to create and implement clear and consistent methods to include and value research activity in the tenure and promotion processes. If faculty do not understand the value placed on research activity as it relates to their future faculty status, focus will be applied elsewhere. Distinct weight values should be given to both grant proposals and awards and this weight should be consistently adopted and applied across all colleges, divisions, and departments within the institution. College or departmental level committees should not be permitted to unilaterally modify the value of research activity. Clear definitions of discipline-specific “research” should be provided so as to fairly evaluate the countless scholarly activities that occur on university campuses (i.e., theatrical performances, creative activities, public service efforts, research and developmental projects, infrastructural and equipment grants, and fee-for-service activities). Activity is more prevalent and individuals are

more motivated when the evaluative metrics of an expectation are clearly understood and consistently and fairly enforced.

A second, fairly basic way to build a culture of respect is to empathize with those doing the work. Leadership at all levels should communicate gratitude and recognize and reward the efforts and the success of researchers. Established consistent means of recognizing and rewarding faculty for research is imperative to building and maintaining the motivation to continue. Success with externally-funded research is not easy and the competition is fierce, especially for PUIs. The Slocum and Scholl (2013) study examined in Chapter II found only 8% of the NSF funding is awarded to PUIs. Individual success rates in securing external funding is low and unfunded proposals are common. Because of these statistics, researchers would benefit from external motivation and sincere recognition for their efforts. There are several inexpensive ways institutions can recognize their active researchers. Institutional websites and university-published magazines are excellent ways to showcase the research across campus. Not only do these venues motivate the researchers but the information published is often times noticed by broader audiences, including funding agencies, professional organizations, and newspapers. This broader recognition will help further establish the research agenda, gain notoriety of the faculty member and the institution, and subsequently improve the potential success of future grant proposals.

Because of the low success rate, recognition of unfunded proposals is an ideal way to build confidence and maintain the energy to keep trying. Thank you cards signed by the sponsored research staff and/or leadership at the time of proposal submission is a nice way to recognize attempts without publishing the lack of funding received. In addition, many funding agencies provide feedback on unfunded proposals. Leadership can assist the researchers in

reviewing, analyzing, and incorporating the feedback into the proposal and resubmitting with the next cycle. Agency representatives appreciate when faculty consciously incorporate the feedback previously provided to improve upon proposals. Institutions who employ leaders and staff members with the experience, expertise, and knowledge to understand both the research and the interests of external agencies will be better positioned to assist researchers and will, therefore, find greater success with externally-funded projects. Leadership should possess personal research experience and have a working knowledge of the opportunities and challenges faced by the researchers. Leaders who possess this expertise are able to exude sincere empathy and make educated decisions regarding the investment of institutional resources to grow the research infrastructure and grants portfolio.

In addition to a knowledgeable leadership team, the research administration staff or office of sponsored research should employ adequate staff with expertise in the primary funding agencies, proposal guidelines, submission requirements and portals, and the governing entity, the Uniform Administrative Requirements, or Uniform Guidance. The Uniform Guidance is published and enforced by the Office of Management and Budget housed with the Office of the President of the United States. The Uniform Guidance is updated regularly and while these changes are communicated in a variety of ways, research staff should participate in professional development conferences and activities to remain knowledgeable in these important areas. Having research administrators who are competent in the various areas of compliance will strengthen the trust with the faculty researchers and provide better support services all contributing to a more robust research portfolio.

Faculty who have colleagues with similar or complementary interests with whom to collaborate and commiserate will be more energetic and productive. Human resources divisions

should make strategic decisions with respect to new faculty hires when vacancies become available. Institutions who consider the lost research expertise along with classroom needs will help to foster a strong teacher-scholar culture across the institution. This focused attention to a faculty member's complete vitae will also help develop and strengthen Ettiene Wenger's concept of Communities of Practice, as described in Chapter II. A research community of practice provides researchers with common ground on which to develop their research expertise, receive feedback, identify collaborators, and garner interest in research across the institution. Supporting a research Community of Practice is an ideal way to provide professional development and mentorship opportunities to the researchers. This provides a structure within which workshops or customized training sessions can occur. Professional development for faculty plays a critical role in promoting both academic and research excellence (Haines & Popovich, 2014). Senior researchers can participate in the Community of Practice and mentor their junior colleagues. Mentorship is the practice of transferring practical knowledge to those more junior and is an accepted and popular method of professional development.

