Preparing Future Scholars for Academia and Beyond:

A Mixed Method Investigation of Doctoral Students'

Preparedness for Multiple Career Paths

by

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ABSTRACT

This action research study is a mixed methods investigation of doctoral students' preparedness for multiple career paths. PhD students face two challenges preparing for multiple career paths: lack of preparation and limited engagement in conversations about the value of their research across multiple audiences. This study focuses on PhD students' perceived perception of communicating the value of their research across academic and non-academic audiences and on an institutional intervention designed to increase student's proficiency to communicate the value of their PhD research across multiple audiences. Additionally, the study identified ways universities can implement solutions to prepare first-generation PhD students to effectively achieve their career goals.

I developed a course titled Preparing Future Scholars (PFS). PFS was designed to be an institutional intervention to address the fundamental changes needed in the career development of PhD students. Through PFS curricula, PhD students engage in conversations and have access to resources that augment both the traditional PhD training and occupational identity of professorate. The PFS course creates fundamental changes by drawing from David Kolb's Experiential Learning Theory and the Social Cognitive Career Theory (SCCT) developed by Robert Lent, Steven Brown, and Gail Hackett. The SCCT looks at one's self-efficacy beliefs, outcome expectations, goal representation, and the interlocking process of interest development, along with their choice and performance.

I used a concurrent triangulation mixed methods research model that included collecting qualitative and quantitative data over 8 weeks. The results of the study

indicated that PhD students' career preparation should focus on articulating the relevancy of their research across academic and non-academic employment sectors. Additionally, findings showed that PhD students' perception of their verbal and non-verbal skills to communicate the value of their research to both lay and discipline specific audiences were not statistically different across STEM and non-STEM majors, generational status, or gender, but there are statistical differences within each group. PhD programs provide students with the opportunity to cultivate intellectual knowledge, but, as this study illustrates, students would also benefit from the opportunity to nurture and develop practical knowledge and turn "theory into practice."

DEDICATION

This dissertation is dedicated to my amazing husband and daughter. Solomon, your commitment and support through the last three years goes beyond the words I can put on this paper. You have witnessed the tears of doubt and the happy dance often within a span of 24 hours. Thank you for the countless times I just walked up to you and started talking about the social structures within higher education and the interlocking elements of just about everything and anything was like a ray of sunshine preparing me for the next round of reading and writing. You make me laugh and help me persevere through all of the changes life throws at us and I will love you always! My dear Kristina, my munchkin, I can't thank you enough for the countless amounts of time you came into the office and just started massaging my neck and letting me read to you. You brought a smile to my face and warmed my heart asking to help clean up the various piles of books and papers scattered all over the floor. I am a lucky woman with a loving husband and beautiful 13 year old daughter.

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They say it takes a village to raise a child well it also takes a village to get a doctoral student through graduate school. From Rosanne “Mom” who read multiple drafts of my personal statement when I applied to the doctoral program, to Aunt Barb who took countless calls throughout the last three years, listening to my cries of joy and sorrow. My educational journey and professional accomplishments would not have been possible without Dr. Carl Bellone, my Italian Godfather. Carl took me under his wing while I was a work-study student at California University, East Bay. We created Academic Programs and Graduate Studies from a two person operation to a thriving department. You taught me how to be an advocate for graduate students and champion of higher education. I am fortunate to have worked with several great people over the years who have become dear friends to me and my family, Lilliana, Michele, Melissa, and Sandy to name a few. That great environment and support system at work continues today with my boss, Dr. Andrew Webber who allows me to conduct action research and improve our practice of supporting graduate students. Victoria Gaytan, one of the best people I have ever worked with. Without Victoria I truly would be running around like a crazed woman, you kept me on top of all the madness and ensured my schedule was free when it needed to be. Angela Simon, a great graphic designer who turned my research forum flyers into handouts that where worthy of handing out. There are so many great people I work with, like Dr. Pamela Garrett my honorary committee member and colleague who read every chapter of every cycle of my action research study. It was a pleasure to have you as a member of my research team and as a colleague. Michael Manning and Robin Hammond are two other great team members. I thank you for joining

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Chapter 1: Introduction and Context

"Graduate programs need to revamp their curricula, structure, and standards in a way that prepares today's graduate students for a wider range of employment, not just academia"

Leonard Cassuto (2015)

Many scholars have analyzed doctoral students, especially PhD students' career preparedness in specific academic disciplines including areas such as science, technology, engineering, and mathematics (STEM). These researchers overwhelming focus on PhD STEM student demographics, experiences in graduate school, and the obstacles that prevent first-generation students from obtaining or completing a doctoral degree (Allum et al., 2014; Gardner, 2011; Gibbs & Griffin, 2013; Gibbs, Kenneth, Mcgready, Bennett, & Griffin, 2014; Holmesland, Seikkula, Nilsen, Hopfenbeck, & Erik Arnkil, 2010; Nash, 2008; Seay, Lifton, Wuensch, Bradshaw, & McDowelle, 2008). Additionally, many scholars and individuals outside academia typically assume that most PhD students seek academic careers (Bok, 2013; Mayhew, 1972; Enders, 2002; Saenz, Hurtado, Barrera, Wolf, & Yeung, 2007). For various reasons, since the recession of 2007, such career aspirations have become illusive; only a small fraction of PhD recipients secure full-time faculty positions (Berman et al., 2011; Bok, 2013; Cassuto, 2015; Curtis, 2011; Jaschik, 2014; Osborne, Carpenter, Burnett, Rolheiser, & Korpan, 2014).

Difficulties in the academic and non-academic job market have implications for both student and educators (Cassuto, 2015; Golde & Dore, 2001). As educators, we must

provide doctoral students, especially underrepresented first-generation doctoral students, with the tools needed to contribute to emerging bodies of knowledge and innovation in academic and non-academic careers (Barnes & Austin, 2008; Gardner, 2013; Gardner, 2011; Hesli et al., 2006; Porter & Phelps, 2014; Walker, Golde, Jones, Bueschel, & Hutchings, 2008). For the purpose of this study academic careers are seen as any position, faculty or non-faculty classifications, in an educational institution.

Underrepresented and First-Generation Students

The United States Department of Education (DOE), the National Science Foundation (NSF), and the National Institutes of Health (NIH) define underrepresented students as being Black, Hispanic, American Indian/Alaska Native, students who have identified with two or more races, persons with disabilities, women in STEM fields, and families whose annual income falls below established low-income thresholds by the federal government (Department of Education, 2012; NIH, 2009, NSF, 2008). DOE, NSF, and NIH are highly recognized agencies that fund structured professional development programs to provide opportunities for underrepresented, first-generation students. DOE, NSF, and NIH, in addition to many universities, define first-generation as "those whose parents' highest level of education is a high school diploma or less" (Chen, 2005; Nunez & Carroll, 1998). Additionally, research finds that "first-generation" students tend to consist of African Americans, Hispanics, and students from low-income families (Chen, 2005; Choy, 2001; Pizzolato, Chaudhari, Murrell, Podobnik, & Schaeffer, 2008; Rendón, 2006). Although the review of the research highlights the demographic characteristics of first-generation undergraduate students, the profile does not change drastically for doctoral students (Gardner, 2013).

The first-generation doctoral student demographic profile, peer and environmental influences within graduate school, engagement and a sense of belonging on universities campuses, and economic influences all contribute to career-oriented decisions (Barnes & Austin, 2008; Choy, 2001; Gardner, 2013; Gardner & Holley, 2011; Holley & Gardner, 2012; Saenz et al., 2007; Seay, Lifton, Wuensch, Bradshaw, & McDowelle, 2008). Though data is limited on first-generation doctoral students' career-oriented decisions, many universities try to create academic career development opportunities and training programs for underrepresented and first-generation graduate students (Allum et al., 2014; R. A. Cherwitz, 2012; Hirudayaraj, 2011; Holley & Gardner, 2012). Despite these few efforts, literature reveals disproportionate levels of social, academic, and career development between first-generation doctoral students and their peers (Kong, Chakraverty, Jeffe, Andriole, Wathington, Tai, 2013; Nettles, 1990; Ostrove, Stewart, Curtin, 2011). Research findings also show that ethnic racial minority groups, and women, including "first-generation" college students, traditionally have limited access to training and limited exposure to multiple career paths. Overall, there is little or no disagreement that career and professional development for graduate students should improve, but there is a need to focus on the unique characteristics of first-generation, underrepresented doctoral students (Cassuto, 2015; Gardner, 2012b; Gardner, 2013; Lehker & Furlong, 2006; Saenz et al., 2007).

Graduate Student Career Development

Unfortunately, educators in American universities lack diverse and extensive career preparation programs and resources to prepare PhD students for non-academic careers (Baptista, Frick, Holley, Remmik, & Tesch, 2015; Cherwitz, 2012; Etzkowitz,

2003; Force, Study, & Language, 2014). Additionally, in American universities, non-academic career paths are either undervalued by many faculty members or the faculty members lack the knowledge needed to prepare their students for multiple career paths (Bok, 2013; Levin, 2008; Porter & Phelps, 2014). PhD students need opportunities to prepare for multiple career paths and develop "transferable skills," specifically the ability to feel confident communicating the value of their research within and across multiple professional contexts (Berrett, 2013; Dunne & Rawlins, 2000; Engineering, 2005; Gansemer-topf, Ewing, & Johnson, 2006; Harden, Allen, Chau, Parks, & Zanko, 2012; Levin, 2008; NASPAA's Policy Issues Committee, 2010; Walker et al., 2008).

Scholars offer a plethora of definitions for and discussions about around "transferable skills" (Atlay & Harris, 2000; Burke, Jones, & Doherty, 2005; Cryer, 1998; Greenan, Humphreys, & McIlveen, 1997; Haigh & Kilmartin, 1999; Magogwe, Nkosana, & Ntereke, 2014; Porter & Phelps, 2014). These scholars repeatedly include written and verbal communications, team collaboration, problem solving, and socialization as essential "transferable skills" for both academic and non-academic career paths. The aim of this study focused on PhD students' perceived level of preparedness of "transferable skills," primarily verbal and non-verbal communication skills needed for academic and non-academic careers paths. The study also identified the ways universities can cultivate conditions that prepare first-generation PhD students to effectively achieve their career goals and communicate the value of their research to multiple audiences.

Local Context

This research was conducted at a Southwest Public Research I Institution where undergraduate students experience a broad array of professional development options to

explore career paths through degree curricula, electives, internships, and even study abroad opportunities. Unlike undergraduate students, many PhD graduate students lack a broad array of experiences to explore multiple career paths. PhD students develop a singular focus on their area of research in a particular subject matter area that include teaching and/or extensive research training. PhD students at this research site develop their scholarship within academic units that fall under 15 different colleges, schools, and institutes.

As the Director of Graduate Support Initiatives for Graduate Education at a large Public Research I institution, I develop and provide a broad array of professional development experiences for all graduate students through the Community of Scholars (CoS) Program. These CoS professional development programs and diversity initiatives include a structured university-wide Teaching Assistant Development (TAD) Program and the Interdisciplinary Research Colloquium (IRC). These CoS structured professional development programs provide opportunities for graduate students, many underrepresented and first-generation, to discuss and share their research, collaborate with peers on interdisciplinary research projects, and develop transferrable skills for multiple career paths. I define a structured program as a for-credit course or a series of workshops under a theme, such as TAD, that a graduate student completes to enhance their professional development for various career opportunities.

PhD students at this research site are exposed to multiple career and professional development opportunities, according to the University Office of Evaluation and Educational Effectiveness (UOEEE). Annually, during 2005-2015, UOEEE found that 80% of students who were graduating with a PhD felt satisfied with career preparation

opportunities and 20% of PhD students want more internship opportunities. This institutional data along with qualitative and quantitative data collected from my pilot studies provide meaningful indicators that support the position that PhD students seek career and professional development opportunities to ensure they are adequately developing "transferable skills" for careers inside and outside the Academy.

Scholars in non-academic sectors and faculty members reaffirm that it is important for PhD students to develop "transferable skills" that go beyond basic research (Wendler et al., 2010). During a pilot study, an engineering faculty member who trains PhD students shared that engineering doctoral students develop skills to find employment in one of three sectors: (a) academia; (b) within a research and development organization; and (c) national laboratories such as the Department of Defense. However, the training varies by engineering department. Thus, individual faculty mentors play a key role in what training occurs (S. Rajan, personal communication, September 9, 2013). In another example, a political science professor stated that most faculty members prepare students to conduct research and work within academia. This may be age-related, and new faculty members who have broader experiences may be more inclined to instruct students in alternative career paths (R. Jones, personal communication, September 10, 2013). Faculty members are the key cog for preparing future scholars for multiple career paths, and these statements reaffirms that there is little institutional or departmental preparation for PhD students at this large Southwest Public Research I Institution or opportunities for developing "transferable skills" for multiple career paths.

Problem and Purpose

Graduate students at a large Southwest Public Research I Institution face two challenges preparing for multiple career paths: (1) lack of exploration to identify multiple career paths and (2) limited engagement to communicate the value of their research across multiple contexts. Value refers to what matters and is of importance to the decision makers in any given context (Dewey, 1939). In this study, I investigated PhD students' perceived level of preparedness for multiple career paths. Preparedness was explored in terms of verbal and non-verbal "communication." I examined participant's self-assessment of their levels of proficiency to communicate the value of research in academic and non-academic settings across STEM and non-STEM disciplines, accounting for gender and generational differences. Generational differences in this study reflects "first-generation" college students who are amongst the underrepresented population earning doctoral degrees in the United States of America. Additionally, I propose how universities can create conditions to further prepare first-generation PhD students to effectively achieve their career goals.

Innovation

As a part of my research and this dissertation, I developed a structured course called Preparing Future Scholars (PFS). As outlined in the syllabus found in Appendix A, the PFS program is a one credit hour, professional development course open to PhD students who have successfully completed their first year of graduate school. The PFS program integrates career exploration, and opportunities for students to communicate the value of their research within and across multiple contexts, through a formal professional development course. Professional development involves continuous learning which can

vary and encompass cycles of long-term or sporadic, individual, or group learning (Guskey, 2000). PhD students, through professional development, especially experiential learning, can explore employment in various contexts (Kolb & Wolfe, 1981). When PhD students were asked during previous pilot studies "How do you feel your educational training/research is preparing you for multiple career paths?", 46.4% of graduate students said they felt slightly prepared, and 11.4% felt they were not at all prepared (N=288). The expansion of professional development through the PFS course provides PhD students the opportunity to hone communication skills with academic or non-academic audiences.

PFS participants explore academic and non-academic organizations and institutions through the University Career Link, a university database of organizations and institutions that seek to hire students from the university. Through this first step of exploration, PFS participants self-identify three organizations and determine how their research interests align with such fields. Participants are encouraged to take a risk and select one organization that challenges the traditional conceptual career pathway, such as a historian in a museum or engineer in a manufacturing firm. The challenge to think outside of their discipline is to promote innovation, develop new knowledge, and turn theory into practice (Baptista et al., 2015). The concept of theory and practice stems from integrated learning and makes connections across settings and over time from one course to the next another, from one discipline to another, and among the academic and non-academic employment sectors (Walker et al., 2008). The second step of the PFS course is for students to prepare to communicate their research with academic or non-academic audiences, including socializing at a PFS "Theory to Practice" mixer. Amidst this process of communication students are building their social capital. Social capital is the process

of building relationships and a social network which will generate a return (Lin, 2001a). Expected returns "consider the reflexive relationship between knowledge [generated by the PFS participants] and its instructional context [within an organization]" bridging the gap between theoretical training and practical application (Crow & Dabars, 2015, p. 177).

This mixed methods research study was the third and final cycle of an action research study. The first two cycles were pilot studies to understand the phenomenon of PhD student career development for multiple career paths. The first cycle focused on characteristics of an interdisciplinary doctoral level professional development course at a large public university that could embrace the Triple Helix theory, which bridges the creation of innovation between university, industry, and government (Etzkowitz, 2011). To further my understanding of career paths for PhD students, I examined the perception of the PhD outside the academy. The second cycle focused on the public perceptions that sometimes minimize the value of a doctoral degree in non-academic sectors. Finally, this study investigated PhD students' perceived level of preparedness for multiple career paths, specifically communication skills, across STEM and non-STEM disciplines, generational status, and gender. The second major purpose was to investigate how universities could create conditions to further prepare first-generation PhD students to effectively achieve their career goals.

Research Questions

To further investigate the challenges PhD students face preparing for multiple career paths, my research was guided by the following three questions:

1. How do PhD students describe the preparation they receive for academic and non-academic career paths?

2. To what extent do PhD students' career preparedness vary across STEM and non-STEM disciplines, generational status, and gender?
3. As a result of an institutional intervention, what are the differences in PhD students' perceived preparedness to communicate the value of their research across multiple audiences?

Chapter 2: Supporting Scholarship and Theoretical Perspective

"Universities have to educate and train not only those who will have careers in research, but also those who will become entrepreneurs, managers, consultants, investors, or policy makers'"

National Academies (1999)

The Preparing Future Scholars (PFS) course is my contribution for preparing graduate students for academic and non-academic career paths. Through PFS, PhD students prepare for multiple career paths by increasing conversations and experiential learning that aid in their preparedness to communicate the value of their theoretical training and research into a practical application. By preparedness, I refer to "transferable skills" and for this research specifically doctoral students' ability to communicate the value of their research across multiple contexts. The continued use of the term communicate includes verbal and non-verbal communication with academic and non-academic audiences.

This chapter interweaves literature and theory on the evolution of graduate education, characteristics of first-generation and underrepresented doctoral students' socialization and social capital development within graduate school, social cognitive career factors, and career development through experiential learning within the social structures of graduate education. As a practitioner and researcher, I felt these pillars were areas to explore to answer my research questions and further my investigation on PhD students' preparedness for multiple career paths. To explore the landscape of best

practices to prepare PhD students for multiple career paths, I conducted a literature search. To search the literature, I preselected the following key words and phrases: "first-generation doctoral students," "social capital," "graduate career development," "experiential learning," "interdisciplinary communications," "transdisciplinary communication," "transferable skills," "career self-efficacy," and "social cognitive career theory." My previous pilot studies guided the pre-selection of these key words and phrases. A search of these key words and phrases in a Public Research I University Library database generated thousands of sources. Despite the number of sources and the preselected key words and phrases, I remained open to other theoretical perspectives that naturally emerged during data collection.

To explore career preparedness of PhD student experiences, the literature was divided into two main sections. In the first section, I explored first-generation PhD students and social capital. I wanted to capture a more holistic perspective of PhD students' career preparedness and the role the university has in the preparation of PhD students for multiple career paths. In the second section I reviewed career development, experiential learning, transferable skills with emphasis on communication skills fostered by universities, and social cognitive career development. Figure 1 is a conceptual model I developed to guide the literature review and help sort through the thousands of sources on these constructs.

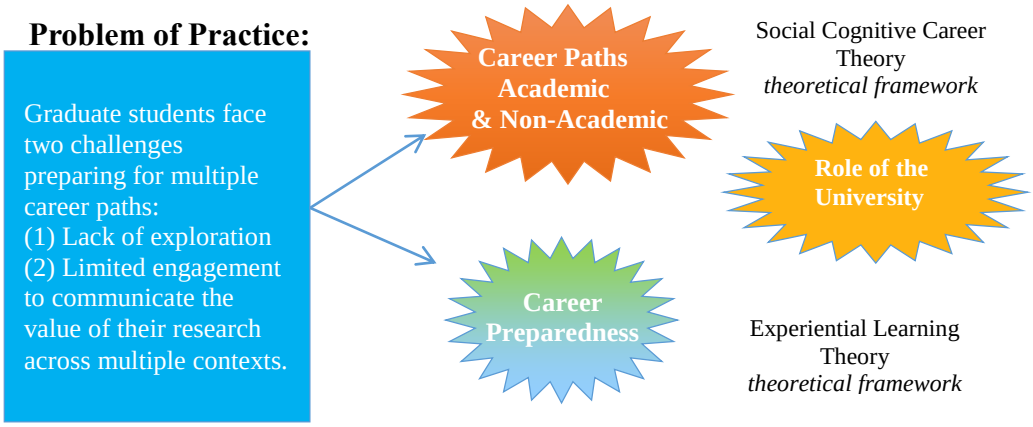

Figure 1. A conceptual model for the investigation of PhD students' preparedness for academic and non-academic career paths.

Review of Literature

The review of scholarly literature on the first section of concepts was heavily influenced by findings focused predominately on underrepresented, first-generation, undergraduate students and the retention of underrepresented graduate students in STEM and biomedical disciplines. The review of scholarly literature on the second section of concepts was also heavily influenced by K-12 and undergraduate populations. This chapter will accomplish three things. First, I will summarize and validate the importance of the integration of experiential learning and awareness of social cognitive career theory in PhD students' perceived level of preparedness for multiple career paths. Second, I will recommend that further studies extend beyond STEM disciplines, focusing on first generation PhD students' career preparedness for multiple career paths that broaden their employment opportunities. Finally, I will demonstrate the need for university professional development programs to align and integrate the use of theory and practice in order to fosters broader career opportunities, and support multiple career path preparedness, specifically for first-generation students.

Although the review of scholarly literature on PhD populations was limited, a growing conversation exists surrounding PhD students' careers paths and preparation for multiple career paths (Allum et al., 2014; Beale, Brown, & Samms Brown, 2014; Berman et al., 2011; Cassuto, 2015; Force et al., 2014; Garcia-Quevedo, Mas-Verdú, & Polo-Otero, 2011; Jaeger, Haley, Ampaw, & Levin, 2013; Lyden, 2013; Mangematin, 2000; Nyquist, 2014; Nyquist & Wulff, 2000; Porter & Phelps, 2014). To further this conversation, I investigated the evolution of the PhD degree and first-generation PhD students' preparedness for multiple career paths.

Graduate Education: The Evolution of the PhD Degree

During the late eighteenth century, the doctor of philosophy (PhD) degree emerged in the European system as a part of an educational reformation and commodification (W. Clark, 2008). One educational reformation focused on class standings, as master degree holders "hoped to achieve parity with the older academic doctors, namely, the doctors of theology, jurisprudence (law), and medicine" (W. Clark, 2008, p.184). Academic parity, privilege, and power was also obtained through the "rules of thought," the fusion of written work and cultivated research (W. Clark, 2008; Readings, 1996, p.67). Graduate schools emerged to help cultivate research, but remained a part of the undergraduate colleges that had a traditional pedagogical mission (W. Clark, 2008). While maintaining the pedagogical mission, American universities began training PhD students in research, specifically "for careers of scholarship and scientific inquires" during the late nineteenth century (Bok, 2013, p.7; W. Clark, 2008).

As American universities' PhD pedagogical training and instruction evolves, we see institutions of higher learning producing a multifaceted interdisciplinary and

transdisciplinary creative approach to address critical issues (Martin & Umberger, 2003; Thune, 2010). The term "interdisciplinary," has no single definition, but, in general, and throughout this study, our understanding of the term includes two or more disciplines working together on a process through which members of different disciplines contribute to a common product or goal, whereas transdisciplinary work refers to one or more academic disciplines working on the same theme using different perspectives (Berg-weger et al., 2015; Bronstein, 2003; Holbrook, 2012). The common product and goal throughout the evolution of the doctoral degree fosters creativity and innovation that inspires doctoral research inside and outside of the academy (Cassuto, 2015; Collin, 2009; Harvey & Knight, 1996; Hodgson, 2012; Nash, 2008; Stokols, 2006).

Doctoral degree. The National Center for Education Statistics (NCES), Institute of Education Sciences (2013) provided a comprehensive outline of the various types of doctoral degrees: Doctor of Philosophy (PhD), Doctor of Education (EdD), Doctor of Medicine (MD), and Doctor of Dental Surgery (DDS). The structure of a doctoral degree was defined by the U.S. Department of Education (2008) as a degree in which a doctoral student selects a dissertation advisor and 2-5 committee members to advise on independent research and upon completion of the research, the advisor and committee approves the proposal. The term "doctoral" throughout this research will refer to a PhD.

Doctoral students: underrepresented, first-generation students. According to NCES (2013), students who are Black, Hispanic, American Indian/Alaska Native, or identify with two or more races are severely underrepresented among doctoral degree recipients in the United States. In 2010-2011, for example, Blacks represented 7.5 percent, Hispanics 6 percent, American Indian/Alaska Native .7 percent, and two or more

races represented .9 percent of earned doctorates (Snyder & Dillow, 2013). Data included the PhD, EdD, and comparable degrees at the doctoral level, as well as such degrees as the MD, DDS, and law degrees. Researchers identify underrepresented students in various ways, but a commonality is that they are students who are seen as first-generation, low-income students, and ethnic minorities (Rendón, 2006). First-generation students is one subset of the underrepresented college student population and includes fifty percent of students (Hirudayaraj, 2011). The term "first-generation," and the continued use of the term, will be defined by the United States Department of Education as "those whose parents' highest level of education is a high school diploma or less" (Chen, 2005; Nunez & Carroll, 1998). The National Education Longitudinal Study (NELS) revealed that first-generation students are at a disadvantage with regard to college preparation and expectations compared to their non-first generation peers (Choy, 2001). While there are several NELS studies on first-generation students, there is sparse data on the sub-population of first-generation doctoral students' career aspirations, preparation, graduate experiences, and outcomes (Allum et al., 2014; Hirudayaraj, 2011; Holley & Gardner, 2012). Studies that do exist speak to influences and obstacles in educational achievement of first-generation undergraduate students (Holley & Gardner, 2012; Seay et al., 2008). Researchers overwhelmingly conduct research on PhD STEM student demographics, experiences in graduate school, and the obstacles that prevent first-generation students from obtaining or completing a doctoral degree (Allum et al., 2014; Gardner, 2011; Gibbs & Griffin, 2013; Gibbs, Kenneth et al., 2014; Holmesland et al., 2010; Nash, 2008; Seay et al., 2008).

Some factors that strongly impact inequities of underrepresented first-generation students relate to parents' education, family income, peer and environmental influences, as well as engagement and a sense of belonging on universities campuses (Barnes & Austin, 2008; Choy, 2001; Gardner & Holley, 2011; Holley & Gardner, 2012; Seay, Lifton, Wuensch, Bradshaw, & McDowelle, 2008). First-generation students are likely to be African American, Hispanic, and students from low-income families (Chen, 2005; Choy, 2001; Pizzolato, Chaudhari, Murrell, Podobnik, & Schaeffer, 2008). Though the data on the number of PhD students who are first-generation is sparse, the literature reveals disproportional levels of social, academic, and career development between underrepresented doctoral students and their peers (Kong, Chakraverty, Jeffe, Andriole, Wathington, Tai, 2013; Nettles, 1990; Ostrove, Stewart, Curtin, 2011).

