GRANT PROPOSAL PREPARATION BY HIGHER EDUCATION FACULTY

by

Kristin M. Shuman

A dissertation
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of the requirements for the degree of
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Committee Approval

To the Graduate Faculty:

     The members of the committee appointed to examine the dissertation of KRISTIN M. SHUMAN find it satisfactory and recommend that it be accepted.

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Sincerely,

Ralph Baergen, PhD, MPH, CIP
Human Subjects Chair

Dedication

I would like to dedicate this project, this long and arduous process and result, to my family. To my parents, you taught me that hard work is the only way to make things truly happen for you. All of you set a great example of how to put your nose down and work for the things you need and want in life. Thank you for showing me how to chase my dreams. Nothing was ever out of reach for me (or so I thought), and now I have accomplished a great feat, thanks to you. To my siblings, we all took different paths in our lives and careers. I am so proud of the professionals and family leaders you are; hard work is everywhere, in every role, and I thank you all for continually teaching me the importance of family.

To my beautiful children that I love more than anything, I hope one day you learn that you can accomplish anything too, if you try. I never could have imagined this day; I worked really hard for a long time, and I accomplished a goal that I set for myself a long time ago. You can set and accomplish goals, too; no matter how long they take sometimes. Never be afraid to try things and work for things that make you proud. You can be anything you want in this life; take advantage of every opportunity you get, my loves.

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CONTENTS

List of Figures

List of Tables

GRANT PROPOSAL PREPARATION BY HIGHER EDUCATION FACULTY

Dissertation Abstract (2017)

The national need for higher education research has increased over the years with the growth of societal issues. Funding for this research is often acquired through competitive grant proposals due to the lack of internal funding in most universities. The skills required to write the grant are sometimes lacking and represented in current literature as a barrier to attaining grants. Informal grant proposal education often comes in the form of "learn as you go" or through unstandardized online tools or communications. Formal grant proposal education, often presented in undergraduate or graduate education, or through formal grant-funding organization workshops, are often mentioned in current literature as a way to increase the opportunity for a successful grant application. According to the literature, there was a need to determine the current status of grant proposal education. The purpose of this study was to determine whether, and how, higher education faculty members have been educated on how to seek out and apply for external grant funding, and whether or not the area of study they specialize in influences formal versus informal grant proposal writing education for faculty members. According to the results, faculty are educated both formally and informally in various settings, the discipline was significantly related to type of grant proposal education received, and informal education, rather than formal grant proposal preparation, tended to be more successful in number of grants and total dollars attained for this sample of the population.

Chapter I

Introduction

Grant writing has become a very important part of the scholarship of higher education faculty members today (Walden & Bryan, 2010). The ability to acquire external funds for a program or department can be a desired trait for employees within the arena of university life. Many universities have a variation of a Research Development office or Office of Sponsored Programs, which assists faculty members in the grant writing process from the initial search for funding opportunities, to the conclusion of the grant. Formal education on the process of grant writing and procurement for faculty members may assist in growth of proposal quality and confidence for grant attainment, and in return, increase the frequency of a grant being sought out, applied for, and awarded. Education on grant writing in graduate programs only occurs in some universities; this means some faculty members, either searching for or currently in a professional position, may possess little to no knowledge of, or experience in grant writing, yet the expectation to write grant proposals is often still present. The purpose of this study was to determine whether, and how, higher education faculty members have been educated on how to seek out and apply for external grant funding, and whether or not the discipline they specialize in influences formal versus informal grant proposal writing education for faculty members. For those who have received formal education in grant writing, information about their education was collected. For participants who have not been formally educated on grant writing, the researcher learned whether the faculty member believes grant proposal writing education

could be incorporated effectively and efficiently into their professional lives and what types of education they believe would be beneficial to them.

Historical Background

Philanthropy in higher education has its roots closely intertwined with religious practice. Supporters of universities, or programs within the university, generally gave privately, yet widely, to continue the success and advance the mission of the school. At the same time, these supporters were also earning spiritual salvation by giving to a purposeful cause. Most gifts were directed toward the development of future clergy members of the donor's personal denomination, internal development and maintenance of the church through external means, and philanthropic efforts (Thelin, 2011).

Between 1850 and 1890, external funding became increasingly substantial; this began the change in the role of philanthropy in higher education toward large sum donations, rather than small community-based gifts. This change has had a large effect on some of the important American research universities since it occurred (e.g., Harvard University, University of Michigan), creating trusts and endowment funds to assist with financial structure and support. As large gifting continued, national funding, or interregional funding, became popular for philanthropists. Money from a non-local source was brought in to support programs, or universities, because the philanthropist wanted to support that particular place or idea (Thelin, 2011).

During this time of large gifting, after 1900, philanthropists became weary of financial requests and considered the growing number of illegitimate higher education institutions to be detrimental to the quality of education. This progression in external funding brought on the more attractive idea of philanthropic foundations. These

foundations would provide the opportunity for funding, based on a specific idea, topic, or location, to all scholars, in all universities. The competitiveness would force the scholars to provide an educated attempt at securing the funds for their particular program or university. From 1920 to 1940, not only did the foundations allow for continual philanthropic efforts, but they had an unexpected effect on the standardization and collaboration of many American universities on curriculum design and the advancement of teaching (Thelin, 2011). From 1941 to 1945, the United States government spent approximately $3 billion on extensive research, and one-third of these funds was directed toward university-focused exploration (Bastedo, Altbach, & Gumport, 2016).

After World War II, the need for scientific research was front and center as a priority of the Federal Government. For at least a decade after the war, the majority of research and development funding involving scientific principles came directly from the Department of Defense (Bastedo, et al., 2016). The need for consistent and effective scientific research was the core principle behind the creation of a federally funded program that would later become the National Science Foundation (NSF) (National Science Foundation, 2016), a government-based agency that has and continues to support non-medical research in engineering and science since the 1950's. The National Institutes of Health (NIH) (National Institutes of Health, 2016), another government-funded research and development center, focuses its attention toward medical research, and has done so for many years (founded in 1887). Both of these entities (NSF and NIH), have competitive funding through a grant proposal and application process. While external funding has and can also come from private grantors, these two foundations (NSF and NIH) are the largest contributors to higher education research funding nationwide.

Currently, NIH distributes approximately 80% of its budget to over 300,000 higher education personnel annually (2016), while NSF accounts for approximately one-fourth of all federal grants in higher education (2016). These foundations have supported and continue to support post-graduate research and employment, the building and maintenance of new research facilities, and the development of scientific programs within universities (Bastedo et al., 2016).

Beginning in the 1960's and continuing well into the 1980's, higher education institutions began experiencing a decline in enrollment and overall funding (Thelin, 2011). It was during this time period that the seeking and attainment of external grant funds became increasingly popular (Thelin, 2011). Not only did this alter the path for the university and its personnel to seek out funding once again, but it also altered the processes of the grant foundations and their foci concerning these monies. Issues became focused toward future projects and innovations, while becoming more topic-related and less university-specific (Thelin, 2011). In the late 1950's, 96% of external funding toward academic-based research came from one of the following sources: (a) the Department of Defense; (b) the Department of Health, Education, and Welfare, mainly through NIH; (c) the Atomic Energy Commission; (d) NSF; or (e) the Department of Agriculture. During this same time frame, the entire budget, nearly $1.4 billion, was directed toward (a) life sciences; (b) physical sciences; and/or (c) engineering, completely neglecting the humanities and social sciences (Bastedo et al., 2016). This seems to have begun the trend of funding natural sciences more so than social sciences in the effort to advance the United States and its academic constituents to international excellence (Bastedo et al., 2016; Thelin, 2011).

The Emergence of Sponsored Programs in Higher Education

As mentioned earlier, most external funding in higher education was attained via the church or through efforts by the United States government through war-based funding (Bastedo et al., 2016; Thelin, 2011). The development of Sponsored Programs departments within higher education universities began in 1948, when the Council on Government Relations (COGR) was established (Council on Government Relations, 2016). The COGR determined that fiscal management went beyond the University Business Office and had extended into the need for Research Development departments within universities. The COGR developed Offices of Sponsored Programs in many high-volume research institutions across the nation. Sponsored Programs departments often manage external funding received by a university for research activities, along with teaching and service assignments (Norris & Youngers, 1998). These departments have extended their duties to include: (a) finding funding sources, (b) assisting in grant proposal preparation, and (c) budget distribution and management (Norris & Youngers, 1998). Research-intensive universities were the original focus of the COGR, when standards in research funding allocation were required due to the increased governmental influence of funding. The increased need for external funding through grants and contracts also emerged in the 1970's (COGR, 2016). Since 1979, the executive board of the COGR has included (a) faculty, (b) research administrators, and (c) university business officers, and oversees research institutions to ensure the general best interest of the community of research universities (COGR, 2016).

Current Demographics of Grant Writing

Currently, external grant funding is changing the landscape of both medical and non-medical research and development (NIH, 2016; NSF, 2016). The technological advances and growth in fields such as: (a) engineering; (b) pharmaceuticals; (c) biomedical sciences; and (d) other medical and non-medical fields, are changing how research is performed, as well as the content of the studies. The opportunities for investigators to gain knowledge and information on specific areas and topics have expanded exponentially since the formation of organizations, such as the NSF, that currently awards the most to campus-based research and development; $45 billion in 2008, to be exact (Bastedo et al., 2016).

The individual topic areas that are funded vary by foundation, however, the two most prominent grant funding organizations, the NIH and the NSF, clearly distinguish their areas of study. The NIH promotes the funding of these areas through grants: (a) medical, both physical and mental; (b) pharmaceuticals; and (c) any health-related area (2016). The NSF broadens the area spectrum to include non-medical research such as: (a) biological sciences; (b) computer and information science; (c) engineering; (d) education; (e) human resources; (f) geosciences; (g) mathematics; (h) chemistry; and (i) physics (2016).

Currently, external federal funding only contributes about 10% of the overall revenue to an average higher education institution, however, at some very prominent research universities, external funding can deliver almost 25% of these same revenues. Support in this area is more than necessary to maintain current and future technological advances and increased research efforts to stay at the front of the grant-attaining pack. In

2006, the majority of federal research funding (~60%) was contributed to the natural sciences (including physical sciences), while engineering only received approximately 15% of total funds. Support for the social sciences, between 1975 and 2006, decreased significantly from 7.5% of total funding, to 3.6% (Bastedo et al., 2016).

Statement of the Problem

The problem that this research project addressed was to determine what type of, and how much education grant seekers are receiving, and whether or not that influences their level of success as a grant writer. If attributes that contribute to successful grant proposals can be identified in connection with the preparation of the seekers (whether they were formally or informally educated on the grant proposal writing process), the outcome of the very time consuming grant proposal writing process may be improved to result in more awards, and fewer negative outcomes such as non-attainment, as well as the time lost spent preparing the proposal application. As mentioned in previous literature, there are many barriers to writing a successful grant proposal (Boyer & Cockriel, 1998; Monahan, 1993; Walden & Bryan, 2010), however, many of those barriers may be specific to the institutions involved in that study and may have no effect on other higher education institutions. The current research study specifically focuses on the lack of education barrier that is prevalent in the literature on grant proposal writing. The outcomes of the study attempt to reduce the effects of this barrier on faculty, and remedy the apparent lack of education in grant proposal writing, while increasing the chances for grant attainment.

Advances in technology and economic health are determined through faculty research at many higher education institutions nationwide (Decker, Wimsatt, Trice, &

Konstan, 2007). Research funding often comes from external sources beyond the operational budget of the university. The application process for acquiring grants can be troublesome and difficult when faculty lack the skills and ability to apply successfully (Ludlow, 2014). Proposal education is important to the future of research as new and aspiring grant writers enter the faculty ranks with the expectation to learn on-the-job (Kleinfelder, Price, & Dake, 2003; Kraus, 2007; Porter, 2007). The difficult nature of attaining external grant funding is shown in the 21% of proposals that were awarded in the 2009 fiscal year, according to the National Institute of Health (NIH) (Dumanis, Ullrich, Washington, & Forcelli, 2013).

Purpose of the Study

The main goal of this study was to determine whether, and how, higher education faculty members have been educated on how to seek out and apply for external grant funding, and whether or not the discipline they specialize in encourages formal versus informal grant proposal writing education for faculty members. By formally educating our new, and existing faculty in the skillful art of grant proposal writing, institutions may increase the potential for successful attainment of grants. The purpose of this study was to understand the current climate of higher education grant writing at a national level by surveying faculty on their education of proposal writing preparation.

Research Questions

The research questions that guided this study are:

1. To what extent are faculty members educated on the grant writing process?

2. Does formal grant education contribute to the success level of grant acquisition in terms of the numbers of grants submitted and received?

3. Does the area of discipline influence whether faculty members are formally or informally educated on grant writing?

4. Does formal or informal education on grant proposal writing affect the amount of funding faculty seek out and attain?

Operational Definitions

The following definitions are provided to ensure uniformity and understanding of these terms throughout the study. The researcher developed all definitions not accompanied by a citation.

Discipline. The discipline is the program in which a professor works (e.g., biology, chemistry, nursing, pharmacy) (Bastedo et al., 2016; Thelin, 2011).

Faculty member. A full-time, grant-seeking faculty member who has a scholarship component to their professional workload at either a R1, R2, or R3 Carnegie classified higher education institution.

Failure. In the current grant proposal climate, "It is uncommon to write a funded grant" (Molldrem, 2010, p. 181). Failure in grant writing is defined as not acquiring the funding through the application process, which is quite common (Molldrem, 2010).

Formal grant writing education. Formal grant writing education takes its form in either: (a) undergraduate curriculum integration; (b) graduate curriculum integration; (c) regional grant information workshops (NIH, NSF, or other external grant funding organization); or (d) national grant information workshops (NIH, NSF, or other external grant funding organization) (NIH, 2016; NSF, 2016).

Grant proposal. A grant proposal, or application, is a request for funds from a giving funder or organization. The proposal is an agreement between the grantor and the

receiver of funds (grantee) on what exactly the money will be utilized for and how it will advance the research being conducted by the investigator(s) involved in the study (Browning, 2014).

Grant writing. Grant writing is the process that takes place when available money through a funding organization, such as the NSF, the NIH, or another funding agency, is awarded to provide financial support to complete specific steps toward a common goal between giver and receiver. A grantor, the giver, and a grantee, the receiver, agree on what will take place through an in-depth application, approval, and management process for the life of the award (Browning, 2014).

Informal grant writing education. Informal grant writing education, as defined in this study, may take its form in many different ways, including: (a) university-offered workshops; (b) research development office support; (c) departmental workshops or collaborations;
(d) collaborating with another professor(s) or mentor(s); (e) reading articles or books;
(f) online tools or webinars; or (g) seeking out previously successful applications as templates (Gaugler, 2004; Kraus, 2007; Walden & Bryan, 2010).

Non-competitive grants (e.g., formula grants). Formula grants, "a fill-in-the-blanks, no-brainer form" (p. 53), differ from competitive grants in the sense that the applicant does not compete with other grant applications for a restricted amount of money. These non-competitive grant situations are based and awarded on predetermined standards, not the quality of the grant proposal, as in competitive grant situations (Browning, 2014).

Office of Sponsored Programs. This office resides within the university setting and is the management center for external funding received by higher education institutions. Research, teaching, and service activities are often funded externally through grant awards and this office assists in: (a) seeking out funding sources; (b) helping faculty write and submit proposals for funding; and (c) accepting, distributing, and managing secured funds (Norris & Youngers, 1998).

R1: Doctoral University – Highest Research Activity. Doctorate-granting institutions that awarded at least 20 research/scholarship doctoral degrees (does not include professional practice doctoral-level degrees, such as the JD, MD, PharmD, DPT, etc.). This classification excludes Special Focus Institutions and Tribal Colleges (Carnegie Classification, 2016).

R2: Doctoral University – Higher Research Activity. Doctorate-granting institutions that awarded at least 20 research/scholarship doctoral degrees (does not include professional practice doctoral-level degrees, such as the JD, MD, PharmD, DPT, etc.). This classification excludes Special Focus Institutions and Tribal Colleges (Carnegie Classification, 2016).

R3: Doctoral University - Moderate Research Activity. Doctorate-granting institutions that awarded at least 20 research/scholarship doctoral degrees (does not include professional practice doctoral-level degrees, such as the JD, MD, PharmD, DPT, etc.). This classification excludes Special Focus Institutions and Tribal Colleges (Carnegie Classification, 2016).

Success. Success according to the NIH has to do with the success of all grants applied for by taking the number of competing applications that are funded each year and

dividing by the total number of competing applications that the foundation receives (2016). For the purposes of this study, success was utilized subjectively. The researcher, interested in each participant's response on success, allowed the participants to determine whether they deemed themselves successful grant writers. Based on whether or not participants have ever attained a grant, as well as other individual factors, the researcher also collected important information about the participants' application and attainment status to pair with the overall definition of success.

Assumptions, Limitations, and Delimitations

Assumptions. The following assumptions applied to this study: (a) the participants involved in the survey understood both the survey and the open-ended questions; (b) participants answered the questions honestly and discussed their professional situation in regard to grant proposal writing; (c) the faculty members who have been employed for a good amount of time recalled their undergraduate and graduate experiences correctly; and (d) the researcher transferred the responses to the open-ended questions verbatim, without alteration.

Limitations. The use of self-reported data through surveys may affect the validity of the results.

Delimitations. This study only focused on full-time, grant-seeking faculty members of Research University Highest, Higher, and Moderate (R1, R2, and R3) higher education institutions, according to the Carnegie Classifications of Institutions of Higher Education (Carnegie Classification, 2016). Grant-seeking faculty members qualify as those who have a scholarship component imbedded in their professional responsibilities

at the university. Adjunct or part-time professors or instructors will not be utilized as participants in this study.

Significance of the Study

Understanding what grant-offering organizations may demand, and how the applicant can best communicate the needs of the fund-seeking institution to match those demands, are difficult when one lacks experience or education (Stokes, 2012). Effective grant proposal writing is a skill that can be learned, very similar to other academic writing styles. By having the proper tools and education prior to attempting the lengthy process of grant procurement, faculty members can increase the odds of gaining and maintaining some much needed grant funding for their department and institution. In any grant writing situation, the quality of the grant proposal, or explaining the grant proposal message in a clear and convincing manner is the first, and some say, the most important skill that a grant writer encounters in lieu of attainment (Lemanski, 2014). In some academic areas, grant writing is self-learned or gained through "trial and error" (Kraus, 2007, p. 1). Determining whether one discipline benefits from this "trial and error" process, while another may benefit more from a formally structured process could be very important to the grant writing processes of faculty in higher education institutions. Knowing how best to prepare higher education faculty members, the forefront of educational research, is key to the increase in grant application and procurement in all universities. One of the criteria used when grants are awarded or denied, is the quality of the application. If faculty members are not educated in grant proposal writing prior to gaining their positions within the ranks of higher education, can we expect them to be successful at external fund procurement once that position has been gained?

Chapter II

Literature Review

The purpose of this study was to understand the current climate of higher education grant writing at a national level by surveying faculty on their education of grant proposal writing. The process of grant attainment begins with a formal application process, followed by a peer-reviewed decision-making process (Itagaki, 2013; NIH, 2016; NSF, 2016). The application, or grant proposal, involves questions that require very specific answers, or plans for the funds (Browning, 2014). The planning, and description of the use of funding given in the proposal, are oftentimes what helps to determine whether or not the grant is funded (Gotley, 2000). The skills necessary to write high-quality grant proposals are either learned formally through collegiate education (undergraduate or graduate level), organization-based workshops performed by the NIH or NSF, or another nationally recognized grant funding agency, or informally, through many different sources of information as described further in this study. This literature review explores (a) formal grant proposal writing education; (b) discipline areas involved with formal grant proposal education; (c) informal grant proposal writing education; (d) discipline areas involved with informal grant proposal education; and (e) success in grant writing.

