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This dissertation, directed and approved by the candidate's committee, has been accepted by the College of Graduate and Professional Studies of Abilene Christian University in partial fulfillment of the requirements for the degree

## **Doctor of Education in Organizational Leadership**



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Dr. Joey Cope, Dean of the  
College of Graduate and  
Professional Studies

Date: July 02, 2020

Dissertation Committee:



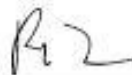
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Abilene Christian University  
School of Educational Leadership

Identifying Competencies and Outputs of SSS Role  
in STEM Bridge Programs in the Silicon Valley

A dissertation submitted in partial satisfaction  
of the requirements for the degree of  
Doctor of Education in Organizational Leadership

by  
Alexandra C. Duran  
August 2020

## **Dedication**

In honor of Ms. Silvia Castro and Professor Fred Thorne—because you knew I was going to achieve this goal even when I did not speak English. Thanks for believing in me. I love and miss you.

## Acknowledgments

First, I thank God for the blessing of completing this personal goal and for the “angels” in each season of my life. I would like to take a moment to thank them. I wish to thank my dissertation committee. Without their guidance, I would not have made it. Dr. Stuart Allen and Dr. Rick Zomer served as wise committee members, and Dr. Peter Williams, my Chair, went above and beyond to help me reach my goal. Thank you to my colleagues that offered their knowledge and time to participate as the study’s panel of experts and to the MAPin team members for their support, expertise, and their role as SSSs/coaches.

Gracias a mi familia y amistades: you put up with me not being always present, missing important events, y por no visitarlos seguido. I am forever grateful for your love, patience, and understanding. I am excited to have time to reconnect with each of you. Finally, to my husband, Donald, and all our furry babies: your unconditional love, understanding and support helped me through the challenging times. You are my blessings. It is time to celebrate. This accomplishment belongs to us. To the angels throughout my life, you know who you are, you have heard me say, “You are an angel to me,” your existence means that God loves me and is good always. Love!

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## Abstract

This study identified the competencies and outputs associated with the role of student support specialists (SSS) in science, technology, engineering, or mathematics (STEM) bridge programs in the community colleges of Silicon Valley. The growth of STEM education, coupled with the increasing diversity of student population in community colleges, has made the work of SSS professionals in the region challenging. While the SSS professionals are often positioned as comprehensive, nonacademic support for STEM students, not enough has been documented on the competencies and outputs associated with SSS role in STEM bridge programs. In addition, most studies on student affairs professionals primarily reported broad competencies that did not necessarily apply to skills required to support STEM students. Using Delphi Method that employed three rounds of data collection and analyses, 19 experts were surveyed in STEM and student affairs and their responses were analyzed using median and interquartile range (IQR). After generating the competencies, their alignment was examined with the competencies in the 2015 American College Personnel Association (ACPA) and the National Association of Student Personnel Administrators (NASPA). Results showed that 36 of the 40 outputs rated were considered essential based on the experts' median and IQR scores. In the same manner, experts rated 34 of the 43 competencies as essential based on their median and IQR scores. The top competencies identified were consistent with previously published studies' findings, in which 17 of these competencies were related to human relations, collaborations, communication, and working with diverse populations. The crosswalk analysis also revealed that the study-generated competencies were in alignment with the professional competencies in the 2015 ACPA/NASPA document. Most of the competencies were related to organization and human resources (32%), followed by advising and supporting, student learning and development, and leadership with

12% each. Among the most rarely cited competencies were related to competency areas such as personal and ethical foundation (6%), technology (6%), and law, policy, and governance (3%). Recommendations and implications of the results for practice in human resources included hiring, talent management, and professional development and training of employees and for future research were discussed.

*Keywords:* student affairs professionals, professional competencies, Delphi model, human relations skills, organization and human resources.



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## Chapter 1: Introduction

Each year, more than two million students enroll in the community colleges in California (California Community Colleges Chancellor's Office [CCCCO], 2016). However, 80% of these students matriculate with at least one developmental course in math or English (Mejia et al., 2016). Developmental courses are remedial courses that students must take to build their English and math skills before they can register for regular courses. These figures, according to Mejia et al. (2016), clearly indicate that many of the students are deemed academically unprepared for college, with about 87% of this student population coming from low-income families with Hispanic and African American backgrounds. While the goal of developmental education is to help students acquire the necessary skills in math and English to prepare them for college-level courses, the program has faced several unintended consequences, including thousands of students dropping out of their classes or failing to finish an academic goal (Mejia et al., 2016).