Socialization

"Socialization is the process through which an individual learns to adopt the values, skills, attitudes, norms, and knowledge needed for membership in a given society, group, or organization," according to Gardner's (2008, p.126) qualitative study on doctoral student success and retention. Many scholars believe socialization is a key influence to underrepresented PhD students' success (Boden, Borrego, & Newswander, 2011; Ducheny, Alletzhauser, Crandell, & Schneider, 1997; Gardner, 2006; Gardner, 2010a; Gardner, 2010b; Gardner, 2010c; Gardner, 2012; Gardner & Barnes, 2007a; Gardner & Barnes, 2007b; Helm et al., 2012; Hurtado et al., 2015; Kong et al., 2013; Liddell et al., 2014; Mendoza, 2007; Ostrove et al., 2011; Walker et al., 2008). Beyond the data on enrollment and graduation rates, information available for describing the performance, preparation for career pathways, and outcomes of PhD students from

underrepresented populations is very limited (Allum et al., 2014; Beale, Brown, & Samms Brown, 2014).

In 2006, Tinto and Pusser noted the gap in higher education performance and preparation between low-income and high-income students, but this did not include PhD students. Strides have been made in the literature on STEM underrepresented PhD students and the role for the university to prepare them for multiple career paths. In fact, we see that at the doctoral level "professional development appears to occur simultaneously with cognitive development" (Gardner, 2006, p. 735) and that there is a strong relationship between doctoral students' preparation, aspirations, underrepresented identity, and performance (Pizzolato et al., 2008; Rendón, 2006).

Austin, Cameron, Glass, Kosko, Marsh, Abdelmagid, and Bürge (2007) illustrated that there are three phases of a doctoral student's development. First, an entry phase in which students become accustomed to expectations, roles, relationships, and the culture of doctoral level education. This is followed by the integration phase in which students acquire basic competency in their field of study and can move around the social worlds. Finally, there is a culminating phase with a pathway to a professional role after graduation. These three phases provide the framework for this action research study and the development of the innovation to create fundamental changes to the professional development of underrepresented PhD students that will engage them in conversations and experiential learning that demonstrates the value of their research in multiple contexts.

I posit a need for a fourth phase. This phase would reside between the integration of basic competency of the field, phase two, and their final culminating experience which

includes the pathway to graduation, phase three. Pilot studies I conducted and the proposed innovation explained in Chapter 3 will highlight an element of a potential fourth phase and an approach for preparing future scholars and underrepresented PhD students for academia and beyond. Equally important, as identified throughout the literature, are not just the attributes of underrepresented PhD students and socialization with individuals but also social structures and social capital.

Social Structures

Institutions of higher learning are social structures that provide a great deal of educational resources and can impact underrepresented doctoral students' experiences with multiple perspectives on social, racial, economic, and gender divisions (Giroux, 2014). Despite various approaches for obtaining social progress, progressive educational theorists John Dewey, Harold Rugg, and Henry Giroux support the ideology of "the school as the primary and most effective interest of social progress" (Thornton, 2001, p.11). Social progress consists of physical and social techniques that adjust to the environment of the situation and are necessary to collectively adapt (Bernard, 1923). Unlike Rugg and Giroux, Dewey felt industry offered "little to engage the emotions and the imagination; it is a more or less mechanical series of strains" (Press, 2013, p. 9). Rugg and Giroux's framework for developing curricula that integrates educational knowledge with practice to address issues of social change and socialization is appearing in professional development programs at institutions of higher learning (Gansemer-topf, Ewing, & Johnson, 2006; Gardner & Barnes, 2007b; Helm et al., 2012; Holaday et al., 2001; Stassun et al., 2011; Richardson, 2006).

Structured professional development programs, traditional pedagogical instruction, and extra-curricular activities contribute to social structures and the progress of our society (Myers-Lipton, 1998; Nelson, 1978).While many university presidents, deans, faculty, and staff are advocates of a graduate education and promote advances in a career or find doctoral study essential for a profession and personal satisfaction, some students leave graduate school early as a result of alienation or a lack of full understanding of their connection and contributions of their research (Austin et al., 2007; Beale et al., 2014). A study of first-semester experiences of professionals who transitioned to full-time doctoral study revealed that those that drop out late in graduate school do so because of a lack of financial support, advisor relationships, or professional goals (Austin et al., 2007), many of the same factors that impede underrepresented populations at all levels of education. Through interviews with four first-semester doctoral students in counseling education, Hughes and Kleist (2005) found that the students doubted their ability to succeed in the program. Evidence later showed that these students had opportunities to gain a better understanding of what was expected of them and were involved in various departmental and social events. These studies revealed that socialization played a role in entering and remaining in graduate school. Further research is needed to understand the difference in socialization between underrepresented PhD students and their peers within social structures and the influence it has on preparation for their career aspirations and meeting career objectives (Hirudayaraj, 2011). Socialization is also a factor for building social capital.

Social Capital

Social capital was explored to investigate how universities can create conditions to further prepare PhD students to effectively achieve their career goals and communicate the value of their research across contexts. According to Lin (2001), the term “social capital” began to surface in 1977 and was further explored and defined in the 1980’s independently by researchers. Lin (2001) explained how Bourdieu saw social capital as an investment for individuals and socialization of members within a dominant group, and Coleman believed there were two elements of social capital. One element is the social structure itself, and the second includes particular actions of individuals and the organizational culture (institutional, departmental, discipline, work groups) and how individuals could generate a return (Lin, 2001). Lin (2001) continues to elaborate on the “controversy generated from macro–versus relational-level perspectives and whether social capital is collective goods or individual goods; that is, institutionalized social relations with embedded resources are expected to benefit both the collective and the individuals in the collective” (Lin, 2001, p. 26). We witness similar controversy within higher education.

Boden, Borrego and Newswander (2001) claim that “higher education institutions in which graduate students are trained are ill-equipped to facilitate interdisciplinary research, teaching, and other aspects of interdisciplinary graduate training" (Boden et al., 2011, p.742) and little, if any, "activities in the organization and socialization through which individuals acquire and incorporate an understanding of those activities” exist (Boden et al., 2011,p.742). Although improvement is needed, higher education institutions are multifaceted structures in which graduate students can build social capital

and learn to facilitate research in various contexts. According to Lin (2010), "social capital must capture the two-way process between action and structure, as mediated through certain middle-level structures and processes" (Lin, 2001, p. 184). This, too, can be observed within the social structures of higher education, the actions between students, and exchanges with members of academic institutions. For example, a Career Service office could be seen as a middle-level structure. Career Service staff strive to make connections between a student's academic interest and various employment sectors. A new PhD student strives to become acclimated within the structure of their academic unit and works closely with faculty to learn the process of research. These are examples of two different structures, a student service structure, and an academic affairs structure. The misunderstood middle-level structure and processes exist in the relationship between faculty, PhD students, and career services' networks. Research generated by faculty and PhD students fuel innovation and can ultimately been seen as the broader contribution to career service employment networks. Activities between the organizations and socialization through which individuals from both networks acquire and incorporate an understanding of the needs within each structure can aid in moving each structure forward and prepare PhD students for multiple career paths.

It is currently unknown to scholars to what extent PhD students' career paths and preparedness expand beyond the academy and vary across disciplines, generational status, and gender (Beale, Brown, & Samms Brown, 2014; Enders, 2002; Gibbs & Griffin, 2013; Osborne et al., 2014; Thune, 2009). It is known that doctoral attrition ranges from 40-70% sometimes result from students not making the correct choice for a career path (Gardner, 2008b). It is also known that "significant numbers of students enter

graduate studies as a way to explore career options (Luzzo, 2000) and thus could benefit from services designed to help them identify and explore their career interests" (Lehker & Furlong, 2006, p.74). A program to help PhD students, especially first-generation doctoral students who may not have a pre-established social capital network, to explore occupational interests involves a multifaceted approach.

This investigation into doctoral students' career development and preparedness, as it has been defined in this research, shares the philosophy of Feehan and Johnston (1999) in which occupational interest and aspiration possess a crossover of efficacy expectations, the trepidations of one's behavior and performance, outcome expectations, and the concern of the consequences of one's behavior in the occupational role. Bandura (1997) also acknowledges, "career pursuits require more than the specialized knowledge and technical skills of one's trades. Success on the job rests partly on self-efficacy in dealing with social realities of work situations, which is a crucial aspect of occupational roles" (p.429). Lin (1999) illustrates our investment in building PhD students' social capital will produce returns and in turn facilitate the flow of innovation and increase the self-efficacy of PhD students' prospects of career in either academic or non-academic sectors.

Social Cognitive Career Theory

Derived from Albert Bandura's self-efficacy theory the Social Cognitive Career Theory is a framework for understanding the elements that foster career development (Lent, Brown, & Hackett, 1994). Career development is a process that evolves over time and has several components. These components include (a) career and academic interest development, (b) career-related choices that are forged, and (c) performance outcomes (Lent et al., 1994). According to Lent et al., (1994) these components interact with an

individual's behavior and environment. Lent et al., (1994) continues to illustrate the interlocking process of all elements including self-efficacy beliefs, outcome expectations, and goal representations as segments that influence career choice and development.

One could argue that individuals earning a PhD have high self-efficacy and outcome expectations. According to Albert and Luzzo (1999) even if individuals have high levels of self-efficacy and high outcome expectations, there still may be barriers preventing them from selecting a career path. Perceived barriers, real or invisible, range from lack of financial support, forms of age, gender and racial discrimination, educational limitations, and many other variables (Albert & Luzzo, 1999; Choi et al., 2012). Students pursuing an advanced degree, such as a PhD, should not be faced with educational limitations that hinder the exploration of academic and non-academic career paths.

Career Development and Experiential Learning

Within the literature we find that advanced degrees are needed to meet the demands of the 21st century and that to meet one's career objectives there has to be an integration of one's personal life and theoretical and practical knowledge (Cohen, Duberley, & Mallon, 2004; Hirudayaraj, 2011). As Hirudayaraj (2011) points out, the socially disadvantaged and often first-generation students are encouraged to pursue an advanced degree with the promise that their education will provide entry into successful careers. Incorporating exploratory career preparation guidance for graduate students early in their educational journey can be an effective way to foster the development of career aspirations (Beckman & Cherwitz, 2009; Cherwitz, Richard, Sullivan, 2014; Martin & Umberger, 2003; Mervis, 2011; Thune, 2010).

Multiple sources suggest that graduate education does not adequately prepare students for various workforces, and there is room for improvement in demonstrating the value of doctoral research in multiple contexts (Allum et al., 2014; Association, 2014; Baker & Henson, 2010; Beale et al., 2014; Beckman & Cherwitz, 2009; Lehker & Furlong, 2006). There appears to be a gap in the literature about the perception of the value of a doctoral degree from professionals outside of academia. Anecdotally, and through previous pilot studies, findings revealed that a university career service office tends to cater to the needs of undergraduates and does not put an emphasis on graduate student populations (Cason, 2014). This is unfortunate since as previously noted many students enter graduate programs as a way to explore career options and thus could benefit from programs designed to help them identify and explore multiple career paths (Lehker & Furlong, 2006). Lehker and Forlung (2006) talk to the problem many graduate students face with respect to developing career aspirations: lack of exploration and preparation for multiple career paths and engaging in conversations that demonstrate the value of their research in different contexts.

The hypothesis of incorporating Kolb's experiential learning theory, which "is a simple description of how experience is translated into concepts that can be used to guide the choice of new experiences," (Jr. Atkinson & Murrell, 1988, p. 375) into a meta-model framework with the theory of "social structure and action" (Lin, 2001b) will prepare students to communicate the value of their research in multiple contexts and potentially be discovered at the conclusion of this study (Atkinson & Murrell, 1988; Kolb & Wolfe, 1981). A meta-model is defined as a model describing many other models. As such, the purpose of meta-modeling is not to present new information, but to organize and

synthesize existing information into systematic patterns (Atkinson & Murrell, 1988). Advocates of experiential learning models can be found in the earliest form of learning from John Dewey (1938), who believed that learning should not be done in isolation and that theoretical experiences should be contextualized by environmental conditions and lead to the growth of the individuals' experiences. Paulo Freire (1970) suggested we move away from the "banking" concept of education where educators deposit information into the minds of students and combine instruction with praxis. At the conclusion of this study, I expect to discover that structured interdisciplinary professional development programs are instrumental cogs in providing support to first-generation PhD students and the exchange of knowledge between academic and non-academic employments sectors (Lehker & Furlong, 2006).

There is a gap in the literature on the formation of PhD career aspirations and the value in exploring experiential education alongside social structures and action. According to Breunig (2005), one of the issues still facing experiential education is that "many experiential educators identify the lack of congruence between what is theoretically espoused and what is practiced" (p.109). This action research study will aim to fill that gap in the literature by investigating PhD students' perceived levels of preparedness for multiple career paths, primarily communicating their research to academic and non-academic audiences and how universities can create conditions to further prepare PhD students to effectively achieve their career goals and objectives.

The approach to assist doctoral students in developing their career goals and objectives, engaging them in a democratic process to move business and public organizations forward, and providing economic growth will vary. Nevertheless, "a

curriculum which acknowledges the social responsibilities of education must present situations where problems are relevant to the problems of living together and where observation and information are calculated to develop social insight and interest" (Dewey, 2008). Doctoral degree-granting institutions are social learning systems which produce scholars who should have competencies that transcend disciplines and employment sectors. This can only happen when a social system designs itself to participate in broader learning systems such as for-profit and not-for-profit organizations, as well as government agencies (Wenger, 1999).

Role of the University

Universities are strategically placed to assist their students and faculty to benefit from the commercial value of the research produced on campuses (D'Este, Mahdi, Neely, & Rentocchini, 2012). Scientific research and innovation are producing products and processes across multiple fields of study that might not be possible without developing the spirit of entrepreneurial education and focusing on broadening the traditional career aspirations of PhD students (García-Rodríguez, Gil-Soto, & Ruiz-Rosa, 2012). Universities can adopt strategic links of research across disciplines to assist its students and faculty in developing entrepreneurial opportunities for various employment sectors including industry and government (Richard Cherwitz & Sullivan, 2014). According to D'Este et al. (2012),"academic researchers integrating multiple fields of research are more likely to disclose innovations to their university technology and transfer office" (D'Este et al., 2012, p.295) which lends itself to creating an environment to support doctoral students in meeting their career objectives. By creating fundamental changes to professional development courses that engage doctoral students in conversation that

demonstrates the value of their research in multiple contexts is an approach that will help universities work more collaboratively with their communities to solve complex problems (Richard Cherwitz & Sullivan, 2014). Understanding the factors that contribute to intellectual, social, and systems' innovation is a great source of inquiry, but very little has been researched on the preparation of first-generation PhD students' career development (Cherwitz, 2005: Hirudayaraj, 2011).

Studies have focused on student persistence in doctoral programs, and factors such as inadequate preparation for research, a disconnect with academic units or faculty advisors, the realities of the perception of becoming a faculty member, and the instability of the job market are all said to contribute to doctoral attrition. Holaday et al. (2001) identifies effective practices and professional development innovations that help support doctoral students' career aspirations. At Clemson University, the graduate school with input from graduate student organizations, found through an on-line needs assessment survey, focus groups with graduate students, faculty, and directors that creating professional development programming is complex due to each student's "growth-oriented" context (Holaday et al., 2001).

This study will help fill a gap in the literature concerning PhD students' perceived level of preparedness for multiple career paths and how universities can create conditions to further prepare PhD students to effectively achieve their career goals. Additionally, this study will embrace the philosophy of the theorists' approaches and strive to address and identify the various levels of progression in graduate career preparedness. Furthermore, this research adds to the body of literature and conversations that address

the need for universities to create fundamental changes to professional development in order to foster the career development and preparedness of PhD students.

Chapter 3: Research Design and Methodology

This action research study investigates PhD students' perceived level of preparedness for communicating their research to academic and non-academic audiences (referred to as lay audiences) and an institutional intervention designed to increase students' confidence to verbally communicate the value of their research in academic and non-academic employment sectors, with a special focus on the implications for underrepresented and first-generation students. A combination of qualitative and quantitative methods will be used to better understand and address the following research questions:

1. How do PhD students describe the preparation they receive for academic and non-academic career paths?
2. To what extent do PhD students' career preparedness vary across STEM and non-STEM disciplines, generational status, and gender?
3. As a result of institutional intervention, what are the differences in PhD students' perceived preparedness to communicate the value of their research across multiple audiences?

To support the selection of a mixed methods approach, I explored mixed methods research and the challenges associated with mixed methods research. This chapter provides justification for the use of a mixed-methods approach for the questions that guided this investigation, provides a detailed account of the setting, site, participants, and measures, and explains the qualitative and quantitative data sources. This chapter also provides methods of analyses and describes the plan of action.

Research Design

Although literature supports the use of qualitative methods with action research as a result of the nature of the problem, a mixed-methods design was selected (Mills, 2007). A mixed-methods approach also provided a more thorough understanding of the research questions and problems (J. W. Creswell, 2014). Previous pilot studies reveal that graduate students at a major Southwest Public Research I Institution face two challenges with respect to preparing for multiple career paths: limited preparation for multiple career paths and limited engagement in conversations that demonstrate the value of their research in different contexts.

The methodological approach for this study was action research since the innovation was designed for improving practice through the four stages of 'plan,' 'act,' 'observe,' and 'reflect' versus creating new knowledge (Cryer, 1998). Under many schools of thought, the approach to knowledge treats persons as objects of inquiry, whereas action research acknowledges one's self-reflection and ability to collaborate to obtain goals and objectives within an organization (Susman & Evered, 1978). This action research study mirrors a continuous cyclical process, as seen in Figure 2, where one identifies problem areas, identifies alternative approaches to address the problem, takes action, evaluates, learns from findings, and begins a new cycle Langley, Moen, Nolan, Norman, & Provost, 2009; Susman & Evered, 1978;). Action research is an appropriate method for this study because it involves various situated actions that illuminate the investigation of PhD students' perceived levels of preparedness for multiple career paths and how universities can create conditions to further prepare first-generation PhD students to effectively achieve their career goals.

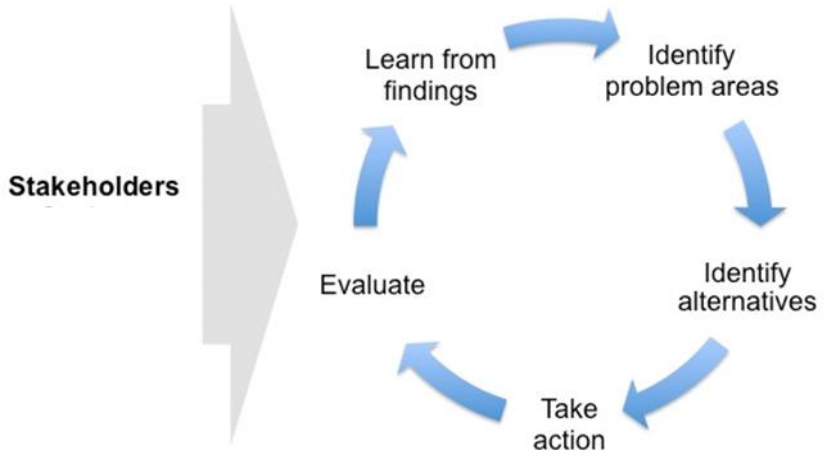

Figure 2. A comprehensive model for action research

Concurrent Triangulation Design

A concurrent triangulation mixed methods design was used. It is a type of design in which qualitative and quantitative data are collected in parallel, analyzed separately, and then merged. As Creswell, Clark, Gutmann, and Hanson (2003) point out, the use of this design allows researchers to "use two different methods in an attempt to confirm, cross-validate, or corroborate findings within a single study" (J. Creswell et al., 2003, p.229). In this study, the use of surveys, self-assessment questionnaires, and group discussions allowed a closer look at both predetermined and emerging themes.

I used multiple sources of data to corroborate evidence on predetermined themes of "Career Preparedness-Perceived Skills," with a focus on communication skills and the "Perceived Role of the University." After data was collected and coded, new themes emerged. The data from these new themes were then put into larger categories: Career Factors, Communication Skills, and University Environmental Factors. Triangulation as a methodological approach allowed me to take a proactive position and speak to the

synergy of the data and relationship between themes and variables (Mertens & Hesse-Biber, 2012). Mertens and Hesse-Biber (2012) illustrate the support for the method of triangulation to examine the relationship between data and to generate knowledge as a tool to accomplish the desired ends combined with a constructivist approach. A constructivist approach is one in which the learner, the PhD student in this study, enhances the process of learning by taking what they have learned in their PhD program and transferring it into new situations, such as academic or non-academic employment sectors (Tynjala, 1999). Successfully transferring knowledge into academic and non-academic employment sectors requires effective communication skills. Quantitative analysis illuminated the relationship between non-verbal and verbal communication skills of PhD students to effectively communicate the value of their research to academic and non-academic audiences. By contrast, the qualitative data aided the investigation of students' experiences communicating the value of research academic and non-academic audiences.

Setting

This study takes place in a major metropolitan Southwest Public Research I Institution. The university serves both undergraduate and graduate students. The President of this university publically deems inclusion to be a strength at this institution and invests in discovery, creativity, and innovation through various research and development programs. Aspiring researchers and professionals are afforded vast amounts of opportunities (University Vision and Goals, 2002-2012). The University "is designed to address the greatest challenges before us. They are local challenges — and they are global. They involve educational success, individual and community opportunity, the

environment and our health, scientific and technological progress, social justice and human worth" (Regents, 2011, para 1). A large public university was the foundation for this action research study due to the contributions it makes to the larger society.

Various stakeholders at the university play a vital role in shaping the general society. Together they are creating teachers, research practitioners, and inventing exceptional products, as well as social and system innovations. This university is fostering the development of multiple innovations and is an ideal setting for conducting action research. Action research is not easy because it usually involves a complex problem that should conclude with a sustainable solution (Bensimon, 2014; Susman & Evered, 1978). As seen in the literature review in Chapter 2, developing multiple career paths for PhD students is a complex problem and phenomenon. The more complex the phenomenon, the greater the challenge is to identify relevant aspects with simple systematic means of praxis (Lockett, O'Shea, & Wright, 2008). This study was conducted at an institution that embraces challenges and is the ideal setting for developing multiple career pathways for graduate students.

Action Researcher

The action researcher's role is an important contextual factor of this study. Since 1996, I have coordinated and overseen university-wide graduate student initiatives that include the development, implementation, and management of graduate recruitment, fellowship programs, and various student services that promote advising and student enrollment in graduate school. Starting in 2006, greater administrative leadership, direction, and supervision was required to aid in the production of proposals to launch partnerships with other top-tier universities to foster the development of new knowledge

and innovation. Additionally, I was charged with spearheading new collaborative opportunities for graduate student services and managing several professional development programs, including a teaching assistant training program. I have always had an active role in the life cycle of a graduate student from identifying prospective students at the inquiry stage, to enrollment, followed by the graduate student's educational experience, and finally graduation.

Fostering opportunities for graduate students that aid in multiple career path preparation will help ensure the students' experiences as graduate students are complete and of value upon graduation. As an action researcher and participant of this study, it is a way to investigate my practice, identify a challenge or problem in graduate students' professional development, and work to improve it (McNiff, 2010). As the researcher of this study, I designed the study and collected and analyzed data to create fundamental changes to professional development programs. The changes to the programs aim to engage PhD students in conversation and experiential learning that demonstrate the value of their research to academic and non-academic audiences. PhD students participating in this action research study were the main producers of knowledge. Action research provides me, a practitioner of higher education, a way to engage, develop, improve, and measure outcomes over time to ensure the goals of all parties will be met (Huang, 2010). My participation in this study allows me to share with colleagues the possibility of creating opportunities for doctoral students outside of the Academy.

Target Population and Sample

A convenience sampling approach was used for the investigation of PhD student's preparedness for multiple career paths, specifically communicating the value of their own

research. Convenience sampling "involves drawing elements from a group that is easily accessible by the researcher and is one of the most commonly used purposive sampling techniques" (Kemper, Stringfield, & Teddlie, 2003, p.278). Late in the Spring semester, an invitation to register for two graduate level professional development courses, Preparing Future Faculty (PFF) and Preparing Future Scholars (PFS), went out to graduate students using a university-wide graduate student organization electronic distribution list. Additionally, an electronic request was sent to graduate student department chairs, directors, and support staff to help promote the Preparing Future Scholars course. Sharing PFS information through both channels provided a greater reach to graduate students. Furthermore, leveraging the PFS class with the PFF program, an already well-established program, was a recruitment strategy to increase PFS applications.

In directly through student organizations and graduate programs, graduate students who completed at least 19 credit hours toward their degree program were invited to submit an application of intent to enroll. Students who submitted an application to participate in the PFS program received a student participation email that outlined the course and research study, Appendix B. Once consent was received from the student, they were sent a link to a short PFS career aspiration and demographic survey. A complete list of survey questions can be found in Appendix C. Among the survey questions were those designed to reveal and determine if they identify with a first-generation population. If consent was not received within three days, or the sample size of the first-generation population was less than half of the total sample, a snowball approach was planned. As Fossey, Harvey, Mcdermott, and Davidson (2002) note,

snowball sampling is used to identity participants with direct knowledge relevant to the investigation being conducted. In a final attempt to increase the number of participants, I asked peers and university faculty with whom I had previously worked to help promote the PFS course. Twenty-four students initially showed interested in the eight-week course, and 19 students enrolled. To address the threat of mortality, also known as attrition, I provided full disclosure and stated the problem of practice and ways to increase the preparation for communicating the value of their research during the first class meeting (Ihantola & Kihn, 2011). Throughout the eight-week course, eight students withdrew due to other obligations, such as fellowship responsibilities or dissertation work. Of the remaining students enrolled in the PFS class, eight elected to participate in my research (N=8).