The final piece of advice to PUIs striving to increase their sponsored research activity is to know your institution and its capacity and capabilities. Not all universities are created equal and not all are capable of being designated as a research-intensive (R1 or R2) institution. The site institution of this study clearly understands its place within the research hierarchy and leverages its capabilities to be a high-performing PUI. One of the leaders interviewed stated "We're not out to be an R1. That's not us…" (Participant 23, personal communication, December 11, 2017).

Institutional leadership holds the primary responsibility for developing, maintaining, and growing a culture that supports the three tenets of academia: teaching, service, and scholarship. As Moss-Kanter advocates in her Organizational Support Theory, effective leadership includes

"the balanced attainment of many goals" (Kanter & Brinkerhoff, 1981, p. 327). Effective leaders do not question the need for change, only the changes that need to occur and how to manage the change to improve upon the current structure.

While administration and leadership hold responsibility for the culture of an organization, there are many aspects of the research efforts for which the researchers should take responsibility. This section provides suggestions and recommendations for researchers to improve their personal research agendas, success rates, and reputations in their disciplines. The recommendations include those identified by this study and the results of the studies cited and research done in preparation of this dissertation.

Recommendations for Researchers

While the responsibility for the infrastructure and institutional support lies with the leadership, the researchers must be accountable for their own research agendas, professional development, and activity in grantsmanship, as well. The institution can commit both financial and nonfinancial support, they can offer professional development experiences, they can put an expert staff in place, and they can recognize and thank the researchers at the highest possible levels but without a commitment and a strong desire by faculty to succeed, success will be limited. Faculty who desire to be successful in externally-funded research need to be proactive with their research agendas and create mechanisms that mitigate their own barriers to success.

The primary recommendation for faculty is to leverage and utilize the opportunities provided by the institution and create additional ways to better balance the teacher-scholar role that is fundamental at a PUI. While most PUIs do not have the luxury of providing a course release to all faculty for research, as the site for this study reported, there are ways faculty can utilize the structure to their advantage. Researchers at PUIs should intentionally build

relationships with those in leadership positions with the ability to support their needs. Communicating research efforts, successes, potential impacts, and needs will help establish a research infrastructure that best supports the faculty who need and utilize the services. Resources at PUIs are limited and must be invested in the most effective ways to produce the best, most worthwhile results. Those with the authority to invest these resources must be aware of the needs and the potential impacts of the research endeavors across the university. Researchers should take every opportunity available to showcase their research and communicate the impact the results will have on society.

Another way to balance the teacher-scholar role is to identify a research agenda about which you are passionate. Regardless of the resources and support provided by the institution, research endeavors still require an inordinate amount of effort. When it is enjoyable, it will be easier to manage and the results will be much more successful. Collaborating with colleagues who hold the same interest and passion and with whom you work well is also a good way to mitigate the challenges and add to the expertise.

Teacher-scholars are defined as having a commitment to both scholarship and teaching while allowing their scholarship to inform and improve their teaching (Akerlind, 2008; Bailey, 1999; Behar-Horenstein, 2014; Kuh, Chen, & Laird, 2007; Waite, 2012). To be successful in both areas, faculty need to find ways to integrate their research into the classroom. Including students in research projects is an ideal way to further impart knowledge, provide real-world experiences, and infuse the research efforts into the classroom. This inclusion also addresses one of the identified reasons faculty participate in research: the altruistic desire to advance the science and to help their institution and their students thrive.

Finally, faculty should take advantage of and utilize the professional development opportunities that are available. The institution's office of sponsored research is an ideal place to find expertise in a variety of research-focused areas. Many sponsored research offices post informative documents, links, and training videos on their websites. If there is a relative topic of interest that presents confusion or misunderstanding, a request to the sponsored research office for additional clarity or training should be made. In addition, there are several professional organizations that specialize in these areas. The National Council of University Administrators (NCURA) and the Society for Research Administrators (SRA) predominately serve the sponsored research office staff but the websites provide easy-access to a wide array of resources that are utilized by researchers, as well. The membership of the Council for Undergraduate Research (CUR) is comprised of faculty and administration. One of CUR's primary foci is the integration of teaching and research at PUIs. The National Organization of Research Development Professionals (NORDP) focuses on developing and managing collaborations and providing practical tools to better position researchers in this ultra-competitive research society.

While this study provided an in-depth analysis of a single high-performing PUI, there are many attributes and variables that were not able to be addressed. Additional studies that would further enhance and strengthen academic research are identified in the next section.