Formal Grant Proposal Writing Education

Formal grant writing education often occurs in the form of undergraduate or graduate curriculum inclusion (Walsh, Bonner, Springer, Lalasz, & Ives, 2013). Grant proposal writing skills within an educational setting (undergraduate or graduate) are often gained from: (a) courses in research methods; (b) data analysis; and/or (c) proposal

writing, paired with a mentorship involving first-hand experience with the official grant (Rikli, 2009). However, not all undergraduate and/or graduate programs include instruction on grant writing. In fact, Blankenship, Jones, and Lovett (2010) researched both undergraduate and graduate programs of colleges and universities that were accredited by the Association to Advance Collegiate Schools of Business (AACSB) to determine which schools offer educational services in grant writing, and in which discipline, in the southwestern region of the United States. More than 110 universities and colleges were explored and the authors found that only 35 (approximately 32%), offered grant writing classes at either the undergraduate or graduate level. More recently, Walsh et al. (2013) examined the entire nation's academic offerings of graduate-level grant writing courses including full syllabi and textbook choice. Initially, the authors searched 1,998 higher education institutions in the United States for any departments that offered grant writing courses. Only 137 grant writing course instructors were contacted after the initial search of programs, indicating a 6-7% availability of these courses on a national scale. In an earlier article, Kraus (2007) explored just one university's grant writing education offerings, the University of Utah. While incorporation into the classroom was not the focus of this article, the library at the University of Utah took on the responsibility of offering educational and effective grant writing services. What began as two one-hour workshops in 2001 with an enrollment of about six offered once early in the fall semester, has now grown into two, two-hour sections, one each semester, with an average enrollment of about eleven. The attendees include: (a) departmental and study coordinators; (b) medical editors; (c) new faculty; and (d) doctoral candidates. The growth of this opportunity was expected since the importance of grant writing skills,

especially in academic medicine and/or health sciences, is critical in today's research atmosphere (Kraus, 2007).

The need for formal grant proposal writing education is critical according to the literature (Rikli, 2009). The Council on Undergraduate Research "has been especially vocal on the need to initiate this type of research engagement at the undergraduate level" (p. 62). Some universities that are considered to be more of a "teaching institution," as opposed to a research university, lack support for this type of educational experience (Rikli, 2009). Research is often not a part of the scholarship workload for faculty at teaching universities, despite the overall need for increased research involvement at all levels (Rikli, 2009). Even when it is not required, many faculty members retain a personal research agenda to help further their professional status in academia. They do this by attempting to write grant proposals in order to support the time spent above and beyond their required faculty activities (Rikli, 2009). A study performed by the Columbia University School of Nursing determined that those involved in grant proposal writing spent up to four 40-hour work weeks and approximately $270,000 in salary and other costs preparing one single NIH grant application to support their research study (Kulage et al., 2015). These time and money costs could potentially be decreased with increased training and education of grant proposal writing. By identifying methods that increase potential grant success, such as (a) written instruction; (b) classroom instruction; (c) mentoring; and (d) online resources, the most effective techniques for grant proposal education will emerge and become standard for the majority of research-based professionals (Wisdom, Riley, Myers, 2015).

Discipline Areas involved with Formal Grant Proposal Education

Many different areas of study involve formal grant writing education through undergraduate or graduate education (Blankenship et al., 2010). In the Blankenship et al. (2010) research study on the southwestern region of the United States and grant writing course offerings, formal education was offered in: (a) leisure studies; (b) curriculum and instruction; (c) arts management; (d) public administration and policy/community planning; (e) social work/sociology; (f) psychology; (g) business; (h) health education/promotion and exercise; (i) nutrition and preventative health; and (j) English. A collection of grant writing course offerings was also compiled for non-AACSB accredited schools in the areas of (a) communications; (b) social work; (c) business; (d) health education/health science; (e) nursing; (f) occupational therapy; (g) education; and (h) English. Apparent from the literature, there is no real pattern to which discipline offers grant writing courses in the southwestern United States (medical versus non-medical areas of study). It appears that educators in all areas of higher education understand the need and importance of applying for and attaining external funding for increased research, as formal education and training has been requested (Kraus, 2007).

Informal Grant Proposal Writing Education

Informal grant writing education does not involve any formal education or setting, in fact informal grant writing involves learning the process through self-teaching methods or gained through "trial and error" (Kraus, 2007). Grant writing has been considered a very important skill for (a) new faculty; (b) graduate and doctoral students; and (c) academic fellows, however the education part of preparing these populations is severely lacking; learning as-you-go is often expected in the medical realm and health

sciences (Kraus, 2007). There are barriers in learning grant writing skills on the job, or informally, as opposed to designating additional time in an individual's schedule for more formal educational sessions. These barriers include: (a) lack of time to seek out funding opportunities; (b) lack of assistance in proposal preparation; and (c) lack of education (Boyer & Cockriel, 1998; Monahan, 1993; Walden & Bryan, 2010).

During graduate school, and more often undergraduate school, very few formal opportunities exist to acquire appropriate grant writing education (Gaugler, 2004). Experiencing any aspect of the grant proposal process could potentially increase the students' "understanding of the scope and preparation necessary to develop winning research proposals" (Gaugler, 2004, p. 524).

Success in grant writing: Does formal or informal education matter?

Academic publishing success and formal grant writing education have been linked; over 50% of first time publishers in academic medicine have reported receiving formal grant writing education (Kraus, 2007). Even so, academic writing and grant proposal writing have been differentiated in recent literature (Porter, 2007). Porter (2007) discussed the differences between academic and grant proposal writing in depth, exposing the factors that contribute to successful academic writers who are ill-equipped to prepare a successful grant proposal. The contrasting factors of academic writing versus grant writing were as follows: (a) scholarly pursuit versus sponsor goals; (b) past versus future orientation; (c) theme-centered versus project-centered; (d) expository versus persuasive rhetoric; (e) impersonal versus personal tone; (f) solo scholarship versus teamwork; (g) length versus brevity; and (h) specialized terminology versus accessible language (Porter, 2007). The differences shown from Porter (2007) only confirm the need

for specialized training to gain effective grant writing skills for current and future grant seekers in higher education. Skills are transferrable; but in this instance, good academic authors do not always translate into good grant proposal drafters (Porter, 2007).

Summary of the Literature

For many years, barriers and motivators to grant proposal preparation have been researched and examined (Kleinfelder et al., 2003; Monahan, 1993; Walden & Bryan, 2010). Of the barriers mentioned, lack of education (along with the essential and growing need for mandatory, structured education) seems to be critical for faculty members' level of confidence in their preparation and ability to write and attain external grant funding (Kleinfelder et al., 2003). Kleinfelder et al. (2003) explored health education faculty members' grant proposal preparatory skills, the only paper on preparatory grant writing skills, and determined that a only a quarter of those surveyed felt prepared to write a grant after they left their graduate programs and entered their professional careers. Of those who were currently in their professional positions, four out of five felt ready. Also included in this study, 90% of faculty felt that grant writing education should be a part of the students' graduate program, while only 65% of the programs offered grant writing skills within the curriculum to their students.

Monahan (1993) examined faculty within New Jersey state colleges and identified two significant barriers to grant proposal writing: a lack of time due to teaching, advising, and other scholarly duties, and a lack of warning of available grants to pursue. Within the study, Monahan (1993) also found that faculty wanted help in four major areas when attempting a grant proposal, according to previous studies. They wanted assistance in: (a) seeking external funding sources; (b) preparing proposals and budgets; (c) getting

necessary approvals, and (d) dealing with campus business staff (distribution and management of funds). Regarding all fours areas, it was clear that the participants in this study felt ill-prepared to seek out, apply for, and/or manage a grant proposal/grant award. Dooley (1995) examined barriers in grant writing as well and determined there were two major barriers: (1) lack of knowledge regarding budgets and funding sources, and (2) lack of training; also known as lack of education of the grant proposal process.

According to Boyer and Cockriel (1998), three major barriers to grant writing emerged during their research: (1) lack of training in grant seeking and grant writing; (2) lack of knowledge of budget development; and (3) lack of knowledge of funding sources. All barriers in this study pointed to lack of education of the grant proposal process.

Other related research on grant proposal writing comes in the form of processes developed within a specific discipline (e.g., business administration, clinical psychology, librarians, nursing, sport management, web/online-based curriculum, and cross-disciplinary areas) (Arlitsch, 2013; Blankenship et al., 2010; Drotar et al., 2014; Glurich & Fleisner, 2010; Kulage et al., 2015; Mutz, Bornmann, & Daniel, 2015; Seifried, Walker, Forman, & Andrew, 2015) and quick, how-to-guides on writing a successful grant proposal, which provide the reader with either bullet points of steps toward writing a grant proposal or were similar to a literature review of current research of compiled ideas from different authors/researchers; none of which provided actual examples of successful proposals, or any statistics on the success rate of the process claimed to be successful (Blanco & Lee, 2012; Devine, 2009; Gholipour, Lee, & Warfield, 2014; Molldrem, 2010; Proctor, Powell, Baumann, Hamilton, & Santens, 2012).

The NIH published an article on how to write a successful grant-mentored NIH career development grant, but it focused directly on junior surgeons. This article provided hidden tips and tricks for surgeons through the grant writing process due to the change to a two-submission only policy; but again, no information was available on how effective this process actually is (Brock & Bouvet, 2010).

The focus of this research study was to take a significant barrier as reported within the current literature and determine how, if, and when faculty are educated on the grant proposal process. After collecting information on how and when faculty are educated on grant proposal preparation, determining what the best education method is to prepare the best possible grant proposal to attain external grant funds was determined (see Chapter V). There is no current literature on this specific topic, therefore this research was warranted.

Chapter III

Methodology

The purpose of this study was to understand the current climate of higher education grant writing at a national level by surveying faculty experiences on their education of grant proposal writing. This study employed mixed methods, engaging both quantitative and qualitative research methods. For the purpose of this study, the population of higher education, full-time faculty members was delimited to those working at a regionally accredited, Carnegie Classified Doctoral University (R1, R2, or R3) and employed with a grant-seeking expectation to their scholarship (Carnegie Classification, 2016; Council for Higher Education Accreditation (CHEA), 2016) (see Appendices B and C). The research questions that guided this study were: (1) To what extent are faculty members educated on the grant writing process?; (2) Does formal grant education contribute to the success level of grant acquisition in terms of the numbers of grants submitted and received?;   (3) Does the discipline influence whether faculty members are formally or informally educated on grant writing?; and (4) Does formal or informal education on grant proposal writing affect the amount of funding faculty seek out and attain?

In terms of the quantitative inquiry, various statistical analyses were used to assess the interactions between grant proposal writing education level and the level of success experienced by the participants, as well as the examination into whether the discipline was a factor in the preparedness of the faculty members, among other factors. The quantitative data built the foundation for the qualitative research.

This research study employed an embedded research design; this is a mixed-methods approach in which both quantitative and qualitative data were collected simultaneously and analyzed; the qualitative follow-up to the quantitative data for further support and enhancement of the quantitative data is required (Creswell & Clark, 2011).

There were multiple independent and dependent variables in this study. The independent variables were: (a) formal education on grant proposal preparation; (b) informal education on grant proposal preparation; and (c) the faculty members' discipline. The dependent variables in this study were: (a) proposal preparation level; (b) success; (c) failure; (d) formal education on grant proposal preparation; (e) informal education on grant proposal preparation; (f) amount of funding attained; (g) encouragement/confidence level; and (h) the effect on Sponsored Programs departments.

The methodology section discusses the: (a) participants and sampling; (b) instrumentation; (c) survey validity and reliability; (d) procedures; and (e) data analysis.

Participants

The participants were full-time, grant-seeking faculty members at Research Highest (R1), Research Higher (R2), or Research Moderate (R3) Doctoral Universities (Carnegie Classification, 2016).

Sampling

This study employed a census approach to survey the most university faculty possible from fully accredited R1, R2, or R3 Doctorate-granting institutions according to the Carnegie Classification and organized regionally through CHEA (2016). The institutions were purposefully selected under three criteria: (1) two institutions were chosen from each of the seven regional accrediting organizations (minus the ACCJC,

which does not meet minimum criteria); (2) one institution was public, the other

institution was private; and (3) there was an equal number of R1, R2, and R3 universities

in the sample (see Appendix C). The email addresses of all faculty members of the

chosen institutions were manually collected by the researcher via each institutions faculty

directory list (approximately 3,700 faculty emails were collected and were sent a link to

the survey). The process began by distributing the survey using the Qualtrics survey

platform. The survey employed different types of question structures and concluded with

an open-ended question/answer section to collect the qualitative portion of the research.

This allowed the researcher to gain more insight into the personal experiences of the

participants while collecting pertinent information for the study (Baumgartner &

Hensley, 2006).

Instrumentation

The researcher employed a quantitative survey that utilized Likert-scale questions

followed by open-ended questions for data collection. This survey was designed and

constructed by the PI based on current literature. Both the quantitative questions and

open-ended questions were derived directly from current literature on the topic of grant

proposal education. The research questions, along with the survey components that help

to answer those questions can be found in Appendix D.

Survey Validity and Reliability

Quantitative validity/reliability. According to Myers, Well, and Lorch (2010), internal

and external validity within a research study are both very important factors. The

traditional definition of validity is the extent to which an instrument measures what it is

supposed to measure. Internal validity "refers to the question of whether observed effects

24

can validly be attributed to the independent variable" (p. 16). External validity, however, will have more to do with the generalization of the results to the overall population (Myers et al., 2010). Validity can be increased by developing an instrument that will be easily interpreted and understood by the participants and that is embedded with concepts and information from current literature. The survey was delivered to the participants in a consistent manner to increase reliability during collection (Ary, Jacobs, Sorensen, & Razavieh, 2010). Unfortunately, due to the low response rate of this online survey, generalizability is limited.

Qualitative instrumentation. The qualitative portion of this study consisted of open-ended questions answered by university faculty members who agreed to participate in the quantitative survey. The information provided in the open-ended question section was coded and themed (Creswell, 2007).

Qualitative validity/reliability. Qualitative validation is crucial to achieve, however there are many different types of qualitative validity; it is difficult to know which one to use (Creswell & Clark, 2011). To achieve validation in qualitative studies, Creswell and Clark (2011) recommended utilizing a variety of validation strategies. Member checking and triangulation are two mentioned by the authors. For the purposes of this study, the researcher has extracted each set of open-ended question responses verbatim, and the responses were sent to two other qualified researchers highly trained in qualitative analysis. These researchers independently reviewed the responses and provided their suggestions for the construction of themes and subthemes (Creswell, 2007). By using this triangulation analysis strategy, potential biases were eliminated through "cross checking [and] peer debriefing" (Marshall & Rossman, 2006, p. 203). Regarding

qualitative reliability, intercoder agreement in qualitative research, an agreement of codes and themes during the triangulation process, has assisted in creating qualitative reliability for this study (Creswell & Clark, 2011).

Procedures

Once Human Subjects Committee approval was gained, a pilot study was conducted using the survey to ensure question clarity and understanding. No major adjustments were made resulting from the pilot study, therefore there was no need to submit any alterations to the Human Subjects Committee. Participants were then contacted via email to complete the survey (all participants were randomly selected from the compiled email lists of included institutions). The final questions in the survey were open-ended and required qualitative analysis. Once the survey was complete, the open-ended portions were extracted and analyzed using a general inductive approach to qualitative data (Thomas, 2006).

Design and Analysis

The study employed a mixed-methods approach. The study's first portion focused on the collection of quantitative data. The quantitative data were analyzed and reported utilizing descriptive statistics including (a) response frequencies; (b) corresponding percentages; and (c) measures of central tendency. Because this study has multiple independent and dependent variables, such as the relationship between formal and informal education within areas of study, and potentially years of professional teaching experience as well as success versus failure of grant attainment and procurement, the testing of multiple variables was conducted using Linear Regressions (see Figure 1).

CONFIDENCE LEVEL

SUCCESS AND/OR FAILURE

TOTAL DOLLARS SOUGHT

TOTAL DOLLARS ATTAINED

EFFECT ON SPONSORED PROGRAMS

INFORMAL EDUCATION

AREA OF DISCIPLINE

FORMAL EDUCATION

GRANT PROPOSAL PREPARATION LEVEL
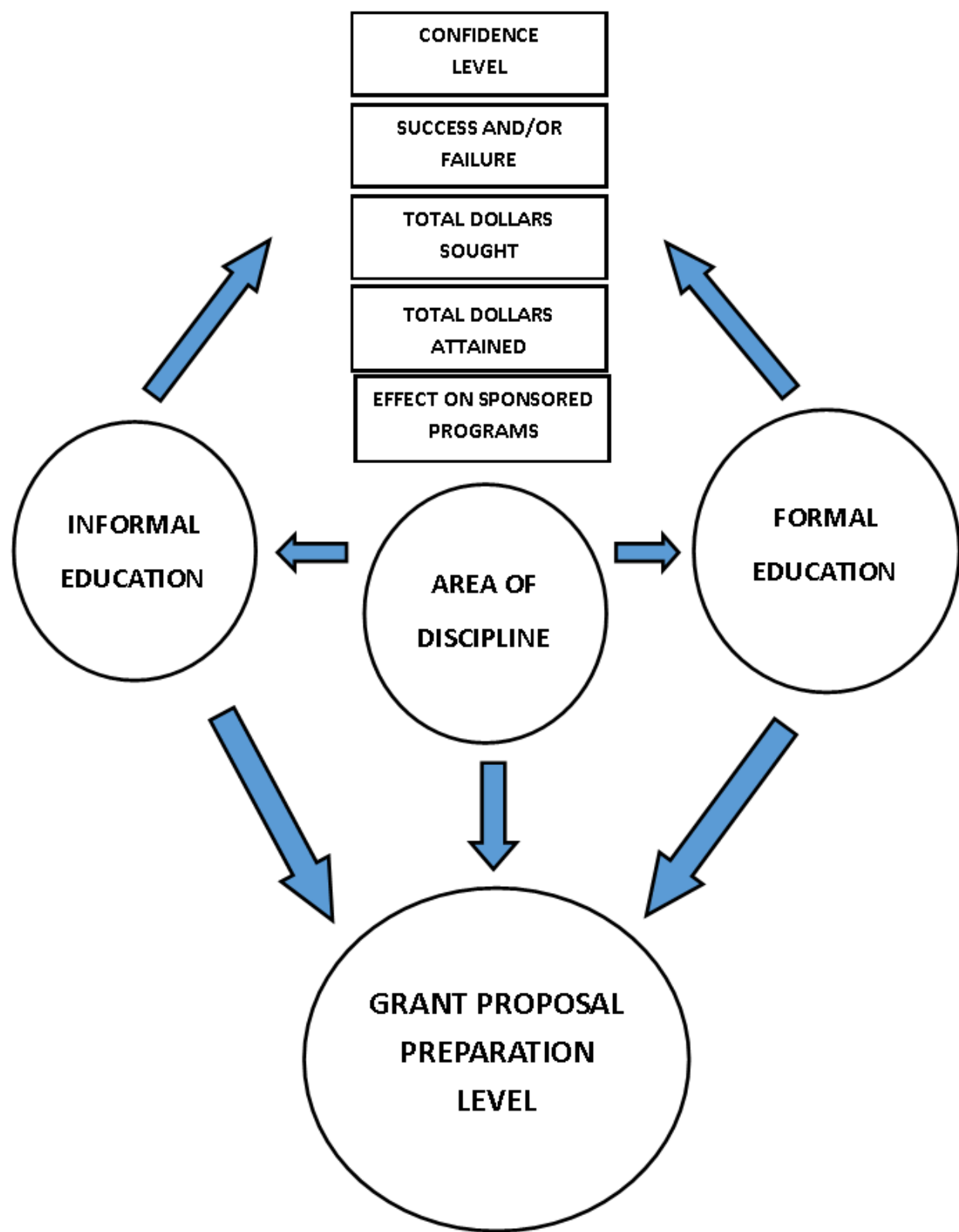
Figure 1: Relationships of Independent and Dependent Variables

These statistical tests were used to determine whether formal or informal grant writing education had an effect on perceived success or failure, or additionally, other dependent variables of the study. The respondent's discipline was also used as a variable to determine whether the relationship existed between formal or informal training in specific disciplines within higher education institutions. Multiple regression models were designed to measure the effects of the independent variables in predicting the dependent variables (e.g., confidence and preparation level).