I used multiple sampling schemes to increase the sample size for both the qualitative and quantitative phases of the study (Collins, Onwuegbuzie, & Jiao, 2007). Toward the end of the Fall semester, I invited PhD students who completed at least 19 credit hours toward their degree program who were not enrolled in the PFS course, (referred to as non-PFS), to participate in a survey. After the 2,436 non-PFS students, 60% of the total population of doctoral students at the university, were identified, I sent an electronic invitation to participate in a survey. Unlike previous invitations to participate in the PFS course, this invitation was sent directly from me. I provided full disclosure of my role at the university and informed student that they would be assisting me in my study to investigate PhD students' perceived level of preparedness of "transferable skills," with a special focus on their self-perceived proficiency levels in communication skills. The desirability to focus on communication skills, both verbal and

non-verbal, stemmed from extensive discussion with faculty, university employer partners, and university colleagues. Lengthier conversation continued to grow from pilot studies and the findings that PhD students had limited engagement in verbally communicating the value of their research within academic and non-academic employment sectors. Additionally, students in my pilot studies revealed that they were uncomfortable around faculty when identifying an interest in non-academic careers.

Measures

I used multiple measures to gage the level of PhD students' perceived level of preparedness for multiple career paths, specifically communication skills, across STEM and non-STEM disciplines, generational status, and gender. Additionally, measures were used to identify what the differences are in PhD students' perceived preparedness to communicate the value of their research across multiple audiences as a result of an institutional intervention. Table 1 below outlines the measures and procedures used for this study. This is followed by an explanation of data collection procedures and sources.

Table 1

Mixed Methods: Data Collection Outline

Phase	Data Source	Data Collection	Data Analysis	Desired Outcomes
Quantitative	PFS Career Aspiration and Demographic Survey (Appendix C)	On-line Survey	Pearson Correlation and Descriptive Statistics (Green & Salkind, 2014)	Identify demographics
	PFS Individual Developmental Plan (Appendix D)	Electronic Assignment	Pearson Correlation and Descriptive Statistics (Green & Salkind, 2014)	Pre-assessment, gage levels of preparedness
	PFS Pre-mixer Survey (Appendix E)	On-line Survey	Pearson Correlation and Descriptive Statistics (Green & Salkind, 2014)	Pre-assessment, gage levels of preparedness
	Non-PFS Preparedness Survey (Appendix F)	On-line Survey	Pearson Correlation and Descriptive Statistics (Green & Salkind, 2014)	Pre-, assessments, gage levels of preparedness to communicate research
	PFS Post Survey (Appendix G)	On-line Survey	Pearson Correlation and Descriptive Statistics (Green & Salkind, 2014)	Post-, post assessments, gage levels of preparedness
Qualitative	PFS Participants, Non-PFS Surveys (Appendix F)	Open-Ended Survey Questions	Thematic and structural coding to create units of data (Saldana, 2013)	Obtain language, from participants on communicating research.
	5 PFS Class Discussions	Unstructured discussions with themed topic	Audio recording, verbatim transcriptions, code, review semantic codes, develop themes related to research questions (Flick, 2014)	Establish connection between experiences, influences to communicate the value of PhD research.

PFS Data Collection Procedures

Students who enrolled in the Fall PFS course were reminded of the email invitation they received to participate in my research study (Appendix B). Students were informed that their participation in my study was voluntary. To protect confidentiality their identity was kept confidential. Since PFS was a one credit hour, graded course, a member of my research team collected consent forms and was the only person who knew which students had agreed to participate in the study until after grades for the class were submitted. As an incentive to participate, students were informed that one week after grades were submitted, those who participated would be entered into a raffle to win a Kindle Fire. Of the 11 students who participated in my innovation for the full eight weeks, eight agreed to participate in my study.

PFS participants received multiple assignments during the course of the eight weeks. Table 2 provides the tentative PFS course timeline and curriculum topics. The PFS syllabus can be found in Appendix A.

Table 2

PFS Course Timeline and Curriculum Topics

Period	Curriculum Topic	Activities
8/21/2015	• Introductions • What is Action Research? • Career Aspirations* • Individual Development Plan • Career Link Database Review	• Confirm signed consent forms on file • PFS Demographic Survey • PFS Individual Development Plan (IDP)
9/4/2015	• Elevator Speech – 30 second pitch • CV to Resume • Interdisciplinary Communication and Influences* o Communication beyond the degree	• Practice pitch • Identify 3 potential PFS Experiential Learning Sponsors • Pre Mixer Survey
9/18/2015	• Entrepreneurship & Innovation* • Mixer Etiquette	• Draft/Revise potential pitch
10/2/2015	• Preparing Future Scholars Mixer	
10/16/2015	• Focus Group PFS Mixer	• Confirm Experiential Learning Activity • Post Mixer Surveys • Reflection papers
10/30/2015	• Social Media* o LinkedIn – Tweeter – University Directory Profile • Experiential Learning Activity	• Informational Interviews
11/13/2015	• Informational Interviews	• End of the Semester Survey (PFS Post Survey)
12/4/2015	• End of the semester reflection	

* Themed Discussed Topics

Data from the PFS Participant Career Aspiration and Demographic Survey

(Appendix C), IDP (Appendix D), and the PFS pre-mixer survey (Appendix E) assignments listed above were used as a pre- assessment to determine whether the intervention increased students' perceived proficiency to verbally communicate the value of their research to academic and non-academic audiences. Appendix H includes the survey questions used as post-assessment to determine the perceived changes in students' proficiency to communicate the value of their research across both audiences. The pre- and post- questions combined consisted of nine multiple choice items, 11 likert-like scaled items, 11 open ended response items, seven yes/no questions, and one question focused on the amount of time participants spent engaged in activities related to professional post graduate opportunities. Questions from the PFS pre- assessment instruments were the same survey questions included in the survey I administered to non-PFS participants. A complete list of survey questions administered to the non-PFS participants can be found in Appendix F. Open ended response items were coded once by theming the data and then by structural coding. As noted by Saldana (2013) theming the data allowed me to identify the subject of the unit of data and organize the large amounts of data. Additionally, Saldana (2013) noted that structural coding is appropriate for researchers employing qualitative semi-structured data-gathering protocols. HyperResearch was used to code both opened ended responses and themed PFS classroom discussions.

Qualitative data sources. The PFS course was developed to focus on a "theory to practice" model. Students explored career paths outside academia and participated in an experiential learning activity that would allow them to engage in conversations with individuals outside academia about the value of their research. This action research study

utilized three different qualitative data collection tools from the PFS course: a self-reflection activity, end of the semester self-reflection paper, and PFS class discussion transcripts. Additionally, non-PFS responses to open ended survey questions provided insight into PhD students' perceived level of preparedness for multiple career paths. This variety of tools allowed me to more fully investigate PhD students' perceived level of preparedness for communicating the value of their research across multiple contexts.

Individual development plan. The PFS Individual Development Plan (IDP) is a tool and the first assignment PFS participants receive to help them self-assess their current skills and strengths. The IDP was intended to help outline a plan for developing skills that will help scholars meet their professional goals. The PFS IDP was modeled after the IDP used by many postdoctoral scholars who are unable to secure tenure-track faculty positions early in their careers (Gitlin, 2008). As Gitlin (2008) illustrated, the IDP is a tool used by many postdoctoral scholars who may rarely get out of their research lab to attend professional development seminars or workshops. The IDP is a tool and resource to outline and discuss core competencies and transferable skills with faculty mentors. Although modeled after the National Postdoctoral Association IDP, the PFS IDP (Appendix D) was tailored to meet the needs of the PFS course and allow PFS participants to communicate with others, not necessarily faculty mentors, about their evolving professional goals, related skills, and the value of their research in multiple contexts.

Self-reflection activity. Two guest speakers were invited to the third PFS class meeting to allow students the opportunity to present to individuals that did not know them and were not familiar with their research. Each student had to introduce themselves, describe

their research focus (the problem), identify their hypothesis about a solution, identify the potential beneficiaries of their results, and briefly explain how they and their results are relevant to their target audience. In closing, they had to identify what they want or need and why from their audience. After each student presented they were asked to score themselves and describe the experience. The data collection survey instrument (Appendix G) featured a 4-point likert-like scale, with response choices as follows: 1 = Needs Improvement, 2 = Adequate, 3 = Good, 4 = Excellent. Half of the participants indicated their pitch "needs improvement." The other half indicated their pitch was "adequate." Comments included "I need to make it more concise," "was nervous," and "too long." Every participant made a comment about needing to practice more. This open-ended data collection tool informed my decision to change the structure of the class schedule and invite a guest speaker to each class and give the students the opportunity to verbally communicate their research to "lay" audiences.

End of the semester self-reflection. For the initial examination of the students' year-end self-reflection entries, I applied structural coding of the entries into Hyperresearch. As noted by Saldana (2013), structural coding is appropriate for virtually all qualitative studies and investigations to gather data and examine relationships, differences, and commonalities. This data source was used to examine the impact the intervention had on PhD students' preparedness to communicate the value of their research across academic and non-academic audiences.

PFS class discussion transcripts. A high-quality, audio-recording device was used in each session. The recording device remained in the researcher's possession at all times

and was locked securely in an office on the University campus. Each recording was transcribed verbatim and structurally coded in Hyperresearch.

Non-PFS Participant Data Collection Procedures

I administered the survey to the non-PFS population in November, late in the semester to "confirm and cross validate" findings from qualitative and quantitative data collected during my innovation (Creswell, Clark, Gutmann, & Hanson, 2003, p.229). My innovation is an institutional intervention designed to increase students' proficiency to verbally communicate the value of their PhD research in both academic and non-academic sectors. Additionally, the analysis of both sets of data was to help identify ways universities can cultivate conditions that prepare first-generation PhD students to effectively achieve their career goals. There is a gap in the university's perception of PhD students in the area of career self-efficacy. A gap analysis of the interlocking process of self-efficacy and career expectations, interests, and behavior (Betz, 2006; Feehan & Johnston, 1999) informs the university of their role in the solution. This study aims to aid the process to better understand PhD students' educational and career goals along with the role of the university to provide the tools and resources for PhD students to be prepared for multiple career paths.

Integration of Quantitative and Qualitative Data

I used a mixed-methods data analysis approach to investigate doctoral students' perceived preparedness to verbally and non-verbally communicate the value of their doctoral research across multiple contexts. In order to enhance the representation of the small population of PFS participants (N=8), I used an interactive analysis to allow one analysis to inform another analysis (Greene, 2007; Onwuegbuzie & Teddlie, 2003).

Multiple surveys were employed during this action research study. The purpose of the surveys was to gather data from the participants so that "inference [could] be made about some characteristic, attitude, or behavior of this population" (Creswell, 2014, p. 157). Appendix C contains the first survey deployed to PFS participants. The Preparing Future Scholar Participant Career Aspirations and Demographic Survey was designed to gather basic demographic data on PhD students enrolled in the PFS course. Univariate descriptive statistics were used to identify data variables within the constructs described in the following section and their frequencies (Green & Salkind, 2014). Appendix F contains the survey instrument which includes the questions completed by all participants in this study. To manage the large amounts of data, I conducted the following four step analysis: data cleaning and reduction, data transformation, data correlation and comparison, and analyses for conclusions and inference (Greene, 2007).

Data Cleaning and Reduction

To begin the interactive analysis, in SPSS, I reviewed data sets from both PFS and non-PFS populations for valid responses and coded questions. I had common codes across instruments for both populations to ensure there was a distinction between the multiple data sources (Bazeley, 2003). As noted by Bazeley (2003), common codes are used to examine inferences from the different populations. Participant's responses were coded and put into either a non-PFS or PFS group.

During my review of descriptive statistics and after conducting a statistical analysis of my results, I found five constructs 1: Career Aspirations and Plans 2: Career Preparedness-Perceived Skills 3: Career Preparedness-Outcome Expectations 4: Career Preparedness-Interest Development, and 5: Perceived Role of the University. I used two

constructs to provide insight for this study: Career Preparedness-Perceived Skills, with a focus on communication skills, and the Perceived Role of the University. These two constructs examine a particular instance of the analysis that help to identify how PhD students describe the preparation they receive for multiple careers paths and the extent PhD students' career preparedness varies across STEM and non-STEM disciplines, generational status, and gender. Additionally, several items provided insight into the impact my institutional intervention had in increasing proficiency levels to communicate the value of students' research across multiple professional contexts.

Since several items measure unique perception and experiences, to ascertain internal consistency reliability, individual items or questions were assessed for their contribution to the constructs used for this study (Forman & Nyatanga, 2001). As Onwuegbuzie and Teddlie (2003) noted a mixed-methods data analysis approach allowed me to extract more meaning from just the PFS participants who participated in my innovation. I recognized that a multimethods approach has distinct parallels (Hunter & Brewer, 2003). From this perspective, I continued to assess the data quality and data-reduction to reduce the large number of overlapping measured variables (Green & Salkind, 2014).

Reliability and Validation

As noted by Hunter & Brewer (2003) "reliability emphasizes the repeated use of a single measurement, while validity implies different measurement" (p. 581) and multimethods increase the validity of research analysis and findings. To ensure reliability of my data, I emailed researchers from two previous studies to gain access to their instruments (Appendix H). One study "sought to uncover the career readiness and

professional development needs of PhD students at a large, Midwestern research university" (Helm et al., 2012). The other study looked at PhD students' and course participants' perceived levels of skill in four areas: group work, communication, planning and project management, and personal awareness (Alpay & Walsh, 2008). Additionally, survey questions were adapted from the grant for Connected Academics: Preparing Language and Literature PhDs for a Variety of Careers. The Connected Academic grant is funded by the Modern Language Association and the Mellon Foundation (2014). Assessment items were also adapted from core competencies developed by the National Postdoctoral Association and tailored to meet the need of the PFS course. To further ensure reliability and validity, questions were repeated verbatim from prior research studies on survey instruments given to both PFS and non-PFS populations (Alpay & Walsh, 2008; Helm, Campa, & Moretto, 2012).

According to Creswell (2014), "qualitative validity means that the researcher checks for the accuracy of the findings by employing certain procedures, while qualitative reliability indicates that the researcher's approach is consistent across different researchers and different projects" (p.201). Several validity strategies were used for each phase of data collection in this mixed-methods study. Validity may be compromised if attention was only focused on one element of the data (J. W. Creswell, 2014). Drawing attention to only one variable and overlooking other explanations, or even trying to draw on different samples for each phase of the study, will invalidate results. As illustrated by J. W. Creswell (2013), I used triangulation to corroborate evidence from different sources of data collection to validate and shed light on PhD students' level of perceived proficiency and confidence on verbal and non-verbal communication skills for this study.

According to Gelo, Braakmann, and Benetka (2008), "validity can be generally referred to as the level of accountability and legitimacy that is strived through data collection, analysis, and interpretation" (p.274). Construct validity was employed in the quantitative analysis phases to provide evidence of validity and explain differences in PhD students' preparedness for communicating the value of their research in different contexts. Smith and Glass (1987) provide additional considerations that will be given to address threats to validity in Chapter 5.

Internal Consistency Reliability

To ascertain internal consistency reliability, individual items or questions were assessed for their contribution to the constructs identified by predetermined themes (Forman & Nyatanga, 2001). My constructs examined a particular instance of the analysis of career preparedness and the role of the university. Construct 1: Perceived Communication Skills (verbal and non-verbal communication), has 14 multiple choice items and four open ended responses. Construct 2: Perceived Role of the University has two multiple choice items. In order to enhance the accuracy of my assessment and evaluations of the perceived level of proficiency of verbal and non-verbal communication skills, using SPSS, I measured Cronbach’s alpha on all items in the perceived communication preparedness construct that could be clearly categorized as a non-verbal or verbal communication skill (Green & Salkind, 2014). Table 3 provides a list of the verbal and non-verbal pre- and post-innovation items measured.

Table 3

Verbal and Non-Verbal Pre- and Post-Innovation Items Measured

Item Number	Item Description
#1_1	Articulating your research using written communication skills to lay audiences (non-verbal)
#1_2	Utilizing media and technology to communicate research (non-verbal)
#1_16	Articulating your research using written communication skills to audiences within your disciplines (non-verbal)
#44_4	Writing for a lay audience (non-verbal)
#44_5	Writing for a discipline-specific audience (non-verbal)
#44_8	Multi-media communication and digital tool (non-verbal)
#1_14	Articulating your research orally to lay audiences (verbal)
#1_17	Starting conversation at social events (verbal)
#44_6	Oral presentation to lay audience (verbal)
#44_7	Oral presentation to a discipline-specific audience (verbal)
#44_11	Conflict resolution, difficult conversations (verbal)

Table 4 reveals result of reliability statistics on the pre- innovation student responses to the survey within the preparedness construct followed by an explanation of results and conclusion.

Table 4

Internal-Consistency Reliability: Perceived Level of Proficiency of Verbal and Non-Verbal Communication Skills

Construct	Within Construct Items	Coefficient Alpha Estimate of Reliability
Perceived Communication Skills (Non-verbal)	Items 1_1, 1_2,1_16,44_4, 44_5, 44_8,	.801 *(n=308)*
Perceived Communication Skills (Verbal)	Items 1_14,1_17,44_6,44_7, 44_11	.774 *(n=312)*

To test the internal consistency and the relatedness of these questions, "the scores for all questions should relate to each other at a positive, high level, where Cronbach's alpha (α) is equal to 0.7 – 1.0" (Clark & Creswell, 2010 p. 190). Cronbach alpha of 0.70 or higher is also considered good in education and the social sciences. In some cases a Cronbach alpha of 0.9, 0.80 or down to 0.50 may be completely acceptable (Forman & Nyatanga, 2001). A reliability coefficient demonstrated and tested my assumption that participants perceive they have proficient verbal and non-verbal communication skills (Cronbach, 1951). Forman and Nyatanga (2001) share many ways for checking reliability, but "Cronbach's alpha coefficient proved useful for constructing the measuring instrument because it provides an index of the degree to which the questions measure attitudes [toward verbal and non-verbal communication skills] and offers a basis for using the same instrument for future or subsequent studies"(Forman & Nyatanga, 2001, p.3). Although the qualitative and quantitative methods of this study generated a substantial amount of data, not all the data was relevant for this study.

Chapter 4: Findings

"A basic challenge is that Ph.D. programs have fostered a culture that glorifies arcane unintelligibility while disdaining impact and audience." (Kristof, 2014)

Throughout this research process my basic challenge was "how" are we, as educators, going to prepare PhD students for multiple career paths? Kristof (2014) identifies one problem as the existing structure of the PhD program and the lack of connection between research and practical application. This action research study was focused on PhD students' perceived level of preparedness of verbal and non-verbal communication skills to convey the value of their research across academic and non-academic employment sectors. In Chapter 1, I discussed the traditional career path for a PhD student as a tenure track professor and acknowledged the need for PhD degree holders in a variety of jobs within and outside academia (Beale et al., 2014). This chapter provides an overview of the findings from both qualitative and quantitative data analysis and assertions for the following research questions:

1. How do PhD students describe the preparation they receive for academic and non-academic careers paths?

2. To what extent do PhD students' career preparedness vary across STEM and non- STEM disciplines, generational status, and gender?

3. As a result of an institutional intervention, what are the differences in PhD students' perceived preparedness to communicate the value of their research across multiple audiences?

Participants

This research represents information from two populations at a large public southwestern university. The first population included PhD students who enrolled in my innovation, the Preparing Future Scholars (PFS) course. The second population included 433 PhD students who were not enrolled in the PFS course, referred to as non-PFS participants. In order to gain a richer perspective from the PFS population (N=8) and heighten awareness of PhD experiences preparing for careers, participants in both groups, were asked to answer the same set of questions at different intervals during the eight-week course of the research study. The survey was administered through Qualtrics and took approximately 10-20 minutes to complete. Participants were allowed to skip survey questions. As an incentive for non-PFS students to complete the whole survey, students were entered into a raffle to win one of four $25 gift cards to Amazon.com. Students were randomly selected as winners.

Based on the results, there were a couple of cases where participants did not know how to respond if an item did not apply to them. For example, students were asked if they continued their education to earn a PhD because they did not have a clear sense of what they wanted to do or if they followed their intense passion for their field of study, rather than a career goal. One student identified that the two were not separate, and another student stated that they "worked in academic research for seven years and decided I would rather work on my own research than other people's, though I have no intense passion." There were also a few participants who felt they already answered the same question in a previous response. I intentionally had different purposes for each question and did not intend for each question to be interpreted in the same manner. The questions

were phrased so that they asked participants how interested they were in career options at different stages of their doctoral program. As previously noted, questions were repeated verbatim from prior research studies (Alpay & Walsh, 2008; Helm, Campa, & Moretto, 2012) to gauge the level of perceived proficiency of transferable skills with a specific focus on communication skills.

Of the 68 non-PFS participants that provided open ended comments, 16% said the survey was too long, but 28% had positive comments regarding the overall survey, including "This was interesting and allowed for self-reflection" and "I liked your survey. It helped me sort through what career areas I would like to focus on as I begin to look for positions." In future studies, I will clarify questions to prompt students to identify in one single question what was previously asked in two. Survey respondents were 38% female, 27% male, and 1% identified as something other than female or male, and 33% of the data on gender was missing.

Table 5 represents the frequencies of the two populations broken down by the first of three independent variables examined during this study: whether their current field of study was considered a STEM discipline. There were 136 participants, 31% of the sample (N=433), non-PFS participants that elected not to answer this question. These frequencies are representative of the responses after the data was cleaned. The data cleaning process is further described later in this section.

Table 5.

Demographics of the Participants by STEM and Non-STEM Disciplines

Current Field of Study	Consider STEM	Frequency (# of responses)	Percent
Non-PFS	Yes	148	36.0
	No	127	30.9
	Did not answer	136	33.1
	Total	411	100.0
PFS	Yes	5	62.5
	No	3	37.5
	Total	8	100.0

Given conflicting definitions of which majors fall under STEM, which sometimes excludes the field of Psychology, I elected to ask students if their current field of study was considered a STEM major. I was intrigued to see how participants would define their major. In this study, the term STEM is defined by the National Science Foundation (NSF) Scholarships in STEM and Innovation in Graduate Education programs (NSF, 2013). Thus, the field of Psychology is included, and Nursing is not. When participants were asked if they considered their current field of study a STEM major, some appeared not to be informed of STEM majors. To align with the NSF definition of STEM, I created another data source field and labeled responses according to the NSF definition of STEM. Table 6 shows the nine majors that were identified by respondents as STEM majors and are actually not STEM majors.

Table 6.

List of Non-PFS Survey Respondents Who Identified a STEM Major Not Recognized as STEM by NSF

Is your current field of study considered a STEM major? (e.g., Science, Technology, Engineering, Mathematics)	**What is your major?**
Yes	English
Yes	Family and Human Development
Yes	Marketing
Yes	Nursing
Yes	Nursing and Health Innovation
Yes	Speech and Hearing Science
Yes	Sustainability
Yes	Sustainability
Yes	Sustainability

Table 7 below shows the 15 responses that did not identify their major as STEM majors but are considered STEM majors for this study.

Table 7.

List of Non-PFS Survey Respondents Who Did Not Identified a STEM Major as Seen by NSF

Is your current field of study considered a STEM major? (e.g., Science, Technology, Engineering, Mathematics)	**What is your major?**
No	Anthropology
No	Anthropology
No	Environmental Social Science.
No	Geography
No	Geography
No	Geography
No	Human Systems Engineering
No	Mathematics Education
No	Psychology
No	Psychology
No	Psychology
No	Psychology
No	Psychology
No	Psychology

Table 8 below represents the frequencies of the two populations broken down by the second independent variable examined during this study: generational status. Participants were asked, "Are you a first-generation college student? First-generation students are those whose parents did not receive a college degree." As with the other question, there were 136 non-PFS participants that elected not to answer the above question.

Table 8.

Generational Status of the Participants

First-Generation Students		Frequency (# of responses)	Percent
Non-PFS	Yes	71	17.3
	No	204	49.6
	Did not answer	136	33.1
	Total	**411**	**100.0**
PFS	Yes	4	50.0
	No	4	50.0
	Total	**8**	**100.0**

Table 9 below represents the frequencies of the two populations broken down by the third and final independent variable examined during this study: gender. Participants were asked "What is your gender?" I phrased the question this way to be gender neutral. There were five participants that identified with a pronoun other than male or female. Additionally, there were 136 non-PFS participants that elected not to answer the above question. The 136 non-PFS respondents who did not answer these above questions failed to complete the entire survey.

Table 9.

List of Participants by Gender

Gender		Frequency (# of responses)	Percent
non-PFS	Male	113	27.5
	Female	157	38.2
	Different identification	5	1.2
	Did not answer question	136	33.1
	Total	**411**	**100.0**
PFS	Male	3	37.5
	Female	5	62.5
	Total	**8**	**100.0**

Integration of Qualitative and Quantitative Finding

During the analysis process of PFS and non-PFS qualitative sources, initially ninety seven structural codes were identified. As indicated in Chapter 3, after examining commonalities, differences, and relationships to the research questions, the codes were grouped into three larger categories: Career Elements, Communication Skills, and University Environmental Factors. I discovered that remaining open to other theoretical perspectives that emerged during data collection and analysis allowed my investigation of doctoral students' perceived preparedness for multiple career paths to shift from examining social capital and levels of socialization within academic and non-academic social structures to the application of communicating the relevancy of research to academic and non-academic audiences. Many of the career elements aligned with social cognitive career factors. Social cognitive career factors are items that comprise the conceptual framework of the social cognitive career theory that "emphasizes the dynamic processes that help to shape and transform occupational and academic interest, choices, and performances" (Lent & Brown, 1996, p.311). Additionally, I found that before I could continue with data analysis, I had to return to Chapter 2 and conduct a literature review on the social cognitive career theory. Finally returning to the data, I found that the categories of career elements, communication skills, and university environmental factors were present in both quantitative and qualitative data.

Career Elements. Prior to data collection, I found, in order to investigate the perceived level of preparedness for multiple career paths, I needed a brief insight into the participants' career aspirations, goals, and why they were pursuing a PhD. PFS and non-PFS participants were asked the following question: "Which of the following statements

best describes your thinking at the time you decided to apply to a PhD?" Of the 419 responses, 57% said I "continued my education because, after my undergraduate/master program, I did not have a good employment prospect or clear sense of what I wanted to do" (n =239), 23% selected "other" (n=100), 19% indicated I "followed my intense passion in my field of study rather than a career goal" (n=80), and 2% (n=8) did not answer the question. As stated before, historically a PhD student is seeking a career in academia, but I found for many participants in this study an actual career path was unclear. Additionally, previous pilot study findings revealed that students' career trajectories changed during their second and third year of the PhD program.