What is alarming is the probability for this population of students to earn a degree in science, technology, engineering, or mathematics (STEM) is only 23% (Mattern et al., 2015). Researchers have cited that the lack of understanding of the relationship between coursework and careers, or the perception of poor instruction, has created student disinterest, which in turn resulted in lower retention rates in STEM programs (D'Souza et al., 2016). This problem has far-reaching consequences for the economy. Bohn (2014) noted that if the trend continues, California will experience a substantial shortage in the supply of skilled workers in some STEM fields by 2025. This will have a negative impact on the economic development of the state.

To address this issue, higher education leaders have implemented initiatives such as acceleration models (Nodine et al., 2013), integrative approaches (D'Souza et al., 2016), learning communities (Dagley et al., 2016), and more recently, the adoption of California Assembly Bill

705—that took effect on January 1, 2018 (CCCCO, 2018). These approaches restructure the current curriculum (Nodine et al., 2013), the student support services offered (Fuller et al., 2016), and the assessment and placement policies involving students enrolling in community colleges in California. Other initiatives have also been reported including the use of the STEM Core Model, a cohort-based, block scheduled accelerated learning community hosted at community colleges (California STEM Core, 2020). An essential component of the STEM Core Model is the student support specialist (SSS), whose role involves recruitment of students from underrepresented populations, supporting student retention, and aligning coursework and careers through academic, social, and personal support (Zoval, 2017).

The importance of SSS and other positions providing academic advising and student support cannot be overemphasized. Research has shown that student affairs professionals and academic advisors influence student success in a variety of ways, including persistence in college, strengthening career and educational aspirations, development of academic skills, as well as improving their overall experience in college (Bahr, 2008; Donaldson et al., 2016; Drake, 2011; Kuh, 2006; Light, 2001; Pascarella & Terenzini, 2005; Strage et al., 2002; Tinto, 1975). Although the role of SSS is critical in supporting student success, there is a growing concern among education leaders and administrators whether these professionals have the preparation and competencies to handle the complexity of the position—especially with the increasing diversity in student demographics and academic preparedness. To date, many of the studies that have examined the role of student affairs professionals focused on broad competencies and characteristics that may not be applicable to specific roles like SSS working in STEM Core Model.

To provide context to the study, the STEM Core model was piloted with participation of developmental-level students at Santa Ana and Saddleback colleges in California. After one year, all 65 students who entered the program with elementary algebra-level skills reached calculus readiness and showed significantly higher than average pass and retention rates (California STEM Core, 2020). The success of the STEM Core model (a cohort-based, block scheduled learning community) can be attributed to the innovative approach it has adopted to support students via contextualized curriculum, and work-based learning opportunities. Most importantly, it includes wraparound academic and social support with supplemental instruction, tutoring, additional counseling, and internships with local employers—particularly in STEM-related positions such as engineering and computer technology. In its attempt to sustain its success in supporting students with high-demand, high-sustainability careers in Silicon Valley, the STEM Core Model plans to increase the number of nontraditional, minority, first-generation, and underrepresented students—such as part-time and Latino students. At present, the program has served 345 students within nine colleges in San Francisco, of which 50% of the students are from underrepresented populations, 30% female, and 75% from economically disadvantaged groups (i.e., students receiving Board of Governor’s fee waiver).

### **Statement of the Problem**

While it is known that comprehensive support, social networks, academic advising, and learning communities influence student success and college life (D’Souza et al., 2016; Mechur-Karp, 2016; Packard & Jeffers, 2013), there has been limited research on the 2015 Professional Competencies for Student Affairs with actual skills needed to succeed in student affairs roles (Gansemer-Topf & Ryder, 2017); particularly in the field of STEM education. The lack of sufficient research on current and emerging competencies in the various roles performed in

student affairs, paired with the growth of the SSS role in the STEM Core Model implementation in community colleges in the Silicon Valley region, presents a gap in the literature. Furthermore, because the SSS is often positioned as comprehensive, nonacademic support for the STEM Core students, little is known about the outputs associated with the role of SSSs and their competencies. Outputs are products, services, or information that result from the provision, delivery, and performance of a certain function or role (McLagan, 1989). For an SSS, for instance, an output would include establishing quality relationships with students from different backgrounds, or providing campus-related support services, or preparing reports (accountability or program reports). This is important because insights on SSS specific roles and necessary competencies would benefit higher education leaders involved in planning to adopt the STEM Core Model, in hiring suitable talent for SSS positions, as well as in creating professional development programs that support individuals in this role. Thus, in addition to identifying the core competencies of SSSs working in the STEM Core Model, this study also sought to identify the outputs of the SSS and the associated competencies for those outputs.