The qualitative analysis was based on the narrative data extracted from the open-ended question section of the survey. The analysis of the qualitative data followed the General Inductive Approach described by Thomas (2006). The steps to inductive coding via Thomas (2006) are as follows:

1. Preparation of raw data files (data cleaning).

2. Close reading of text.

3. Creation of categories: The evaluator identifies and defines categories or themes. The upper-level or more general categories are likely to be derived from the evaluation aims. The lower-level or specific categories will be derived from multiple readings of the raw data, sometimes referred to as in vivo coding. In inductive coding, categories are commonly created from actual phrases or meanings in specific text segments.

4. Overlapping coding and uncoded text.

5. Continuing revision and refinement of category system: Within each category, search for subtopics, including contradictory points of view and new insights.

The data were collected verbatim and read by multiple researchers (triangulation) to develop categories and themes using open coding. The data were re-read and categories were assigned to all data units. Categories were organized into key themes and subthemes. The key themes, and the connections among them to the support the quantitative data, were reported and supported using appropriate quotations from the transcribed data. The themes and connections were used to address, and help to answer, the research questions.

The major delimitation to this study was the use of only full time, grant-seeking faculty members. The inclusion of adjunct, or part-time, faculty or other non-faculty grant-seeking individuals could have resulted in a different outcome, or potentially a much higher response rate, increasing the ability to generalize to the overall population. The population not included in this study may also have had important contributions to grant proposal education techniques as this topic expands on a national level.

Summary

This chapter addressed both the quantitative and qualitative methods that were utilized in this research study. The participants were described and the rationale for their selection was discussed. The procedures for data acquisition were conducted as described. The methods for data collection and the analysis addressing the research questions were discussed, thereby tying the proposed analysis to the purpose of the study. The purpose of this study was to understand the current climate of higher education grant writing at a national level by surveying faculty on their education of proposal writing.

Results

The purpose of this study was to understand the current climate of higher

education grant writing at a national level by surveying faculty on their education of grant

proposal writing. The following questions guided this study: (1) To what extent are

faculty members educated on the grant writing process?; (2) Does formal grant education

contribute to the success level of grant acquisition in terms of the numbers of grants

submitted and received?; (3) Does the discipline influence whether faculty members are

formally or informally educated on grant writing?; and (4) Does formal or informal

education on grant proposal writing affect the amount of funding faculty seek out and

attain?

This chapter presents the results of the data analyses completed in the study.

Described in this chapter are the results as follows: (a) descriptive statistics for

participant demographics; (b) quantitative statistical analyses of multiple independent and

dependent variables using Linear Regressions; (c) quantitative statistical analysis using

one-way ANOVA; and (d) qualitative analyses of open ended questions using General

Inductive Theory to derive major codes and themes to assist the quantitative data in

answering the research questions (Thomas, 2006).

In total, 147 participants began the survey out of 3,623 faculty members of the

contacted sample. This results in a response rate of 4.06%; well below the average online

response rate of 20-47% (Nulty, 2008). Furthermore, only 38 total participants completed

the entire survey (1.05%) causing non-generalizability to the overall population due to a

very low response rate. The original number of emails sent with a link to the survey was

to 3,758 potential participants; however, 133 emails were immediately bounced according to the Qualtrics survey software (3.54%). The researcher personally received 11 emails asking for removal from the email list or demonstrating non-qualification for the study (0.3%), with four of those 11 emails (36.37%) containing extremely negative responses toward the survey and/or the study (Appendix E).

Descriptive Statistics of Participant Demographics

Of the respondents who completed the survey, 47.4% were female ($n = 18$), while 52.6% were male ($n = 20$) (see Table 1).

Faculty rank resulted in the following distribution: (a) Assistant Professor, 18.4% ($n = 7$); (b) Associate Professor, 31.6% ($n = 12$); and (c) Professor, 50.0% ($n = 19$). When asked if the participating faculty member had a primarily "clinical" or "research"-related component to the faculty appointment, 39.5% responded "no" ($n = 15$); the remainder of the sample, 60.5% ($n = 23$) responded "yes, research." No participants in this study responded "yes, clinical" (see Table 1).

The researcher inquired about tenure status. Only two of the 38 participants (5.2%) responded to the non-tenure track option, while 7 participants (18.4%) were currently on the tenure-track at their respective universities. The majority of the responding participants were already tenured faculty members (76.3%; $n = 29$) (see Table 1).

Table 1

Faculty status of participants (n = 38)

	Frequency	Percentage
Female	18	47.4
Male	20	52.6
Faculty Rank		
Assistant Professor	7	18.4
Associate Professor	12	31.6
Professor	19	50.0
Primarily a Clinical or Research Appointment?		
No	15	39.5
Yes, Research	23	60.5
Tenure Status		
Tenured	29	76.3
Tenure Track	7	18.4
Non-tenure Track	2	5.3

Question five was an important qualifying question for this research study. The participants were asked if there was an embedded grant-seeking component to their professional workload, and if there was, how many hours and/or percentage of their time was required of them to perform grant-seeking/applying activities. If the respondent answered "no" to this question, the survey was terminated; this was the reason for the original number of respondents plummeting from 147 to 38. While faculty members may

have thought it was important for them to apply for grants, it may not have been an actual requirement of their job description. Therefore, their experiences, while important, were not invited for this research project. Faculty members with an actual component for grant-seeking activities most likely partake in grant proposal preparation more often than those who do not have that requirement; this was the reasoning behind limiting the population to those faculty who grant-seek on a more frequent basis. Of the 38 respondents, 1 participant (2.6%) mentioned an hourly requirement for grant-seeking activities, while 26 other respondents confirmed they had, and entered a percentage requirement for grant-seeking activities (see Table 2).

Table 2

Grant-seeking component and time/percentage spent (n = 38)

	Frequency	Percentage
Grant-seeking Component to Workload	38	100
Number of hours required		
10	1	2.6
Percentage of time spent		
0-25	13	34.1
26-50	10	26.3
51-75	3	7.9
76-100	0	0.0

Note: 27 of 38 respondents (71%) entered an answer to this question

The type of degree held by faculty members was collected in order to determine whether or not there were relationships between type of degree held and any of the other variables collected by the survey. According to the survey results, six participants (15.8%) held an Educational Doctorate degree (Ed.D.), while 30 faculty members (78.9%) held Doctorate of Philosophy degrees (Ph.D.). Of the 38 faculty members who completed the survey, three participants (7.9%) held Other Doctorate degrees, while one participant (2.6%) only held a master's degree as the highest academic pursuit. Two of the participants (5.3%) had two or more doctoral degrees, according to the results and how the categories were presented in the questionnaire (see Table 3).

The participants were also asked about total professional experience as a faculty member in order to determine the potential time exposure to grant preparation (as a variable). According to the results, one participant (2.6%) had been a faculty member for less than two years, four participants (10.5%) had more than two, but less than five years of experience, three participants (7.9%) had more than five years, but less than 10 years of faculty experience, while the majority of the sample population ($n = 29$; 76.3%) had been faculty members for 10 years or more (see Table 3).

Table 3

Highest academic degree earned and total professional experience (n = 38)

Highest Degree Earned	Frequency	Percentage	Professional Exp.	Frequency	Percentage
Doctorate (Ed.D.)	6	15.8	0 - ≤ 2 years	1	2.6
Doctorate (Ph.D.)	30	78.9	≥ 2 - ≤ 5 years	5	13.2
Doctorate (Other)	3	7.9	≥ 5 - ≤ 10 years	3	7.9
Master's Degree	1	2.6	> 10 + years	29	76.3

The research inquired about the participants' current discipline. Some required text specification to distinguish within the umbrella of the discipline itself (e.g., Biological Sciences, Physical Sciences, Social Sciences, and Other). Table 4 shows the overall selection by the participant, as well as the individual specific entries for natural sciences (e.g., biological and physical sciences) and what are referred to as social sciences (e.g., communication, economics, public health). The results demonstrated the frequencies as: (a) agriculture ($n = 2$); (b) biological sciences ($n = 9$); (c) computer and information sciences ($n = 1$); (d) education ($n = 5$); (e) engineering ($n = 3$); (f) health professions ($n = 7$); (g) physical sciences ($n = 5$); (h) social sciences ($n = 4$); and (i) other ($n = 2$) (see Table 4).

Table 4

Discipline (n = 38)

	Frequency	Percentage
Agriculture	2	5.3
Biological Sciences: Please Specify (9 23.7%)		
Animal Behavior	1	2.6
Biological Oceanography	1	2.6
Ecology	1	2.6
Microbiology	1	2.6
Neuroscience	1	2.6
Organismic and Evolutionary Biology	1	2.6
Physiology	1	2.6
Plant-microbe Interactions	1	2.6
Reproductive Genetics	1	2.6
Computer and Information Sciences	1	2.6
Education	5	13.2
Engineering	3	7.9
Health Professions	7	18.4
Physical Sciences: Please Specify (5 13.2%)		
Biochemistry	1	2.6
Chemistry	1	2.6
Medical and Biological Physics	1	2.6
Physics	2	5.3
Social Sciences: Please Specify (4 10.5%)		
Communication and Journalism	1	2.6
Economics	2	5.3
Public Health applications of Social Science	1	2.6
Other: Please Specify		
Medical and Laboratory Sciences	1	2.6
Statistics	1	2.6

The number of grants sought out and applied for were tallied by the participants (see Table 5); this was used to examine the relationships between the preparation level of the faculty member and the confidence level of preparing the grant application, along with their personal success level of attaining funding. According to Table 5, only one participant (2.6%) has not applied for any grants since becoming a full-time, grant-seeking faculty member, while seven participants (18.4%) have applied for one to five grants, five participants (13.2%) have applied for six to ten grants, six participants (15.8%) have applied for 11 to 19 grants, and exactly half of the sample participants ($n = 19$; 50.0%) have applied for 20 or more grants over the course of their full-time, grant-seeking faculty appointments. Table 5 also displays the successful outcome of those attempted applications. Five participants (13.2%) have never received a funded grant, while nine participants (23.7%) have received funding one to five times, 10 participants (26.3%) have received funding six to ten times, eight participants (21.1%) have received grant funds 11 to 19 times, and only six participants (15.8%) have received funding for 20 or more external grants.

Table 5

Total grants applied for and awarded (n = 38)

Applied For	Frequency	Percentage	Awarded	Frequency	Percentage
0	1	2.6	0	5	13.2
1 – 5	7	18.4	1 - 5	9	23.7
6 – 10	5	13.2	6 - 10	10	26.3
11 – 19	6	15.8	11 - 19	8	21.1
20 +	19	50.0	20 +	6	15.8

Total dollars acquired from successful grant applications was the next question for participants in the survey (see Table 6). According to the results, two participants (5.3%) have never received any dollars from attempted grant proposal applications. Six participants (15.8%) have received between $1 and $10,000 dollars, four participants (10.5%) have received between $10,001 and $100,000 dollars, three participants (7.9%) have received between $100,001 and $500,000 dollars, two participants (5.3%) have received between $500,001 and $1,000,000 dollars, while impressively, a majority of the participants ($n = 21$; 55.3%) have applied for and received over $1,000,001 dollars of external grant funding (see Table 6).

Table 6

Total dollars acquired from successful grant applications (n = 38)

	Frequency	Percentage
$0	2	5.3
$1 - $10,000	6	15.8
$10,001 - $100,000	4	10.5
$100,001 - $500,000	3	7.9
$500,001 - $1,000,000	2	5.3
$1,000,001 +	21	55.3

Last, the frequency of seeking out and applying for grants was explored. According to Table 7, one participant (2.6%) seeks grants on a daily basis, while eight participants (21.1%) seek grants weekly, 17 participants (44.7%) seek appropriate grants on a monthly basis, and 12 participants (31.6%) only look for grants on an annual schedule. The results also showed that one participant (2.6%) had never applied for any

of the grants sought out, while the majority of the sample ($n = 34$; 89.5%) apply for external grants occasionally, and three participants (7.9%) always apply for appropriate grants that they find (see Table 7).

Table 7

Frequency of grants sought out and applied for (n = 38)

Sought Out	Frequency	Percentage	Applied For	Frequency	Percentage
Daily	1	2.6	Never	1	2.6
Weekly	8	21.1	Occasionally	34	89.5
Monthly	17	44.7	Always	3	7.9
Annually	12	31.6			

Data Analyses

The questionnaire consisted of two instruments to determine the relationships between multiple independent and dependent variables (see Figure 1). The main instruments were a quantitative Likert-scale survey and a qualitative open-ended instrument, in addition to the demographic information presented by the participants (see Appendix A). A majority of the Likert-scale questions focused directly on formal education of grant proposal preparation and informal education of grant proposal preparation, along with confidence and the potential effect of Offices of Sponsored Programs.

After the data set was adjusted (due to the inclusion criteria question that reduced 147 participants to 38 total), the data were entered into SPSS for regression analysis. Multiple linear regressions were performed with the independent and dependent variables (nineteen alone using the discipline as the independent variable versus the dependent

variables dealing with formal and informal education), along with an ANOVA to examine the relationship of formal education being the "norm" in the discipline.

Quantitative Statistics using Linear Regression

The regression analyses indicated 43 statistically significant results ($p \leq .10$), and over 200 nonsignificant relationships between independent and dependent variables for this study. According to Borg and Gall (1989), most educational studies use $p \leq .05$, however exploratory studies may use an accepted value of $\leq .10$ (p. 351). Each independent variable was paired with the appropriate dependent variables and were regressed using SPSS. Although a multiple regression model utilizing all independent variables regressed on the dependent variables was desired, the degree of freedom issues with a small sample size suggested individual regressions as indicated. The independent variables for this study were: (a) discipline of the faculty member; (b) formal education on grant proposal preparation; and (c) informal education on grant proposal education. The dependent variables included: (a) proposal preparation level; (b) success or failure of grant attainment; (c) formal education on grant proposal preparation; (d) informal education on grant proposal education; (e) amount of dollars sought through external grants; (f) amount of dollars attained through external grants; (g) confidence level of the faculty member when attempting a grant proposal; and (h) what effect, if any, grant proposal education through Sponsored Programs offices has had on faculty members. There were multiple regressions with different factors involved; the PI created nominal expressions for the regressions, and were numbered R# (R and the number of the regression); note some examples in the text (e.g., R14 and R22). All nonsignificant tables from the resulting regressions performed in this study can be found in Appendix I.

Discipline Regressions. The first four regressions involved the area of education of the faculty members, and whether or not there was an influence of formal education from various influences of their undergraduate programs (see Appendix A for the full list of factors from the survey tool used in the regression analyses).

According to the Adjusted R Square value = .134, Regression 1, involving undergraduate original research performed, was the only one of these four regressions on formal education factors and discipline area that indicated that the model explained very little of the variability of data around the mean, while the p value indicated a statistically significant relationship between the variables (p = .014) (see Table 8).

The next eight regressions involved the area of education of the faculty members and whether or not there was an influence of formal education from their master's or doctoral level programs. Adjusted R^2 and p value combinations of each regression indicate no statistical significance among this group (see Appendix I).

The final two regressions involved the discipline and formal education factors; this time in the form of whether or not formal education was the "norm" in the participants' discipline (R14) and also whether formal workshops were beneficial to the participant (R15). Regression 14 demonstrated a poor R^2 = .179, while p = .005. Regression 15 also showed a very low R^2 (= .027), combined with an indeterminate statistically significant result (p = .164) (see Table 8).

Table 8

Regressions of Formal Education factors on Discipline

Reg #	Factor	Adj R^2	SS	df	MS	F	Sig.
1	UG original Research	.134	13.434	1	13.434	6.723	.014
				36			
14	Formal educ "norm" in area	.179	13.938	1	13.938	9.069	.005
				36			
15	Formal seminars most "helpful	.027	4.097	1	4.097	2.021	.169
				36			

SS = sum of squares; df = degrees of freedom; MS = mean square

Informal education factors were regressed against discipline to determine whether or not any significant relationships existed in the next set of regressions. According to the results, the informal education factors of "learning as you go"/"trial and error" grant education, as well as informal situations being helpful to the faculty member when preparing a grant, both demonstrated statistically significant p values ($p = .018$; $p = .012$, respectively), while the Adjusted R^2 value of both may call the results into question (see Table 9).

As shown previously when regressed with formal education opportunities, the discipline also shows an indefinitely significant result when regressed with informal opportunities for faculty to learn and feel confident about grant writing. Due to the low Adjusted R^2 value of these regressions, many of the results may be called into question.

Table 9

Regressions of Informal Education factors on Discipline area

Reg #	Factor	Adj R^2	SS	df	MS	F	Sig.
16	"learn as you go"/"trial and error"	.122	5.971	1 36	5.971	6.127	.018
19	Informal situations when preparing	.141	5.845	1 36	5.845	7.07	.012

Formal Education Regressions. The regressions involving formal educational factors were performed against the remaining dependent variables listed above (i.e., proposal preparation level, amount of dollars sought, amount of dollars attained, confidence of the faculty member, and what effect, if any, grant proposal education through Sponsored Programs offices has had on faculty members). Formal and informal education factors were separated and regressed against the variables to determine whether statistically significant relationships existed or not (informal education regressions are presented in the next section of the Results).

R20 consisted of all of the elements of formal education (see Appendix I, Table I15). According to the negative Adjusted R^2 value (= -.088) paired with the *p* value (= .661), no significant relationship was demonstrated when all formal education factors were regressed on how often grant applications were sought out by the participants. However, in the coefficient table of this regression, the formal factor of grant writing education incorporated into the master's program of the participant through mock grant proposal preparation showed borderline statistical significance with seeking out grant opportunities (*p* = .079) (see Table 10).

R21 represented similar results to the previous regression (the two are related; formal education factors against the ability and effort to seek out grants (Q12) and apply for those same grants (Q13) demonstrates preparation of the participant). According to the coefficients of this regression, significance was seen between grant proposal preparation during undergraduate education through mock grant proposals, as well as undergraduate quantitative and qualitative research experience ($p =.003$; $p =.073$; and $p =.107$, respectively) (see Table 10).

Table 10

Regressions of Formal Education factors on various Dependent variables

Reg #	Factor	Dep Var	Adj R^2	SS	df	MS	F	Sig.
20*	Master's mock grants	How often seek grants?	-.088	7.151	15 21	.477	.806	.079
21	All formal factors	How often apply for grants?	.265	2.224	15 21	.148	1.866	.092
21*	UG mock grants							.003
21*	UG quant research							.073
21*	UG qual research							.107
23*	Doctorate orig research	How many grants applied?	-.010	23.420	15 21	1.561	.977	.071
23*	Grant proposal part of term deg							.064
25*	Doc mock grants	Confidence gained in UG	-.012	86.404	15 21	5.760	.971	.093
25*	Formal is "norm" in area							.099
26	All formal factors	Confidence gained in Grad	.284	92.631	15 21	6.175	1.952	.078
26*	UG mock grants							.086
26*	UG quant research							.039
26*	Formal is "norm" in area							.004
27*	Master's orig research	Confidence gained UG quant	.205	80.385	15 21	5.359	1.619	.028
27*	Doc mock grants							.027
27*	Formal is "norm"in area							.017
28	All formal factors	Confidence gained Grad quant	.301	69.306	15 21	4.620	2.033	.066
28*	Formal is "norm" in area							.008
29*	Formal is "norm" in area	Confidence gained UG qual	.156	74.820	15 21	4.988	1.445	.077
30	All formal factors	Confidence gained Grad qual	.274	71.442	15 21	4.763	1.907	.085
30*	Master's quant research							.074
30*	Master's qual research							.063
30*	Formal is "norm" in area							.006
31*	UG mock Grants	Confidence through funder seminars (form)	.220	56.268	15 21	3.751	1.677	.043
31*	Grant proposal part of term deg							.090
31*	Formal wkshps most helpful							.057
32*	UG quant Research	Confidence through educ seminars (inform)	.255	64.970	15	4.331	1.821	.060
32*	Formal is "norm" in area							.025
32*	Formal wkshps most helpful							.078

* = coefficients of the regressions

Regression 22 (R22) explored the relationship between the formal education factors of

the quantitative survey with the total number of external grants the participants had

applied for since becoming full-time faculty members; no statistical significance was

found among the variables tested (see Appendix I, Table I16).