Through the qualitative data collected from the following open-ended survey questions: "What were your career goals(s)/aspirations(s) as a child? Think back as far as you can. What or who influenced these career aspirations?"; "At what point, if any, did these career goals changes and why?" and "What are some of barriers/challenges/obstacles, 'real or invisible,' you have or are experiencing that have impacted you and how did or will you persevere over those barriers?" I found non-PFS and PFS students consistently referred to elements identified by Lent, Brown, and Hackett (1994) and Bandura (2002). These elements include self-efficacy beliefs, outcome expectations, goal representation, a person's attributes and behavior, interest development, choice and performance, and environmental factors. Through the order in which the above questions were asked and answered, I discovered complete narratives that illustrated career conceptualization begins early, and over time, through the linkages of social cognitive career elements, a shift occurs in career aspirations and goals. I found many of these careers shifts went from an academic career path to a non-academic career

path. Other career conceptualization shifts were less clear due to short or incomplete answers or other variables such as perceived age discrimination which fell outside the scope of this study. Below are four examples of narratives complied by taking each open-ended response and putting them together as one passage. These narratives can be said to reveal the interlocking social cognitive career themes. I found the structure and my interpretation of these narratives to be consistent and reflective of other participants in this study. The first is from a STEM female PFS participant who is a first-generation student. The second is from a STEM male PFS participant who is not a first-generation student. The third narrative is a non-STEM female non-PFS participant who is not a first-generation student. The final narrative is from a non-STEM male non-PFS participant who is not a first-generation student. Responses did not appear to vary much across STEM and non-STEM disciplines or generational status. I did find that responses varied slightly across gender lines. Students have been given pseudonyms in order to protect their identity. April, a STEM female PFS participant who is a first-generation student, stated:

> "As a child, I wanted to be a medical doctor or a medical research scientist. One of my sisters was diagnosed with Type I diabetes at a very young age (she was 4, I was 9). As I've found is the case with many doctors and medical scientists, this personal experience shaped my early interest in these professions. As the first person in my family to attend college, I also felt the need to push myself and be an example to my siblings; even as a child I knew being a doctor was a rigorous and respected path to pursue. While I still have great respect and admiration for doctors, my career goals have since changed. I maintained my desire to be in the medical field until a few experiences in my undergraduate career altered my interests. First, I was an undergraduate researcher in a biochemistry lab at a medical school and realized I did not enjoy laboratory work. I felt I was lucky to have these experiences early. Second, I found a passion for environmental science and policy and conducting research outdoors. I hoped that the opportunity to pursue further education would allow me the freedom to shift my previous career goals. I knew that I did not want to pursue a career as an academic

> professor when I entered my program. I have encountered some unexpected resistance to openly discussing non-academic careers and opportunities from within the university. As I do not have any family members or friends (outside of my academic cohort) that have earned degrees, I struggle with finding advice on how to approach my career search. One way I am addressing these barriers is by taking Preparing Future Scholars. I heard that this course was an open environment to learn about and discuss how to prepare for a future outside of (or even in addition to) academia.

April began modeling positive self-efficacy beliefs as outlined by Bandura (1997) to enhance outcome expectations. April's outcome expectations interlocked with her experiences as an undergraduate appear to have caused a shift in career choice and mirrors segments of the social cognitive career approach to career development described by Lent and Brown (1996). Through laboratory activities, April refined her skills and found an interest in research outdoors. This new-found interest also appears to have caused a shift from an academic to a non-academic career path. As the sense of isolation from not being able to engage in conversation about career paths grew, April continued to maintain positive self-efficacy beliefs and took her own initiative to prepare for a non-academic career path.

Nico, a male PFS STEM student whose parents went to college, stated that when he was a child he wanted

> "To work as a research scientist, to make/ invent something which can be used by mass population. I was influenced by the supportive environment at home promoting higher education as a life goal and schooling which generated interest in science during early high school years. My career goals have not changed substantially, in fact they have gotten more specific as I have continued on my desired path and became more aware of the specifics in my field of research."

Nico, continued to state that his,

> "Present goal is to work as a research scientist to generate new ideas for the development of futuristic engineering products which can be used by mass population to improve their standard of living both in first/third world countries. The biggest barrier for me is lack of awareness/mentoring towards the approach required to follow my career goal. This is one of the reason I have joined PFS, to get access to the information on where to access resources which can help in deciding the career moves required to achieve my career goals. I also plan to use the resources available on campus such as writing workshops, career development workshops."

Through Nico's responses I found positive environmental factors from home, high school, and college, combined with elements of choice and performance and interest development. I found this to be demonstrated through Nico's enrollment in the PFS course and use of other campus resources. Nico appears to model his behavior after the supportive environment promoting education and career goals, whereas April's behavior was modeled after her own positive self-efficacy beliefs and choice and performance. As noted by Betz and Hackett (2006) to reference elements of the social cognitive career theory one must examine behavior.

Jessica, a non-STEM female non-PFS participant who is not a first-generation student, shared that:

> "The earliest career goal I had was to be a ballet dancer. Throughout high school, my career goals continued to be arts or music-based. I started college as a piano performance major, but was drawn to the Humanities as a field of study and a career pathway. As far as who or what influenced my career aspirations, I would say that occasionally a teacher or other adult provided guidance or encouragement along the way, but my most successful and satisfactory career goals always have sprung from and are fueled by my passion for learning and creating. My attempts to rationally choose a career based on logic or market dynamics failed miserably (my one semester as an undergrad business major; my one "lost" year working in a bank...)."

Jessica continued to state:

> "My career goals coalesced in my mid-twenties into the education field, where I found challenge and satisfaction as a high school teacher. After having children of my own, and working both in and out of education, I

> found myself intrigued by education policy as it impacted teaching, teachers, and students. So in my early 40s I applied to the Ed Policy PhD program. Today, two-thirds of the way through my program, my career goal is to find gainful employment in an education-related field, ideally in a position that values or requires my advanced degree(s). I'm not certain that I will graduate, however, and I'm even less certain that I still want a university teaching job… I work full-time as a high school teacher, and I am a parent to 3 children. This puts a bit of a barrier between myself and the rest of my cohort, which is mostly much younger, and mostly single. It also seems to give my professors a preconceived idea about who I am and what my potential is, or might be. I have persevered by reaching out to my fellow grad students and by learning from their expertise in areas where I am not as competent (statistics, for example), and by trying to be punctual, prepared, and attentive in all my classes."

Within Jessica's responses I found the interlocking process of interest development early in her career through the pursuit of a humanities degree and a performance-related career path. Jessica's career outcome expectations appear to be shaped by several variables including self and parental efficacy beliefs and perceived perception of market forces. I found that these beliefs and a mixture of experiences caused a shift in career conceptualization that were focused less on academic or non-academic career paths but more on social structures, which Bussey and Bandura (1999, p.676) refer to a "social transmission model." Jessica's career conceptualization shifts appear to be the result of a broader network of influences including parental responsibilities and societal perception of gender, age, and levels of education.

We see the opposite with Alan, a non-STEM male non-PFS participant who is not a first-generation student. Alan said,

> "I wanted to be a bunch of different things growing up. The one that stands out is police officer. This was most likely influenced by my family and those around me who provided praise for the choice. Change started during my undergrad where I started to see the value in education and began to enjoy the school work. I saw that I could make a difference at a higher level and directly affect policy, rather than working on the

> ground like a police officer. I think one of the biggest challenges has been dealing with the stress and pressure of graduate school in general. While the work has been difficult and demanding, the hardest challenge has been mental: finding ways to deal with stress, overcoming "imposter" syndrome, maintaining positive feelings about ones direction. I am fortunate to have really good people around me that have supported me through everything."

I found Alan's career conceptualization shifts illustrate the interlocking process of various SCCT elements. This can be illustrated through his self-efficacy belief to make change as a police officer, supported by the environmental element of family, along with positive goal behavior. Again we see with Alan and Jessica that their career conceptualization shifts are not directly associated with an academic or non-academic career path, but more with the interlocking process of social cognitive career elements and social structures.

Through Lent, Brown, and Hackett (1994), Bussey and Bandura (1999), and Hirudayaraj (2011), I found the interlocking process of their theoretical frameworks to be a factor in PhDs students' career development. Through the qualitative data analysis I found participants' gender to be a factor in the students' preparedness and exploration of multiple career paths. Both women had perceived career ideas rooted in a gender specific role. Bussey and Bandura (1999) note gender roles are influenced by individual experiences and the reaction of others in different social structures, such as academic and non-academic employment sectors. Both April and Jessica, through their experiences, had career ideas rooted in a gender-related career path. April wanted to be a doctor based on the need to nurture and care for her younger sister. Jessica wanted a career in dance and theater, also typically perceived as a gender-specific career, later shifting to care for

children, both her own and those she taught in high school. Nico and Alan both had perceived male gender roles of building, protecting, and serving.

The theme "career elements" revealed support into the investigation of career choice and pursuit of a PhD across gender, discipline, and generational status. These elements of support included components relevant to one's self-efficacy beliefs, outcome expectations, and one's behavior which enhanced interest development, performance, and choice to pursue multiple career paths. Several career elements could be examined in greater depth to investigate the transformation of a PhD student's career choices. However, SCCT suggests that self-efficacy and career expectations influence outcome expectations which in this case mediates the process of communicating the value of PhD research across multiple audiences (Wang, Lo, Xu, Wang, & Porfeli, 2007).

Communication Skills. The next two categories align with how PhD students describe the preparation they receive for academic and non-academic career paths. The development of this theme and the next theme are based on the overall data set. Quantitative data results from non-PFS participants indicated that 66% (N=427) of students overwhelming perceived themselves to be "extremely proficient" or "somewhat proficient" when giving an oral presentation to a lay (non-academic) audience, including short elevator speeches about their research. Qualitative data provided by PFS year-end reflection papers, PFS classroom discussions transcripts, and non-PFS participants' responses to open ended survey questions revealed that participants had an optimistic outlook on the preparation they received from their graduate program toward an academic career and a pessimistic outlook on the preparation they received from their graduate program toward a non-academic career. I defined optimistic as being hopeful for

positive outcomes; whereas, I defined pessimistic as having negative returns and not being hopeful for future development. The data revealed that the sense of optimism came after completing the PFS course (post-intervention). Michelle, a PFS female STEM student whose parents went to college, stated that:

> "One of the highlights of my semester was being in a situation where I had to give my elevator pitch to the University President at 7:30AM before I had had my coffee over breakfast. We were at the National Conference on Citizenship, and he sat at the table I was eating breakfast at and proceeded to ask me about my research interests. While I was nervous and fumbling around at first, it turned out that he is passionate about domestic violence and the genetic role in violence and violence against women, and I was able to engage in a meaningful conversation with him. Walking away, I felt confident in my mission, but I also knew that I had a lot of work to do on my elevator pitch.

The sense of optimism was seen across STEM and non-STEM disciplines, generational status, and gender. April, the STEM female PFS participant who is a first-generation student, stated that:

> "After exercising my elevator speech both in the class and in the PFS mixer, I feel more confident about presenting myself in front of a small crowd. I may still be nervous when giving an elevator speech in the future, but I will definitely be more confident, and I believe confidence is a crucial element."

Johnathan, a PFS male STEM student whose parents went to college, shared his sense of optimism in his level of preparedness for multiple career paths by stating:

> In addition to gaining a greater understanding of my own existing skill set, I also gained a number of new skills that will be helpful in navigating the next stage of my career, including how to pitch myself (or an idea) to a prospective employer that is outside of academia. This was something I hadn't thought about in a general sense before taking the course…Now I feel like I have a base pitch to work from; one that I can modify and make more specific as needed. I also feel like the experience working on pitches has prepared me to develop a pitch for a specific idea if I decide to go that route…After working on the basics of how to make a pitch over the course

> of the PFS program, I feel I would be much more prepared to develop a pitch for a particular idea.

When non-PFS participants were asked the following open-ended question, "At this point in your graduate program and with the knowledge you currently have, how would you describe the preparation you have received towards non-academic and academic career paths?" respondents either said they had little or no preparation for non-academic career paths. Those that had non-academic preparation gained it from their own work experiences or participation in an internship program. Of the non-PFS population, 31% (n=133) participated in an undergraduate internship program. I found that despite participation in an internship program it was not enough to feel optimistic about the preparation for multiple career paths. Javas, a STEM male non-PFS participant who is a first-generation student and participated in an internship program, stated that he "received limited preparation for future career paths. The focus has been on current work and not on the diverse career opportunities that might be available in the future. This is an area where change is critical." Through the two categories of analysis, career elements and communication skills, there was a means of an interlocking process with university environmental factors.

University Environmental Factors. Findings from the theme university environment factors are presented in three segments. First, the paired-samples t test of the data for the PFS-pre- and post-innovation surveys are presented. Second, is a rotated factor analysis matrix of verbal and non-verbal items. Finally, non-PFS participants perceived levels of preparedness toward the preparation they received toward academic and non-academic career paths are presented through qualitative findings.

Paired-Samples T Test. As a result of the institutional intervention, I conducted a paired- samples t test to compare PFS participants' perceived level of preparedness to communicate the value of their research verbally and non-verbally. There was a significant difference in the perceptions of verbal and non-verbal communication on a 4-point scale, with response choices 4=Needs improvement, 3=Only Slightly Proficient, 2=Somewhat Proficient, and 1=Extremely Proficient. The significant difference ($p < .005$) of five items are presented below in Table 10. While statistically significant, small differences are revealed from the PFS participants how they communicate the value of their research across academic and non-academic audiences.

Table 10 reveals only five out of 11verbal and non-verbal pre- and post-innovation items measured. As shown in Table 10 below, the mean difference (MD) score of each item deceased by at least a half percentage point for "writing for a lay audience" and "utilizing media and technology to communicate research." Items decreasing in percentage reveals an increase in the students' perceived proficiency of that item. The mean differences of "multi-media communication and digital tools," "articulating your research using written communication skills to audiences within your disciplines," and "oral presentation to lay audience" deceased 1.00 point from retrospective pre- to post-innovation assessments. The three items with a decrease in one point were more heavily discussed and utilized in the PFS course.

Table 10.

Significant Mean Scores, Standard Deviations, and Cohen's d in PFS Participants' Level of Proficiency in Verbal and Non-verbal Communication

Paired Items	Pre-intervention Mean	Post-intervention Mean	MD	SD	t	df	sig	d
Writing for a lay audience (non-verbal)	2.38	1.75	0.625	0.518	3.416	7	0.011	0.98
Multi-media communication and digital tools (non-verbal)	2.75	1.75	1.00	0.926	3.055	7	0.020	1.24
Utilizing media and technology to communicate research (non-verbal)	3.17	2.33	0.833	0.408	5.00	5	0.004	1.06
Articulating your research using written communication skills to audiences within your disciplines (non-verbal)	2.67	1.67	1	0.894	2.739	5	0.041	1.07
Oral presentation to lay audience (verbal)	2.88	1.88	1	0.535	5.292	7	0.001	1.93

To conclude the qualitative analysis, I ran a factor analysis on pre-intervention data from both PFS and non-PFS participants. This analysis allowed me to determine if there were additional underlying constructs that could potential help address the problem of practice.

Factor Analysis

In education research, exploratory factor analysis has been the most common form of the application followed by confirmatory factor analysis (Reio & Shuck, 2014). Reio and Shuck (2014) further illustrate how exploratory factor analysis is a quantitative method used for theory generation and to ascertain any underlying correlation among the observed variable. Reio and Shuck (2014) continue to outline how confirmatory factor analysis is used to test processes at later stages of research. To determine if there were additional constructs in this study to the ones I identified, I conducted an exploratory factor analysis. As Pohlmann (2004) notes, a factor analysis is effective to measure many variables and determine if there may be more important underlying variables to explore. The computations for the factor analysis were generated by SPSS. The statistical software attempted to interpret my data by factor rotating. As Pohlmann's research on the use and interpretation of factor analysis (2004) highlighted through factor rotating and analysis, there is a "separation in the variable-factor correlation" (p.15). This process allowed me to evaluate underlying constructs that aligned with my investigation of PhD students' perceived preparedness for multiple career paths.

The dimensionality of the 11 items from the pre-intervention survey given to PFS and non-PFS participants ($n > 347$) measuring their perceived level of proficiency in verbal and non-verbal communication was analyzed using maximum likelihood factor analysis. Through this analysis, I was able to determine if there were any underlying dimensions beyond verbal and non-verbal skills when PhD students communicated the value of their research. The rotated solution, as shown below in Table 11, yielded three interpretable factors. The factor loading, which represent how variables are weighted into

each factor, revealed three sets of items. After SPSS, the statistical software generated the three components, I arranged each item by the highest variance. I found the items aligned with "an audience" rather than verbal and non-verbal communication skills. As seen in Table 11, I divided the items into three sections based on the order of the variances. I labeled each factor: Lay, Discipline, and Social Audiences. I found that the factor analysis revealed an underlying construct: audience.

Table 11.

Pre-Intervention Rotated Component Matrix

	Components		
	Factors 1: Lay Audiences	Factors 2: Discipline	Factors 3: Social
Utilizing media and technology to communicate research (non-verbal)	.857	.020	.112
Multi-media communication and digital tool (non-verbal)	.742	.127	.051
Articulating your research using written communication skills to lay audiences (non-verbal)	.667	.379	.261
Writing for a lay audience (non-verbal)	.569	.293	.435
Articulating your research orally to lay audiences (verbal)	.551	.218	.522
Oral presentation to lay audience (verbal)	.434	.170	.683
Writing for a discipline-specific audience (non-verbal)	.117	.906	.096
Articulating your research using written communication skills to audiences within your disciplines (non-verbal)	.228	.849	.044
Oral presentation to a discipline-specific audience (verbal)	.148	.692	.394
Starting conversation at social events (verbal)	.046	.010	.811
Conflict resolution, difficult conversations (verbal)	.133	.252	.572

Audiences. As a result of the institutional intervention, I found that there were positive significant differences in PFS participants' proficiency levels of their communication skills until they had to actually engage in conversation with lay "non-academic" audiences, discipline specific "academic" audiences, or individuals in social settings. Rebecca, a non-STEM female PFS participant who is a first-generation student, shared her experience after having the opportunity to attend a PFS mixer with individuals from various non-academic organizations and communities:

> When I got up, and I spoke, you know, they were like, I don't know what you are talking about, and I said, well, I don't know what you are talking about, you know. So, it did help me in the aspect of you know, relaying my ideas, in layman's terms, to those who were not in my field.

Rebecca uncovered a layer of the "basic challenge" Kristof (2014) speaks to, a disconnection between audiences and impact of effective communication. I found that this may not just be between academic and non-academic audiences. Maggie, a STEM female PFS participant who is not a first-generation student, also expressed the challenge, but said:

> I felt like it was refreshing on one hand, to share it [her research] with people that were so outside of my field, because if I was able to convey my message to people that had nothing to do with my field, then that was a good sign, and I feel like they all got it, and felt it was important, so, that was good.

After my analysis of qualitative and quantitative data, I found a statement from April that describes my overall findings into the perceived level of preparedness for multiple career paths:

> I just wanted to second something that, I think, several people mentioned. I received very little preparation for a non-academic career outside of this course, and discussions that we have had inside this course. In my department, it is even somewhat taboo to discuss this with other students, in case faculty above you hears and, because faculty don't take you seriously if they know that you are even considering something outside of an academic career. There are a few faculty sprinkled here and there, but it is hard to find out who they are. So, it is, it's hard to even try to talk about finding out information about what you might do, when you graduate, even if that is what you are really interested in.

In summary, it can be suggested that PhD students adopt a sense of control and proficiency over taking responsibility for their career development. However, findings show university environmental factors, such as course offerings, faculty participation, and degree program structures which promote "transferable skill" development, influence the mindset of academic and non-academic audiences and students' levels of perceived preparedness for multiple career paths. The final chapter provides overall conclusions, implications, and recommendations that speak to the findings discussed in this chapter and the study overall.

Chapter 5: Conclusions, Interpretations, and Recommendations

"People not only gain understanding through reflection, they evaluate and alter their own thinking." Albert Bandura, Encyclopedia of Human Behavior, 1994

The purpose of this action research study was to investigate PhD students' perceived level of preparedness for multiple career paths in order to answer the following research questions: How do PhD students describe the preparation they receive for academic and non-academic careers paths? To what extent do PhD students' career preparedness vary across STEM and non-STEM disciplines, generational status, and gender? And, finally, as a result of an institutional intervention, what are the differences in PhD students' perceived preparedness to communicate the value of their research across multiple audiences? The purpose of this final chapter is to discuss the overall conclusions from the perspective of the assertions, implications, and limitations of the study and present a summary of recommendations for practice and further research.

This mixed methods research design was the third and final cycle of an action research study. The first cycle focused on characteristics of an interdisciplinary doctoral level professional development course at a large public university that bridges the creation of innovation between university, industry, and government for the purpose of developing alternative career paths for PhD students. The second cycle focused on the public perception that sometimes minimizes the value of a doctoral degree in non-academic sectors. Finally, this study investigated PhD students' perceived level of

preparedness for multiple career paths, in addition to ways universities can cultivate conditions for PhD students to achieve their career goals.

From the study conducted, it appears that students who start the journey to pursue a doctoral degree have a higher sense of occupational self-efficacy. As Bandura (1997) notes, occupational self-efficacy has two levels of influence, personal elements and social elements. PhD students who participated in this study illustrated personal influence through their educational experiences and their belief that learning influences new ventures, such as exploring non-academic career pursuits. PhD students' social elements were based on a set of interlocking elements and influenced a person's perspective. The social cognitive career theory as defined by Lent et al (Lent et al., 1994; Lent & Brown, 1996) was an added layer of discovery into the social cognitive elements in which a PhD student's interest development, choice and behavior, goal representation, and outcome expectations influence career development. The results of this study illustrated all layers of the social cognitive theory. In this study new insight was provided into the PhD students' development and exploration of multiple career paths.

It appears from the results of this study that a PhD program influences a higher perceived efficacy of mastery in technical skills, such as communicating the value of PhD research for academic career pursuits, but the competencies to fulfill non-academic pursuits are limited or completely unknown. The findings from both PFS and non-PFS participants also suggest a need to focus on elements of the social cognitive career theory. These elements include interest development interlocked with choice and performance. Findings from this study also suggest that academic and non-academic career preparation

should be incorporated into an institutional intervention to broaden a student's sphere of career awareness and expose PhD students to a wider range of employment opportunities.

Literature continues to grow on the culture and structure of graduate education, along with the need to address the challenges graduate students have with respect to preparing for multiple career paths (Barber, 2015; Cassuto, 2016; Flaherty, 2015; James, 2016; Magaldi, 2015; Patel, 2016; Young, 2015; Wyck, 2016). To address the various changes, stewards of graduate education (Richardson, 2006) should generate policies and procedures using formal knowledge based on research and scholarship to transform the landscape of graduate education and bridge the theoretical and practical knowledge needed for various employment sectors. Furthermore, stewards of graduate education cannot ignore the needed fundamental changes to the professional development of PhD students that will engage them in conversations and experiential learning that demonstrate the value and relevancy of their research across multiple settings and audiences. Considering both the theoretical framework and the analysis of the qualitative and quantitative data outlined in Chapter 4, I formed three assertions.

Assertions

Each assertion is tied to the research question of the study and presents evidence for further research. The first research question of this study aimed to investigate PhD students' perceived preparedness for academic and non-academic career paths. Multiple instrument items provided data to answer the first research question, but the following survey question was instrumental in drawing the first assertion. PFS and non-PFS participants were asked: "At this point in your graduate program and with the knowledge you currently have, how would you describe the preparation you have received toward non-academic and academic career paths? Be specific."

Assertion One

PhD students seek more instruction and can benefit from engaging in conversations about their research to academic and non-academic audiences.

Evidence and implications. Evidence that PhD students seek more instruction was revealed in Chapter 4. PFS participants enrolled in the innovation because they either felt they could not talk to faculty about their interest in non-academic career paths or they did not know how to access the tools and resources to explore and talk about their research or research areas of interest to academic and non-academic audiences. In addition to the PhD students that enrolled and showed interested in the PFS course, 37% of the students in the study (N=427), pre-innovation participants, felt they should be encouraged to attend more "transferable skills" development workshops. While this data does not directly suggest students are seeking to engage in conversations about their research to academic and non-academic audiences, it does suggest that students feel there is a lack of encouragement to develop transferable skills which, as the literature revealed in Chapter 2, includes communication and collaborations. Further evidence to support the need to provide students with more opportunities to engage in conversation with academic and nonacademic audiences was provided by pre-innovation findings. Participants were asked to indicate the level of comfort/confidence with the following situations or issues: Having to communicate with people they did not know and networking with academics and senior people within their discipline. Over 55% of the respondents (n=272) indicated they were uncomfortable with having to communicate with people they did not know well, and 61% (n=273) were uncomfortable networking with academic and senior people within their discipline. These findings suggest that students seek additional instruction in

how to engage in conversations about their research to academic and non-academic audiences. Although the intent of this study was to focus on PhD students' perceived level of preparedness of verbal and non-verbal communication skills needed for academic and non-academic career paths, quantitative and qualitative data from PFS and non-PFS participants yield findings to support evidence that the delivery model was not the challenge, rather their level of confidence and proficiency in engaging with different audiences was low. PFS qualitative data revealed that the content to deem the research relevant in multiple settings proved challenging. These results also support research results which indicate PhD holders have very little knowledge of the labor market (Garcia-Quevedo et al., 2011). The study findings suggest PhD students feel knowledgeable of academic careers, but the findings also suggest it is necessary to provide doctoral students with instruction on how to engage in conversation about their research across academic and non-academic employment sectors.

This study involved a wide investigation into PhD students' perceived preparedness for academic and non-academic career paths. The second research question of this study aimed to investigate to what extent PhD students' perceptions of their proficiency in their verbal and non-verbal skills to communicate the value of their research to lay and discipline audiences were different across STEM and non-STEM majors, generational status, and gender. The study findings shows PhD students' perceptions of their proficiency in their verbal and non-verbal skills to communicate the value of their research to lay and discipline audiences pre-innovation are not statistically different across STEM and non-STEM disciplines, generational status, or gender; rather, there are

statistical differences in their delivery method. The study findings lead me to draw the second assertion:

Assertion Two

PhD students' perceptions of career preparedness are forged by venue and delivery method rather than proficiency in their verbal and non-verbal skills.