### **Purpose of the Study**

The purpose of this study was to identify the roles, associated outputs, and needed competencies of SSSs with a specific focus on student affairs professionals working in STEM bridge education programs. Also, because required and emerging competencies of these professionals may vary in locations and contexts, this study explored these concepts among the professionals employed in local community college districts in the Silicon Valley region. The intent of the research was to provide valuable insights to educational leaders, administrators, and professionals involved in adopting STEM bridge programs, in hiring suitable talent for SSS positions, as well as in creating professional development programs that support individuals in



this role. The findings will also support the enrollment, retention, or graduation of students in STEM courses, particularly those from underrepresented groups.

### **Research Questions**

Although research on core competencies of the student affairs profession has been well established (Burkard et al., 2005; Fiddler & Alecia, 1996; Gansemer-Topf & Ryder, 2017; Menke et al., 2018; Reynolds, 2011), several gaps have been identified in the existing literature. First, most studies on student affairs professionals, including the SSS, primarily involved the identification of required competencies as perceived by experts in the field (e.g., faculty members, administrators, advising staff, and student professional personnel). Second, most of the required competencies identified by experts are broad in scope. As such, these competencies might lack applicability to SSS supporting work in STEM education. The growth of the STEM Core Model implementation, coupled with the increasing diversity of student population in community colleges, may require more specific skills and competencies for SSS professionals to succeed in their role. Third, most of the existing studies did not explicitly identify the outputs associated with those competencies, focused mainly on determining whether the found competencies were aligned with those described in the 2015 Professional Competencies for Student Affairs. Considering these gaps, this study purposely addressed the following research questions:

RQ1: Given the emerging role of the SSS within the STEM Core Model, what are the outputs expected of this role?

RQ2: Given the growth of STEM Core Model implementation, what are the emerging competencies needed to produce those outputs?

RQ3: How do these SSS competencies associated with the STEM Core Model compare or align with the 2015 Professional Competencies for Student Affairs?

### **Definitions of Key Terms**

This section provides operational definitions of the important terms that have been recurrently used in the present chapter. For this purpose, the following terms are defined accordingly:

**Bridge programs.** Bridge programs are programs in adult education that community colleges implement or adopt to improve low-skilled students' transition into postsecondary education and training by developing career pathways (Office of Vocational and Adult Education, U.S. Department of Education, 2012). STEM bridge programs support students in improving their academic skills in order to be successful in STEM courses and STEM careers. The STEM Core Model is an implementation of a STEM bridge program (see definition below).

**Competencies.** Competencies are underlying characteristics that a person acquires through experience, study, and training, which results in effective performance of a job (Klemp, 1980; Spencer & Spencer, 1993). Similarly, Dubois (1998) defined competencies like knowledge, skills, mindsets, and thought patterns that when used singularly or in various combinations, result in successful performance. In short, competencies are building blocks for successful performance in work, at an occupation, or in a profession.

**Competency model.** A competency model is “an organizing framework that lists the competencies required for effective performance in a specific job, job family (i.e., group of related jobs), organization, function, or processer” (Marrelli et al., 2005, p. 537). It is also a descriptive tool that identifies the competencies required to perform a specific role within an occupation, organization, or industry (Fogg, 1999).

**Knowledge.** Knowledge refers to the information and learning of an individual (Vazirani, 2010). Knowledge is a component of competency that can include four key concepts: factual, conceptual, procedural, or metacognitive knowledge. Factual knowledge involves the basic elements that individuals must know to solve problems. Conceptual knowledge involves recognizing the interrelationships among the basic elements within a larger structure that enable them to function together. Procedural knowledge represents knowledge of how to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods. Metacognitive knowledge, lastly, represents awareness and knowledge of one's own cognition (Anderson et al., 2001).

**Motives.** Motives are emotions, desires, physiological needs, or similar impulses that prompt action (Vazirani, 2010).

**Outputs.** Outputs are products, services, or information that result from the provision, delivery, and performance of a certain function or role. For example, an evaluator who identifies the impact of an intervention on an organization or an individual will produce the following outputs: (i) evaluation designs and plans; (ii) evaluation instruments; (iii) evaluation findings, conclusions, and recommendations; and (iv) evaluation processes and feedbacks (McLagan, 1989).

**Role theory.** Role theory (RT) proposes that individuals have roles in society and that these roles are performed with certain expectations (Van der Horst, 2016).

**Self-concepts.** Self-concepts refer to a person's self-image and attitudes (Vazirani, 2010).

**Skills.** Skills refer to a person's ability to perform a certain task (Vazirani, 2010).

**Social support.** Social support is the awareness or understanding that one is cared for, valued, supported by others, and ultimately, experiences a sense of belonging (Taylor, 2011; Wills, 1991).