Recommendations for Future Studies

The results, findings, and themes identified by this study have potential to inform future research by delving deeper into many of the characteristics or variables addressed. Significance can be found in much of the data to drive researchers and leaders to continue to build upon research infrastructures at PUIs that can successfully compete with the R1 institutions at a much higher level.

A continuation of this specific study on a longitudinal basis would further strengthen the validity of what were identified as characteristics of a successful research infrastructure at a PUI. Following the study site's research portfolio and continuous efforts to move toward a research-focused culture that retains a balance between the pedagogical prerequisites of academia and the research demands would be both interesting and beneficial to the future of academic research.

This study focused on the perceptions of active researchers and did not include the non-research active faculty. The inclusion of non-active research faculty would provide data on how to engage faculty not currently participating in research. Including this population in a study would provide a more in-depth understanding of what motivates, encourages, and supports external research at an institution of higher education. The data could allow institutions to further broaden and strengthen their research base.

Another potential beneficial future study is one that broadens the participant base and includes multiple institutions in the various research classifications. This broader study would address a limitation to this study and allow for generalizability among all institutions of higher education. This broader study could compare and contrast institutions from across the Carnegie Classification system, including research-intensive institutions, PUIs, tribal institutions, medical schools, and even two-year or associate degree-conferring institutions.

Studies that delve deeper and focus specifically on the many variables that affect our participation and success in research (gender, faculty rank and step, years of service, work-life responsibilities, disciplines, confidence levels, resource availability, funding opportunities, etc.) would provide a more profound and comprehensive understanding of the challenges and incentives that strengthen research infrastructures within academia. This type of study would elaborate on the teacher-scholar model and provide institutions with the types of resources that

motivate specific researchers. A study targeted to specific variables would help institutions focus specific resources on disciplines that struggle with external research.

Many academics participate in research or scholarly activity that do not seek or require external funding. Institutions often times fund small pilot studies or public service activities. Faculty also perform research to collect data for publication, presentation, and a general altruistic desire to enhance knowledge in a specific discipline. This type of research is central to the growth of research and is a cornerstone of academia. A study on the impact of unfunded academic research on the confidence, interest and participation in, and success of an institution's research portfolio would add greatly to the body of knowledge.

As this study identified, students are a primary focus and reason faculty participate in research and remain active in their respective disciplines. A study that addresses the correlation between a research-active faculty base and student retention and success would add greatly to the body of knowledge in this field.

Conclusion

This study utilized a single, bounded case study and semi-structured focus groups to reveal the characteristics of a predominantly undergraduate institution of higher education considered to have a high-performing research portfolio. Faculty researchers, research administration staff, and the research leadership comprised the target audience and focus group participants. The results revealed a cohesive infrastructure with high levels of mutual gratitude and respect among the diverse groups of individuals and entities that constitute the research infrastructure.

The single and probably shortest comment of all of the interviews summarizes the impression received while performing the focus groups, interacting with the university

community, and subsequently, writing this dissertation: “We have a pretty good gig here.” Researchers, research staff, and the research leadership have a high regard for the role each plays in the research life-cycle. The collective efforts to support research, funded and unfunded, is immense and strategic at the institution that served as the site for this study.

While there is a strong rapport among the key stakeholders at the site institution, this study revealed areas for continued growth and improvement, as well. The leadership at this institution embodies the definition of transformational leadership by utilizing their personal experiences and knowledge to create positive change, motivate and encourage, and build confidence among their researchers. In addition, the leadership recognizes the need for continuous change and improvement of the research infrastructure and actively acknowledge, seek, and act on the needs of the research community.

Recent data from the federal government may indicate change, as well. A recent report by the American Association for the Advancement of Science (AAAS) suggests there could be an upswing in available grant funds covered by the Omnibus proposal recently signed by President Trump (Hourihan & Parkes, 2018). This report summarizes the possible increases in funding for R&D projects to benefit the National Institutes of Health and the Department of Energy, specifically. Institutional leadership should use these data to empower, focus, and strategically invest available resources to change along with the funding streams.

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Appendix A

Active Researcher Focus Group Questions

1. What is your discipline and/or area of research expertise/interest?

2. Do you consider yourself active in scholarly activities?

3. Approximately, how many grant proposals have you submitted in your career? Received?

3a. Tell me about the challenges you face while writing, submitting, and/or managing an external grant project.