The next two regressions (R23 and R24) explored the relationships of formal

education factors against the total number of grants acquired, and how much total money

has been attained (see Appendix I, Tables I18 and I19) since the participant became a

full-time faculty member; no statistical significance was demonstrated in either

regression (R^2 = -.010; p = .508, and R^2 = -.159; p = .784, respectively). The coefficient

table of Regression 23 did demonstrate some borderline statistically significant outcomes

between receiving grant proposal education during the doctoral program through

conducting original research AND writing a grant proposal being part of the terminal

degree, and how many external grants the participant has applied for since becoming a

full-time faculty member (p = .071; p = .064, respectively).

The next set of regressions dealing with the formal education factors explored the

relationships between those factors and the confidence level of the faculty member in

applying for external grants (Regressions 25 - 31). According to the regression

coefficients of R25, there were individually significant factors for confident faculty

members who were formally educated at the doctoral level (p = .093), and also those who

consider being formally educated a "norm" in their current area of study (p = .099) (see

Table 10).

Regression 26 demonstrated borderline significance for confidence level when

education was provided in a graduate grant writing course (R^2 = .284; p = .078). The

regression coefficients of R26 also showed some significant results when looking at confidence level. Grant writing education incorporation in undergraduate programs through direct assignments focused on grant preparation (p = .086) and grant writing education incorporation in undergraduate programs through quantitative research training (p = .039) increased the confidence of the faculty members; of most significance, however, was the overall confidence level the faculty members experienced when formal education was the "norm" in their area (p = .004) (see Table 10).

Regression 27 showed no significant results (see Appendix I, Table I22), while the coefficients of the regression showed statistically significant results for confidence when original research was required at the master's level (p = .028), grant proposal preparation was required at the doctoral level (p = .027), and formal education was the "norm" in the faculty members' disciplines (p =.017) (see Table 10).

While R28 had an elevated adjusted R^2 value, the p value showed potential significance (R^2 = .301; p = .066) for confidence level and graduate-level quantitative research experience. The coefficients of this regression were also nonsignificant, with one exception: formal education being the "norm" in the faculty members' disciplines (p = .008).

R29 showed no statistical significance between formal education factors and confidence level (see Appendix I, Table I23), while again, formal education as the "norm" in the faculty members' disciplines demonstrated statistical significance (p = .077) in the coefficient table.

Regression 30 demonstrated another elevated adjusted R^2 value (= .274) while showing borderline significance (p = .085) for formal education factors and confidence

level. When examining the coefficients of R30, there were three significant results related to confidence: two related to education within the master's programs; one through quantitative research classes ($p = .074$), the other through qualitative research classes ($p = .063$), and like other regressions, the third, and most statistically significant result that linked the faculty members' confidence level to formal education was that formal education was considered the "norm" in the current discipline ($p = .006$) (see Table 10).

There were multiple coefficients of Regression 31 that showed statistical significance for confidence level provided through formal seminars by funding agencies and the formal education factors of undergraduate education. Direct preparation of mock grant proposals ($p = .043$), writing a grant proposal as part of a terminal degree ($p = .090$), and formal seminars/workshops being helpful when preparing a grant proposal ($p = .057$) were significant when regressed against funding source seminar/workshops helping the faculty member feel confident when writing a grant proposal.

Formal education factors and encouragement level of faculty to seek out and apply for external grants after experiencing formal seminars/workshops of those funding sources (e.g., NIH, NSF, USDA, NEH) were explored in Regression 32 (see Appendix I, Table I25). The Adjusted R^2 value (= .255) paired with the p value (= .101) showed no statistical significance when formal education factors were regressed on experiencing a formal grant proposal writing seminar/workshop through funding sources (e.g., NIH, NSF, USDA, NEH) (see Appendix I). However, statistical significance appeared in the coefficients of R32. Formal education factors were: (a) being educated during an undergraduate quantitative research class ($p = .060$); (b) formal education being the "norm" in the faculty members' area of study ($p = .025$); and (c) formal workshops being

most helpful to faculty members when they write a grant proposal ($p = .078$)

demonstrated appropriate p values when regressed on educational seminars from funding

sources (e.g., NIH, NSF, USDA, NEH) encouraging faculty members to apply for grants

(see Table 10).

Informal Education Regressions. The regressions involving informal educational

situations were performed against the dependent variables as listed above in the formal

regressions section (i.e., proposal preparation level, amount of dollars sought, amount of

dollars attained, confidence of the faculty member, and what effect, if any, grant proposal

education for faculty members has on Sponsored Programs departments).

Regressions 33 and 34 (see Appendix I, Tables I26 and I27) examined informal

education factors and proposal preparation level of the faculty member. From the

Adjusted R^2 values and the p values of the regressions ($R^2 = -.038$; $p = .625$; $R^2 = -.086$;

$p = .896$), no statistical significance was demonstrated in either situation and neither

coefficient table of either regression showed any significance either.

The next set of regressions explored the number of external grants sought out,

along with the attainment (both number and dollar amounts) paired with informal

education factors (Regressions 35 – 37). According to the Adjusted R^2 value ($= .249$)

along with the p value ($= .045$), R35 demonstrated borderline significance for the number

of grants sought and being informally educated. Furthermore, the coefficient table of this

regression shows the "learn as you go" process as significant in this situation ($p = .076$)

(see Table 11).

The next two regressions addressed attainment of grants (both number and dollar

amounts) and informal education factors (R36 and 37). According to the Adjusted R^2

value (= .284) paired with the *p* value (= .004), borderline significance was demonstrated

for number of grants sought and informal education factors.

Table 11

Regressions of Informal Education factors on various Dependent variables

Reg #	Factor	Dep Var	Adj R^2	SS	df	MS	F	Sig.
35	All informal factors	How often seek grants?	.158	15.134	4 33	3.784	2.736	.045
35*	"learn as you go"/ "trial and error" learning							.076
36	All informal factors	# of grants awarded	.284	22.049	4 33	5.512	4.673	.004
36*	"learn as you go"/ "trial and error" learning							.019
37	All informal factors	Total $ acquired	.267	41.312	4 33	10.328	4.372	.006
37*	"learn as you go"/ "trial and error" learning							.009
39*	Informal situations being helpful in preparing a proposal	Confidence gained in Grad grant writing course	.039	23.693	4 33	5.923	1.378	.066
44*	Informal situations being helpful in preparing a proposal	Confidence gained from funding source workshop	.050	15.816	4 33	3.954	1.489	.071
46*	"learn as you go"/ "trial and error" learning	Sponsored Programs assistance helpful	.076	15.366	4 33	3.842	1.761	.043

Consistent with the previous regression, the coefficient table of R36 showed the

"learn as you go" process as significant with the number of grants attained (*p* = .019) (see

Table 12). The amount of dollars attained through external grant applications and

informal education factors (R37) also showed borderline significance due to the Adjusted

R^2 value and a very appropriate *p* value (R^2 =.267; *p* = .006). The coefficients of

Regression 37 also show the "learn as you go" process as significant with the amount of

money attained through external grant applications (*p* = .009) (see Table 11).

The next set of regressions dealing with informal education factors explored the

relationships between those factors and the confidence level of the faculty member in

applying for external grants (Regressions 38 – 44). Almost every regression, as well as

the coefficients of the regressions, showed no significance when examining informal education factors and confidence level of faculty members (see Appendix I). Statistical significance was demonstrated in the coefficient output of Regression 39. Informal situations being helpful when preparing a grant proposal and the confidence level of the faculty member were taken into consideration and regressed ($p = .066$) (see Table 11).

The coefficient table of Regression 44 showed significance ($p = .071$) between informal situations being the most helpful when preparing a grant proposal and those same faculty members feeling confident after attending a funding source workshop (e.g., NIH, NSF, USDA, NEH) (see Table 11).

The final regressions, R45 and R46, focused on Sponsored Programs offices and the effect, if any, it had on informal education factors. Regressions 45 and 46 and the coefficients of Regression 45 did not show any significance (see Appendix I). Further examination of the coefficients of Regression 46 showed significance ($p = .043$) for "learn as you go" faculty members who felt grant writing assistance through the Sponsored Programs department was helpful (see Table 11).

Quantitative Statistics using One-Way ANOVA

A statistical analysis of One-Way ANOVA was performed on formal education being the "norm" in the faculty members' discipline, and in which discipline the faculty member currently taught. The results showed statistical significance ($p = .038$) and the areas that contributed to the significance were what are considered "hard sciences," including: (a) Biochemistry; (b) Biological Sciences; (c) Ecology; (d) Health Professions; (e) Neuroscience; (f) Physiology; and (g) Animal Science.

Table 12

One-Way ANOVA

Formal education in grant proposal preparation is the "norm" in discipline area by Discipline area

	SS	df	MS	F	Sig.
Between groups	25.541	7	3.649	2.504	.038
Within groups	43.722	30	1.457		
Tukey HSD					.071

Qualitative Analysis using General Inductive Theory

From the survey's open-ended questions, three major themes emerged: (a) formal and informal education opportunities for grant proposal preparation; (b) motivators and barriers to prepare grant proposals for research purposes; and (c) types of grants sought. There were various subthemes that supported both formal and informal education including: (a) feeling prepared or unprepared; (b) success with grant proposals; and (c) various types of education/training to prepare a grant proposal. Motivators and barriers to grant proposal preparation were also major themes that have been previously represented in grant writing literature (Boyer & Cockriel, 1998; Monahan, 1993; Walden & Bryan, 2010).

Table 13

Emergent themes and subthemes

Theme	*Subtheme*
Formal Education	Prepared to Write a Grant Proposal
	Unprepared to Write a Grant Proposal
	Success
	Education/Training Opportunities
Informal Education	Prepared to Write a Grant Proposal
	Unprepared to Write a Grant Proposal
	Success
	Education/Training Opportunities
Motivators	Funding/Research Support
	Professional Advancement/Requirement
Barriers	Time/Workload
	Lack of Resources/Support
	High Competition, Low Success Rate
Types of Grants Sought	Competitive/Peer-Reviewed
	Non-competitive
	No Preference on Type of Grant

Note: Raw Data Examples – see Appendix J

Theme #1: Formal Education on Grant Proposal Preparation

Formal education on grant proposal preparation was defined in Chapter I as: (a) undergraduate curriculum integration; (b) graduate curriculum integration; (c) regional grant information workshops (NIH, NSF, or other external grant funding organization); or (d) national grant information workshops (NIH, NSF, or other external grant funding organization) (NIH, 2016; NSF, 2016). Formal education was described in relation to four different categories: (1, 2) feeling prepared or unprepared to attempt a grant proposal; (3) success, according to the participants; and (4) different types of education/training beneficial to the faculty member.

Theme #1, Subtheme #1: Prepared to Write a Grant Proposal. Feeling prepared to invest the time and energy in an external grant proposal for funding research was mentioned along with formal education opportunities. Both internal and external opportunities for formal education on writing a grant proposal were described as beneficial and helpful. Formal preparation came most often in the form of graduate program curriculum, according to the participants of this study. Writing grants both in graduate-level classes as part of the curriculum as well as collaborating with graduate level faculty members presented the best results.

Theme #1, Subtheme #2: Unprepared to Write a Grant Proposal. Twenty-one participants of this study mentioned feeling unprepared to write a grant proposal in combination with formal education opportunities on grant proposal preparation. The majority of the responses had to do with the timing of the faculty members' undergraduate or graduate education. A large majority of the faculty members who participated in this study were older and had been teaching at the university level for 10+

years; many of their curriculums did not offer grant writing education courses during their time in college. One participant mentioned, "I was trained in the dark ages. I obtained my Ph.D. in 1972," while three others corroborated, "No formal training when I was a grad student in the 1970's," "No – preparation was non-existent when I came through UG/Grad levels," and "There was no formal grant writing training when I was a student, especially at the undergraduate level." Even another participant mentioned, "Basically learned after becoming a faculty member. My major professor wrote proposals, but didn't involve me directly in those activities."

Theme #1, Subtheme #3: Success. When asked about success and individual definitions of what success meant to the participants, various answers were given; of course receiving funding was by far the most common response. However, there were also answers that related to formal education factors such as feeling competent during the preparation part and also receiving constructive feedback or any type of scoring from the funding sources. One participant mentioned, "Initial success is getting a good score from reviewers, but of course ultimate success is being funded."

Theme #1, Subtheme #4: Education/Training Opportunities. Exposure and training in undergraduate and/or graduate school was the most common response to which formal opportunity participants wished they had experienced during their college education to prepare them for grant proposal preparation later in their careers. Furthermore, having classes or incorporated curriculum that focused directly on grant proposal preparation was mentioned as potentially beneficial. A participant expressed that a "hands on grant preparation course(s) with a dedicated mentor" would have been helpful when learning how to prepare a grant proposal. Two other participants mentioned formal workshops, but

felt at this later point in their career that the workshops would/should be "VERY targeted to NIH and/or NSF" and that workshops would be helpful "only if it were highly tailored to a grant that I want to pursue. Generic advice would be pretty worthless at this point. So too are grant workshops focused on other disciplines." This participant expressed that he/she and colleagues have wasted time and energy at proposal development workshops directed at other disciplines.

A question asked whether or not the participants felt formal education opportunities would benefit them at this point in their careers, to which the majority of the respondents, due to being in the later stages of their careers, said that earlier in their careers would have been helpful, but now would not be beneficial to them, "No need for that at the current point of my career (likely retirement within 5-6 years)."

Theme #2: Informal Education on Grant Proposal Preparation

Informal education on grant proposal preparation was defined in Chapter I as: (a) university-offered workshops; (b) research development office support; (c) departmental workshops or collaborations; (d) collaborating with another professor(s) or mentor(s); (e) reading articles or books; (f) online tools or webinars; or (g) seeking out previously successful applications as templates (Gaugler, 2004; Kraus, 2007; Walden & Bryan, 2010) and was described in relation to four different categories: (1, 2) feeling prepared or unprepared to attempt a grant proposal; (3) success, according to the participants; and (4) different types of education/training beneficial to the faculty member.

Theme #2, Subtheme #1: Prepared to Write a Grant Proposal. Informal grant proposal education was quite apparent in the responses of the participants. While formal education was presented as a viable way to feel prepared to write a grant proposal,

informal education situations were also presented as perfectly acceptable and effective

ways to prepare faculty members for the same task. The most commonly mentioned

informal education situation that made participants feel prepared to write a grant proposal

was working directly with an experienced faculty member (whether that faculty member

was formally or informally educated was not the focus). One participant mentioned, "I

mainly learned grant writing by watching and helping my PhD mentor prepare grants.

That is the way most scientists learn. I think it is the best way…" Another participant

expressed a similar situation, "…from my PhD training, I was always involved in

assisting with lab grant proposals. Additionally, I completely self-funded 4 of 5 of my

graduate years by attaining competitive scholarships and grants." Working in peer

groups/mentoring programs and receiving exposure to successful grant proposals were

also mentioned as helpful tools to preparing a grant application; however, participants

still explained that departmental oversight and support from Sponsored Programs offices

was necessary. This idea connects directly to the commonly given response of working

directly with someone who is educated in grant proposal preparation.

Informal workshops were also a source of grant proposal preparation for some

participants; although the pairing of these university-provided workshops were still often

mentioned along with working with colleagues, offices of Sponsored Programs, or other

already-educated faculty members, "…collegial review of proposals and collaborative

proposal preparation by/with successful colleagues…extremely valuable in learning what

to do and what not to do and in developing my own voice."

Theme #2, Subtheme #2: Unprepared to Write a Grant Proposal. Informal education

opportunities specifically named as making a participant feel unprepared for grant

proposal preparation mainly included self-training. Many respondents mentioned that they wished they had experienced more formal education opportunities, showing a lack of preparation when only informal education was present, "Formal training early in my career would have been helpful." Another participant responded, "…more education, especially in Doctoral program, would be helpful for those pursuing tenure track faculty positions." And another mentioned, "Would have appreciated better training as a grad student and post doc."

Theme #2, Subtheme #3: Success. Along with formal education situations and success, receiving the grant award (funding) was the ultimate measure of success for the participants. However, informal situations and success were related when it came to the process that the participants experienced when preparing the grant proposal. Some of the respondents felt successful just for completing the grant proposal and submitting it, even if it did not get funded, "just writing and completing it is a success. Even if not funded, there is a lot of work preparing that can help for other grants."

Theme #2, Subtheme #4: Education/Training Opportunities. The most common responses for informal education/training opportunities involved self-training, working directly with a faculty member/colleague, and/or attending some type of university-offered workshop, which were deemed as quite unhelpful in most statements. One participant mentioned, "Graduate courses and experiences were good, but you cannot learn to write grants without writing them…"

Peer mentoring programs were mentioned, along with departmental oversight and being able to view "more examples of successful proposals." One participant strongly expressed that the most helpful situation would involve, "A committed mentor who is a

successful grant writer can make a huge difference to a new assistant professor. That is the single most effective thing I can think of…"

Faculty members can also individually seek out education online and through collaborative efforts. Two participants expressed, "…any type [of help] would help me." and "Webinars and online info are useful. Having ways to connect collaborators would be useful, as well."

Theme #3: Motivators to Preparing Grant Proposals

Motivators and barriers in grant writing (preparing grant proposals) have been researched previously (Boyer & Cockriel, 1998; Walden & Bryan, 2010). Boyer and Cockriel (1998) presented motivators as: (1) consideration in tenure or promotion decisions; (2) building a professional reputation as a capable researcher; and (3) a strong commitment from the college president. Walden and Bryan (2010) presented quite a few more motivators more than 20 years later. They listed: (1) opportunity to probe or research new information; (2) personnel support such as graduate assistants or clerical help during preparation and when the funding is received; (3) having travel money available; (4) building a professional reputation; (5) more flexibility in time allocation; and (6) assistance in grant proposal preparation. The current study presents four major motivators (subthemes) to grant proposal preparation and include: (1) funding research efforts and/or student support; (2) working closely with others (collaboration); (3) competition for grant funding; and; (4) professional advancement and/or requirement of duties.

Theme #3, Subtheme #1: Funding Research Efforts. Many participants mentioned conducting and funding the research effort as a major motivator when attempting to

prepare a grant proposal, "Motivation is to do the research" or "Motivation is funding my research!" As we will discuss in Chapter 5, many faculty members rely heavily on external funding to help conduct research in their discipline. Some participants mentioned the importance of grant funding for the financial support of students, "…and needing money to educate students" and "…provide student support." One participant stated how grant proposals provide "funding for large and important projects that would never happen without a grant."

Theme #3, Subtheme #2: Working Closely with Others (Collaboration). "Having collaborators is a great motivator" was expressed by a participant. Informally educated faculty members were common in this study, and many mentioned that working with other individuals on grant proposal preparation was a definite motivator, including students. "Main motivation is supporting the graduate program and getting to work with graduate students," which may not be possible without external grant funding.

Theme #3, Subtheme #3: Competition for Grant Funding. Some faculty members like the competitiveness of preparing grant proposals, "… the high level of competition for grants" and "I love the science and the competition so that's all the encouragement I need to prepare a grant."

Theme #3, Subtheme #4: Professional Advancement and/or Requirement of Duties. Just a few of the participants mentioned how preparing grant proposals would help them to advance to an elevated position, or was already a requirement of their current position and duties. One participant mentioned, "…aspiring for full professorship…" while another said, "[grant proposal preparation is] a research requirement."