Evidence and implications. Quantitative data from PFS and non-PFS participants yields data to support evidence of this assertion. Evidence from the factor analysis discussed in Chapter 4 revealed that PhD students engaged in conversations with three types of audiences: lay "non-academic," discipline specific, and audiences in a social setting. A pre innovation paired-samples t-test was conducted to compare PhD students' perceived level of proficiency in giving an oral presentation to a lay audience, including short "elevator speeches" about their research, and their perceived level of proficiency giving an oral presentation to a discipline-specific audience. The paired-samples t-test revealed no overall significant difference in PhD students' proficiency presenting their research orally to lay ($M=1.83$, $SD=.836$) or to a discipline-specific ($M=1.83$, $SD=.836$) audience; $t(353) = .978$, $p=.329$. As seen in Table 12 below, examining the lay and discipline composites derived from the factor analysis, there was also no significant difference ($p>.005$) across the three variables: STEM and non-STEM disciplines, generational status, or gender.

Table 12.

Pair-Samples T-Test between PhD Students Communicating Research Verbally or Non-verbally with Lay or Discipline Specific Audiences.

	Lay	Discipline
STEM	(M=1.94, SD=.911)	(M=1.91, SD=.858) t(156)= .403, p=.688
Non-STEM	(M=1.69, SD=.802)	(M=1.73, SD=.750) t(131)= -.611, p=.542
First-Generation	(M=1.90, SD=.906)	(M=1.94, SD=.917) t(77)= -.382, p=.704
Non-First Generation	(M=1.80, SD=.857)	(M=1.79, SD=.771) t(210)= .087, p=.931
Male	(M=1.75, SD=.870)	M(1.80, SD=.843) t(116)= -.669, p=.505
Female	(M=1.85, SD=.862	(M=1.83, SD=.784) t(166)= .374, p=.709

Note. M=Mean. SD=Standard Deviation.

Additionally, as seen in Table 13 below, within the groups there is not a significant difference between their proficiency presenting their research orally to lay or discipline-specific audiences.

Table 13.

Pair-Samples T-Test between Communicating Research Verbally or Non-verbally with Lay or Discipline Specific Audiences across STEM and Non-STEM Disciplines, Generational Status, and Gender

	Lay	Discipline
STEM Male 1st Gen	(M=2.12, SD=.993)	(M=2.18, SD=1.07) t(16)=-.324, p=.750
STEM Male Non-1st Gen	(M=1.81, SD=.900)	(M=1.85, SD =.784) t(58)=.306, p=.761
STEM Female 1st Gen	(M=2.26, SD=.991)	(M=2.16, SD=.898) t(18)=.622, p=.542
STEM Female Non-1st Gen	(M=1.90, SD =.863,	(M=1.82, SD=.840) t(61)=.820, p=.416
Non STEM Male 1st Gen	(M=1.33, SD=.492)	(M=1.58, SD=.900) t(11)=-.761, p=.463
Non STEM Male Non-1st Gen	(M=1.59, SD=.700)	(M=1.59, SD=.733) t(29)=.000, p=1.0
Non STEM Female 1st Gen	(M=1.76, SD=.830)	(M=2.17, SD=.928) t(28)=-.189, p=.851
Non STEM Female Non-1st Gen	(M=1.70, SD=.801)	(M=1.74, SD=.801) t(56)=-.314, p=.755

Note. M=Mean. SD=Standard Deviation.

It could be that there is no significant difference in the findings illustrated in the tables above because graduate programs are overwhelming preparing their PhD students to present their research to multiple audiences. Additionally, it could be that students do not know they have challenges until they are presented with the opportunity to engage and make connections with professionals outside academia in a social environment.

As noted in Chapter 3, the rotated factor matrix in Table 11 revealed a social element to PhD students' perception of preparedness to communicate their research across multiple audiences. When PhD students were asked to rate their skills when articulating their research orally to lay audiences and starting conversations at networking events, there were significant differences as seen in Table 14 below. Table 14 reveals a small p value ($p \leq 0.05$) across each group, STEM, non-STEM, generational status, and gender. As previously noted a small p value indicates strong evidence against the relationship between PhD students' perceived level of proficiency articulating their research to lay audiences and starting conversations at social events. It could be that PhD students perceive that they have excellent skills articulating their research, but could use improvement starting conversations at social networking events.

Table 14.

Pair-Samples T-Test between PhD Students Articulating Research to Lay Audiences and Starting Conversations at Social Networking Events

	Articulating Research to Lay Audiences		Starting Conversations at Social Networking Events			
	M	SD	M	SD	t-test	p
STEM	1.97	.908	2.50	1.08	t(154) = -5.80	.000
Non-STEM	1.80	.826	2.15	1.01	t(155) = -5.99	.000
First-Generation	1.95	.938	2.28	1.08	t(77) = -3.10	.003
Non-First Generation	1.87	.850	2.36	1.06	t(208) = -6.23	.000
Male	1.78	.835	2.45	1.06	t(115) = -6.53	.000
Female	1.96	.904	2.25	1.07	t(165) = -3.59	.000

Note. M=Mean. SD=Standard Deviation.

Furthermore, as seen in Table 15 below, within the groups there is a split between the eight groups. The first four groups reveal a statistical significant difference between articulating their research to lay audiences and starting conversations at networking events. It should also be noted that the first two groups, non-STEM male first-generation and STEM male first-generation, in the second half of the table, are marginally significant ($p<.082$, $p<.083$). This suggests that they too could improve in starting conversations at social events.

Table 15.

Pair-Samples T-Test between Articulating Research to Lay and Starting Conversations at Networking Events across STEM and Non-STEM Disciplines, Generational Status, and Gender

	Articulating Research to Lay Audiences		Starting Conversations at Social Networking Events			
	M	SD	M	SD	t-test	p
STEM Male Non-1st Gen	1.79	.833	2.66	1.04	t(57) = -5.58	.000
STEM Female Non-1st Gen	2.02	.885	2.30	1.12	t(60) = -3.29	.002
STEM Female 1st Gen	2.21	1.13	2.68	1.06	t(18) = -2.80	.012
Non-STEM Female Non-1st Gen	1.88	.847	2.18	1.01	t(56) = -2.14	.037
Non-STEM Male 1st Gen	1.58	.669	2.08	.996	t(11) = -1.92	.082
STEM Male 1st Gen	2.12	.928	2.47	1.13	t(16) = -1.85	.083
Non-STEM Male Non-1st Gen	1.62	.820	2.17	1.04	t(28) = -.372	.712
Non-STEM Female 1st Gen	1.83	.889	2.03	1.05	t(28) = -1.14	.264

Note. M=Mean. SD=Standard Deviation.

It is unclear the causes for the differences in articulating research to lay audiences and starting conversations at networking events across STEM and non-STEM disciplines, generational status, and gender. Speculations can be made that some students have less opportunities to engage in conversation at networking events and are unaware of the steps for conducting an employment search. It could be that non-STEM students find it easier to talk about and make connections with people on topics that are a bit more subjective in nature. The implication of PhD students not being able to engage and start conversations at social networking events could result in lost opportunities for funding, future collaborations, new research, and non-academic employment prospects. Qualitative data presented in Chapter 4 revealed that Nico was not aware of opportunities and lacked mentoring. Michelle, the non-STEM non-first-generation female student, learned after attending a networking breakfast that she was able to articulate the value of her research,

but through reflection, acknowledged she was in need of additional practice. Although the qualitative data does not identify the causes for the differences, it does lead to the next assertion.

Assertion Three

PhD student career preparation should focus on articulating relevancy of research across academic and non-academic employment sectors.

Evidence and Implications. Literature reveals that PhD programs are training students to become college faculty. The same literature supports this assertion and the need to consider restructuring doctoral training to align with academic and non-academic employment sectors (Berman et al., 2011; Cassuto, 2015; Richard Cherwitz & Sullivan, 2014; Engineering, 2005; Gaff, 2002; Golde & Dore, 2001). Quantitative data from PFS and non-PFS participants yields data to support evidence of this assertion. Participants were asked in a pre-intervention survey question asked students to what extent they agreed or disagreed with the following statement: My department is helpful and supportive in a graduate's search for professional employment. The question featured a 5-point likert-like scale, with response choices as follows: 1 = Strongly Agree, 2 = Agree, 3 = Neither Agree or Disagree, 4 = Disagree, and 5=Strongly Agree. As seen in Table 16 below, less than 35% combined said they "Agree" or "Strongly Agree" that their department is helpful in the professional employment search.

Table 16.

Department is Helpful and Supportive in Professional Employment Search

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	35	8.2	8.2	8.2
Agree	108	25.3	25.3	33.5
Neither Agree nor Disagree	89	20.8	20.8	54.3
Disagree	40	9.4	9.4	63.7
Strongly Disagree	24	5.6	5.6	69.3
Did Not Ask	8	1.9	1.9	71.2
Skipped Question	123	28.8	28.8	
Total	427	100.0	100.0	100.0

Furthermore, across STEM and non-STEM disciplines, generational status, and gender, less than 50% of all STEM students and non-STEM first-generation female students "Agree" or "Strongly Agree" their departments are helpful in the professional employment search. Those in disagreement, could be international students in STEM disciplines with various employment barriers such as Visa requirements. Additionally, there could be resistant from faculty who structure their programs for academic research rather than supporting their students preparing for multiple career paths. The results also indicated, of the non-STEM first-generation female students in disagreement, 45% (n=28) have not yet taken their compressive exams and 59% have not defended their dissertation proposal. These findings suggest that educational milestones, such as taking compressive exams or defending a dissertation proposal, have a role on students' perception of the level of support they receive from their departments.

As stewards of graduate education, we must not forget, as discussed in Chapter 1, the disproportional levels of social, academic, and career development between first-generation doctoral student and their peers. Researchers Seay et al. (2008) and Tate et al.

(2015) outlined a great number of persistent obstacles that impact first-generation graduate students, such as being a single parent, working full-time, and family influences on career development and paths. While there is caution for generalization beyond this population, it appears these findings have implications to the training of future scholars.

Implications for not providing doctoral students with opportunities to engage in conversations about their research across multiple audiences could continue to exasperate the problem, as illuminated by Kristof (2014), where research is seen as a mystery and glorified as something that happens only on a university campus, in a laboratory, or within a company's research and development department. The paradigm must evolve from the traditional mindset that the pursuit of a PhD is a path to a tenure-track faculty position to the mindset that the pursuit of a PhD is a path to the development of innovation for both academic and non-academic employment sectors.

Academic and non-academic labor markets are dependent on the diffusion of innovation: systems innovation, product innovation, and social innovation. A good way to see an innovation come to fruition is to turn users into partners (Robinson, 2009). There are four key stakeholders in the institutional social structure of higher education: faculty, students, alumni, and administrators. The success of the diffusion of an innovation within academic and non-academic labor markets depends on how well the idea is perceived by each stakeholder. The innovators (PhD students) and early adopters (end users) of an innovation must establish effective conversations with each other to ensure the idea is spread within academic and non-academic markets (Robinson, 2009). These conversations will allow the perception of PhD training to shift from training in a

particular subject for an academic career, to a more comprehensive training that will prepare PhD students for academia and beyond.

Results demonstrate more instruction is being sought out by PhD students on how to engage in conversation about the relevancy of their research across multiple audiences through PFS and other avenues on campus since, as one student described, "Training was not offered in my program. It was available in other parts of the university, but I had to create the path for myself." Faculty, researchers, practitioners, as well as policy makers should acknowledge what PhD students are saying to ensure they are versatile in the workforce and fostering transferable skills that will allow them to be successful in various employment sectors.

Limitations of the Study

This action research study has some limitations that should be taken into consideration. First, the sample size of the PFS population was small (N=8) which impaired the analysis of the innovation's effectiveness on a larger scale. A larger pool of participants could have significantly enriched both qualitative and quantitative data and the value the innovation added to students' career development. Additionally, although the non-PFS data provided validation of the PFS data, the results from PFS data are not statistically significant enough to generalize to the overall PhD student population. Second, time for collecting from both the PFS and the non-PFS populations was limited. The PFS class met every other Friday from 9-11am. Although this time slot was ideal since PhD students typically do not have classes on Friday, it may have limited the number of students willing to participate. Another time constraint that could have impacted the results of the study was the duration of the PFS course. Meeting every other

Friday could have provided too much of a gap between meetings, discussions, and activities. Although the class was structured for PFS participants to have activities during an off week, official graded assignments were not given. An excessive work load would exceed university policy for a one-credit hour course. University policy, outlined in the University course catalog states: "At least 15 contact hours of recitation, lecture, discussion, testing or evaluation, seminar, or colloquium, as well as a minimum of 30 hours of student homework is required for each unit of credit." The final time constrain during data collection which may have impeded the study was the window of time given to non-PFS participants to respond to the pre-intervention survey. The survey was deployed during the Thanksgiving holiday break and once again during the second week of December. In addition to the window of deployment occurring during the end of the semester, the survey took approximately 15 to 20 minutes to complete. Additional limitations to the study include four threats to validity. These four threats are outlined below:

Regression. Occurs when subjects are chosen because of their position on a variable is extreme (Smith & Glass, 1987). In this study the threat to internal validity known as regression could occur by repeatedly soliciting PhD students who had previously participated in for-credit professional development courses or attended other events. Additionally, 50% of the PFS participants responded that they "disagree" or "strongly disagree" when asked to what extent they agreed or disagreed with the following statement: My department is helpful and supportive in a graduate's search for professional employment. PhD students who participated in this study appear to

recognize the problem of practice, unlike other students who may be unaware of career development challenges.

Nonequivalence. The nonequivalence threat can occur when any characteristic that make two or more groups being compared unequal in any respect other than the treatment within the study (Smith & Glass, 1987). For example, in this study STEM doctoral students were compared to non-STEM students and first-generation students were compared to their non-first-generation peers. The two groups are also potentially very nonequivalent due to the PFS students voluntarily enrolling in the class and the non-PFS students recruited to take a survey being unaware of the tools and resources PFS students received for preparing for multiple career paths.

Mortality. Takes place when participants drop out of the study (Smith & Glass, 1987). This occurred with PFS and non-PFS participants. A total of 10 of the 16 students enrolled in the PFS course elected to participate in this study. At the end of the eight week course, two of the 10 student withdrew from the study. These students stated that they withdrew due to other obligations. Students' characteristics and differences in obligation could potentially impact the results of this study. A total of 136 non-PFS participants did not complete the pre-intervention survey. Survey fatigue or a sense of frustration may have caused them to randomly select answers.

Novelty Effect. Occurs when programs are new. In this study, the PFS course is in its second year, and there is currently a high level of enthusiasm for the program. The novelty effect could impact this study since there are no other programs designed to prepare PhD students for non-academic career tracks.

Further Discussion, Research, and Recommendation for Practice

I generalized the assertions in this chapter to warrant the need to fundamentally change the structure of PhD students' career development, beginning with the innovation for this research, the Preparing Future Scholars (PFS) course. The current structure, encompassing exploration of career paths and resource development, is loosely structured. Some fundamental changes moving forward will allow doctoral students to foster and develop transdisciplinary and interdisciplinary innovations outside of the Academy. The PFS course and its integration of internal and external community members of practice will bridge the creation of interdisciplinary and transdisciplinary innovation. The next cohort of PFS will engage internal and external community members of practice and will allow doctoral students to holistically look at systems innovation, product innovation, and social innovation which align with their research.

The intent of my research is not to challenge or compare the PhD with other professional doctoral degrees, such as the EdD, or to take a stance on vocational training. The purpose is to ensure PhD students have the tools and research to venture down multiple career paths and communicate the importance of their research and skills they develop while earning their degree. Understanding why there is a need to change the landscape of graduate education requires a reflection on the reasons why and how we as educators are training PhD students. Bandura (1997) noted that "people not only gain understanding through reflection, they evaluate and alter their own thinking." Students' reasons for pursuing a PhD will vary. Some students will want to follow in their parent's footsteps and become a faculty member at a Southwest Public Research I Institution. Other students, such as first-generation students, may strive to not follow in their parent's

footsteps and understand that an educational credential for a job that pays a livable wage is no longer a high school diploma. Additionally, as noted by the Bureau of Labor Statistics (BLS), the median weekly earnings grow with more education, as indicated by the following national averages: $1,624 for those with a doctoral degree; $1,300 for master's degree recipients; $1,006 for bachelor's degree holders; and $625 for those with a high school diploma. And once employed, those with advanced degrees have a lower risk for unemployment. As BLS 2013 data indicates, 2.2% of individuals with doctoral degrees, 3.4% with a master's degree, 4.0% with a bachelor's degree, and 7.5% with a high school diploma face unemployment. These statistics along with this study's findings reinforce reasons for champions of graduate education to continue conversations and explore how we can ensure PhD students are being trained to become university tenure-track faculty, entrepreneurs, and managers and engage in conversations about their research across multiple contexts. These conversations will help to reduce the public perception and mindset of many within academia that those who have earned a PhD only have the skills for a specialize field and want to work in academia (Richard Cherwitz, 2012; Kristof, 2014; Osborne et al., 2014; Ostrove et al., 2011; Porter & Phelps, 2014; Rynes, Bartunek, & Daft, 2001). Further studies are needed to understand the public perception of the value of a doctoral degree.

Through the research of this dissertation and further work I hope to engage university administrators, and non-academic audiences in conversations that will promote the creation of a required career development course for graduate students who have successfully completed their first year of graduate school. Graduate level preparation and research foster the development of new knowledge and new ideas. Further, by drawing

on knowledge and ideas, market forces may influence researchers and generate new innovations to address critical issues such as high unemployment rates, drug abuse, cancer, or more efficient automobiles. Collaborations to address such issues can be found within interdisciplinary, multidisciplinary, and transdisciplinary graduate research, but the experiential learning to apply the knowledge, or as one PhD student said "to look behind the scenes," of the application within academic and non-academic settings is lacking. This would be especially true of first-generation students who often lack the social capital to immerse themselves in the dialog of self-promotion.

Recommendation for Practice

PhD programs are attempting to make significant inroads into the following areas: synergic professional development programs which engage industry interest in careers for graduate students, best practices for teaching assistant development and evaluation, financial aid metrics, and the overall impact student support programs have on the recruitment and retention of highly qualified graduate students.

It would be my recommendation that graduate education impose required graduate professional development courses that would bridge pedagogy with the transferable skills needed in various employment sectors. Although modifications to the curriculum are needed to ensure students are taught about the current employment climate, students can currently select one of three graduate career exploratory courses currently offered at the institution where this research was conducted.

Academic Career Exploration Course

Preparing Future Faculty (PFF) is dedicated to doctoral students and postdoctoral scholars who have clearly identified their career trajectory as a future faculty member.

The PFF program is a one-credit-hour yearlong program which provides an introduction to a career as a faculty member and provides students with tools and resources needed to obtain a career as faculty within their discipline. PFF students learn about the many roles of faculty members and are given an insider's perspective by distinguished faculty and administrators at various institutions. An overview and comparison of how faculty roles differ by institution type and a summer exchange program could provide additional practical experience to what is currently being provided as a teaching assistant.

Interdisciplinary Research Exploration

Universities can help foster the development of first-generation and underrepresented populations by offering a course similar to the course titled the Interdisciplinary Research Colloquium (IRC). IRC is a one-credit-hour course open to all graduate scholars and required for first year graduate student recipients of the Doctoral Enrichment Fellowship and Reach for the Stars Fellowship. IRC is funded by the Graduate Education Support Programs. This colloquium provides an opportunity for students to discuss and share their own research, collaborate with peers on interdisciplinary research projects, and interact with other underrepresented scholars in a multicultural academic community. This program helps develop their leadership abilities and prepares them to excel in academic and professional endeavors.

Throughout the academic year each IRC student participates in two presentations. The first is a group presentation in which each student works with 2-3 other students on identifying an issue and developing a solution to that problem. However, that solution has to incorporate each student's area of research for a truly interdisciplinary experience. The second presentation is an individual one. In this presentation, the student has the

opportunity to practice for an upcoming conference, project, or poster session. Students also have the option of simply sharing their current research ideas with peers and faculty guests for direct feedback. Each presentation is followed by a 10 minute follow-up discussion. The IRC program welcomes others to attend student presentations, especially group presentations, as their proposed projects are also submitted to a university wide program called Changemaker Challenge which could potentially fund their proposal. Opening presentations to a wider audience also allows students the opportunity to ensure they are able to communicate the value of their research in multiple contexts to students, staff, and faculty.

Mentoring is also a key element of IRC and any professional development program. Scholars are assigned an IRC peer mentor, who is typically a second year graduate student who has also participated in the IRC program. It is also common for graduate students to have a faculty advisor; however, IRC students must also identify a faculty mentor at the beginning of the semester. Although students have a faculty advisor that will help get them through their program of study, they are also required to seek out another faculty member who may or may not be affiliated with their program of study. A faculty mentor or advisor may not and does not have to be the same person. This faculty mentor's objective is to provide students with a different academic lens and approach to working with other faculty and help with overall socialization to academia.

Socialization within any organization can be complex and an organization's culture can be difficult to understand due to its complexity and various components (Craig, 2004). To support graduate student retention efforts and to ensure successful completion of their graduate studies, the IRC program actively engages in opportunities

that support diversity across the curriculum. To foster the scholarly environment of IRC and to promote diversity, development of leadership skills, and comprehensiveness of exchange in the mentoring process, each IRC fellow meets regularly with their assigned faculty advisor and faculty mentor. Socialization within graduate school occurs inside and outside of the classroom and interaction with faculty is a key component to positive socialization experiences (Boden, Borrego, & Newswander, 2011; Gardner, 2010; Mendoza, 2007). The form and length of the interaction between the IRC student and faculty mentor may vary; however, the exchange provokes scholarly discussion and guidance to help the student succeed throughout their program of study and foster academic, social, and career aspirations.

Non-Academic Career Exploration

The implementation of the Preparing Future Scholars (PFS) course will allow exploration of non-academic careers and provide students with the opportunity to hone transferable skills that will impact their potential non-academic career trajectory.

Interdisciplinary training programs have shown to have many benefits (Martin & Umberger, 2003; Akins, 2005). One training program which supports the structure of PFF, IRC, and PFS, the three professional development programs outlined above, is funded by the National Science Foundation (NSF). The Integrative Graduate Education and Research Traineeship (IGERT) program (http://www.igert.org/) is a model which fosters the interdisciplinary and transdisciplinary training of doctoral STEM students for career paths inside and outside of the academy. The IGERT program, unlike PFF, IRC and PFS, is incorporated into an academic degree program. PFS, PFF and IRC students do not receive credit toward their degree program, but courses are graduate level

progressive, practical cooperative educational models, in which, they learn practical applications from faculty, staff, and industry leaders.

Traditional cooperative educational programs are structured in a manner to be aligned in the same field of study as the student is enrolled in, provide credit toward a degree, and provide employment hours (Akins, 2005). Additional studies have been conducted to show the value added in Kolb's experiential learning theory and meta-model frameworks. During 1983-1989, researchers at the University of Rhode Island conducted a longitudinal study and found that participation in career preparation programs while in graduate school influenced a graduate student's decision on a long-term career in the field of student development and provided a higher placement rate of participants (Richmond & Sherman, 1991). Requiring graduate students to enroll in a career exploration course such as IRC, PFF and PFS could not only have a positive impact on the student, but also improve relationships between government, industry, and institutions of higher learning. As previous stated "the global competitiveness of the US and capacity for innovation hinges fundamentally on a strong system of graduate education" (Wendler et al., 2010, p. 1). As a researcher and practitioner I will continue to conduct action research on the programs within my sphere of influence to ensure I help prepare graduate students for academia and beyond.

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APPENDIX A

PREPARING FUTURE SCHOLARS SYLLABUS

Preparing Future Scholars Syllabus

Instructors: Jennifer Cason
Director of Student Support Initiatives, Division of Graduate Education
Jennifer.Cason@xxx.edu

Robin Hammond
Director of Career Center, Schools of Engineering
Robin.Hammond@xxx.edu

Dates and Location of Classes: This course will meet face-to-face on alternating Fridays (August 28, September 1, September 25, October 9, October 23, November 6, November 20, December 4) during the Fall semester in Discovery Hall 246 from 9 to 11am.

Office Hours: To make appointments, email the instructors directly.

Course Description: The Preparing Future Scholars (PFS) program is a one credit hour course open to students who have successfully completed their first year of graduate school. The program explores non-academic careers and provides students with the opportunity to hone transferable skills that will impact their potential non-academic or academic career trajectory and ways to engage and have an impact in the community.

Goals and objectives:
Goal 1: To foster a scholarly environment at our university and the community, to nurture students and provide a forum for discussions, career exploration, and activities that foster leadership skills.

- Objective 1.1: Conduct a bi-weekly seminar wherein PFS participants will receive training in career pursuits and be exposed to leaders with advanced degrees in non-academic careers.
- Objective 1.2: The seminar will focus on the development of career paths, research, and activities with the purpose to foster multiculturalism and promote interdisciplinary and transdisciplinary transferable skills.
- Objective 1.3: PFS participants will present their scholarly ideas and research to peers, faculty, and industry leaders in open forums.

Goal 2: To promote academic diversity, convey the significance of scholars' research in multiple contexts and enhance scholarly promise among PFS participants.

- Objective 2.1: Participants will engage in an experiential learning opportunity with Experiential Learning Sponsors and identify the impact their research will have on the industry.
- Objective 2.2: Participants will be required to create a resume and present a one page proposal or pitch on how their research will impact society.
- Objective 2.3: Participants will receive training in scholarly pursuits; specifically in communicating beyond their discipline and presentation techniques.