3b. How do you manage those challenges?

4. How confident are you in your ability to write and secure a large grant?
4a. How confident are you in your ability to manage/execute a large grant?
1 = extremely unconfident
2 = somewhat unconfident
3 = neutral
4 = somewhat confident
5 = extremely confident
4b. Can you provide an explanation or an example as to why you chose these answers?

5. How would you describe your leadership's approach or philosophy to sponsored research?

6. How is research included in the strategic plan? Is it being implemented effectively across campus?

7. Tell me about the research infrastructure. What types of resources, educational opportunities, and support does your institution provide in terms of your research agenda?

8. How is participation in research a consideration for promotion? Is participation in research an expectation? Do you think the current practices are effective/supportive? Why?

9. Were you aware of the research infrastructure/portfolio before you accepted a position? Was this a factor in your decision to accept the position?

10. Do you include graduate and/or undergraduate students in your research projects? What do you think the benefits are of including students in research projects?

11. What skills do you feel are essential to be a successful researcher? What resources do you feel are essential to successfully execute a grant project?

12. Are there external grant opportunities that you used to take advantage of that are no longer available? How do you think the climate and current administration in Washington, DC and/or the state has effected your success in external research?

13. Do you feel it is important for faculty to participate in external research? Why or why not?

14. Do you think there are any resources or supports that would encourage more participation in external research? What are they?

15. Is there anything else you would like to tell me about the research infrastructure or support?

Appendix B

Sponsored Research Office Focus Group Questions

1. Describe your individual role(s) and the role of the Sponsored Research Office.
2. Describe the characteristics of your faculty base. How many/percentage of the faculty would you consider active researchers?
3. How is research included in the institution's strategic plan?
4. How would you describe leadership's approach or philosophy to sponsored research?
5. Tell me about the research infrastructure. What types of resources, educational opportunities, and support does your institution provide in terms of your research agenda? Do you feel these support and motivate researchers? How?
6. Of the current resources available, which one(s) do you think help researchers the most? The least? Do you have suggestions for additional resources?
7. Tell me about the roles/responsibilities of the PIs.
8. Describe a time when you struggled or had a challenge with a researcher. How was it handled or resolved?
9. Do you think your office is able to be proactive and responsive to problems? Can you explain?
10. In your opinion, how confident are researchers in their ability to write and secure a large grant? Execute a large grant project?

    1 = extremely unconfident
    2 = somewhat unconfident
    3 = neutral
    4 = somewhat confident
    5 = extremely confident

11. In your opinion, why should (or would) faculty participate in external research? What are the benefits of externally funded projects?

12. How does your office support and encourage more external research? What additional services could your office provide (assuming adequate staffing) that you believe would grow research?

13. What is your biggest challenge in supporting the research infrastructure and the growth in external funding?

14. What do you believe the researchers' biggest challenge(s) is or are?

15. If you could change/add anything to the research infrastructure, what would it be?

16. Is there anything else you would like to tell me?

Appendix C

Leadership Focus Group Questions

1. Tell me about your research or grant experiences at this institution. At a prior institution. (proposals submitted, awards received, agencies funded, and experiences during the processes).
2. Tell me about the research infrastructure. What types of resources, educational opportunities, and support does your institution provide to support sponsored research?). Describe your priorities and role as an administrator.
3. How would you describe your approach or philosophy to sponsored research?
4. Describe the characteristics of your faculty base? How many/percentage of the faculty would you consider active researchers?
5. How is research included in the strategic plan? Is it effective?
6. Do you feel it is important for faculty to participate in external research? Why or why not?
7. How is participation in research a consideration for tenure/promotion? Is it an expectation? To what extent does research interest/expertise play in new faculty hires?
8. What are your biggest challenges with respect to the research endeavors? How do you manage those challenges? What do you think are the biggest challenges faced by the researchers?
9. In your opinion, how confident are your researchers in their ability to write and secure a large grant? Execute a large grant project?

    1 = extremely unconfident
    2 = somewhat unconfident
    3 = neutral
    4 = somewhat confident
    5 = extremely confident

10. What do you think the benefits are of including students in a research project?
11. What types of support or resources do you think should be offered to encourage more participation in external research?
12. What skills do you feel are essential to be a successful researcher? Resources?
13. How do you think the current climate/administration in Washington, DC has effected your success in external research?

14. Is there anything else you would like to tell me?