Theme #4: Barriers to Preparing Grant Proposals

Barriers to grant proposal preparation presented by Boyer and Cockriel (1998) and Monahan (1993) included: (1) lack of time due to heavy teaching loads or other scholarly activities; (2) lack of training in grant seeking and grant writing; (3) lack of knowledge of budget development; and (4) lack of knowledge of funding sources and advanced warning of proposal due dates. According to Walden and Bryan (2010), there was only one major barrier to grant proposal preparation; inadequate support available to submit proposals in a timely manner. The results of the current study indicate three major barriers to grant proposal preparation: (1) time and professional workload; (2) lack of resources and/or support to conduct research; and (3) high competition, little success.

Theme #4, Subtheme #1: Time and Professional Workload. Time and professional workload were by far the most common responses that participants indicated were barriers to grant proposal preparation. Many participants simply responded with "time" when asked what barriers there are for them in this regard. One participant stated, "Everyone wants you to get grants but they want you to create the time to write them above and beyond your other responsibilities," while another concurred with "The sheer amount of paperwork needed (besides the scientific part) is a time sink."

Theme #4, Subtheme #2: Lack of Resources and/or Support to Conduct Research. According to the open-ended responses, 5 participants explained what a barrier their universities' research office (Sponsored Program office) was when it came to preparing grant proposals (see raw data in Appendix J). One participant mentioned the difficulty in "navigating the research office forms for budget preparation and approval" while another expressed "My university administration and OSP office are barriers to doing my job

effectively…" Increasing the support provided by these offices could potentially help more faculty members apply for and secure grants for future research projects.

Theme #4, Subtheme #3: High Competition, Little Success. Participants of this study mentioned the competitive nature of external grant applications paired directly with low success rates of actual attainment as a barrier to preparing the grant proposal initially. One participant expressed, "Lots of efforts, little chance of success," while two more mentioned "the high level of competition for success" and "low probability of success."

Theme #5: Type of Grants Sought by Faculty Members

According to the results of this study, three major subthemes emerged when types of grants sought out were mentioned in the open-ended questions. The qualitative analysis produced three subthemes: (1) competitive or peer-reviewed grant proposals; (2) non-competitive grant proposals; and (3) no preference on type of grant. Differences between the types matter because competitive grants are often more difficult to secure, but result in larger funding allocations, while non-competitive grants are easier, yet yield lower dollar amounts (Browning, 2014). Some faculty did not pay attention to the type, yet whether or not it fit their personal needs for the research project was in question.

Theme #5, Subtheme #1: Competitive and/or Peer-Reviewed Grant Proposals. The majority of the participants of this study mentioned only attempting grant proposals for competitive or peer-reviewed grants. Some mentioned the reasoning behind this as the discipline: "I don't know of any non-competitive grants in my field."; "I don't come across non-competitive opportunities…," and "I don't believe I have ever seen a non-competitive proposal in my area of study. Everything is competitive."

Some also mentioned that competitive or peer-reviewed grant proposals are the only path to professional advancement and/or promotion. One participant mentioned, "Peer reviewed for promotion or advancement," while another commented, "Peer-reviewed is better for $$ [funding amount] and tenure/promotion."

Regarding the funding amount, multiple participants mentioned that competitive grants often resulted in larger funding amounts. One stated, "Peer reviewed is better for $$ [funding amount]…," while another said, "Peer reviewed grants are preferred as they are generally worth more…" Another participant also corroborated this idea and expressed, "Peer-reviewed grants typically support larger projects."

Theme #5, Subtheme #2: Non-competitive Grant Proposals. While competitive grant proposals often are harder to secure, yet yield larger amounts of money, non-competitive grant proposals are sometimes quite attractive for the exact opposite reasons. Oftentimes, non-competitive grant proposals are easier to secure, having fewer applications submitted, yet yield a much lower funding amount. While some of the participants of this study only mentioned applying for competitive grants (due to prestige, funding amounts, and/or the fact that they are not aware of any non-competitive grants in their fields), many of the participants had no issue at all with applying for, and sometimes preferred, non-competitive grants due to easier security of funding and a higher success rate of attainment. One participant mentioned, "I'll apply for all with no discrimination. It's like the lottery, you can't win if you don't play," while others expressed, "non-competitive have higher success rates" and "non-competitive, higher likelihood of an award but usually less money." The appeal factor of non-competitive grants is also something that participants mentioned. One participant wrote, "Non-competitive, of course, is the most

appealing" and another wrote "peer-reviewed is better, but easier to write non-competitive."

Theme #5, Subtheme #3: No Preference on Type of Grant. Choosing which type of grant, either competitive/peer-reviewed or non-competitive, in some instances during this study, did not matter to the participants. Some respondents simply mentioned applying for the grant that fit their research needs the best, whether it was competitive or not. The strongest response to this subtheme was, "I apply for either, based on what best fit my research topics," while another concurred, with "only fit for funding to project considered."

Conclusion

The results of this study vary and offer only a partial explanation for the current climate of grant proposal education of faculty members in higher education. Some statistically significant relationships emerged through the ANOVA analyses of some of the regressions performed in this study, yet most were insignificant or questionable due to the Adjusted R^2 values of the regressions performed on the independent and dependent variables. The one-way ANOVA also showed significance for formal education being the "norm" in the faculty members' disciplines. The qualitative portion revealed five major themes due to General Inductive Theory, with various subthemes that support each major theme presented. The purpose of this study was to understand the current climate of higher education grant writing at a national level by surveying and interviewing faculty on their education of proposal writing.

Chapter V

Discussion

The purpose of this study was to understand the current climate of higher education grant writing at a national level by surveying faculty on their education of grant proposal writing. The following questions guided this study and are answered in this section: (1) To what extent are faculty members educated on the grant writing process?; (2) Does formal grant education contribute to the success level of grant acquisition in terms of the numbers of grants submitted and received?; (3) Does the discipline influence whether faculty members are formally or informally educated on grant writing?; and (4) Does formal or informal education on grant proposal writing affect the amount of funding faculty seek out and attain?

This chapter discusses: (a) the response rate; (b) descriptive statistics, (c) the results of this research study connected to the research questions and current research/ literature on the topic of grant proposal preparation education of faculty members; and (d) conclusions, recommendations for practice, and (e) suggestions for future research.

Response Rate

The response rate of this research project will be addressed first in this discussion section. Throughout the course of the survey, three reminders were sent to participants in an attempt to increase the response rate of the survey (Appendix F, G, and H). On the third and final reminder, the subject line of the email contained a plea for responses, using capital letters for the word "PLEASE"; this produced some of the negative behavior within the emails mentioned previously. According to current literature, a plea within an email is a proven and accepted way to increase response rates in online surveys

(Petrovcic, Petric, & Manfreda, 2016). Capital letters within text has been described in other literature as "screaming" or "email flaming," however, this was not the intention of the primary investigator of the current study (Turnage, 2008).

Descriptive Statistics of Participant Demographics

Of greatest importance in the demographic section of the questionnaire were the results of the questions of: (a) gender; (b) tenure status; and (c) total professional experience in years as a faculty member. Gender distribution was essentially equal with females representing 47.4% ($n = 18$) of the sample population, while males made up the remaining 52.6% ($n = 20$). Male and female faculty members were equally represented as respondents in this study. Tenure status and length of employment were also quite interesting results; both demonstrated that the majority of the sample population (76.3%; $n = 29$) were tenured faculty with 10 or more years of experience as a full-time faculty member. This demographic result represents an older population of faculty members.

Results of the Study

The results of the multiple linear regressions showed significant relationships among area of education regressed on: (a) conducting original research as a requirement during undergraduate education; (b) formal education being the "norm" in the faculty members' discipline; (c) formal workshops being most helpful to faculty members when writing a grant proposal; (d) informal education through "learn as you go" or "trial and error" processes making a faculty member feel confident about grant proposal preparation; and (e) informal situations being most helpful when preparing grant proposals. From these results, one can conclude that the discipline has a significant relationship to how the faculty member is educated (whether formally or informally), and

what they believe and feel is most helpful to them in grant proposal preparation situations.

The results of the multiple linear regressions of formal education factors showed various statistically significant relationships. Among them, formal education of preparing a mock grant proposal during the master's degree program regressed on how often faculty members look for grants to apply to. As far as applying for the actual grants, significance was found when faculty members were: (a) educated during their undergraduate education through actual grant proposal preparation; (b) educated during their doctoral program by conducting original research; and (c) when the faculty member had to write a proposal for completion of the terminal degree. This demonstrates that education in a formal setting may promote a faculty member to apply for more grants than those not educated formally.

Regarding the confidence level of the faculty members (participants), the most significant results arise from many of the formal education factors. Faculty members gained a high level of confidence for preparing grant proposals when they were prepared formally through: (a) undergraduate education when grant preparation was part of the assignment; (b) undergraduate education when involved in a quantitative research class; (c) master's level education when they were required to conduct original research; (d) master's level quantitative, as well as qualitative research courses; (e) graduate level courses devoted to grant proposal preparation; (f) doctoral level courses in which mock proposals were a requirement; and the most common result, (g) when formal education was the "norm" in that faculty member's discipline. The results of the regressions on

formal education factors show the importance related to how confident the participants were about preparing grant proposals.

Funding source seminars provided by the NIH, NSF, USDA, NEH, etc. also made faculty members experience confidence when they were formally educated previously through: (a) undergraduate courses that involved mock grant proposal preparation; (b) a terminal degree requirement to prepare a grant proposal; and (c) when they previously attended a helpful formal seminar provided by those same funding sources (e.g., NIH, NSF, USDA, NEH).

Finally, significance was demonstrated for the encouragement level of the faculty members due to a funding source seminar provided by the NIH, NSF, USDA, NEH, etc. when: (a) faculty members were educated in an undergraduate quantitative research course; (b) formal education was the "norm" in the faculty members' discipline; and (c) when they previously attended a helpful formal seminar by those same funding sources (e.g., NIH, NSF, USDA, NEH).

Informal education factors were also regressed against various grant proposal preparation factors. No significant results were displayed among any of the informal education factors and grant proposal preparation level of the faculty members.

Regarding the confidence level of the participants of this study, participants who experienced grant writing education during their graduate degree showed a significant relationship with informal situations being quite helpful to them in preparing an actual grant proposal. Another significant statistic emerged when informal situations were helpful to those who had experience with funding source seminars (e.g., NIH, NSF,

USDA, NEH). This combination of experiences (informal and formal) was pertinent throughout the open-ended response section of the survey.

Regarding the relationship between Sponsored Programs offices and the effect, if any, they had on informal education factors, demonstrated very little statistical significance; except for the "learn as you go" or "trial and error" factor. This element showed significance when paired with faculty members who considered grant writing assistance through the Sponsored Programs office to be helpful.

According to the qualitative portion of this study, there were five major themes with various supporting subthemes, according to the triangulation and development of themes through the process of General Inductive Theory. The major themes included: (a) formal and informal education opportunities for grant proposal preparation; (b) motivators and barriers to prepare grant proposals for research purposes; and (c) types of grants sought were provided.

Research Questions

The following questions guided this study: (1) To what extent are faculty members educated on the grant writing process?; (2) Does formal grant education contribute to the success level of grant acquisition in terms of the numbers of grants submitted and received?; (3) Does the discipline influence whether faculty members are formally or informally educated on grant writing?; and (4) Does formal or informal education on grant proposal writing affect the amount of funding faculty seek out and attain?

Research Question #1. According to the results of this study, faculty members, depending on discipline, were educated both formally and informally, through various

undergraduate and graduate courses, as well as through funding source seminars provided by the NIH, NSF, USDA, NEH, etc., "learn as you go," "trial and error," and collaborative situations. Neither type of education was determined to be better or more beneficial than the other, and in some instances, both were mentioned together. According to the responses, faculty in the natural sciences were often more formally educated than those in other disciplines, but responses showed varying levels of education among all disciplines.

The descriptive statistics and the qualitative, or open-ended portion of this study, showed that many of the faculty members were older and had either not had the opportunity to experience formal grant proposal education through their undergraduate or graduate degrees and gained experience by learning on the job as grant writing became more common in higher education. Some participants described undergraduate and graduate education experiences through different courses and/or requirements within their academic careers. The findings of the current study contradict the findings of previous literature. According to Kraus (2007), grant proposal writing was often a self-taught skill in academic medicine and/or health sciences. In a previous study, the researchers surveyed new physicians and found there was a request for more formal education in grant proposal preparation (Medina-Walpole, Barker, & Katz, 2004).

In 2004, Gaugler explored grant proposal preparation as part of the tenure-track process in higher education and determined that there were very few formal opportunities to "acquire comprehensive grant writing skills in graduate school" (Walsh et al., 2013). Nine years later, Walsh et al. (2013) explored the syllabi and course texts of grant writing courses offered across the United States. The authors found only 93 graduate level

opportunities for grant proposal preparation education existed in a formal curriculum setting, and the overall focus was on: (a) proposal writing; (b) budgeting; and (c) identification of funding sources by utilizing example proposals and specific models of grant proposals in course textbooks.

Various authors have written articles suggesting incorporating grant proposal preparation into both undergraduate and graduate level coursework, rather than the typical academic term paper, especially in the natural sciences, but also including business administration, sport management, and psychology (Blankenship et al., 2010; Cole, Inada, Smith, & Haaf, 2013; Drotar et al., 2014; Itagaki, 2013; Seifried et al., 2015). Academic writing and grant proposal writing are quite different. According to Lemanski (2014) and Porter (2007), preparing mock grant proposals, rather than writing term papers may prepare the future faculty members for the requirements to come later in their career.

Research Question #2. There was no significant or outstanding relationship, according to the statistical analysis, that determined formal education as a more successful route to grants submitted or received. According to a study by Reed, Kern, Levine, and Wright (2005), 54% of first-time authors in academic medicine who were formally educated in grant proposal preparation secured major external grant funds; this is the only current research study that connects formal education to actual success in attaining grant funding. In fact, there is literature that provides a step-by-step approach to "writing successful grants"; this requires just reading the article, with no workshop attendance anywhere or formal education required, according to the authors (Brock & Bouvet, 2010; Devine, 2009; Gholipour et al., 2014; Gotley, 2000; Ludlow, 2014; Proctor et al., 2012; Stokes,

2012; Wisdom et al., 2015). In some instances in fact, according to this research study and the statistical analysis of attainment and total dollars attained, informally educated faculty members were just as, if not more successful than their formally educated counterparts.

Research Question #3. In simple terms, yes, the discipline had a significant relationship to the type of education received by the faculty member in this study. According to the one-way ANOVA performed ($p = .038$), faculty members who resided in the "hard sciences" (e.g., biochemistry, biological sciences, ecology, health professions, neuroscience, physiology, and animal science) considered being formally educated the "norm" in their disciplines. According to Arlitsch (2013), "Grant funding supports universities and academic faculty, particularly in the hard sciences…" (p. 370). While faculty in other disciplines do pursue external grants and strive for more formal education, the idea that faculty in the hard sciences are more commonly educated in grant proposal preparation is not a newfound concept (Blankenship et al., 2010; Drotar et al., 2015; Seifried et al., 2015).

Research Question #4. Formal education factors showed no significant relationship with how often grant opportunities were sought out by the participants. However, the formal factor of grant writing education incorporated into a master's program through mock grant proposal preparation did show significance with seeking out grant opportunities. Receiving education during the undergraduate program through mock grant proposals showed a strong relationship with actually applying to the grant opportunities sought out by faculty members. This shows that formal education may help better prepare the grant seeker to actually submit a grant proposal for external funding.

Statistical significance was demonstrated through regressing grant proposal education during the doctoral program through conducting original research and writing a grant proposal as part of the terminal degree when regressed on how many external grants the participant has applied for since becoming a full-time faculty member. No significance appeared in the total dollar amount attained for any of the formal education factors.

Regarding the informal education factors of "learn as you go" or "trial and error" learning situations, significance was demonstrated when grants were sought out, applied for, and/or attained. As far as total dollar amount attained was concerned, significance was seen in the "learn as you go" or "trial and error" situation. No current literature has explored this concept, nor represents this finding; it is an original result and is unique to this research study.

Peer review situations for grant proposal preparation are common in current literature, as well (Abdoul et al., 2012; Dumanis et al., 2013; Sattler, McKnight, Naney, & Mathis, 2015). While peer review education incorporated into undergraduate and/or graduate programs may create exposure for young professionals (Dumanis et al., 2013), the overall outcome of peer review without any formal education on the process of review or exposure to successful grant proposals, may still not be beneficial in the long term when grant proposals are submitted (Abdoul et al., 2012; Sattler et al., 2015).

Conclusions and Suggestions for Future Research

Due to the results of this study, there were a few major suggestions for future researchers when it comes to exploring the barrier of lack of education to grant proposal preparation. Including all levels of faculty in the study, not just those with a grant-seeking

component to their scholarship duties, may have resulted in a higher response rate with more widely varying experiences on grant proposal preparation. Future research on grant proposal preparation should examine all faculty levels and other grant-seeking (non-faculty) departments in order to produce a wider variety of responses and exploration of the topic of grant proposal preparation in higher education. Viewing the grant proposal process from the administrative perspective and how to best organize faculty positions and responsibilities should also be explored in further detail to promote the seeking and attainment of grant funding.

The quick glimpse at Sponsored Programs offices from this study could be explored in more detail, as well. Some of the responses of participants demonstrated the assistance provided by Sponsored Programs offices for grant proposal preparation, as quite lack-luster. By exploring how much these offices actually assist (or rather, do not assist) faculty members at the university level, potential increases in the support provided to grant-seekers to increase research activity could be attained. This increase in support may also assist more faculty in exploring the opportunity to prepare a grant proposal for external funding, thereby increasing their professional portfolios, as well as increasing the funding in their respective department and university. Interaction from the Sponsored Programs offices in universities, especially incorporated into the classroom, could potentially increase the seeking and applying components to grant proposal writing.

According to previous and current research, grant proposal preparation included at the graduate level (master's or doctoral) of the future faculty member could increase the ability of seeking, applying for, and acquiring successful grant proposals to assist with departmental funding and research efforts. As a result of this study and consistent

with the literature (Blankenship et al., 2010; Cole et al., 2013; Gaugler, 2004; Kleinfelder et al., 2013; Reed et al., 2005), I recommend that faculty consider including formal grant proposal opportunities in their curricula. While formal education can assist in preparing the faculty member for the grant application process, the timing and availability of funds, dependent upon the discipline, should also be taken into consideration; being prepared is important, but if money is not available, grant attainment becomes quite difficult. Faculty members who can potentially achieve reviewer status (of grant proposals) could gain quite a bit of experience on the grant application process for future research of their own.

Last, the remaining barriers identified by this and other research studies could use more exploration, as well (Monahan, 1993; Dooley, 1995; Boyer & Cockriel, 1998; Walden & Bryan, 2010). These barriers include: (a) a lack of time due to teaching, advising, service, and other aspects of scholarly duties; (b) a lack of advance notice of available grants to pursue; (c) seeking external funding sources; (d) preparing proposals and budgets; (e) getting necessary approvals; and (f) dealing with campus business staff (distribution and management of funds). Motivators are also very important to focus on to continue the process of seeking and applying for grants. Yet, if the barriers could potentially be reduced and/or eliminated in some universities, grant proposal preparation may possibly increase along with research efforts by all levels of faculty.

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APPENDIX A

Survey Questions

APPENDIX A

Survey Questions

1. **Gender**

   Female

   Male

2. **Faculty Rank**

   Assistant Professor

   Associate Professor

   Professor

   Other: Please specify: _____

3. **Is your faculty appointment primarily Clinical or Research?**

   No

   Yes, Clinical

   Yes, Research

4. **Tenure Status**

   Tenured

   Tenure-Track

   Non-Tenure Track

5. **Do you have a grant seeking component to your workload? How many hours are required of your overall workload?**

   Yes

   No

   # of required hours: _____

6. **Graduate degrees earned? Check all that apply.**

Doctorate (EdD) Discipline: _____

Doctorate (PhD) Discipline: _____

Doctorate (other) Specify Degree and Discipline: _____

Master's Degree and Discipline: _____

Other: Please Specify Degree and Discipline: _____

7. **Total professional experience as a faculty member**

0 - ≤2 years

>2 - ≤5 years

>5 - ≤10 years

>10+ years

8. **Discipline of Major Faculty Appointment**

Agriculture

Architecture and Related Programs

Biological Sciences

Business

Computer and Information Sciences

Education

Engineering

Fine Arts & Humanities

Health Professions

Law

Physical Sciences

Social Sciences

Other: Please list _____

9. **How many external grants have you applied for since you became a full-time faculty member?**

0

1-5

6-10

11-20

20+

10. **How many external grants have you been awarded since you became a full-**

    time faculty member?