Student Learning Outcomes:
Student who engage, challenge and apply themselves will:

1. Enhance communication skills and convey the significance of their research across multiple professional contexts.
2. Develop an individual development plan (IDP) to enhance and achieve career aspirations.
3. Improve ability to "network" and foster skills to build relationships for non-academic career pathways.
4. Develop and engage in an experience learning activity with a PFS Experiential Learning Sponsor
5. Create a professional presence online through social media
6. Articulate their research to lay audience

Required Course Texts, Materials and Resources:

1. Create a CareerLink Profile
2. Create a LinkedIn Profile
3. Create an account www.usajobs.gov

Course Format and Tentative Course Calendar: PFS is a Participatory Action Research (PAR) based course in which students are seen as key stakeholders and will engage in the design and process of preparing for multiple career paths in various ways:

1. Individual Self Development
    a. One minute or less, self-introduction and value of research (elevator speech)
    b. Communicating Beyond your Discipline:
        i. "Networking" Building Relationships - Career Mixers, Socials, Alumni Gatherings
        ii. Informal Interviews
        iii. Reflection papers (1-2 pgs.)
2. Two-Way Experiential Learning Opportunity

Date	Topics – Activities – Action Items	Time Allotted	Assignment Due
Week 1 Friday, Aug. 21st *We do not meet this week – work on your own*	• Blackboard (BB) shell opened to students • Read/Review Syllabus • Individual Development Plan (IDP) available to students in BB	Self-Paced	• **AR**: Submit Participant Demographic Survey and Consent Forms • Start IDP – Due 8/28/15 • Draft Elevator

			Speech – 30 seconds or less, to be delivered on 8/28/14
Week 2 Friday, Aug. 28th Face-to Face Meeting in Discovery 246	• Overview of Action Research • Introductions, Career Aspirations, Non-Academic Environments, Your Resume • Using Sun Devil Career Link & LinkedIn , and USAJobs.gov	• 15 minutes – Jennifer • 90 minutes – Jennifer Rhodes • 15 minutes Robin	• **AR:** Complete and submit IDP via Blackboard • Create Career Account • Create a LinkedIn Profile https://www.linkedin.com/ • Review training to optimize robust features at http://university.linkedin.com/linkedin-for-students • Create an account in usajobs.gov account

9/4/2015 *We do not meet this week – work on your own*	• Update ASU Directory Profile, LinkedIn, • Review Career Link • Practice elevator speech		• **AR:** Identify 3 potential PFS Experiential Learning Sponsors and describe the significance and value of your research and/or skills to their organization in 200 words or less. Submit via Blackboard • Develop a 2-minute practice pitch-for your top PFS Experiential Sponsor
9/11/2015 Face-to Face Meeting in MU –	• Pitch workshop	• Michael Manning	• Be prepared to 2-minute practice pitch-for your top PFS Experiential Sponsor
9/18/2015 *We do not meet this week – work on your own*	• Work on pitch	• Schedule 1:1 meeting with E&I Staff, Jennifer, or Robin if needed	• Refine pitch
9/25/2015	• Communicating Beyond Your Discipline • CV to Resume	• Kevin Burns	**AR:** Pre-Mixer Interview Self-Assessment Survey • In-Class Self Reflection

10/9/2015	• LinkedIn	• Jennifer Rhodes	
10/23/2015	• PFS Sponsor Mixer		
10/30/2015 *We do not meet this week – work on your own*	• Update IDP	• http://myidp.sciencecareers.org/	• **AR:** PFS Mixer 2 page Reflection paper due • Confirm & Schedule Experiential Learning Activity
11/6/2015	• PFS Sponsor Mixer Focus Group	• Michael Manning	• Experiential Learning Activity
11/13/2015 *We do not meet this week – work on your own*	• Update IDP • Experiential Learning Active		• Experiential Learning Activity
11/20/2015	• PFS Wrap UP	• Pamela Garrett	• Experiential Learning Activity
12/4/2015	• PFF/PFS Luncheon	•	• **AR:** End of the semester reflection and survey

Assignment Descriptions:

Assignment	**Score/Pct.**
1. **Course Participation.** The success of this class hinges upon consistent and constructive participation of all members. Otherwise, our collective learning will suffer. Each session, you are expected to be physically present and engage actively in course-related conversations and actives.	20%
2. **Action Research Assignments (AR)** will aid in your career development and the reexamination of graduate student support programs at ASU to ensure graduate education is adequately preparing PhD students for possible careers inside and outside the Academy.	80% (10% per submission)

a. **Individual Development Plan (IDP)** is a tool and the first assignment to help you: i. assess your current skills and strengths ii. make a plan for developing skills that will help you meet your professional goals iii. communicate with others about your evolving professional goals, related skills, and the value of your research in multiple contexts The IDP you create is a document you will want to revisit multiple times, to update and refine as your goals change and/or come into focus, and to record your progress and accomplishments. **During this class you will submit your IDP at the beginning and end of the course.** **b. Experiential Learning Activity.** PFS participants will engage in an experiential learning activity with PFS Experiential Learning Sponsors that could include a variety of activities including meetings, visits with clients and colleagues, networking activities, business lunches, observation of daily work, organization tours, etc. These activities will teach you to think and collaboratively build or reshape knowledge or innovations fostered by the significance of your research in a new setting.	

Grading: The grade option for PFS (GRD598) is A-E. A passing grade will be based on your attendance, participation and submission of assignments.

Grading Scale

All final grades will be rounded to the nearest percentage as needed.

Letter Grade	Percentage
A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	70-76
D	61-69
E	<60

Evaluation Criteria: In general, assignments will be marked for completion and the evidence that you spent time thinking about the assignment, integrating your broader knowledge of your career aspirations and perspective of potential outcomes.

Assignment Policies: Assignment will be submitted through Blackboard or email to Jennifer Cason, surveys will administered through Qualtrics. All assignments are due by

11:55pm Arizona Time on the designated day identified in the syllabus – late submissions will be reduced by 2% each day.

Suggestions for Success:
PFS is a "worry-free" course. By attending the PFS Seminars and participating in the discussions in class, students will ensure their academic success.
PFS aims to provide tools and resources that could potentially be useful on future career paths. The course provides structured time to dedicate to career exploration and development and most importantly a space to engage and discuss openly about your future and pursuits after grad school. PFS aims to help you think outside the box and requires you build connections outside your sphere of comfort and convey the significance of your research to lay audience. PFS aims to assist you in exploring multiple paths and think about new way your research could potentially impact multiple populations, become entrepreneurial or at least think in an entrepreneurial way. The phrase "I am very busy now and into the foreseeable future" is a reoccurring phrase for all of but in the PFS course you are giving yourself permission to "invest" structured time to your career development.

Student Conduct: Academic Integrity/Plagiarism. University policy states "The highest standards of academic integrity are expected of all students. The failure of any student to meet these standards may result in suspension or expulsion from the university and/or other sanctions as specified in the academic integrity policies of the individual academic unit. Violations of academic integrity include, but are not limited to, cheating, fabrication, tampering, plagiarism, or facilitating such activities." For more information see the provost website.

Harassment: University policy prohibits harassment on the basis of race, sex, gender identity, age, religion, national origin, disability, sexual orientation, Vietnam era veteran status and other protected veteran status. If you feel you are being harassed for these reasons, contact the Student Life Office

Electronic Communication: Acceptable use of university computers, internet and electronic communications can be found in the Student Code of Conduct and in the University's Computer, Internet, and Electronic Communications Policy.

Accommodations: Disability Accommodations for Students. Students who feel they may need disability accommodation(s) in class should obtain the necessary information from the Disability Resource Center on campus. It is the student's responsibility to make the first contact with the DRC. Instructors may provide accommodations only as specified by the DRC documentation.

Religious Accommodations for Students: Students who need to be absent from class due to the observance of a religious holiday or participate in required religious functions must notify the faculty member in writing as far in advance of the holiday/obligation as possible. Students will need to identify the specific holiday or obligatory function to the faculty member. Students will not be penalized for missing class due to religious

obligations/holiday observance, but must make arrangements for making up tests/assignments within a reasonable time as determined by the instructor.

Military Personnel Statement: A student who is a member of the National Guard, Reserve, or other U.S. Armed Forces branch and is unable to complete classes because of military activation may request complete or partial administrative unrestricted withdrawals or incompletes depending on the timing of the activation. For information, contact a class instructor.

APPENDIX B

STUDENT PARTICIPATION EMAIL AND CONSENT FORM

Student Participation Email & Consent Form

Dear [Program Participant Name]:

Congratulations! The Graduate Education Student Support Program is pleased to invite you to participate in the Preparing Future Scholar (PFS) program and research study on the career aspirations and preparedness of doctoral students. **Please read the following information carefully.**

If you have not enrolled already, you are officially invited to enroll in the Preparing Future Scholars: GRD 791

Course ID: 105887
Class Number: 71365
Location: Discovery 246
Time: 9:00 A-11:00 A
Meeting Dates: 8/28, 9/11, 9/25, 10/9, 10/23, 11/6, 11/20 and 12/4

For this 1 credit hour, plan on dedicating time to the following:

- Self-assessment tools and activities – approx. 1-2 hr./wk. x 8/wks.
- Class – approximately 2 hours x 8 times in semester
- Writing – Reflection papers
- Experiential Learning Activity – varies on arrangement made with organization (Preparing Future Scholar Experiential Learning Sponsor)

In addition to being the Director of Graduate Education Support Initiative I am a graduate student working under the direction of Professor Daniel Dinn-You Liou in the Mary Lou Fulton Teachers College at Arizona State University. I am conducting a research study to create fundamental changes to the professional development of PhD students that aid in the development of their career aspirations and convey the significance of their research within academia and beyond.

I am inviting you to be a part of this research study. If you agree to participate, your PFS classwork and discussions will be used and analyzed at the conclusion of this course.

You have the right not to participate and to stop participation at any time. Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty and it will not affect your grade. However, as an incentive to participate, one week after grades are submitted those who have participated will also be eligible to win a: Kindle Fire HD 7, 7" HD Display, Wi-Fi, 8 GB, valued at $139.00. If you participated in the study your name will be entered into a raffle and a name will be drawn to win the Kindle Fire HD 7.

To protect confidentiality you will have the option to remain anonymous. Dr. Pamela Garrett, a member of my research team will work with me to create study codes to be used on data documents (e.g., completed questionnaire) instead of recording identifying information. Dr. Garrett will collect consent forms and be the only person aware of your

participation in this study until after the conclusion and grades for the class have been submitted.

Information collected through class audio recordings and class assignments will only be viewed by individuals of the research team and every effort will be made to prevent anyone outside of the project from connecting individual subjects with their responses. The results of this study may be used in reports, presentations, or publications but your name will not be used. Again, your participation in the study will not be identified to me until the semester is over and not impact your grade in the course.

There are no foreseeable risks or discomforts to your participation. Your participation and the findings from this study will contribute to the literature and discussion on training PhD students for success within and outside the Academy. Prominent discussions on doctoral education have centered on the preparation of doctoral students, especially PhD students' career trajectories in specific academic disciplines including areas such as science, technology, engineering, and mathematics (STEM), but we see a gap in the literature about the preparation and career trajectories of PhD students who engage in conversations across disciplines. The course will be co-taught by me and Robin Hammond. Robin Hammond is the founding director of the Ira A. Fulton Schools of Engineering Career Center with over 20 years of experience working in higher education in career and leadership development. Ms. Hammond has co-authored papers and presented at international, national, and regional conferences in career development and engineering education, and she also instructs special topics and experiential education courses at ASU.

If you have any questions concerning the research study, please contact the research team at: Dr. Daniel Dinn-You Liou at dliou@asu.edu; Jennifer Cason at jennifer.cason@asu.edu, Robin Hammond at robin.hammond@asu.edu or Pamela Garrett at Pamela.Garrett@asu.edu . If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. Please let me know if you wish to be part of the study.

Replying to this email will verify that you have read and understand the information outlined above and that you are 18 years of age or older. In addition, you have read this information and fully understand the contents, meaning and impact of this release. You understand that you are free to address any specific questions regarding this release by submitting those questions in writing before participating, and agree that your failure to do so will be interpreted as a free and knowledgeable acceptance of the terms of this program.

By hitting reply to this email you will automatically be replying to Dr. Pamela Garrett. If you agree to allow your classwork to be used as data in this research, please reply with the following:

___YES: I would like to participate in the Preparing Future Scholars for Academia and Beyond:
A Mixed Method Investigation of Doctoral Students' Career Aspirations and Preparedness.

APPENDIX C

PFS CAREER ASPIRATION AND DEMOGRAPHIC SURVEY

PFS Career Aspiration & Demographic Survey

What is your gender?

What is your age?

Please specify your ethnicity.

- White (1)
- Hispanic or Latino (2)
- Black or African American (3)
- Native American or American Indian (4)
- Asian / Pacific Islander (5)
- Two or more races (6)
- Other (7)

What is the highest degree you have completed?

- Bachelor's degree (1)
- Master's degree (2)

What field of study was this degree in? (e.g. Sociology)

As an undergraduate student did you participate in an Internship program?

- Yes (1)
- No (2)

Are you a first-generation college student? First-generation students are those whose parents did not receive a college degree.

- Yes (1)
- No (2)

What is the highest level of education obtained by your immediate family members (e.g., your parents/guardian or sibling) (check one):

- No schooling completed (1)
- Nursery Schooling to 8th grade (2)
- Some high school, no diploma (3)
- High school graduate, diploma or the equivalent (e.g. GED) (4)
- Some college credit, no degree (5)
- Trade/technical/vocational training (6)
- Associate degree (7)
- Bachelor's degree (8)
- Master's degree (9)
- Professional degree (e.g. Law degree, MD) (10)
- Doctorate degree (e.g. PhD, EdD) (11)

What is your current field of study?

What is your current enrollment status?

- Full-time (1)
- Part-time (2)

Current year in PhD program?

- 1st year (1)
- 2nd year (2)
- 3rd year (3)
- 4th year (4)
- 5th year (5)
- >6th year (6)

Which of the following statements best describes your thinking at the time you decided to apply to a PhD: (check one)

- Continued my education because after my undergraduate/master program because I did not have a good employment prospect or clear sense of what I wanted to do. (1)
- Followed my intense passion in my field of study rather than a career goal. (2)

At the time you enrolled in your doctoral program, indicate how interested you were in each possible career option

	Had Not Considered (1)	Not at all interested (2)	Somewhat interested (3)	Moderately interested (4)	Very interested (5)
Teach at a research focused College/University (1)	❍	❍	❍	❍	❍
Teach at a non-research focused University (2)	❍	❍	❍	❍	❍
Conduct research in an academic setting (3)	❍	❍	❍	❍	❍
Conduct research in a non-academic setting (4)	❍	❍	❍	❍	❍
Become an administrator at an institution of higher education (5)	❍	❍	❍	❍	❍
Work as an independent consultant (6)	❍	❍	❍	❍	❍
Work in the private sector (7)	❍	❍	❍	❍	❍
Work for the government (8)	❍	❍	❍	❍	❍
Work for a non-profit organization (9)	❍	❍	❍	❍	❍
Own and operate own business (10)	❍	❍	❍	❍	❍

Right now, which of the following statements currently best reflects your formulation of career goals? (Check one)

- ☐ I have definite career goals which I am pursuing. (1)
- ☐ I have several possible goals that I am considering. (2)
- ☐ I am struggling to identify the best career path for me. (3)
- ☐ I have not given much thought to my career options. (4)

Right now, which of the following statements best reflects the employment opportunities you believe will be available to you upon graduation: (check one)

- Based on my career interests, and field of study, I believe job opportunities be few and difficult to find. (1)
- Base on my career interest, and field of study, I believe job opportunities will be available and only moderately hard to find. (2)
- Based on my career interests, and field of study, I believe job opportunities will be plentiful and easy to obtain a job. (3)

At this point in your graduate program and the knowledge you currently have, how would you define and describe the academic preparation you have received towards your aspiring career? Be specific

APPENDIX D

PFS INDIVIDUAL DEVELOPMENT PLAN ASSIGNMENT

Preparing Future Scholars Individual Development Plan

Preparing Future Scholars Individual Development Plan (IDP) is a tool and the first assignment to help you:

- assess your current skills and strengths
- make a plan for developing skills that will help you meet your professional goals
- communicate with others about your evolving professional goals, related skills, and the value of your research in multiple contexts

The IDP you create is a document you will want to revisit multiple times, to update and refine as your goals change and/or come into focus, and to record your progress and accomplishments.
There are many different IDP instructions and templates. This document includes instructions and a template that are designed for Preparing Future Scholars PhD students.

The PFS IDP is adapted from the grant for Connected Academics: Preparing Language and Literature PhDs for a Variety of Careers. The grant is funded by the Modern Language Association and the Mellon Foundation (2014). Assessment items were also adapted from the
core competencies developed by the National Postdoctoral Association and is applicable to graduate students and is tailor to meet the need of the PFS course.

Steps for Creating a PFS Individual Development Plan

STEP 1: Conduct a Self-Assessment

Self-assessments are important to help identify strengths and weaknesses while also providing you with insight into the proficiency of your skills. Utilize your experiences from the past year in order to help identify your skills, interests and values. MyIDP provides an extensive assessment that will give graduate students and postdocs detailed lists of skills, interests and values. While my IDP is geared to those in the STEM fields,

this assessment is valuable for all graduate students and postdocs as you begin your Individual Development Plans.

The PFS IDP will aid in taking a realistic look at your current abilities by identifying your experiences. Utilize the topics below to assess your skills, strengths, and areas in which development is needed.

Give yourself plenty of time to think about each area, remember this is an assessment and a long comprehensive list. Pace yourself, this may take at least 1 hour to complete.

****

How proficient do you think you are in the following areas?
1= Needs Improvement, 2=Only Slightly Proficient, 3=Somewhat Proficient,
4= Extremely Proficient,

Conceptual Academic Knowledge	**1**	**2**	**3**	**4**	**N/A**
Conducting independent research					
Leading a research project					
Analyzing and interpret data					
Developing curricula					
Performing research with human subjects					
Converting your CV to a Resume or Resume to CV					
Assessing trends in your field					
Teaching a small “seminar” course					
Teaching a large “lecture” course					
Teaching/Overseeing a Lab course					
Assess the learning outcomes of the students I am teaching					
Create an inclusive classroom environment of diverse students					
Collaborating with others in interdisciplinary research					

1= Needs Improvement, 2=Only Slightly Proficient, 3=Somewhat Proficient,
4= Extremely Proficient,

Communication Skills	**1**	**2**	**3**	**4**	**N/A**
Writing for a lay audience					
Writing for a discipline-specific audience					
Oral presentation to a lay audience (including short "elevator speeches" about your research)					
Oral presentation to a discipline-specific audience					
Multi-media communication & digital tools					
Ability to give constructive feedback					
Ability to receive constructive feedback					
Conflict resolution, including difficult conversations & minimizing conflict					
Respect intellectual contributions of others					
Ability to mentor					
Ability to network and build professional relationships					
Ability to collaborate or work in teams					
Writing grants					
Publishing and presenting research					
Informational interviewing					

1= Needs Improvement, 2=Only Slightly Proficient, 3=Somewhat Proficient,
4= Extremely Proficient,

Professionalism/Leadership/Management Skills	**1**	**2**	**3**	**4**	**N/A**
Determining workplace etiquette					
Serve on departmental & institutional-wide committees, develop policy, and engage in university governance					

Demonstrating cultural competence					
Engage in “small talk” in the break room					
Work with tight time constraints					
Motivate others					

Organizational skills					
Understanding the meaning of mission, vision & strategy					
Being a change agent					
Coaching & developing others					
Project management skills					
Budgeting					
Organizational skills					
Setting goals & monitoring results					
Working with diverse teams/groups					

1= Needs Improvement, 2=Only Slightly Proficient, 3=Somewhat Proficient,
4= Extremely Proficient

Responsible Conduct of Research	**1**	**2**	**3**	**4**	**N/A**
Identifying conflicts of interest					
Understanding data ownership & sharing issues					
Demonstrate responsible publication practices & authorship					
Identifying & mitigating research misconduct					
Demonstrating responsible conduct in research with animals (when applicable)					

STEP 2: Career Exploration

As you continue on in the process of creating your Individual Development Plan, connect with a mentor(s) to discuss career opportunities. Additionally, research each career deeply by reading articles and books, attending events, networking and conducting informational interviews. Browse professional society websites to obtain more information on career paths.

The PFS IDP will helps you map out the general path you want to take toward achieving your goals. The template below can be expanded and modified to fit your own list of goals and strategies.
As part of the assessment process, and in preparation for creating a truly individualized IDP, ask yourself some questions related to your aspirations, current responsibilities/requirements and career goals. Doing so will lead you to actions or goals to incorporate into your plan. Your aim is to develop skills that will lead to your success in your current position as a researcher and communicate the value of your research in multiple contexts.

Self-Reflection

1. What were your career goal(s) aspiration(s) as a child? Think back as far as you can. What or who influenced theses career aspirations?

2. At what point, if any, did these career goals change and why? What are your career goals today?

3. What are some barriers/challenges/obstacles "real or invisible" you have or are experiencing that have impacted you and how did or will you preserve over those barriers?

4. What are the skills you believe you have developed in your current program of study to help you achieve the career goals identified in question 2?

5. What are the skills you believe your STILL have to develop in your current program of study to help you achieve the career goals identified in question 2?

Step 3: Set goals

Setting both short-term and long-term goals are important as you progress through your training. Goals will keep you accountable and benefit your growth as you develop skills for now, later and your future.

1. Identify two long-term career goals:

2. Identify two short-term goals:

Step 4: Implementation

Put your plan into action. This semester in the PFS you will implement your individual development plan and take step to go beyond traditional approaches such as speaking to and working with interdisciplinary groups in for-profit and not for-profit organizations.

Remember discussing what you discovered from your skills assessment, and talking about your career goal and interests might help you identify developmental needs and areas to work on. By helping you compare current skills and strengths with those needed to achieve your career objectives, your mentor can be an important ally.

Some might feel it's risky to share, for example, their weaknesses or their interest in a career outside academia with their mentor. While it's not necessary to share all results right away, consider how the feedback from your mentor might support your plan, and provide insights and resource ideas.

It is strongly recommended that you discuss your plan with your primary mentor but also be creative about whom you approach for advice. You can get useful feedback from multiple people with a broad range of experiences and perspectives including friends, family, staff and faculty other than your primary mentor.

Your name: Today's date:

APPENDIX E

PFS PRE-MIXER SURVEY

PFS Pre Mixer Survey

This survey will take approximately 10-15 minutes to complete. Please do not skip questions. These questions and responses will aid you and me in our exploration of career and professional development preparedness and readiness for multiple career pathways. In addition your responses will provide a skills perception inventory for evaluating transferable skills.

Please rate your skills within the following areas:

	Needs Improvement	Adequate	Good	Excellent	N/A
Articulating your research using written communication skills to lay audiences (non-academic and scholars outside your discipline).	❍	❍	❍	❍	❍
Utilizing multiple media and technologies to communicate the value of your research	❍	❍	❍	❍	❍
Articulating your research orally to lay audiences (non-academic and scholars outside your discipline).	❍	❍	❍	❍	❍
Critical Thinking and Problem Solving	❍	❍	❍	❍	❍

Articulating your research using written communication skills to audiences within your discipline.	❍	❍	❍	❍	❍
Team Work	❍	❍	❍	❍	❍
Starting conversations at social events. (For example, if you see someone you would like to meet, you go to that person instead of waiting for him or her to come to you)	❍	❍	❍	❍	❍
Taking initiative at social events (For example, if you meet someone interesting who is hard to connect with. You'll soon stop trying to make contact with that person)	❍	❍	❍	❍	❍
Professionalism	❍	❍	❍	❍	❍
Networking at social events (For example, when you're trying to connect with someone who seems uninterested at first, you don't give up easily)	❍	❍	❍	❍	❍

Listening effectively to decipher meaning, including knowledge, values, attitudes and intentions	❍	❍	❍	❍	❍
Leadership	❍	❍	❍	❍	❍
Utilize multiple media and technologies, and know how to judge their effectiveness as well as their impact	❍	❍	❍	❍	❍
Communicate effectively in diverse environments	❍	❍	❍	❍	❍
Career Management	❍	❍	❍	❍	❍

In this series of questions, drag each item to the box that reflects your choice.
How well you believe your graduate program prepared you to perform each skill?

Has strongly prepared me	Has adequately prepared me	Has contributed to my skill level	Has not contributed to my skill level	Has lowered my skill level
_____ Do independent research	_____ Do independent research	_____ Do independent research	_____ Do independent research	_____ Do independent research
_____ Lead a research project	_____ Lead a research project	_____ Lead a research project	_____ Lead a research project	_____ Lead a research project
_____ Publish and present research	_____ Publish and present research	_____ Publish and present research	_____ Publish and present research	_____ Publish and present research

_____ Collaborate with others in interdisciplinary research	_____ Collaborate with others in interdisciplinary research	_____ Collaborate with others in interdisciplinary research	_____ Collaborate with others in interdisciplinary research	_____ Collaborate with others in interdisciplinary research
_____ Teach a laboratory	_____ Teach a laboratory	_____ Teach a laboratory	_____ Teach a laboratory	_____ Teach a laboratory
_____ Teach a small ”seminar” course	_____ Teach a small ”seminar” course	_____ Teach a small ”seminar” course	_____ Teach a small ”seminar” course	_____ Teach a small ”seminar” course
_____ Teach a large “lecture” course	_____ Teach a large “lecture” course	_____ Teach a large “lecture” course	_____ Teach a large “lecture” course	_____ Teach a large “lecture” course
_____ Conduct research to improve my teaching	_____ Conduct research to improve my teaching	_____ Conduct research to improve my teaching	_____ Conduct research to improve my teaching	_____ Conduct research to improve my teaching
_____ Assess the learning outcomes of the students I am teaching	_____ Assess the learning outcomes of the students I am teaching	_____ Assess the learning outcomes of the students I am teaching	_____ Assess the learning outcomes of the students I am teaching	_____ Assess the learning outcomes of the students I am teaching
_____ Utilize technology in teaching	_____ Utilize technology in teaching	_____ Utilize technology in teaching	_____ Utilize technology in teaching	_____ Utilize technology in teaching
_____ Create an inclusive classroom environment of diverse students	_____ Create an inclusive classroom environment of diverse students	_____ Create an inclusive classroom environment of diverse students	_____ Create an inclusive classroom environment of diverse students	_____ Create an inclusive classroom environment of diverse students
_____ Serve on departmental and institution-wide committees, develop policy, and engage in	_____ Serve on departmental and institution-wide committees, develop policy, and engage in	_____ Serve on departmental and institution-wide committees, develop policy, and engage in	_____ Serve on departmental and institution-wide committees, develop policy, and engage in	_____ Serve on departmental and institution-wide committees, develop policy, and engage in

university governance _____ Ability to Network _____ Ability to mentor _____ Ability to collaborate or work in teams	university governance _____ Ability to Network _____ Ability to mentor _____ Ability to collaborate or work in teams	university governance _____ Ability to Network _____ Ability to mentor _____ Ability to collaborate or work in teams	university governance _____ Ability to Network _____ Ability to mentor _____ Ability to collaborate or work in teams	university governance _____ Ability to Network _____ Ability to mentor _____ Ability to collaborate or work in teams

The next set of questions explores your professional development planning as you proceed toward the completion of your program. The first group probes your concerns with several career related issues.