0

1-5

6-10

11-20

20+

11. **How much total money have you acquired through successful external grant**

    applications?

$1 - $10,000

$10,001 - $100,000

$100,001 - $500,000

$500,001 - $1,000,000

$1,000,001+

12. How often do you look for grants to apply for?

Never

Daily

Weekly

Monthly

Annually

13. How often do you apply for the grants you find?

Never

Occasionally

Always

Below are statements with which you may agree or disagree. Using the five point scale below, please indicate your level of agreement with each item.

1 = strongly agree
2 = agree
3 = neither agree or disagree
4 = disagree
5 = strongly disagree
n/a = not applicable

1. During my undergraduate education, it was required for students to conduct original research in my resultant degree field.	① ② ③ ④ ⑤ n/a
2. Grant writing education was incorporated into my undergraduate education through direct assignments focused on preparing a mock grant proposal.	① ② ③ ④ ⑤ n/a
3. Grant writing education was incorporated into my undergraduate education through research training (quantitative) to assist in preparing a grant proposal.	① ② ③ ④ ⑤ n/a
4. Grant writing education was incorporated into my undergraduate education through research training (qualitative) to assist in preparing a grant proposal.	① ② ③ ④ ⑤ n/a
5. During my graduate education (Master's), it was required for students to conduct original research in my resultant degree field.	① ② ③ ④ ⑤ n/a
6. Grant writing education was incorporated into my graduate education (Master's) through direct assignments focused on preparing a mock grant proposal.	① ② ③ ④ ⑤ n/a

7. Grant writing education was incorporated into my graduate education (Master's) through research training (quantitative) to assist in preparing a grant proposal.	①②③④⑤ n/a
8. Grant writing education was incorporated into my graduate education (Master's) through research training (qualitative) to assist in preparing a grant proposal.	①②③④⑤ n/a
9. Grant writing education was incorporated into my graduate education (Doctorate) through direct assignments focused on preparing a mock grant proposal.	①②③④⑤ n/a
10. Grant writing education was incorporated into my graduate education (Doctorate) through research training (quantitative) to assist in preparing a grant proposal.	①②③④⑤ n/a
11. Grant writing education was incorporated into my graduate education (Doctorate) through research training (qualitative) to assist in preparing a grant proposal.	①②③④⑤ n/a
12. During my graduate education (Doctorate), it was required for students to conduct original research in my resultant degree field.	①②③④⑤ n/a
13. Writing a grant proposal was part of my terminal degree.	①②③④⑤ n/a
14. Education provided in an undergraduate grant writing course has helped me feel confident when writing a grant proposal.	①②③④⑤ n/a
15. Education provided in a graduate grant writing course has helped me feel confident when writing a grant proposal.	①②③④⑤ n/a
16. Education provided in an undergraduate quantitative research course has helped me feel confident when writing a grant proposal.	①②③④⑤ n/a
17. Education provided in a graduate quantitative research course has helped me feel confident when writing a grant proposal.	①②③④⑤ n/a
18. Education provided in an undergraduate qualitative research course has helped me feel confident when writing a grant proposal.	①②③④⑤ n/a

19. Education provided in a graduate qualitative research course has helped me feel confident when writing a grant proposal.	①②③④⑤ n/a
20. A funding source seminar/workshop i.e. NIH, NSF, USDA, NEH, etc. has helped me feel confident when writing a grant proposal.	①②③④⑤ n/a
21. Experiencing grant proposal writing education (i.e. education in undergrad/grad education) encouraged me to apply for an external grant.	①②③④⑤ n/a
22. Experiencing grant writing education (i.e. an educational seminar/workshop from an external funding source i.e. NIH, NSF, USDA, NEH, etc.) would encourage me to apply for an external grant.	①②③④⑤ n/a
23. Being formally educated in grant writing is the norm in my area of discipline.	①②③④⑤ n/a
24. Informal grant writing education (i.e. "learn as you go" or "trial and error" through personal or collaborative efforts among colleagues) has made me feel confident when writing a grant proposal.	①②③④⑤ n/a
25. Experiencing informal grant writing education (i.e. "learn as you go", "trial and error") would encourage me to apply for an external grant.	①②③④⑤ n/a
26. Being informally educated in grant writing is the norm in my area of discipline.	①②③④⑤ n/a
27. My university offers grant writing assistance programs through the Sponsored Programs/Research Development office.	①②③④⑤ n/a
28. The grant writing assistance programs through the Sponsored Programs/Research Development office are very helpful.	①②③④⑤ n/a
29. Formal workshops are most helpful to me when I write a grant proposal.	①②③④⑤ n/a
30. Informal situations are most helpful to me when I write a grant proposal.	①②③④⑤ n/a

Open-Ended Questions

1. What types of grant writing education have you participated in (internal, external, competitive, non-competitive)? What value did it have, if any?

2. When applying for an external grant, do you consider the type of grant (non-competitive vs. peer-reviewed/juried) before preparing a proposal? Is one more attractive than the others? Why or why not?

3. How many grants have you received as a student? How many grants have you received as a faculty member?

4. What are the barriers, if any, that prevent you from preparing external grant proposals? What are the motivators, if any, that promote you to prepare external grant proposals?

5. Do you feel prepared from your undergraduate and/or graduate education to create a grant proposal for external funding? Why or why not?

6. How do you define "success" in regard to writing grant proposals?

7. How could you have been better prepared for the expectation of grant proposal writing at the university level?

8. Would you like more opportunities to formally learn how to prepare a grant proposal? If so, what types of opportunities would you benefit from most?

9. What additional comments do you have regarding grant proposal preparation?

APPENDIX B

Individual Development and Educational Assessment (IDEA)
List of Discipline Codes

APPENDIX B

Individual Development and Educational Assessment (IDEA) List of Discipline Codes

1. Agriculture
• Agricultural & Extension Education
• Agriculture—Vocational Education
• Animal Science
• Forest Biology
• Landscape Architecture
• Plant Sciences
• Range Science
• Soil Science
• Veterinary Medicine

2. Architecture and Related Programs
• Architectural Environmental Design
• Architectural Urban Design and Planning
• Architecture
• City/Urban, Community, and Regional Planning
• Interior Architecture
• Landscape Architecture

3. Biological Sciences
• Biochemistry
• Bioinformatics
• Botany
• Genetics
• Microbiology & Immunology
• Zoology & Physiology

4. Business
• Accounting
• Business
• Business Administration
• Business Management
• Finance
• Management
• Management Information Systems
• Marketing
• Organizational Behavior

5. Computer and Information Sciences
• Computer Programming
• Computer Science
• Computer Systems Analysis
• Data Processing Technology

6. Education
• Business Education
• Education
• Education Administration
• Education Leadership
• Educational Foundations
• Educational Psychology
• Exercise Physiology
• Health Education
• Health Education & Promotion
• Higher Ed Administration/Leadership
• Instructional Leadership
• Kinesiology
• Mathematics Education
• Physical Education
• Special Education

7. Engineering
• Chemical Engineering
• Electrical Engineering
• Engineering
• Engineering Management
• Environmental Engineering
• Materials Science & Engineering
• Mechanical Engineering

8. Fine Arts & Humanities
• American Studies
• Area Studies
• Communications/Communication Technology
• English
• Ethnic, Minority, and Gender Studies
• Folklore and American Studies
• Foreign Language Studies
• History
• Humanities
• Journalism
• Music
• Philosophy

• Romance Languages & Literatures
• Theatre
• Visual and Performing Arts

9. Health Professions
• Audiology
• Health
• Medicine
• Occupational Therapy
• Pathology
• Pharmacy
• Physical Therapy
• Public Health
• Speech Language Pathology
• Speech Pathology

10. Law
• Law
• WTO Trade Law

11. Physical Sciences
• Chemistry
• Geology
• Mathematics
• Physics
• Statistics
• Statistics & Quantitative Methods

12. Social Sciences
• Clinical Psychology
• Criminal Justice
• Economics
• Geography
• Linguistic Anthropology
• Political Science
• Psychology
• Public Administration
• Social Ecology
• Social Work

APPENDIX C

**Council on Higher Education Accreditation (CHEA)
Regional Accrediting Organization List**

Council on Higher Education Accreditation (CHEA) Regional Accrediting

Organization List

This appendix represents each category of accrediting bodies by region, which was also

paired with the Carnegie Classification list of institutions to determine inclusion criteria

in this research study. Each institution represented in this study is considered a **Doctoral**

University. This category includes institutions that awarded at least 20

research/scholarship doctoral degrees during the update year (this does not include

professional practice doctoral-level degrees, such as the JD, MD, PharmD, DPT, etc.). It

also excludes Special Focus Institutions and Tribal Colleges. Each institution is then

ranked as follows:

R1: Doctoral Universities – Highest research activity

R2: Doctoral Universities – Higher research activity

R3: Doctoral Universities – Moderate research activity

Each institution was randomly selected using the criteria mentioned above. Six

out of seven regional accrediting scopes are represented in the research study, along with

equal numbers of Carnegie classified Doctoral Universities ($R1_n = 4$, $R2_n = 4$, $R3_n = 4$).

Accrediting Commission for Community and Junior Colleges (ACCJC) Western

Association of Schools and Colleges. CHEA-Recognized Scope of Accreditation:

Associate degree-granting institutions in California, Hawaii, the Territories of Guam and

American Samoa, the Commonwealth of the Northern Mariana Islands, the Republic of

Palau, the Federated States of Micronesia, and the Republic of the Marshall Islands

(2003).

Universities represented in this study:

No universities could be represented at this level; they are two-year institutions and thus not included in the Carnegie Classification Doctoral Universities (R1, R2, or R3). This is the only regional accrediting organization that is not represented in the research study.

Middle States Commission on Higher Education (MSCHE). CHEA-Recognized Scope of Accreditation: Degree-granting institutions which offer one or more postsecondary educational programs, including those offered via distance education, of at least one academic year in length in Delaware, the District of Columbia, Maryland, New Jersey, New York, Pennsylvania, Puerto Rico, the Virgin Islands, and other geographical areas outside the United States in which the Commission conducts accrediting activities (2013). Universities represented in this study:

Public: University of Delaware (DE) (R1)

Private: Fairleigh Dickinson University (NJ) (R3)

New England Association of Schools and Colleges (NEASC-CIHE) Commission on Institutions of Higher Education. CHEA-Recognized Scope of Accreditation: The accreditation of institutions that award the bachelor's, master's and doctoral degrees and associate's degree-granting institutions that include in their offerings at least one program in liberal studies or another area of study widely available at the baccalaureate level of regionally accredited colleges and universities in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and internationally (2013). Universities represented in this study:

Public: University Massachusetts - Amherst (R1)

Private: Suffolk University (MA) (R3)

97

Northwest Commission on Colleges and Universities (NWCCU). CHEA-Recognized

Scope of Accreditation: The Northwest Commission on Colleges and

Universities (NWCCU) is an independent, non-profit membership organization

recognized by the U.S. Department of Education as the regional authority on educational

quality and institutional effectiveness of higher education institutions in the seven-state

Northwest region of Alaska, Idaho, Montana, Nevada, Oregon, Utah, and Washington. It

fulfills its mission by establishing accreditation criteria and evaluation procedures by

which institutions are reviewed (2016). Universities represented in this study:

Public: Utah State University (UT) (R2)

Private: Seattle Pacific University (WA) (R3)

Higher Learning Commission (HLC). CHEA-Recognized Scope of Accreditation:

Degree granting institutions incorporated in Arizona, Arkansas, Colorado, Illinois,

Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, New Mexico, North

Dakota, Ohio, Oklahoma, South Dakota, West Virginia, Wisconsin, Wyoming or

federally authorized sovereign nations that are authorized (licensed) by the same state or

nation to award higher degrees (associate, baccalaureate, master's and doctoral degrees

(both research and professional)) (2012). Universities represented in this study:

Public: Oakland University (MI) (R3)

Private: Case Western Reserve University (OH) (R1)

Southern Association of Colleges and Schools Commission on Colleges (SACSCOC).

CHEA-Recognized Scope of Accreditation: Regional accrediting body for degree-

granting institutions of higher education in Alabama, Florida, Georgia, Kentucky,

Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, Virginia,

Latin America, and other Commission approved international sites, including the

accreditation of programs offered via distance and correspondence education within these

institutions (2014). Universities represented in this study:

Public: Florida Atlantic University (FL) (R2)

Private: Baylor University (TX) (R2)

WASC Senior College and University Commission (WSCUC). CHEA-Recognized

Scope of Accreditation: Baccalaureate degree or higher institutions in California, Hawaii,

and the Pacific Basin; institutions that offer programs outside the United States when

such institutions are capable of being reviewed effectively by WASC processes (2014).

Universities represented in this study:

Public: University of Hawaii at Manoa (HI) (R1)

Private: Claremont Graduate University (CA) (R2)

APPENDIX D

Research Questions and Survey Components

APPENDIX D

Research Questions and Survey Components

1. To what extent are faculty members educated on the grant writing process?

    Survey components: Likert 1 -23, Open Ended #1, 4, 5, 7, 8

2. Does formal grant education contribute to the success level of grant acquisition in terms of the numbers of grants submitted and received?

    Survey components: Demo #9, 10, 11, 12, 13, Likert 1 -23, Open Ended #2, 3, 6

3. Does the discipline influence whether faculty members are formally or informally educated on grant writing?

    Survey components: Demo #8, Likert 1 -30, Open Ended #5, 7, 8

4. Does formal or informal education on grant proposal writing affect the amount of funding faculty seek out and attain?

    Survey components: Demo #9, 10, 11, 12, Likert 1 -30, Open Ended #6

APPENDIX E

Emails from Participants

APPENDIX E

Emails from Participants

Emails received directly from contacted participants indicating: (a) removal from the survey list, (b) non-qualification, and/or (c) negativity toward the survey/study. If the following participants would have engaged in the survey, chances are, due to inclusion criteria (being a full-time, grant-seeking faculty member), the survey would have eventually been terminated nonetheless. Either way, here are the responses received via personal email by the primary investigator.

"Hi Kristin,
I just wanted to let you know that because you use ALL CAPS in parts of your email, it was sent to my junk folder. SHOUTING at people doesn't get their attention except to make them annoyed."

"Please remove me from your list. Thank you and best wishes on your endeavors."

"I am not a faculty mbr."

"I retired from active teaching a decade ago and thus am not in a good position to respond to your survey."

"Dear Kristin,
Is this a legitimate email from you? Please remove me from the list."

"Aloha Kristin,
Upon checking with our faculty we are not participating in this survey."

"Please delete me from your list; I am NOT faculty."

"Kristin, you have the wrong e-mail for me. I am retired."

"Please feel free to remove me from your distribution list. This does not apply to me."

"Dear Kristin, I am not a faculty member."

"Dear Kristin, My position does not give me the opportunity to write grants. Thank you for including me."

APPENDIX F, G, and H

Emails to faculty inviting participation

(First, Second, and Final Reminders)

Email to faculty inviting participation

<u>First Reminder – September 21, 2016</u>

Subject: **<u>First Reminder:</u>** Doctoral Dissertation Survey on Grant Proposal Preparation by Higher Education faculty

Dear Faculty Member:

I am writing to ask for your participation in a survey that will examine grant proposal preparation by higher education faculty. If you have already completed this survey, please disregard this reminder.

Research funding is often acquired through competitive external grant proposals and therefore very important for faculty to be well prepared for writing proposals. This study will help fill a gap in the higher education literature regarding formal and informal education that prepares faculty to write grant proposals. This is research for my dissertation for my doctoral degree in Educational Leadership from Idaho State University.

Below is a link that will take you to the survey introduction on Qualtrics and provide details about the survey and informed consent; your participation is of course completely voluntary. The survey requests demographic information, responses to 30 Likert scale statements, and eight open-ended questions. Pilot study respondents indicated a time of approximately 20-30 minutes to complete this survey.

If you would like to participate, please click on the link at the bottom of this page. Instructions for the survey can be found after you log in.

Participant email addresses were collected from an on-line directory at your university. In an attempt to include all full-time, grant-seeking faculty, emails were sent to faculty that carried one of the following titles, according to their universities' website: (a) professor; (b) assistant professor; (c) associate professor; (d) clinical professor; and/or (e) research professor. If you are not a full-time, grant-seeking faculty member, please disregard this participation invitation.

If, however, you are a full-time, grant-seeking faculty member meeting the participation criteria described, I invite you to participate in this survey; please click here to continue. This web page will be available until October 1, 2016.

This survey has been approved by the Human Subjects Committee (IRB-FY2017-23) at Idaho State University. If you would like a hard copy of the survey, respond to this email with your address and I will mail you one.

Kristin M. Shuman, EdD Candidate, CSCS, RSCC

Email to faculty inviting participation

<u>**Second Reminder – September 28, 2016**</u>

Subject: <u>**Second Reminder:**</u> Doctoral Dissertation Survey on Grant Proposal Preparation by Higher Education faculty

Dear Faculty Member:

I am writing to ask for your participation in a survey that will examine grant proposal preparation by higher education faculty. If you have already completed this survey, please disregard this reminder.

Research funding is often acquired through competitive external grant proposals and therefore very important for faculty to be well prepared for writing proposals. This study will help fill a gap in the higher education literature regarding formal and informal education that prepares faculty to write grant proposals. This is research for my dissertation for my doctoral degree in Educational Leadership from Idaho State University.

Below is a link that will take you to the survey introduction on Qualtrics and provide details about the survey and informed consent; your participation is of course completely voluntary. The survey requests demographic information, responses to 30 Likert scale statements, and eight open-ended questions. Pilot study respondents indicated a time of approximately 20-30 minutes to complete this survey.

If you would like to participate, please click on the link at the bottom of this page. Instructions for the survey can be found after you log in.

Participant email addresses were collected from an on-line directory at your university. In an attempt to include all full-time, grant-seeking faculty, emails were sent to faculty that carried one of the following titles, according to their universities' website: (a) professor; (b) assistant professor; (c) associate professor; (d) clinical professor; and/or (e) research professor. If you are not a full-time, grant-seeking faculty member, please disregard this participation invitation.

If, however, you are a full-time, grant-seeking faculty member meeting the participation criteria described, I invite you to participate in this survey; please click here to continue. This web page will be available until October 1, 2016.

This survey has been approved by the Human Subjects Committee (IRB-FY2017-23) at Idaho State University. If you would like a hard copy of the survey, respond to this email with your address and I will mail you one.

Kristin M. Shuman, EdD Candidate, CSCS, RSCC

APPENDIX H

Email to faculty inviting participation

Final Reminder – September 30, 2016

Subject: **Final Reminder:** Doctoral Dissertation Survey on Grant Proposal Preparation by Higher Education faculty

Dear Faculty Member:

PLEASE! I really need your help! I have extended the final deadline of this survey until October 5, 2016. This information could be VERY HELPFUL to all faculty!!

I am writing to ask for your participation in a survey that will examine grant proposal preparation by higher education faculty. If you have already completed this survey, please disregard this reminder.

Research funding is often acquired through competitive external grant proposals and therefore very important for faculty to be well prepared for writing proposals. This study will help fill a gap in the higher education literature regarding formal and informal education that prepares faculty to write grant proposals. This is research for my dissertation for my doctoral degree in Educational Leadership from Idaho State University.

Below is a link that will take you to the survey introduction on Qualtrics and provide details about the survey and informed consent; your participation is of course completely voluntary. The survey requests demographic information, responses to 30 Likert scale statements, and eight open-ended questions. Pilot study respondents indicated a time of approximately 20-30 minutes to complete this survey.

If you would like to participate, please click on the link at the bottom of this page. Instructions for the survey can be found after you log in.

Participant email addresses were collected from an on-line directory at your university. In an attempt to include all full-time, grant-seeking faculty, emails were sent to faculty that carried one of the following titles, according to their universities' website: (a) professor; (b) assistant professor; (c) associate professor; (d) clinical professor; and/or (e) research professor. If you are not a full-time, grant-seeking faculty member, please disregard this participation invitation.

If, however, you are a full-time, grant-seeking faculty member meeting the participation criteria described, I invite you to participate in this survey; please click here to continue. This web page will be available until October 5, 2016.

This survey has been approved by the Human Subjects Committee (IRB-FY2017-23) at Idaho State University. If you would like a hard copy of the survey, respond to this email with your address and I will mail you one.

Kristin M. Shuman, EdD Candidate, CSCS, RSCC

APPENDIX I

Nonsignificant Results by Table and Regression Number

Nonsignificant Results by Table and Regression Number

**Independent variable(s) listed in table as Predictor(s); Dependent variable listed as dependent variable.

Table I1: *Regression 2*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.000[a]	.000	-.028	.463

a. Predictors: (Constant), Q8 - Area of Discipline:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.000	1	.000	.000	.998[b]
	Residual	7.711	36	.214		
	Total	7.711	37			

a. Dependent Variable: Q14_2 - Grant writing education was incorporated into my undergraduate education th...

b. Predictors: (Constant), Q8 - Area of Discipline:

Table I2: *Regression 3*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.103[a]	.011	-.017	.987

a. Predictors: (Constant), Q8 - Area of Discipline:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.379	1	.379	.389	.537[b]
	Residual	35.095	36	.975		
	Total	35.474	37			

a. Dependent Variable: Q14_3 - Grant writing education was incorporated into my undergraduate education th...

b. Predictors: (Constant), Q8 - Area of Discipline:

Table I3: *Regression 4*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.069[a]	.005	-.023	1.119

a. Predictors: (Constant), Q8 - Area of Discipline:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.214	1	.214	.171	.682[b]
	Residual	45.049	36	1.251		
	Total	45.263	37			

a. Dependent Variable: Q14_4 - Grant writing education was incorporated into my undergraduate education th...

b. Predictors: (Constant), Q8 - Area of Discipline:

Table I4: *Regression 5*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.168[a]	.028	.001	1.531

a. Predictors: (Constant), Q8 - Area of Discipline:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.448	1	2.448	1.044	.314[b]
	Residual	84.394	36	2.344		
	Total	86.842	37			

a. Dependent Variable: Q14_5 - During my graduate education (Master's level), it was required for students...

b. Predictors: (Constant), Q8 - Area of Discipline:

Table I5: *Regression 6*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.084[a]	.007	-.021	2.152

a. Predictors: (Constant), Q8 - Area of Discipline:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.188	1	1.188	.257	.616[b]
	Residual	166.706	36	4.631		
	Total	167.895	37			

a. Dependent Variable: Q14_6 - Grant writing education was incorporated into my graduate education (Master...

b. Predictors: (Constant), Q8 - Area of Discipline:

Table I6: *Regression 7*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.139[a]	.019	-.008	1.965

a. Predictors: (Constant), Q8 - Area of Discipline:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.755	1	2.755	.713	.404[b]
	Residual	139.060	36	3.863		
	Total	141.816	37			

a. Dependent Variable: Q14_7 - Grant writing education was incorporated into my graduate education (Master...

b. Predictors: (Constant), Q8 - Area of Discipline:

Table I7: *Regression 8*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.178[a]	.032	.005	1.957

a. Predictors: (Constant), Q8 - Area of Discipline:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.486	1	4.486	1.172	.286[b]
	Residual	137.856	36	3.829		
	Total	142.342	37			

a. Dependent Variable: Q14_8 - Grant writing education was incorporated into my graduate education (Master...

b. Predictors: (Constant), Q8 - Area of Discipline:

Table I8: *Regression 9*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.110[a]	.012	-.015	.627

a. Predictors: (Constant), Q8 - Area of Discipline:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.173	1	.173	.440	.511[b]
	Residual	14.143	36	.393		
	Total	14.316	37			

a. Dependent Variable: Q14_9 - During my graduate education (Doctorate level), it was required for student...

b. Predictors: (Constant), Q8 - Area of Discipline:

Table I9: *Regression 10*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.158[a]	.025	-.002	1.448

a. Predictors: (Constant), Q8 - Area of Discipline:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.925	1	1.925	.918	.344[b]
	Residual	75.470	36	2.096		
	Total	77.395	37			

a. Dependent Variable: Q14_10 - Grant writing education was incorporated into my graduate education (Doctor...

b. Predictors: (Constant), Q8 - Area of Discipline:

Table I10: *Regression 11*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.013[a]	.000	-.028	1.436

a. Predictors: (Constant), Q8 - Area of Discipline:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.013	1	.013	.006	.938[b]
	Residual	74.198	36	2.061		
	Total	74.211	37			

a. Dependent Variable: Q14_11 - Grant writing education was incorporated into my graduate education (Doctor...

b. Predictors: (Constant), Q8 - Area of Discipline:

Table I11: *Regression 12*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.180[a]	.032	.005	1.450

a. Predictors: (Constant), Q8 - Area of Discipline:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.449	1	2.449	1.166	.288[b]
	Residual	73.551	35	2.101		
	Total	76.000	36			

a. Dependent Variable: Q14_12 - Grant writing education was incorporated into my graduate education (Doctor...

b. Predictors: (Constant), Q8 - Area of Discipline:

Table I12: *Regression 13*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.015[a]	.000	-.028	1.392

a. Predictors: (Constant), Q8 - Area of Discipline:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.016	1	.016	.008	.929[b]
	Residual	69.800	36	1.939		
	Total	69.816	37			

a. Dependent Variable: Q14_13 - Writing a grant proposal was part of my terminal degree.

b. Predictors: (Constant), Q8 - Area of Discipline:

Table I13: *Regression 17*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.158[a]	.025	-.002	1.076

a. Predictors: (Constant), Q8 - Area of Discipline:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.066	1	1.066	.921	.344[b]
	Residual	41.697	36	1.158		
	Total	42.763	37			

a. Dependent Variable: Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

b. Predictors: (Constant), Q8 - Area of Discipline:

Table I14: *Regression 18*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.295[a]	.087	.062	1.147

a. Predictors: (Constant), Q8 - Area of Discipline:

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.511	1	4.511	3.427	.072[b]
	Residual	47.384	36	1.316		
	Total	51.895	37			

a. Dependent Variable: Q14_26 - Being informally educated in grant proposal preparation is the norm in my a...

b. Predictors: (Constant), Q8 - Area of Discipline:

Table I15. *Regression 20*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.605[a]	.365	-.088	.769

a. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.151	15	.477	.806	.661[b]
	Residual	12.417	21	.591		
	Total	19.568	36			

a. Dependent Variable: Q12 - How often do you look for grants to apply for?

b. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

Table I16. *Regression 22*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.593[a]	.352	-.111	1.356

a. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.967	15	1.398	.760	.703[b]
	Residual	38.600	21	1.838		
	Total	59.568	36			

a. Dependent Variable: Q9 - How many external grants have you applied for since you became a full time...

b. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

Table I17. *Regression 22 Coefficients*

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.048	3.005		.016	.987
	Q14_1 - During my undergraduate education, it was required for students to conduct...	.180	.194	.206	.932	.362
	Q14_2 - Grant writing education was incorporated into my undergraduate education th...	.733	.688	.263	1.065	.299
	Q14_3 - Grant writing education was incorporated into my undergraduate education th...	.431	.580	.331	.743	.466
	Q14_4 - Grant writing education was incorporated into my undergraduate education th...	-.497	.504	-.431	-.986	.335
	Q14_5 - During my graduate education (Master's level), it was required for students...	-.288	.249	-.342	-1.154	.261
	Q14_6 - Grant writing education was incorporated into my graduate education (Master...	-.100	.377	-.162	-.264	.794
	Q14_7 - Grant writing education was incorporated into my graduate education (Master...	-.795	.724	-1.193	-1.097	.285
	Q14_8 - Grant writing education was incorporated into my graduate education (Master...	1.030	.904	1.544	1.140	.267
	Q14_9 - During my graduate education (Doctorate level), it was required for student...	-.284	.434	-.139	-.654	.520
	Q14_10 - Grant writing education was incorporated into my graduate education (Doctor...	-.023	.301	-.026	-.077	.940
	Q14_11 - Grant writing education was incorporated into my graduate education (Doctor...	.239	.293	.261	.817	.423
	Q14_12 - Grant writing education was incorporated into my graduate education (Doctor...	-.503	.358	-.568	-1.406	.174
	Q14_13 - Writing a grant proposal was part of my terminal degree.	.190	.262	.204	.728	.475
	Q14_23 - Being formally educated in grant proposal preparation is the norm in my are...	-.028	.217	-.029	-.128	.900
	Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro...	.206	.218	.223	.945	.355

a. Dependent Variable: Q9 - How many external grants have you applied for since you became a full time...

Table I18. *Regression 23*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.641[a]	.411	-.010	1.264

a. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23.420	15	1.561	.977	.508[b]
	Residual	33.553	21	1.598		
	Total	56.973	36			

a. Dependent Variable: Q10 - How many external grants have you been awarded since you became a full-time...

b. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

Table I19. *Regression 24*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.569[a]	.324	-.159	1.942

a. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37.952	15	2.530	.671	.784[b]
	Residual	79.237	21	3.773		
	Total	117.189	36			

a. Dependent Variable: Q11 - How much total money have you acquired through successful grant application...

b. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

117

Table I20. *Regression 24 Coefficients*

	Coefficients^a					
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	-2.833	4.305		-.658	.518
	Q14_1 - During my undergraduate education, it was required for students to conduct...	.283	.277	.230	1.020	.319
	Q14_2 - Grant writing education was incorporated into my undergraduate education th...	1.209	.986	.309	1.227	.234
	Q14_3 - Grant writing education was incorporated into my undergraduate education th...	.441	.831	.241	.530	.602
	Q14_4 - Grant writing education was incorporated into my undergraduate education th...	-.419	.722	-.259	-.581	.568
	Q14_5 - During my graduate education (Master's level), it was required for students...	-.031	.357	-.026	-.086	.932
	Q14_6 - Grant writing education was incorporated into my graduate education (Master...	-.134	.540	-.156	-.249	.806
	Q14_7 - Grant writing education was incorporated into my graduate education (Master...	-1.000	1.038	-1.070	-.964	.346
	Q14_8 - Grant writing education was incorporated into my graduate education (Master...	1.133	1.295	1.211	.875	.392
	Q14_9 - During my graduate education (Doctorate level), it was required for student...	-.639	.622	-.223	-1.026	.316
	Q14_10 - Grant writing education was incorporated into my graduate education (Doctor...	.129	.432	.105	.300	.767
	Q14_11 - Grant writing education was incorporated into my graduate education (Doctor...	.062	.419	.048	.148	.884
	Q14_12 - Grant writing education was incorporated into my graduate education (Doctor...	-.528	.512	-.425	-1.030	.315
	Q14_13 - Writing a grant proposal was part of my terminal degree.	.241	.375	.184	.643	.527
	Q14_23 - Being formally educated in grant proposal preparation is the norm in my are...	-.007	.312	-.005	-.022	.983
	Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro...	.056	.312	.043	.179	.860

a. Dependent Variable: Q11 - How much total money have you acquired through successful grant application...

Table I21. *Regression 25*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.640[a]	.410	-.012	2.435

a. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	86.404	15	5.760	.971	.513[b]
	Residual	124.515	21	5.929		
	Total	210.919	36			

a. Dependent Variable: Q14_14 - Education provided in an undergraduate grant writing course has helped me f...

b. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

Table I22. *Regression 27*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.732[a]	.536	.205	1.819

a. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	80.385	15	5.359	1.619	.152[b]
	Residual	69.507	21	3.310		
	Total	149.892	36			

a. Dependent Variable: Q14_16 - Education provided in an undergraduate quantitative research course has hel...

b. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

Table I23. *Regression 29*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.713[a]	.508	.156	1.858

a. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	74.820	15	4.988	1.445	.214[b]
	Residual	72.477	21	3.451		
	Total	147.297	36			

a. Dependent Variable: Q14_18 - Education provided in an undergraduate qualitative research course has help...

b. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

Table I24. *Regression 31*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.738[a]	.545	.220	1.496

a. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	56.268	15	3.751	1.677	.135[b]
	Residual	46.975	21	2.237		
	Total	103.243	36			

a. Dependent Variable: Q14_20 - A funding source seminar/workshop (i.e. NIH, NSF, USDA, NEH, etc.) has help...

b. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

Table I25. *Regression 32*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.752[a]	.565	.255	1.542

a. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	64.970	15	4.331	1.821	.101[b]
	Residual	49.949	21	2.379		
	Total	114.919	36			

a. Dependent Variable: Q14_22 - Experiencing grant proposal writing education through an educational semina...

b. Predictors: (Constant), Q14_29 - Formal seminars/workshops are most helpful to me when I prepare a grant pro..., Q14_2 - Grant writing education was incorporated into my undergraduate education th..., Q14_9 - During my graduate education (Doctorate level), it was required for student..., Q14_11 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_1 - During my undergraduate education, it was required for students to conduct..., Q14_23 - Being formally educated in grant proposal preparation is the norm in my are..., Q14_6 - Grant writing education was incorporated into my graduate education (Master..., Q14_13 - Writing a grant proposal was part of my terminal degree., Q14_10 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_3 - Grant writing education was incorporated into my undergraduate education th..., Q14_5 - During my graduate education (Master's level), it was required for students..., Q14_12 - Grant writing education was incorporated into my graduate education (Doctor..., Q14_4 - Grant writing education was incorporated into my undergraduate education th..., Q14_7 - Grant writing education was incorporated into my graduate education (Master..., Q14_8 - Grant writing education was incorporated into my graduate education (Master...

Table I26. *Regression 33*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.272[a]	.074	-.038	.819

a. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.767	4	.442	.659	.625[b]
	Residual	22.128	33	.671		
	Total	23.895	37			

a. Dependent Variable: Q12 - How often do you look for grants to apply for?

b. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

Table I27. *Regression 34*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.177[a]	.031	-.086	.338

a. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.123	4	.031	.268	.896[b]
	Residual	3.772	33	.114		
	Total	3.895	37			

a. Dependent Variable: Q13 - How often do you apply for the grants you find?

b. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

Table I28. *Regression 33 Coefficients*

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3.596	.364		9.886	.000
	Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro...	.109	.174	.143	.625	.536
	Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...	-.055	.179	-.073	-.306	.762
	Q14_26 - Being informally educated in grant proposal preparation is the norm in my a...	.124	.119	.183	1.044	.304
	Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal.	.061	.211	.074	.287	.776

a. Dependent Variable: Q12 - How often do you look for grants to apply for?

Table I29. *Regression 34 Coefficients*

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.052	.150		13.664	.000
	Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro...	-.031	.072	-.102	-.438	.664
	Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...	-.056	.074	-.186	-.760	.453
	Q14_26 - Being informally educated in grant proposal preparation is the norm in my a...	.025	.049	.090	.504	.618
	Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal.	.066	.087	.199	.752	.457

a. Dependent Variable: Q13 - How often do you apply for the grants you find?

Table I30. *Regression 38*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.221[a]	.049	-.067	2.499

a. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.549	4	2.637	.422	.791[b]
	Residual	206.003	33	6.243		
	Total	216.553	37			

a. Dependent Variable: Q14_14 - Education provided in an undergraduate grant writing course has helped me f...

b. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

Table I31. *Regression 38 Coefficients*

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.658	1.110		2.395	.022
	Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro...	.267	.532	.116	.501	.619
	Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...	-.482	.547	-.214	-.880	.385
	Q14_26 - Being informally educated in grant proposal preparation is the norm in my a...	-.299	.362	-.147	-.826	.415
	Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal.	.427	.645	.173	.662	.513

a. Dependent Variable: Q14_14 - Education provided in an undergraduate grant writing course has helped me f...

Table I32. *Regression 39*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.378[a]	.143	.039	2.073

a. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23.693	4	5.923	1.378	.263[b]
	Residual	141.807	33	4.297		
	Total	165.500	37			

a. Dependent Variable: Q14_15 - Education provided in a graduate grant writing course has helped me feel co...

b. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

Table I33. *Regression 40*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.181[a]	.033	-.085	2.159

a. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.202	4	1.301	.279	.889[b]
	Residual	153.771	33	4.660		
	Total	158.974	37			

a. Dependent Variable: Q14_16 - Education provided in an undergraduate quantitative research course has hel...

b. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

Table I34. *Regression 40 Coefficients*

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.417	.959		2.521	.017
	Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro...	.351	.459	.178	.764	.450
	Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...	-.156	.473	-.081	-.331	.743
	Q14_26 - Being informally educated in grant proposal preparation is the norm in my a...	-.007	.313	-.004	-.021	.983
	Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal.	.131	.557	.062	.235	.816

a. Dependent Variable: Q14_16 - Education provided in an undergraduate quantitative research course has hel...

Table I35. *Regression 41*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.399[a]	.159	.057	1.784

a. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.871	4	4.968	1.561	.208[b]
	Residual	104.998	33	3.182		
	Total	124.868	37			

a. Dependent Variable: Q14_17 - Education provided in a graduate quantitative research course has helped me...

b. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

Table I36. *Regression 41 Coefficients*

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.704	.792		2.150	.039
	Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro...	.128	.380	.073	.338	.738
	Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...	.016	.391	.010	.042	.967
	Q14_26 - Being informally educated in grant proposal preparation is the norm in my a...	-.212	.259	-.137	-.821	.417
	Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal.	.647	.461	.345	1.404	.170

a. Dependent Variable: Q14_17 - Education provided in a graduate quantitative research course has helped me...

Table I37. *Regression 42*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.348[a]	.121	.015	2.049

a. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.099	4	4.775	1.137	.356[b]
	Residual	138.612	33	4.200		
	Total	157.711	37			

a. Dependent Variable: Q14_18 - Education provided in an undergraduate qualitative research course has help...

b. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

Table I38. *Regression 42 Coefficients*

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.809	.911		1.987	.055
	Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro...	.398	.436	.203	.912	.368
	Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...	-.293	.449	-.153	-.653	.518
	Q14_26 - Being informally educated in grant proposal preparation is the norm in my a...	.110	.297	.063	.372	.713
	Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal.	.541	.529	.257	1.023	.314

a. Dependent Variable: Q14_18 - Education provided in an undergraduate qualitative research course has help...

Table I39. *Regression 43*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.415[a]	.172	.072	1.827

a. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.869	4	5.717	1.714	.171[b]
	Residual	110.105	33	3.337		
	Total	132.974	37			

a. Dependent Variable: Q14_19 - Education provided in a graduate qualitative research course has helped me...

b. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

Table I40. *Regression 43 Coefficients*

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.871	.812		2.305	.028
	Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro...	.417	.389	.232	1.073	.291
	Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...	-.067	.400	-.038	-.167	.868
	Q14_26 - Being informally educated in grant proposal preparation is the norm in my a...	-.245	.265	-.153	-.923	.363
	Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal.	.515	.472	.266	1.092	.283

a. Dependent Variable: Q14_19 - Education provided in a graduate qualitative research course has helped me...

Table I41. *Regression 44*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.391[a]	.153	.050	1.630

a. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.816	4	3.954	1.489	.228[b]
	Residual	87.658	33	2.656		
	Total	103.474	37			

a. Dependent Variable: Q14_20 - A funding source seminar/workshop (i.e. NIH, NSF, USDA, NEH, etc.) has help...

b. Predictors: (Constant), Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...

Table I42. *Regression 45*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.253[a]	.064	-.049	1.043

a. Predictors: (Constant), Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t..., Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.453	4	.613	.564	.691[b]
	Residual	35.889	33	1.088		
	Total	38.342	37			

a. Dependent Variable: Q14_27 - My university offers grant writing assistance programs through the Sponsore...

b. Predictors: (Constant), Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t..., Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal.