Not At All Concerned	Concerned	Somewhat Concerned	Moderately concerned	Fairly Concerned	Very Concerned	Not Applicable
_____ Being prepared to teach	_____ Being prepared to teach	_____ Being prepared to teach	_____ Being prepared to teach	_____ Being prepared to teach	_____ Being prepared to teach	_____ Being prepared to teach
_____ Being prepared to do research	_____ Being prepared to do research	_____ Being prepared to do research	_____ Being prepared to do research	_____ Being prepared to do research	_____ Being prepared to do research	_____ Being prepared to do research
_____ Being prepared to write grants.	_____ Being prepared to write grants.	_____ Being prepared to write grants.	_____ Being prepared to write grants.	_____ Being prepared to write grants.	_____ Being prepared to write grants.	_____ Being prepared to write grants.
_____ Being able to supervise others	_____ Being able to supervise others	_____ Being able to supervise others	_____ Being able to supervise others	_____ Being able to supervise others	_____ Being able to supervise others	_____ Being able to supervise others
_____ Knowing how to find a position	_____ Knowing how to find a position	_____ Knowing how to find a position	_____ Knowing how to find a position	_____ Knowing how to find a position	_____ Knowing how to find a position	_____ Knowing how to find a position

in an area of interest _______ Having time to think about career issues _______ Meeting expectations of major advisor in career selection	in an area of interest _______ Having time to think about career issues _______ Meeting expectations of major advisor in career selection	in an area of interest _______ Having time to think about career issues _______ Meeting expectations of major advisor in career selection	in an area of interest _______ Having time to think about career issues _______ Meeting expectations of major advisor in career selection	in an area of interest _______ Having time to think about career issues _______ Meeting expectations of major advisor in career selection	in an area of interest _______ Having time to think about career issues _______ Meeting expectations of major advisor in career selection	in an area of interest _______ Having time to think about career issues _______ Meeting expectations of major advisor in career selection

In this section estimate approximately how much of your time you spend engaged in each activity in a given academic year. Select the appropriate interval from the scale provided.

	Less than 5%	5% - 15%	15%-25%	25%-50%	Less than 50%
Researching/investigation job opportunities	❍	❍	❍	❍	❍
Strategizing with my advisor or mentor (if different) on post-graduate opportunities	❍	❍	❍	❍	❍
Attending workshops and professional development conferences hosted by the Graduate School, the Teaching Assistant Training Program, or career services.	❍	❍	❍	❍	❍
Attending career and/or professional development workshops in my college	❍	❍	❍	❍	❍
Consultation with a career adviser	❍	❍	❍	❍	❍
Networking with faculty and other professional contacts at professional meetings	❍	❍	❍	❍	❍
Networking with faculty and other professional contacts through emails/listservs	❍	❍	❍	❍	❍
Participating in activities through my professional society	❍	❍	❍	❍	❍

How frequently do you utilize the following resources to investigate organizations and employment opportunities?

	Do not know about	Not at All	Sometime	Often	Frequently	Quite Frequently
Chronicle of Higher Education	❍	❍	❍	❍	❍	❍
Professional associations in my field	❍	❍	❍	❍	❍	❍
Targeted employers (through databases, professional directories)	❍	❍	❍	❍	❍	❍
Sun Devil Career Link (available at Career Services)	❍	❍	❍	❍	❍	❍
Job listing services (monster.com; MSN careers; Career-builder.com for example)	❍	❍	❍	❍	❍	❍
Discipline specific career sites (i.e. Science Next-Wave, for example)	❍	❍	❍	❍	❍	❍
Federal government website	❍	❍	❍	❍	❍	❍
My professional network	❍	❍	❍	❍	❍	❍
My mentor	❍	❍	❍	❍	❍	❍

What challenges do you anticipate in gaining employment after graduation? (Check all that apply)

- ❑ Finding an open position
- ❑ Preparing my written credentials (CV, Resume, cover letter)
- ❑ Proficiency in interviewing skills
- ❑ Researching potential employers
- ❑ Having appropriate supervisory skills
- ❑ Having scholarly publications from my dissertation and/or associated graduate school projects.
- ❑ Having conference presentations from my graduate school research activities
- ❑ Having appropriate research experiences
- ❑ Having appropriate teaching experiences
- ❑ Having developed all necessary skills
- ❑ Having appropriate budgeting (grant management) experience.

Please indicate which of the following activities have you participated in or completed? (Check all that apply)

- ❑ Presented at a national professional conference?
- ❑ Presented at a regional/state professional conference?
- ❑ Presented at an international professional conference?
- ❑ Competed in an on-campus research presentation
- ❑ Published in a peer reviewed journal
- ❑ Published in a professional publication (non-reviewed)
- ❑ Published book chapters
- ❑ Reviewed a professional publication
- ❑ Published a magazine, newspaper article
- ❑ Edited a book
- ❑ Written a books (published or accepted for publication)
- ❑ Engaged in outreach/extension service
- ❑ Served as a professional consultant
- ❑ Served in a leadership position in a professional society

To what extent to you agree or disagree with each of the following statements:

	Strongly disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
My department is helpful and supportive in a graduates' search for professional employment.	❍	❍	❍	❍	❍

Faculty members in my program are interested in the welfare and professional development of graduate students.	❍	❍	❍	❍	❍
My advisor has not helped me establish connections within a professional society.	❍	❍	❍	❍	❍
My advisor encourages me to develop as a teacher.	❍	❍	❍	❍	❍
My advisor encourages me to develop as a researcher.	❍	❍	❍	❍	❍
My doctoral experience is preparing me well for my career aspirations.	❍	❍	❍	❍	❍
My advisor knows my career aspirations.	❍	❍	❍	❍	❍

Please indicate your expected level of comfort / confidence with the following situations or issues.

very uncomfortable / very unsure	uncomfortable / not confident	slightly uncomfortable / slightly concerned	comfortable / at ease	very comfortable / very confident
_____ Working with others on an interdisciplinary group project	_____ Working with others on an interdisciplinary group project	_____ Working with others on an interdisciplinary group project	_____ Working with others on an interdisciplinary group project	_____ Working with others on an interdisciplinary group project
_____ Being able to communicate with people of different cultures	_____ Being able to communicate with people of different cultures	_____ Being able to communicate with people of different cultures	_____ Being able to communicate with people of different cultures	_____ Being able to communicate with people of different cultures
_____ Recognizing excessive stress in myself	_____ Recognizing excessive stress in myself	_____ Recognizing excessive stress in myself	_____ Recognizing excessive stress in myself	_____ Recognizing excessive stress in myself
_____ Being able to give constructive feedback to peers and other students	_____ Being able to give constructive feedback to peers and other students	_____ Being able to give constructive feedback to peers and other students	_____ Being able to give constructive feedback to peers and other students	_____ Being able to give constructive feedback to peers and other students
_____ Being aware of strategies for dealing with stress	_____ Being aware of strategies for dealing with stress	_____ Being aware of strategies for dealing with stress	_____ Being aware of strategies for dealing with stress	_____ Being aware of strategies for dealing with stress
_____ Dealing with conflict with my supervisor	_____ Dealing with conflict with my supervisor	_____ Dealing with conflict with my supervisor	_____ Dealing with conflict with my supervisor	_____ Dealing with conflict with my supervisor
_____ Having a realistic awareness of how I am perceived	_____ Having a realistic awareness of how I am perceived	_____ Having a realistic awareness of how I am perceived	_____ Having a realistic awareness of how I am perceived	_____ Having a realistic awareness of how I am perceived
_____ Having to	_____ Having to	_____ Having to	_____ Having to	_____ Having to

communicate with people I don't know very well	communicate with people I don't know very well	communicate with people I don't know very well	communicate with people I don't know very well	communicate with people I don't know very well
_____ Being able to enhance my creativity when I need to	_____ Being able to enhance my creativity when I need to	_____ Being able to enhance my creativity when I need to	_____ Being able to enhance my creativity when I need to	_____ Being able to enhance my creativity when I need to
_____ Understanding how my and others' personality-types influence work interactions	_____ Understanding how my and others' personality-types influence work interactions	_____ Understanding how my and others' personality-types influence work interactions	_____ Understanding how my and others' personality-types influence work interactions	_____ Understanding how my and others' personality-types influence work interactions
_____ Understanding and maintaining my motivation for work and study	_____ Understanding and maintaining my motivation for work and study	_____ Understanding and maintaining my motivation for work and study	_____ Understanding and maintaining my motivation for work and study	_____ Understanding and maintaining my motivation for work and study
_____ Networking with academics and senior people within my discipline	_____ Networking with academics and senior people within my discipline	_____ Networking with academics and senior people within my discipline	_____ Networking with academics and senior people within my discipline	_____ Networking with academics and senior people within my discipline
_____ Being aware of my specific areas for further development	_____ Being aware of my specific areas for further development	_____ Being aware of my specific areas for further development	_____ Being aware of my specific areas for further development	_____ Being aware of my specific areas for further development
_____ Receiving feedback and dealing with criticism of my work	_____ Receiving feedback and dealing with criticism of my work	_____ Receiving feedback and dealing with criticism of my work	_____ Receiving feedback and dealing with criticism of my work	_____ Receiving feedback and dealing with criticism of my work
_____ Having an awareness of my strengths	_____ Having an awareness of my strengths	_____ Having an awareness of my strengths	_____ Having an awareness of my strengths	_____ Having an awareness of my strengths

and weaknesses	and weaknesses	and weaknesses	and weaknesses	and weaknesses
_______ Being able to enthuse a non-expert about my work	_______ Being able to enthuse a non-expert about my work	_______ Being able to enthuse a non-expert about my work	_______ Being able to enthuse a non-expert about my work	_______ Being able to enthuse a non-expert about my work
_______ Appreciating a program of non-technical skills development	_______ Appreciating a program of non-technical skills development	_______ Appreciating a program of non-technical skills development	_______ Appreciating a program of non-technical skills development	_______ Appreciating a program of non-technical skills development
_______ Having a good understanding of research ethics	_______ Having a good understanding of research ethics	_______ Having a good understanding of research ethics	_______ Having a good understanding of research ethics	_______ Having a good understanding of research ethics
_______ Being able to describe the good attributes of a conference poster	_______ Being able to describe the good attributes of a conference poster	_______ Being able to describe the good attributes of a conference poster	_______ Being able to describe the good attributes of a conference poster	_______ Being able to describe the good attributes of a conference poster

Please indicate your level of agreement with the following statements.

	Strongly disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Workshops for transferable skills development are generally not useful	❍	❍	❍	❍	❍
PhD students should be encouraged to attend more transferable skills	❍	❍	❍	❍	❍

development workshops					
Workshops for skills development are only important for some students	❍	❍	❍	❍	❍
I wish I had more skills training as an undergraduate student	❍	❍	❍	❍	❍
Attending career development workshops is distracting to my research	❍	❍	❍	❍	❍
I can understand the benefits of transferable skills training	❍	❍	❍	❍	❍
Most skills training is obvious and can be more effectively covered by reading a book	❍	❍	❍	❍	❍

To receive credit for taking this survey. Please enter your last name and ASU student ID #.

APPENDIX F

NON-PFS PREPAREDNESS SURVEY

Preparing Future Scholars for Academia and Beyond

Taking this survey will verify that you have read and understand the information outlined in the "Preparing Future Scholars for Academia and Beyond" email sent to you and that you are 18 years of age or older. In addition, you have read this information and fully understand the contents, meaning and impact of this release. You understand that you are free to address any specific questions regarding this release by submitting those questions in writing before participating, and agree that your failure to do so will be interpreted as a free and knowledgeable acceptance of the terms of this request. You have the right not to participate and to stop participation at any time. Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty and it will not affect you in any way

This survey will close on Saturday, December 19, 2015 at 1 p.m. This survey will take approximately 15-20 minutes to complete. Please do not skip questions. These questions and responses will aid in the investigation of doctoral students' preparedness and readiness for multiple career pathways. In addition your responses will provide a skills perception inventory for evaluating transferable skills.

As an incentive to participate, on Monday, December 21, 2015 those who have taken this survey, and completed all questions will also be eligible to win a $25 Amazon gift card. Four gift cards will be raffled, if selected to win a $25 Amazon gift card you will be notified by email.

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty and it will not affect you in any way. Withdrawing or not completing every question will exclude you from the raffle drawing.

Begin Survey

Which of the following statements best describes your thinking at the time you decided to apply to a PhD: (check one)

- ❍ Continued my education because after my undergraduate/master program I did not have a good employment prospect or clear sense of what I wanted to do.
- ❍ Followed my intense passion in my field of study rather than a career goal.

❍ Other: please explain _____

At the time you enrolled in your doctoral program, indicate how interested you were in each possible career option

	Had Not Considered	Not at all Interested	Somewhat Interested	Moderately Interested	Very Interested
Teach at a research focused college/university	❍	❍	❍	❍	❍
Teach at a non-research focused university	❍	❍	❍	❍	❍
Conduct research in an academic setting	❍	❍	❍	❍	❍
Conduct research in a non-academic setting	❍	❍	❍	❍	❍
Become an administrator at an institution of higher education	❍	❍	❍	❍	❍
Work as an independent consultant	❍	❍	❍	❍	❍
Work in the private sector	❍	❍	❍	❍	❍
Work for the government	❍	❍	❍	❍	❍
Work for a non-profit organization	❍	❍	❍	❍	❍

Own and operate own business	❍	❍	❍	❍	❍

Right now, which of the following statements currently best reflects your formulation of career goals? (Check one)

❍ I have definite career goals which I am pursuing.

❍ I have several possible goals that I am considering.

❍ I am struggling to identify the best career path for me.

❍ I have not given much thought to my career options.

Right now, which of the following statements best reflects the employment opportunities you believe will be available to you upon graduation: (check one)

❍ Based on my career interests, and field of study, I believe job opportunities will be few and difficult to find.

❍ Base on my career interests, and field of study, I believe job opportunities will be available and only moderately hard to find.

❍ Based on my career interests, and field of study, I believe job opportunities will be plentiful and easy to obtain a job.

What were your career goal(s)/aspiration(s) as a child? Think back as far as you can. What or who influenced theses career aspirations? At what point, if any, did these career goals change and why? What are your career goals today?

What are the skills you believe your STILL have to develop in your current program of study to help you achieve the career goals identified today?

What are the skills you believe you have developed in your current program of study to help you achieve the career goals identified today?

What are some barriers/challenges/obstacles, “real or invisible,” you have or are experiencing that have impacted you and how did or will you persevere over those barriers?

How proficient do you think you are in the following areas?

	Needs Improvement	Only Slightly Proficient	Somewhat Proficient	Extremely Proficient	N/A
Writing for a lay audience	❍	❍	❍	❍	❍
Writing for a discipline-specific audience	❍	❍	❍	❍	❍
Oral presentation to a lay audience (including short “elevator speeches” about your research)	❍	❍	❍	❍	❍
Oral presentation to a discipline-specific audience	❍	❍	❍	❍	❍
Multi-media communication & digital tools	❍	❍	❍	❍	❍

Ability to give constructive feedback	❍	❍	❍	❍	❍
Ability to receive constructive feedback	❍	❍	❍	❍	❍
Conflict resolution, including difficult conversations & minimizing conflict	❍	❍	❍	❍	❍
Respect intellectual contributions of others	❍	❍	❍	❍	❍
Ability to mentor	❍	❍	❍	❍	❍
Ability to network and build professional relationships	❍	❍	❍	❍	❍
Ability to collaborate or work in teams	❍	❍	❍	❍	❍
Writing grants	❍	❍	❍	❍	❍
Publishing and presenting research	❍	❍	❍	❍	❍
Informational interviewing	❍	❍	❍	❍	❍

How proficient do you think you are in the following areas?

	Needs Improvement	Only Slightly Proficient	Somewhat Proficient	Extremely Proficient	N/A
Identifying conflicts of interest	❍	❍	❍	❍	❍
Understanding data ownership & sharing issues	❍	❍	❍	❍	❍
Demonstrate responsible publication practices &	❍	❍	❍	❍	❍
Authorship	❍	❍	❍	❍	❍
Identifying & mitigating research misconduct	❍	❍	❍	❍	❍
Demonstrating responsible conduct in research with animals (when applicable)	❍	❍	❍	❍	❍

How proficient do you think you are in the following areas?

	Needs Improvement	Only Slightly Proficient	Somewhat Proficient	Extremely Proficient	N/A
Determining workplace etiquette	❍	❍	❍	❍	❍

Serve on departmental & institutional-wide committees, develop policy, and engage in university governance	❍	❍	❍	❍	❍
Demonstrating cultural competence	❍	❍	❍	❍	❍
Engage in “small talk” in the break room	❍	❍	❍	❍	❍
Work with tight time constraints	❍	❍	❍	❍	❍
Motivate others	❍	❍	❍	❍	❍
Organizational skills	❍	❍	❍	❍	❍
Understanding the meaning of mission, vision & strategy	❍	❍	❍	❍	❍
Being a change agent	❍	❍	❍	❍	❍
Coaching & developing others	❍	❍	❍	❍	❍

Project management skills	❍	❍	❍	❍	❍
Budgeting	❍	❍	❍	❍	❍
Organizational skills	❍	❍	❍	❍	❍
Setting goals & monitoring results	❍	❍	❍	❍	❍
Working with diverse teams/groups	❍	❍	❍	❍	❍

At this point in your graduate program and with the knowledge you currently have, how would you describe the preparation you have received towards non-academic and academic career paths? Be specific.

Please rate your skills within the following areas:

	Needs Improvement	Adequate	Good	Excellent	N/A
Articulating your research using written communication skills to lay audiences (non-academic and scholars outside your discipline)	❍	❍	❍	❍	❍
Utilizing multiple media and technologies to communicate	❍	❍	❍	❍	❍

the value of your research					
Articulating your research orally to lay audiences (non-academic and scholars outside your discipline)	❍	❍	❍	❍	❍
Critical thinking and problem solving	❍	❍	❍	❍	❍
Articulating your research using written communication skills to audiences within your discipline	❍	❍	❍	❍	❍
Team work	❍	❍	❍	❍	❍
Starting conversations at social events. (For example, if you see someone you would like to meet, you go to that person instead of waiting for him or her to come to you)	❍	❍	❍	❍	❍

Taking initiative at social events (For example, if you meet someone interesting who is hard to connect with. You'll soon stop trying to make contact with that person)	❍	❍	❍	❍	❍
Professionalism	❍	❍	❍	❍	❍
Networking at social events (For example, when you're trying to connect with someone who seems uninterested at first, you don't give up easily)	❍	❍	❍	❍	❍
Listening effectively to decipher meaning, including knowledge, values, attitudes and intentions	❍	❍	❍	❍	❍
Leadership	❍	❍	❍	❍	❍
Utilize multiple media and	❍	❍	❍	❍	❍

technologies, and know how to judge their effectiveness as well as their impact					
Communicate effectively in diverse environments	❍	❍	❍	❍	❍
Career management	❍	❍	❍	❍	❍

How proficient do you think you are in the following areas?

	Needs Improvement	Only Slightly Proficient	Somewhat Proficient	Extremely Proficient	N/A
Conducting independent research	❍	❍	❍	❍	❍
Leading a research project	❍	❍	❍	❍	❍
Analyzing and interpreting data	❍	❍	❍	❍	❍
Developing curricula	❍	❍	❍	❍	❍
Performing research with human subjects	❍	❍	❍	❍	❍
Converting your CV to a resume or resume to CV	❍	❍	❍	❍	❍

Assessing trends in your field	❍	❍	❍	❍	❍
Teaching a small “seminar” course	❍	❍	❍	❍	❍
Teaching a large “lecture” course	❍	❍	❍	❍	❍
Teaching/overseeing a lab course	❍	❍	❍	❍	❍
Assess the learning outcomes of the students I am teaching	❍	❍	❍	❍	❍
Create an inclusive classroom environment of diverse students	❍	❍	❍	❍	❍
Collaborating with others in interdisciplinary research	❍	❍	❍	❍	❍

In this section estimate approximately how much of your time you spend engaged in each activity in a given academic year. Select the appropriate interval from the scale provided.

	Less than 5%	5% - 15%	15%-25%	25%-50%	more than 50%
Researching/investigation job opportunities	❍	❍	❍	❍	❍
Strategizing with my advisor or mentor (if different) on post-graduate opportunities	❍	❍	❍	❍	❍
Attending workshops and professional development	❍	❍	❍	❍	❍

conferences Hosted by the Graduate School, the Teaching Assistant Training Program, or career services					
Attending career and/or professional development workshops in my college	❍	❍	❍	❍	❍
Consultation with a career adviser	❍	❍	❍	❍	❍
Networking with faculty and other professional contacts at professional meetings	❍	❍	❍	❍	❍
Networking with faculty and other professional contacts through emails/listservs	❍	❍	❍	❍	❍
Participating in activities through my professional society	❍	❍	❍	❍	❍

Please indicate which of the following activities have you participated in or completed? (Check all that apply)

- ❑ Presented at a national professional conference
- ❑ Presented at a regional/state professional conference
- ❑ Presented at an international professional conference
- ❑ Competed in an on-campus research presentation
- ❑ Published in a peer reviewed journal
- ❑ Published in a professional publication (non-reviewed)
- ❑ Published book chapters
- ❑ Reviewed a professional publication

- ❑ Published a magazine, newspaper article
- ❑ Edited a book
- ❑ Written books (published or accepted for publication)
- ❑ Engaged in outreach/extension service
- ❑ Served as a professional consultant
- ❑ Served in a leadership position in a professional society

How frequently do you utilize the following resources to investigate organizations and employment opportunities?

	Do not know about	Not at All	Sometime	Often	Frequently	Quite Frequently
Chronicle of Higher Education	❍	❍	❍	❍	❍	❍
Professional associations in my field	❍	❍	❍	❍	❍	❍
Targeted employers (through databases, professional directories)	❍	❍	❍	❍	❍	❍
Sun Devil Career Link (available at Career Services)	❍	❍	❍	❍	❍	❍
Job listing services (e.g. monster.com; MSN	❍	❍	❍	❍	❍	❍

careers;Career-builder.com)						
Discipline specific career sites (i.e. Science Next-Wave, for example)	❍	❍	❍	❍	❍	❍
Federal government website	❍	❍	❍	❍	❍	❍
My professional network	❍	❍	❍	❍	❍	❍
My mentor	❍	❍	❍	❍	❍	❍

What challenges do you anticipate in gaining employment after graduation? (Check all that apply)

- ❑ Finding an open position
- ❑ Preparing my written credentials (CV, resume, cover letter)
- ❑ Proficiency in interviewing skills
- ❑ Researching potential employers
- ❑ Having appropriate supervisory skills
- ❑ Having scholarly publications from my dissertation and/or associated graduate school projects
- ❑ Having conference presentations from my graduate school research activities
- ❑ Having appropriate research experiences
- ❑ Having appropriate teaching experiences
- ❑ Having developed all necessary skills
- ❑ Having appropriate budgeting (grant management) experience

To what extent to you agree or disagree with each of the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
My department is helpful and supportive in a graduates' search for professional employment	❍	❍	❍	❍	❍
Faculty members in my program are interested in the welfare and professional development of graduate students	❍	❍	❍	❍	❍
My advisor has not helped me establish connections within a professional society	❍	❍	❍	❍	❍
My advisor encourages me to develop as a teacher	❍	❍	❍	❍	❍
My advisor encourages	❍	❍	❍	❍	❍

me to develop as a researcher My doctoral experience is preparing me well for my career aspirations My advisor knows my career aspirations	❍ ❍	❍ ❍	❍ ❍	❍ ❍	❍ ❍

In this series of questions, drag each item to the box that reflects your choice. Please indicate your expected level of comfort/confidence with the following situations or issues.

very uncomfortable / very unsure	uncomfortable / not confident	slightly uncomfortable / slightly concerned	comfortable / at ease	very comfortable / very confident
_____ Working with others on an interdisciplinary group project _____ Being able to communicate with people of different cultures _____ Recognizing	_____ Working with others on an interdisciplinary group project _____ Being able to communicate with people of different cultures _____ Recognizing	_____ Working with others on an interdisciplinary group project _____ Being able to communicate with people of different cultures _____ Recognizing	_____ Working with others on an interdisciplinary group project _____ Being able to communicate with people of different cultures _____ Recognizing	_____ Working with others on an interdisciplinary group project _____ Being able to communicate with people of different cultures _____ Recognizing

excessive stress in myself _______ Being able to give constructive feedback to peers and other students _______ Being aware of strategies for dealing with stress _______ Dealing with conflict with my supervisor _______ Having a realistic awareness of how I am perceived _______ Having to communicate with people I don't know very well _______ Being able to enhance my creativity when I need to _______ Understanding how my and others'	excessive stress in myself _______ Being able to give constructive feedback to peers and other students _______ Being aware of strategies for dealing with stress _______ Dealing with conflict with my supervisor _______ Having a realistic awareness of how I am perceived _______ Having to communicate with people I don't know very well _______ Being able to enhance my creativity when I need to _______ Understanding how my and others'	excessive stress in myself _______ Being able to give constructive feedback to peers and other students _______ Being aware of strategies for dealing with stress _______ Dealing with conflict with my supervisor _______ Having a realistic awareness of how I am perceived _______ Having to communicate with people I don't know very well _______ Being able to enhance my creativity when I need to _______ Understanding how my and others'	excessive stress in myself _______ Being able to give constructive feedback to peers and other students _______ Being aware of strategies for dealing with stress _______ Dealing with conflict with my supervisor _______ Having a realistic awareness of how I am perceived _______ Having to communicate with people I don't know very well _______ Being able to enhance my creativity when I need to _______ Understanding how my and others'	excessive stress in myself _______ Being able to give constructive feedback to peers and other students _______ Being aware of strategies for dealing with stress _______ Dealing with conflict with my supervisor _______ Having a realistic awareness of how I am perceived _______ Having to communicate with people I don't know very well _______ Being able to enhance my creativity when I need to _______ Understanding how my and others'

personality-types influence work interactions ______ Understanding and maintaining my motivation for work and study ______ Networking with academics and senior people within my discipline ______ Being aware of my specific areas for further development ______ Receiving feedback and dealing with criticism of my work ______ Having an awareness of my strengths and weaknesses ______ Being able to enthuse a non-expert about my work	personality-types influence work interactions ______ Understanding and maintaining my motivation for work and study ______ Networking with academics and senior people within my discipline ______ Being aware of my specific areas for further development ______ Receiving feedback and dealing with criticism of my work ______ Having an awareness of my strengths and weaknesses ______ Being able to enthuse a non-expert about my work	personality-types influence work interactions ______ Understanding and maintaining my motivation for work and study ______ Networking with academics and senior people within my discipline ______ Being aware of my specific areas for further development ______ Receiving feedback and dealing with criticism of my work ______ Having an awareness of my strengths and weaknesses ______ Being able to enthuse a non-expert about my work	personality-types influence work interactions ______ Understanding and maintaining my motivation for work and study ______ Networking with academics and senior people within my discipline ______ Being aware of my specific areas for further development ______ Receiving feedback and dealing with criticism of my work ______ Having an awareness of my strengths and weaknesses ______ Being able to enthuse a non-expert about my work	personality-types influence work interactions ______ Understanding and maintaining my motivation for work and study ______ Networking with academics and senior people within my discipline ______ Being aware of my specific areas for further development ______ Receiving feedback and dealing with criticism of my work ______ Having an awareness of my strengths and weaknesses ______ Being able to enthuse a non-expert about my work

_____ Appreciating a program of non-technical skills development _____ Having a good understanding of research ethics _____ Being able to describe the good attributes of a conference poster	_____ Appreciating a program of non-technical skills development _____ Having a good understanding of research ethics _____ Being able to describe the good attributes of a conference poster	_____ Appreciating a program of non-technical skills development _____ Having a good understanding of research ethics _____ Being able to describe the good attributes of a conference poster	_____ Appreciating a program of non-technical skills development _____ Having a good understanding of research ethics _____ Being able to describe the good attributes of a conference poster	_____ Appreciating a program of non-technical skills development _____ Having a good understanding of research ethics _____ Being able to describe the good attributes of a conference poster

Please indicate your level of agreement with the following statements.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Workshops for transferable skills development are generally not useful	❍	❍	❍	❍	❍
PhD students should be encouraged to attend more transferable skills	❍	❍	❍	❍	❍

development workshops					
Workshops for skills development are only important for some students	❍	❍	❍	❍	❍
I wish I had more skills training as an undergraduate student	❍	❍	❍	❍	❍
Attending career development workshops is distracting to my research	❍	❍	❍	❍	❍
I can understand the benefits of transferable skills training	❍	❍	❍	❍	❍
Most skills training is obvious and can be more effectively covered by reading a book	❍	❍	❍	❍	❍
I plan to be pro-active in developing my transferable	❍	❍	❍	❍	❍

skills throughout my PhD At the end of the day, my academic performance will be the only thing that's important to my employment and career progression Career development workshops are likely to help refine my behavior and change my outlook on life	❍ ❍	❍ ❍	❍ ❍	❍ ❍	❍ ❍

What is your gender?