Table I43. *Regression 45 Coefficients*

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.515	.463		3.270	.003
	Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t...	.030	.228	.032	.133	.895
	Q14_26 - Being informally educated in grant proposal preparation is the norm in my a...	.070	.151	.081	.461	.648
	Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal.	.168	.269	.162	.624	.537
	Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro...	.050	.222	.052	.226	.823

a. Dependent Variable: Q14_27 - My university offers grant writing assistance programs through the Sponsore...

Table I44. *Regression 46*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.419[a]	.176	.076	1.477

a. Predictors: (Constant), Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t..., Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.366	4	3.842	1.761	.160[b]
	Residual	72.002	33	2.182		
	Total	87.368	37			

a. Dependent Variable: Q14_28 - The grant writing assistance programs through the Sponsored Programs/Resear...

b. Predictors: (Constant), Q14_24 - Informal grant writing education (i.e. "learn as you go" or "trial and erro..., Q14_26 - Being informally educated in grant proposal preparation is the norm in my a..., Q14_25 - Experiencing informal grant writing education (i.e. "learn as you go" or "t..., Q14_30 - Informal situations are most helpful to me when I prepare a grant proposal.

APPENDIX J

Open Ended Questions and Responses

Open Ended Questions and Responses

Comments were transferred verbatim from open-ended responses. Errors were not corrected.

Q15 - What types of grant writing education have you participated in (internal, external, competitive, non-competitive)? What value did they have, if any?

None
None
External, competitive
Learn as you go. Most grant workshops were on process and not on content development.
Internal and external-very hlpufl in providing key ponts and major areas to address.
None
internal; helpful to understand the components of the grant application
NINR workshop, internal department and college workshops; helpful but tend to work with mentors not necessarily from these workshops
Internal
2 day writing workshop was great
All listed. The most useful was experiential training with a mentor.
None
Actual hands on writing of both internal and external competitive scholarships and grants.
external, competitive -- only mildly helpful
Informal by collegial review of proposals and collaborative proposal preparation by/with successful colleagues. This was extremely valuable in learning what to do and what not to do and in developing my own voice.
Internal, external. Not especially valuable except for one workshop that covered a change in proposal format, offered by the funding agency.
NIH Grant Writing Workshop and it was very valuable
all of the above, somewhat helpful
None really. Learned through trial and error. I'm sure that I would have benefited from formal training.
internal, external; good to consider the goals/outcomes
On the job-training

internal only; somewhat

Mostly informal, discussing grants with campus leadership of research organizations. Occasional meeting with program officers from granting agencies during campus visits.

external through graduate program; somewhat helpful but a one-off

Most of the education has either been informal or provided by institutions as a way to equip their faculty and graduate students to develop fundable proposals. NIH offers grant writing courses and they are probably very good but I have never taken one.

internal and nsf seminars with mixed results

internal, agency based. Some value, not too much

internal and external as trainer. Very helpful

external competitive. It was moderately useful

None

A few seminars, not very helpful but I'm an old guy

two NIH workshops, informal staff showing me how to search databases...all very helpful

Internal

Q16 - When applying for an external grant, do you consider the type of grant (non-competitive vs. peer reviewed/juried) before preparing a proposal? Is one more attractive than the others? Why or why not?

only peer reviewed

No

All the grants I apply for are competitive/peer reviewed.

I apply for either, based on what best fits my research topics.

All are competitive. No choice.

It is more about the focus of the grant source rather than the competitive or peer reviewed.

yes, federal grants are more prestigious. But i apply for both because in the end you just want the $ to do the work.

No

peer reviewed is better but easier to write non competitive

Consider money needed

I don't come across non-competitive opportunities

Yes. Peer reviewed grants are preferred as they are generally worth more -- both financially and in terms of prestige.

Peer reviewed NIH or NIH like grant mechanisms.

yes, peer-reviewed grants typically support larger projects

No, I'll apply for all with no discrimination. It's like a lottery, you can't win if you don't play.

I don't know of any non-competitive grants in my field.

No, am not aware of any non-competitive grants in my field

non-competitive, higher likelyhood of ann award but usually less money

Yes. Non-competitive, of course, is the most appealing.

no - only fit for funding to project considered

all of our grant opportunities ware peer reviewed

no...i look for grants that are funding my area of research.

No. I'm usually seeking to fund a particular project and will pursue the best match in terms of funding amount and accessibility.

Non-competitive would be great, but most are competitive and I apply for both

I don't believe I have ever seen a non-competitive proposal in my area of study. Everything is competitive

non-competitive have higher success rates

I have never heard of non-competitive. Sounds good if you can get it!

Yes. I like the competition so I prefer peer reviewed

I almost always apply for peer reviewed proposals. All major funding sources (NIH, NSF, American Heart Association, etc) that I would naturally apply for are strictly peer-reviewed

No

Non-competitive based on reputation is more attractive as if available they are easier to get.

peer-reviewed is better for $$ and tenure/promotion

competetive, peer review

Q17 - How many grants have you received as a student (undergraduate or graduate)? How many grants have you received as a faculty member?

0 as a student; around 40 as a faculty member

One as a postdoctoral fellow, 13 as a faculty

1 as a grad student. 6-8 as a faculty member.

2 as student, more than 5 as a faculty member.

2, and 10

Non as a student but at least 30 as a faculty member (both internal and external)

0 as student, many as faculty member

1/3

none; 6

1, 3

0, 1

As a grad student, I received 2 grants. As a faculty member, I have received >10 grants

4 or 5 as a graduate student, 8 as a faculty member

0 as a student, 23 as a faculty member

Student - 0 external, 2 internal Faculty - 3 internal 10 external

Probably 5 or so; probably 12 or so.

Student = 0, Faculty = 9

5 as a grad student, 15 as a professsional

3/0

0

Graduate Student - 1; Faculty - none (yet!)

as a student I wrote projects that were funded but PI was the center director

None as a student, 7 as a faculty member.

2 internal as grad student, 5 internal, 0 external as faculty

Two as a student. Probably between 15 and 20 as a faculty member but that is a rough count

external grants - 3 as a faculty member, 0 otherwise

0 as student. About 13 as faculty

0 as student; 12 as faculty

Student, 1 (NSF graduate fellowship). Faculty memberL 11 (external competitive) plus a few internal awards that hardly count

0 as student; about 5 as faculty member

1 as student, 15+ as faculty member

graduate=1, faculty = 23

1 as faculty member

0, 15

Q18 - What are the barriers, if any, that prevent you from preparing external grant proposals? What are the motivators, if any, that encourage you to prepare external grant proposals?

barriers used to be the writing part; motivation is to do the research

I am motivated by the excitement of my research program.

No major barriers at present. Motivation is funding my research!

Time is a huge barrier. Lack of resources from our research office.

Time constraints (teaching, actually performing research, service activities, training graduate students, etc.). Need to support research.

Time and in-house support to write and support grant work. Having collaborators is a great motivator.

time is the barrier. A potential positive outcome is the motivator.

finding a grant that would be appropriate for the study

teaching time, committee work including curriculum, faculty search; not having worked as grad /PhD student under someone's wing; other disciplines do this more often and I see the difference in research/grant outcomes; motivator - good for university/school, aspiring for full professorship; grant focused exactly on my area of current research/interest

Time. Help.

teaching load, funding to do my research

Time. The need for resources and funding.

hindrance to preparing proposals: time constraints, balancing family matters having come into marriage and raising a family later in life; encouragement: having to support personnel, supportive academic environment

barriers: my own capacity (can't work more than 100%), funding caps; motivators: funding for large and important projects that would never happen without a grant

Barriers - navigating the research office forms for budget preparation and approval. Motivators - summer salary, drive to do independent research, complete lack of non-competitive internal resources to support independent laboratory-based experimental research

Time. Money.

The major barrier is time management in that is it worth the extensive time committemnet to prepare an R01 when the likelihood of success is low as compared to using that time to submit more manuscripts to journals where there is a good chance of success.

No time. A research requirement.

Lack of time/funding

Time and the high level of competition for grants.

finding time to write proposal / work with finance office, etc.

None

time, skill and support to write larger grants.

Main barriers are the time involved, the low probability of success, and the difficulty of working with the campus grants office. Main motivation is supporting the graduate program and getting to work with graduate students.

Having to compete with the R1 pool while at a smaller university

Barriers are many including time to write and the fact that institutions do not provide protected time to write grants. Everyone wants you to get grants but they want you to create the time to write them above and beyond your other responsibilties. Motivators include the fact that work in my area is hard to do without funding, larger more impactful studies can be done with funding, and staff and faculty need salary support.

My university administration and OSP office are barriers to doing my job effectively. Our Vice Provost for Research is also the head of his own center which is a conflict of interest our university refuses to deal with effectively and that is a de-motivator for grant applications at our institution.

Time is the main barrier. The second is the amount of administrative detail required. Motivators are that it is highly valued in my field and needing money to educate students.

Time is always an issue. The sheer amount of paperwork needed (besides the scientific part) is a time sink. I love the science and the competition so that's all the encouragement I need to prepare a grant.

time is the main barrier. The motivators are financial (they pay summer salary), the provide student support, and I like doing research

Lots of efforts, little chance of success

The time and competitive nature of grant process a barrier. Funding in my former area of research has all but dried up so it is highly competitive.

moving toward retirement

time to do it

time prevent submission.

Q19 - Do you feel prepared from your undergraduate and/or graduate education to create a grant proposal for external funding? Why or why not?

yes prepared; surrounded by excellent faculty who write grants

No. i was trained in the dark ages. i obtained my Ph.D in 1972

My grad education helped a bit, but not a lot. No formal training when I was a grad student in the 1970s.

A little bit, but more education, especially in doctoral program, would be helpful for those pursuing tenure track faculty positions.

No. Learned as I went. No formal training in place.

No--I learned on my own but inour programs now we try to have both an optional formal courses and more importantly opportunities for our graduate students (and some undergrad though rare) work with facutly to write grants.

No

somewhat prepared, but would seek mentorship

no - never applied for grants, not the focus

Learned on the go. Little to no graduate prparation

yes, helped PI write proposals in grad school

No. The training received when I was an undergrad / grad student was woefully inadequate to prepare me for grant writing.

Yes...from my PhD training, I was always involved in assisting with lab grant proposals. Additionally, I completely self-funding 4 of 5 of my graduate years by attaining competitive scholarships and grants

no, most of what i leared about grant proposal prep was through informal means

Graduate-yes. Our qualifying proposal was two independent grant proposals on unrelated topics defended orally in front of a committee. Excellent training. Undergraduate-no. This was not a formal part of the curriculum, nor should it be in my view. There are a lot of end-points with a B.S. that will not require grant preparation.

I was reasonably prepared. I got the first one I applied for.

No, as indicated above I received no formal training in grant writing. My primary preparation came from personal advisement from my doctoral advisor after I completed my degree.

SOmewhat, I had to learnon my own.

Basically learned after becoming a faculty member. My major professor wrote proposals, but didn't involve me directly in those activities.

Somedays, yes. Somedays, no.

I have been fortunate to "win" many large center grants

No

No.

Not really. A couple of days of seminars isn't preparation.

Graduate courses and experiences were good but you cannot learn to write grants without writing them and getting reviews back from the funding agency. Thats how you learn to write a competitive grant.

No - preparation was non-existent when I came through UG/Grad levels

No - no education in this whatsoever

No. There was no formal grant writing training when I was a student, especially at the undergraduate level.

I mainly learned grant writing by watching and helping my PhD mentor prepare grants. That is the way most scientists learn. I think it is the best way. If you count one-on-one interaction with your research mentor as being part of graduate education, then my answer to your question is YES! If you mean a specific course aimed at grant writing taken by a group of students, I never had such a course in undergrad or grad school.

Education did not help; learned from being a co-PI early in my career

NO.

yes, especialy since I have been successful in getting an R01

somewhat - but not as much as I'd like

Q20 - How do you define "success" in regard to writing grant proposals?

receiving funds

meeting the deadline and getting the grant funded.

Initial success is getting a good score from reviewers, but of course ultimate success is being funded.

Receiving grants that help to build upon your research expertise and topics of interest appropriately.

Obtaining funding. Duh.

Success from teh insitutional perspectives is getting udning, but as an individual even if not funded--getting useful feedback is a type of success.

getting the funds

recieving the award and the funds

submitting several a year; using "not funded" critiques to refine proposals; building on pilot work; deciding good use for money

Ultimately getting funding for scholarly work

good reviews and ultimately being funded

Getting funded.

receiving funding

winning funding, or coming close enough to the funding cutoff to warrant a revision and resubmission

Getting funded. Getting great reviews without funding is incredibly gutting and disheartening, it makes the system feel rigged and that I am on the outside.

Um, I get the money? It's pretty clear!

At least scored competitively but preferably funded

Winning an award.

Being funded.

Helpful reviews or getting funded

I have been continually funded since 1985

ideally to get funded, but just writing and completing it is a sucess. even if not funded there is alot of work preparing that can help for other grants

Obviously being awarded the grant is the main definition of success. But writing grant proposals is in itself helpful for organizing my own thinking about a project.

getting the grant

Success is defined several ways. One is the number of grants written. That alone is an indicator of success given the effort required and the lack of protected time provided by most institutions. A second is whether the grant was discussed and scored if you are submitting to NIH. A third is level of the score and percentile rank (again assuming the NIH system) a fifth is whether it got funded and a sixth is the amount of funding secured.

At the very least, resulting in a recommend to fund from NSF,even if they run out of money

Getting grants.

Funding

You get the money

Getting funded; I do not even list failed proposals on my CV

Having them funded.

getting the funding

complete and in on time

Q21 - How could you have been better prepared for the expectation of grant proposal writing at the university level?

I could have had exposure to grant writing in my undergraduate and graduate days

Training at the undergrad and graduate levels.

would have appreciated better training as a grad student and postdoc.

Peer to peer mentoring programs, better oversight from departmental leadership, support through research office.

A course on content development. Ability to generate compelling arguments.

MOre formal training and opportunities as a graduate student.

more formal preparation

formal education and practice

should have been paired with faculty/faculty team and written grants with them, even if on their specific topic; expectations to submit grants as PhD student

Had a class that covered the topic

more time to write

Hands on grant preparation course(s) with a dedicated mentor.

I have been well prepared.

during graduate studies, yes

Perhaps a program like ASM's Kadner Institute, but I had lots of informal and qualitative training already.

More examples of successful proposals.

Formal coursework at the doctoral level

Formal training as a graduate student.

Formal training early in my career would have been helpful.

not sure. but if expected as part of role, support would be helpful

Better integration of grant seeking into the dissertation process. No one told me what was available or that it would be a good idea to apply.

Had it more ingrained in graduate program and having more admin support now.

A committed mentor who is a successful grant writer can make a huge difference to a new assistant professor. That is the single most effective thing I can think of, a mentor who will work hard to help a new faculty member write grants.

If grant writing were an expectation demanded at the phd and postdoctoral level, which it is not. So my bosses wrote the proposals in a vacuum while I did the research/journal article writing

A PhD level course or practicum of some kind.

Since grant writing was not part of the curriculum in the 80's, any training would have helped.

I pretty much knew what I was getting into

Participate as a PhD student

YES.

most definitely

required more of it.

actual grant submission as student

Q22 - Would you like more opportunities to formally learn how to prepare a grant proposal? If so, why types of opportunities would you benefit from most?

not now; earlier in my career would have been helpful

Not at this stage.

No need for that at the current point of my career (likely retirement within 5-6 years)

Yes.

How to write compelling persuasive arguments for your work.

webinars and on-line info are useful. Having ways to connect collaborators would be useful as well.

No

yes: group presentation and then individual meetings for support

not right now

I have learned much on my own know

yes, training targeted to certain funding vehicles

Yes. Preparing SBIR/STTR proposals and CDMRP proposals.

N/A

no, i'm pretty experienced at this point

No.

Nope, I'm good.

Not at this point in my career

Seminars with panel reviewers

At this point, probably not. But I would encourage younger faculty members to do so.

Specific guidance from funding sources

of course

Only if it were highly tailored to a grant that I want to pursue. Generic advice would be pretty worthless at this point. So too are grant workshops focused on other disciplines. (Colleagues and I have wasted a lot of time at proposal development workshops geared to the natural sciences and engineering.

Not sure

I do not because I no longer need it.

Sure, but at this point I am midcareer and would have to overcome the age barrier to grant awarding as well

No, not now.

I've been pretty successful, so I don't think I really need more training, just more time.

Not sure more workshops would be helpful. Maybe if they were VERY targetted to NIH and/or NSF

As a PhD student, work with faculty members on writing a real grant proposal

Not at this point in my career.

not at this point in my career

yes - any type would help me

Q23 - What additional comments do you have regarding grant proposal preparation?

people need to see examples of winning proposals

The culture has changes since I was a student and inmy current institution undergrads and grads are exposed to grant writing in 600-level coursese

This is good info to obtain.

None.

Internal university sup[ort is esesntial for a sucessful progra that includes strong grant success.

need an office that identifies faculty across UD with mutual interests and forming grant writing teams.

No

takes enormous amount of work, sometimes for no positive outcomes; when there are so many responsibilities to faculty role, easy to let grantwriting become lower on prioirty list

Na

Most grant writing seminars I've attended focused too much on how to find the funding sources and budget aspects such as understanding F&A, fringe, etc. Often, I felt that less time was then available for the nitty gritty of developing the science and preparing the proposal. The structure and presentation design of proposals should be emphasized more.

anyone applying for a grant should partner with others who have more experience

Learn how to write well in general terms and read good, entertaining literature. Half the battle is not boring/pissing off reviewers with your own style.

My discipline currently funds at around 8%, so it is very frustrating.

My Office of Sponsored Porgrams needs science oriented personel. That would help tremendously.

None.

My sense is that the assistance has to be highly organic -- built into my research context with feedback from colleagues who know my work and the priorities of the granting agency.

Your numbers of proposals written and received were too coarse to get any accurate information - at 20 years into my faculty position, I have written over 100 grant proposals but 20+ was the highest option. Your questions were poorly designed in this regard.

The best way to learn is through collaboration with experienced grant writers, and through sitting on evaluation panels.

There has to be a way to take some of the burden off the professor in preparing a grant. Writing the scientific part can take up to 100 hrs for a large grant. However, the additional amount of paperwork required by NIH/NSF and other nationally supported funding, continues to grow. The NIH submission I sent in this summer was 84 pages, of which only 13 was about the science. The national funding agencies need to figure out a way to reduce this amount of paperwork to allow the scientist/engineer more time to think about the science.

I could go on forever. 1) You need to be able to write well, or else you need someone to edit your writing. If you use an editor, it must be someone who knows the science well enough to edit scientific writing. This cuts down the options. If you are an Assistant Professor who cannot write well, recruit a native English speaking graduate student who CAN write well, and FORCE that student to edit your proposals. 2) THE BEST WAY TO LEARN HOW TO WRITE GRANTS IS TO SERVE AS A REVIEWER OF GRANT PROPOSALS. Beg NSF and NIH to let you serve on a studey section or review panel. Two days on a review panel is worth 50 grant writing workshops. 3) Here at OU, the group WISE@OU has tried to help new faculty with grant writing. Talk to Kathy Moore (PI for NSF-supported grant that funds WISE@OU) about details. 4) Get some feedback about your grant BEFORE you

submit it. You don't want to find out the obvious weaknesses of your proposal by getting your first round of NIH or NSF review comments back. That loses you 6 months to a year. Both the Office of Research Administration and the Center for Biomedical Research have per-peer reivew services. Most faculty don't take advantage of them because they are running against a deadline. So my advice is to look up the deadline for your garnt, then PRETEND THE DEADLINE IS 2 MONTHS EARLIER, finish the grant two months early, and then get as much feedback as possible. 5) The new Vice President for Research, David Stone, has experience setting up boot camps for new faculty, largely focused on grant writing. Talk to him. He just started last month.

Interesting survey. PhD students in my field (Statistics) indeed should get some better training on this.

It is hard and very competitive. Support for young faculty should continue.

None