What is your age?

Please specify your ethnicity.

❍ White

❍ Hispanic or Latino

❍ Black or African American

❍ Native American or American Indian

❍ Asian / Pacific Islander

- ❍ Two or more races
- ❍ Other

What is the highest degree you have completed?

- ❍ Bachelor's degree
- ❍ Master's degree

What field of study was this degree in? (e.g. Sociology)

As an undergraduate student did you participate in an internship program?

- ❍ Yes
- ❍ No

Are you a first-generation college student? First-generation students are those whose parents did not receive a college degree.

- ❍ Yes
- ❍ No

What is the highest level of education obtained by your immediate family members (e.g., your parents/guardian or sibling) (check one):

- ❍ No schooling completed
- ❍ Nursery schooling to 8th grade
- ❍ Some high school, no diploma
- ❍ High school graduate, diploma or the equivalent (e.g. GED)
- ❍ Some college credit, no degree
- ❍ Trade/technical/vocational training
- ❍ Associate degree
- ❍ Bachelor's degree
- ❍ Master's degree

- ❍ Professional degree (e.g. Law degree, MD)
- ❍ Doctorate degree (e.g. PhD, EdD)

Is your current field of study considered a STEM major? (e.g., Science, Technology, Engineering, Math)

- ❍ Yes
- ❍ No

Which non-STEM major is your current field of study?

- ❍ Art
- ❍ Business
- ❍ Counseling
- ❍ Education
- ❍ English
- ❍ History
- ❍ Music
- ❍ Public Administration
- ❍ Other

What is your major?

Have you taken your comprehensive exams?

- ❍ Yes
- ❍ No

Have you defended your dissertation proposal?

- ❍ Yes
- ❍ No

What is your current enrollment status?

❍ Full-time

❍ Part-time

Current year in PhD program?

❍ 1st year

❍ 2nd year

❍ 3rd year

❍ 4th year

❍ 5th year

❍ >6th year

❍ I graduated

❍ I am no longer in the PhD program

At this stage of your doctoral program, indicate how interested you are in each possible career option

	Had Not Considered	Not at All Interested	Somewhat Interested	Moderately Interested	Very Interested
Teach at a research focused college/university	❍	❍	❍	❍	❍
Teach at a non-research focused University	❍	❍	❍	❍	❍
Conduct research in an academic setting	❍	❍	❍	❍	❍
Conduct research in a non-academic setting	❍	❍	❍	❍	❍

Become an administrator at an institution of higher education	❍	❍	❍	❍	❍
Work as an independent consultant	❍	❍	❍	❍	❍
Work in the private sector	❍	❍	❍	❍	❍
Work for the government	❍	❍	❍	❍	❍
Work for a non-profit organization	❍	❍	❍	❍	❍
Own and operate own business	❍	❍	❍	❍	❍

Thank you for taking this survey. If you have any questions, please feel free to contact Jennifer Cason at (480) 965-8968 or at jennifer.cason@asu.edu

On Monday, December 21, 2015 participants who have taken this survey, and completed all questions will be eligible to win a $25 Amazon gift card. Four gift cards will be raffled separately, if selected, you will be notified by email.

Please enter your name (First and Last) and email address below if you would like to be entered into the raffle.

Please add any additional comments or question here.

APPENDIX G

PFS SELF-REFLECTION ACTIVITY

Preparing Future Scholars Self Reflection Activity

Your Name:_____

This was your second time communicating the value of your research beyond your discipline. Given the 30 seconds time constraints. On a scale of 1-4 how did you feel about your pitch.

1 = Need Improvement 2= Adequate 3= Good 4= Excellence

SELF ASSESSMENT PITCH SCORE:_____

Using the space provided below, please take the next 5mins in class to answer the following, briefly describe why you gave yourself the score above. Also describe what the differences are from the first time you stood in front of class and gave your pitch. For example, how did you feel, did you prepare and practice since the last class, how did you prepare, or did you just go for it. Please write clearly.

Reminder: Information collected through class audio recordings and class assignments will only be viewed by individuals of the research team and every effort will be made to prevent anyone outside of the project from connecting individual subjects with their responses. The results of this study may be used in reports, presentations, or publications but your name will not be used. Again, your participation in the study will not be identified to me until the semester is over and not impact your grade in the course.

There are no foreseeable risks or discomforts to your participation. Your participation and the findings from this study will contribute to the literature and discussion on training PhD students for success within and outside the Academy.

APPENDIX H

PFS POST SURVEY

PFS Post Survey

This survey will take approximately 10-15 minutes to complete. Do not skip questions and be sure to answer each question. Now that the Preparing Future Scholar class is over we will revisit a few questions from your IDP and topics discussed in class regarding your preparedness for multiple employment sectors and career paths.

How proficient do you think you are in the following areas?

	Needs Improvement	Only Slightly Proficient	Somewhat Proficient	Extremely Proficient	N/A
Writing for a lay audience	❍	❍	❍	❍	❍
Writing for a discipline-specific audience	❍	❍	❍	❍	❍
Oral presentation to a lay audience (including short "elevator speeches" about your research)	❍	❍	❍	❍	❍
Oral presentation to a discipline-specific audience	❍	❍	❍	❍	❍
Multi-media communication & digital tools	❍	❍	❍	❍	❍
Ability to give constructive feedback	❍	❍	❍	❍	❍
Ability to receive constructive feedback	❍	❍	❍	❍	❍

Conflict resolution, including difficult conversations & minimizing conflict	❍	❍	❍	❍	❍
Respect intellectual contributions of others	❍	❍	❍	❍	❍
Ability to mentor	❍	❍	❍	❍	❍
Ability to network and build professional relationships	❍	❍	❍	❍	❍
Ability to collaborate or work in teams	❍	❍	❍	❍	❍
Writing grants	❍	❍	❍	❍	❍
Publishing and presenting research	❍	❍	❍	❍	❍
Informational interviewing	❍	❍	❍	❍	❍

How proficient do you think you are in the following areas?

	Needs Improvement	Only Slightly Proficient	Somewhat Proficient	Extremely Proficient	N/A
Determining workplace etiquette	❍	❍	❍	❍	❍
Serve on departmental & institutional-wide committees,	❍	❍	❍	❍	❍

develop policy, and engage in university governance					
Demonstrating cultural competence	❍	❍	❍	❍	❍
Engage in "small talk" in the break room	❍	❍	❍	❍	❍
Work with tight time constraints	❍	❍	❍	❍	❍
Motivate others	❍	❍	❍	❍	❍
Organizational skills	❍	❍	❍	❍	❍
Understanding the meaning of mission, vision & strategy	❍	❍	❍	❍	❍
Being a change agent	❍	❍	❍	❍	❍
Coaching & developing others	❍	❍	❍	❍	❍
Project management skills	❍	❍	❍	❍	❍
Budgeting	❍	❍	❍	❍	❍
Organizational skills	❍	❍	❍	❍	❍
Setting goals & monitoring results	❍	❍	❍	❍	❍
Working with diverse teams/groups	❍	❍	❍	❍	❍

At this point in your graduate program and with the knowledge you currently have, how would you define the preparation you have received towards non-academic and academic career paths? Be specific.

Please rate your skills within the following areas:

	Needs Improvement	Adequate	Good	Excellent	N/A
Articulating your research using written communication skills to lay audiences (non-academic and scholars outside your discipline).	❍	❍	❍	❍	❍
Utilizing multiple media and technologies to communicate the value of your research	❍	❍	❍	❍	❍
Articulating your research orally to lay audiences (non-academic and scholars outside your discipline).	❍	❍	❍	❍	❍
Critical Thinking and Problem Solving	❍	❍	❍	❍	❍
Articulating your research using written communication skills to audiences	❍	❍	❍	❍	❍

within your discipline.					
Team Work	❍	❍	❍	❍	❍
Starting conversations at social events. (For example, if you see someone you would like to meet, you go to that person instead of waiting for him or her to come to you)	❍	❍	❍	❍	❍
Taking initiative at social events (For example, if you meet someone interesting who is hard to connect with. You'll soon stop trying to make contact with that person)	❍	❍	❍	❍	❍
Professionalism	❍	❍	❍	❍	❍
Networking at social events (For example, when you're trying to connect with someone who seems uninterested at first, you don't give up easily)	❍	❍	❍	❍	❍

Listening effectively to decipher meaning, including knowledge, values, attitudes and intentions	❍	❍	❍	❍	❍
Leadership	❍	❍	❍	❍	❍
Utilize multiple media and technologies, and know how to judge their effectiveness as well as their impact	❍	❍	❍	❍	❍
Communicate effectively in diverse environments	❍	❍	❍	❍	❍
Career Management	❍	❍	❍	❍	❍

How proficient do you think you are in the following areas?

	Needs Improvement	Only Slightly Proficient	Somewhat Proficient	Extremely Proficient	N/A
Conducting independent research	❍	❍	❍	❍	❍
Leading a research project	❍	❍	❍	❍	❍
Analyzing and interpret data	❍	❍	❍	❍	❍
Developing curricula	❍	❍	❍	❍	❍
Performing research with human subjects	❍	❍	❍	❍	❍
Converting your CV to a Resume or Resume to CV	❍	❍	❍	❍	❍
Assessing trends in your field	❍	❍	❍	❍	❍
Teaching a small “seminar” course	❍	❍	❍	❍	❍
Teaching a large “lecture” course	❍	❍	❍	❍	❍
Teaching/Overseeing a Lab course	❍	❍	❍	❍	❍
Assess the learning outcomes of the students I am teaching	❍	❍	❍	❍	❍
Create an inclusive classroom environment of diverse students	❍	❍	❍	❍	❍
Collaborating with others in interdisciplinary research	❍	❍	❍	❍	❍

In this series of questions, drag each item to the box that reflects your choice. Please indicate your expected level of comfort / confidence with the following situations or issues.

very uncomfortable / very unsure	uncomfortable / not confident	slightly uncomfortable / slightly concerned	comfortable / at ease	very comfortable / very confident
_____ Working with others on an interdisciplinary group project	_____ Working with others on an interdisciplinary group project	_____ Working with others on an interdisciplinary group project	_____ Working with others on an interdisciplinary group project	_____ Working with others on an interdisciplinary group project
_____ Being able to communicate with people of different cultures	_____ Being able to communicate with people of different cultures	_____ Being able to communicate with people of different cultures	_____ Being able to communicate with people of different cultures	_____ Being able to communicate with people of different cultures
_____ Recognizing excessive stress in myself	_____ Recognizing excessive stress in myself	_____ Recognizing excessive stress in myself	_____ Recognizing excessive stress in myself	_____ Recognizing excessive stress in myself
_____ Being able to give constructive feedback to peers and other students	_____ Being able to give constructive feedback to peers and other students	_____ Being able to give constructive feedback to peers and other students	_____ Being able to give constructive feedback to peers and other students	_____ Being able to give constructive feedback to peers and other students
_____ Being aware of strategies for dealing with stress	_____ Being aware of strategies for dealing with stress	_____ Being aware of strategies for dealing with stress	_____ Being aware of strategies for dealing with stress	_____ Being aware of strategies for dealing with stress
_____ Dealing with conflict with my supervisor	_____ Dealing with conflict with my supervisor	_____ Dealing with conflict with my supervisor	_____ Dealing with conflict with my supervisor	_____ Dealing with conflict with my supervisor
_____ Having a realistic awareness of how I am perceived	_____ Having a realistic awareness of how I am perceived	_____ Having a realistic awareness of how I am perceived	_____ Having a realistic awareness of how I am perceived	_____ Having a realistic awareness of how I am perceived

_____ Having to communicate with people I don't know very well	_____ Having to communicate with people I don't know very well	_____ Having to communicate with people I don't know very well	_____ Having to communicate with people I don't know very well	_____ Having to communicate with people I don't know very well
_____ Being able to enhance my creativity when I need to	_____ Being able to enhance my creativity when I need to	_____ Being able to enhance my creativity when I need to	_____ Being able to enhance my creativity when I need to	_____ Being able to enhance my creativity when I need to
_____ Understanding how my and others' personality-types influence work interactions	_____ Understanding how my and others' personality-types influence work interactions	_____ Understanding how my and others' personality-types influence work interactions	_____ Understanding how my and others' personality-types influence work interactions	_____ Understanding how my and others' personality-types influence work interactions
_____ Understanding and maintaining my motivation for work and study	_____ Understanding and maintaining my motivation for work and study	_____ Understanding and maintaining my motivation for work and study	_____ Understanding and maintaining my motivation for work and study	_____ Understanding and maintaining my motivation for work and study
_____ Networking with academics and senior people within my discipline	_____ Networking with academics and senior people within my discipline	_____ Networking with academics and senior people within my discipline	_____ Networking with academics and senior people within my discipline	_____ Networking with academics and senior people within my discipline
_____ Being aware of my specific areas for further development	_____ Being aware of my specific areas for further development	_____ Being aware of my specific areas for further development	_____ Being aware of my specific areas for further development	_____ Being aware of my specific areas for further development
_____ Receiving feedback and dealing with criticism of my work	_____ Receiving feedback and dealing with criticism of my work	_____ Receiving feedback and dealing with criticism of my work	_____ Receiving feedback and dealing with criticism of my work	_____ Receiving feedback and dealing with criticism of my work

_____ Having an awareness of my strengths and weaknesses	_____ Having an awareness of my strengths and weaknesses	_____ Having an awareness of my strengths and weaknesses	_____ Having an awareness of my strengths and weaknesses	_____ Having an awareness of my strengths and weaknesses
_____ Being able to enthuse a non-expert about my work	_____ Being able to enthuse a non-expert about my work	_____ Being able to enthuse a non-expert about my work	_____ Being able to enthuse a non-expert about my work	_____ Being able to enthuse a non-expert about my work
_____ Appreciating a program of non-technical skills development	_____ Appreciating a program of non-technical skills development	_____ Appreciating a program of non-technical skills development	_____ Appreciating a program of non-technical skills development	_____ Appreciating a program of non-technical skills development
_____ Having a good understanding of research ethics	_____ Having a good understanding of research ethics	_____ Having a good understanding of research ethics	_____ Having a good understanding of research ethics	_____ Having a good understanding of research ethics
_____ Being able to describe the good attributes of a conference poster	_____ Being able to describe the good attributes of a conference poster	_____ Being able to describe the good attributes of a conference poster	_____ Being able to describe the good attributes of a conference poster	_____ Being able to describe the good attributes of a conference poster

What are the transferable skills you believe you have identified and developed in PFS to help you achieve your career goals?

What are the transferable skills you believe you STILL have to develop to help you achieve your career goals?

Is your current field of study considered a STEM major? (e.g., Science, Technology, Engineering, Math)

- ❍ Yes
- ❍ No

Which non-STEM major is your current field of study?

- ❍ Art
- ❍ Business
- ❍ Counseling
- ❍ Education
- ❍ English
- ❍ History
- ❍ Music
- ❍ Public Administration
- ❍ Other

What is your major?

Have you taken your comprehensive exams?

- ❍ Yes
- ❍ No

Have you defended your dissertation proposal?

- ❍ Yes
- ❍ No

At this stage of your doctoral program, indicate how interested are you in each possible career option

	Had Not Considered	Not at all interested	Somewhat interested	Moderately interested	Very interested
Teach at a research focused College/University	❍	❍	❍	❍	❍
Teach at a non-research focused University	❍	❍	❍	❍	❍
Conduct research in an academic setting	❍	❍	❍	❍	❍
Conduct research in a non-academic setting	❍	❍	❍	❍	❍
Become an administrator at an institution of higher education	❍	❍	❍	❍	❍
Work as an independent consultant	❍	❍	❍	❍	❍
Work in the private sector	❍	❍	❍	❍	❍
Work for the government	❍	❍	❍	❍	❍
Work for a non-profit organization	❍	❍	❍	❍	❍
Own and operate own business	❍	❍	❍	❍	❍

What challenges do you anticipate in gaining employment after graduation? (check all that apply)

- ❑ Finding an open position
- ❑ Preparing my written credentials (CV, Resume, cover letter)
- ❑ Proficiency in interviewing skills
- ❑ Researching potential employers
- ❑ Having appropriate supervisory skills
- ❑ Having scholarly publications from my dissertation and/or associated graduate school projects.
- ❑ Having conference presentations from my graduate school research activities
- ❑ Having appropriate research experiences
- ❑ Having appropriate teaching experiences
- ❑ Having developed all necessary skills
- ❑ Having appropriate budgeting (grant management) experience.

To receive credit for taking this survey. Please enter your last name and ASU student ID #.

APPENDIX I

PERMISSION TO REPRODUCE INSTRUMENTS

From: **e.alpay@surrey.ac.uk [mailto:e.alpay@surrey.ac.uk]**
Sent: **Sunday, September 13, 2015 1:27 AM**
To: **Jennifer Cason**
Subject: **Re: Doctoral Student Inquiry: Skills Perception Inventory Article**

Hi Jennifer,

Thanks for your interest in this work. Yes - absolutely ok to use the SKIPI questionnaire (in full or otherwise) for your work. Good luck with it and I look forward to seeing any outputs.

Kindest regards

Esat

E. Alpay PhD(Cantab) MA(Psychology of Education) CEng MIChemE MBPsS FHEA
Director of Learning and Teaching
Programme Leader (BEng/MEng Programmes in Chemical Engineering)
Senior Lecturer (Chemical and Process Engineering)
Associate Editor - European Journal of Engineering Education
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FEPS (J2)
University of Surrey
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+44 (0)1483 686555
www.surrey.ac.uk/cpe/people/esat_alpay/

From: Jennifer Cason <Jennifer.Cason@asu.edu>
Sent: 13 September 2015 00:48
To: Alpay E Dr (Chem. & Proc. Eng.)
Subject: Doctoral Student Inquiry: Skills Perception Inventory Article

Hello Dr. Alpay:

I am the Director of Graduate Education Student Support Programs at Arizona State University. I am also a third year doctoral student in the Educational Leadership and Innovation program at ASU. As the director, I am charged with the oversight, development and implementation of several professional development programs within Graduate Education: http://graduate.asu.edu/cos

As a doctoral student, my research area of interest is graduate student professional development, specifically exploration of, and preparation for, the doctoral career path(s). While developing instruments for my data collection I came across the article “Alpay, E., & Walsh, E.

(2008). A skills perception inventory for evaluating postgraduate transferable skills development. Assessment & Evaluation in Higher Education, 33(6), 581–598. doi:10.1080/02602930701772804

The article you coauthored aligns with my work and areas of interest – so thank you and your co-author for publishing your work. While I plan on citing your work in my dissertation I would also like to, with proper citation, formally request the use some of the questions from the questionnaire you developed for your Research Skills Development Course. I am specifically interested in questions 1,2,3,6,8-10,12,14,16,18,20,22,24,26,28,29,31-33 as well as the 10 statements participants used to indicate their level of agreement.

While your focus of assessment came from student participants, their supervisors, the program itself and the university as a whole. In my study assessment will come from student participants' self-assessment and program administrators. Your questionnaire and study will help me to establish results that are valid and reliable. It would be my honor to be able to use your instrument. I hope, with proper citation, this will be okay with you and your co-author.

Thank you for taking the time to read my email. I look forward to your reply.

Best regards,

Jennifer

****

Jennifer Cason, MBA
Director, Graduate Education
Student Support Initiatives

Interdisciplinary Building B (INTDSB) 285
Arizona State University
PO Box 871003 Tempe, AZ 85287-1003

From: Helm, Matthew [mailto:helmmatt@msu.edu]
Sent: Friday, September 11, 2015 10:13 AM
To: Campa, Henry; Jennifer Cason
Subject: RE: ASU CIRTL: Jennifer Cason

Hi Jennifer,

Yes, you may use these questions. Best of luck to you on your dissertation. And please let me know if you like to discuss any part of our study.

Matt

Matt Helm, Ph.D.

Director, Graduate Student Life & Wellness
130 Chittenden Hall
The Graduate School
Michigan State University
517-884-1351
helmmatt@msu.edu

Follow MSU Grad Life & Wellness

For important resources to help you with your Academic Job Search or Expanded Career opportunities in Industry, government, and nonprofits visit Graduate Career Services on the web:

http://careersuccess.msu.edu

From: Campa, Henry [mailto:campa@anr.msu.edu]
Sent: Friday, September 11, 2015 12:48 PM
To: Jennifer Cason <Jennifer.Cason@asu.edu>
Cc: Helm, Matthew <helmmatt@msu.edu>
Subject: RE: ASU CIRTL: Jennifer Cason

Hi Jennifer,
Thanks for the note.

I'm ccing Matt Helm on this email since he was the senior author of this publication...hence you probably need his permission as well. I have no problem at all with you including the questions below as long as you acknowledge that these are the direct questions used in Helm et al. 2012....I assume that is why you are also including the citation.

Best,

Rique

From: Jennifer Cason [Jennifer.Cason@asu.edu]
Sent: Thursday, September 10, 2015 11:53 PM
To: Campa, Henry
Subject: RE: ASU CIRTL: Jennifer Cason

Hello Dr. Campa:

I hope this email finds you doing well. I regret we never had a chance to connect since the CIRTL meeting. Since then I have defended my dissertation proposal. I passed and

am now moving forward with data collection. Since my original email below I have rewritten my research questions and slightly changed the focus of my study to look at PhD students' preparedness of transferable skills, particular communication skills. I am writing you today to share with you that I the following citation will be in my dissertation.

Helm, M., Campa, H., & Moretto, K. (2012). Professional Socialization for the Ph.D.: An Exploration of Career and Professional Development Preparedness and Readiness for Ph.D. Candidates. *Journal of Faculty Development*, *26*(2), 5–23.

I would also like to formally request the use of some of the questions found in appendix A. I would specifically like to use #'s 53-82, 94-104, and 107-108. While all the information I need can be found in the appendix of the article, the scale used for questions 75-82 is unclear to me. The specific question and scale is below.

Thank you again for your support.
Sincerely,
Jennifer

In this section estimate approximately how much of your time you spend engaged in each activity in a given academic year. Select the appropriate interval from the scale provided.
Not At All
Less than More than
5% 5-15% 15-25% 25%-50% 50%
1 2 3 4 5 6
Researching/investigation job opportunities
Strategizing with my advisor or mentor (if different) on post-graduate opportunities
Attending workshops and professional development conferences hosted by the Graduate School, the Teaching Assistant Training Program, or career services.
Attending career and/or professional development workshops in my college
Consultation with a career adviser
Networking with faculty and other professional contacts at professional meetings
Networking with faculty and other professional contacts through emails/listservs
Participating in activities through my professional society

APPENDIX J

IRB EXEMPTION

EXEMPTION GRANTED

Daniel Dinn-You Liou

Division of Educational Leadership and Innovation - West

dliou@asu.edu

Dear Daniel Dinn-You Liou:

On 8/20/2015 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Preparing Future Scholars for Academia and Beyond: A Mixed Method Investigation of Doctoral Students' Preparedness for Multiple Career Paths
Investigator:	Daniel Dinn-You Liou
IRB ID:	STUDY00002998
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• PFS Experiential Learning Sponsors Recruitment IRB Update.pdf, Category: Consent Form; • Appendix G Data collection procedures.docx, Category: IRB Protocol; • Udpated 8_19_15 IRB Appendix D Snowball PFS Recruitment _Attention Graduate Students.pdf, Category: Consent Form; • Appendix B 8_20_15 Stdnt Part_Consent Email_IRBUpdated.pdf, Category: Consent Form; • 8 19 2015 IRB Protocol SocialBehavioralUpdate.docx, Category: IRB Protocol; • Appendix A IRB PFS Fall 15 Syllabus.docx, Category: IRB Protocol; • PFS Experiential Learning Sponsors Consent IRB Update.pdf, Category: Consent Form; • Appendix C PFS PD Survey IRB Updates.docx, Category: IRB Protocol; • Appendix H IRBCompletionReport3890507.pdf, Category: IRB Protocol; • Appendix F PFS IDP.docx, Category: IRB Protocol;

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (1) Educational settings on 8/20/2015.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Jennifer Cason

Roberta Anslow-Hammond
Pamela Garrett