**STEM Core Model.** The STEM Core Model is a cohort-based, block-scheduled learning community implemented at community colleges to support the progress of students in developmental skills level courses. It is an innovative model that supports students to complete algebra through calculus courses in two semesters and includes contextualized curriculum, work-based learning opportunities, wrap-around academic and social support (including supplemental instruction), tutoring, additional counseling, and internships with local employers (California STEM Core, 2020).

**Student support specialist (SSS).** SSS is a student affairs professional who provides support to students with their academic and nonacademic needs. In the context of this study, the SSS is a skilled professional who supports students who are enrolled in STEM education.

**Traits.** Traits refer to the physical characteristics and consistent responses to situations or information (Vazirani, 2010).

## **Summary**

In summary, this chapter provided an introduction of the research questions that this study attempts to address. The following chapter presents a literature review beginning with an overview of the California Community College (CCC) system, followed by a discussion of the theoretical framework that guides the study. In addition, the literature review also covers a synthesis of competency studies that pertain to student affairs professionals and a review of bridge programs in STEM education. Chapter 3 provides a description of the study design, study participants, data collection procedures and instrumentation, and data analysis.

## Chapter 2: Literature Review

CCCs are a significant part of the State of California's educational infrastructure. Data shows that over two million students enroll in courses in one of the 115 colleges in the system each year (CCCCO, 2016). Eighty percent of the students enrolled enter higher education with developmental skills in math and English (Mejia et al., 2016). The probability for these populations to earn a STEM-related degree is only 23%, and half of that figure represents students who are academically ready for STEM courses (Mattern et al., 2015). To address this issue, higher education leaders have implemented various initiatives to restructure the curriculum and student support services (Fuller et al., 2016; Nodine et al., 2013). The STEM Core model is one of these initiatives and the setting of this study (California STEM Core, 2020). A key factor of the STEM Core model is the SSS, whose role involves the recruitment of students from underrepresented populations, supporting student retention, and aligning coursework and careers through academic, social, and personal support (Zoval, 2017).

Although comprehensive support and social networks influence student success (D'Souza et al., 2016; Mechur-Karp, 2016; Packard & Jeffers, 2013), limited research has been conducted to align the 2015 Professional Competencies for Student Affairs with the skills actually needed to succeed in student affairs roles (Gansemer-Topf & Ryder, 2017). The lack of sufficient research on current competencies, the required outputs for these competencies in various roles performed in student affairs, and the growth of the SSS's role in implementing the STEM Core model represent gaps in the literature. Furthermore, it is also likely that the implementation of STEM Core Model may have produced different competencies than those identified in the 2015 document developed by the American College Personnel Association (ACPA) and the National Association of Student Personnel Administrators (NASPA). For this reason, it is critical that

these competencies are examined in order to help organizations prepare such professionals working in STEM education.

The review of literature begins with an overview of the CCC system and recent California State legislation designed to increase student educational goal completion. It also addresses the diversity among the students attending these colleges and the vital role the colleges play in the State of California's economy. This is followed by a discussion of the general theoretical framework that guides the study. Specifically, three important theories are discussed in detail: (i) RT and organizational role theory (ORT), (ii) concept mapping, and (iii) social support theory (SST). The concepts of RT and ORT are critical inasmuch as they provide the benchmark in determining the success of an individual in performing his/her functions in an organization (Kessler, 2013). RT and ORT, as applied in student affairs profession in community colleges, provide a link between the professionals' functions and students' ability to meet their educational needs. While roles are critical, the use of competency mapping provides a framework that identifies key competencies that guide organizations to function smoothly and effectively. For this reason, different competency models and studies related to student affairs professionals are reviewed in order generate an understanding of the current competencies required for this position. Because these professionals play an important role in the success of students, SST is also be discussed. SST asserts that college personnel have a direct positive impact on student college success because they serve as critical access points to resources and provide information needed to navigate the college environment (Capizzi et al., 2017; Coleman, 1994). Research has shown that social support is imperative.

Finally, a review of STEM bridge programs and other similar interventions is conducted to understand the characteristics of STEM bridge programs and the competencies implemented

by faculty and staff who work in these interventions. STEM programs have been the focus of a significant amount of national research studies, particularly as it relates to the ability to prepare students for a career in STEM industries (D'Souza et al., 2016). These programs also have received much attention for how they support students in navigating the college experience. Thus, the purpose of this study was to identify current and emerging competencies and associated outputs of the SSS role with a specific focus on professionals working in STEM bridge education programs in the Silicon Valley. The intent was to provide valuable insights to educational leaders involved in planning to adopt STEM bridge programs, in hiring suitable talent for SSS positions, as well as in creating professional development programs that support individuals in this role. Furthermore, this literature review attempts to answer four questions essential for the completion of the overall study: (i) What is ORT and how does it guide this study?; (ii) What are the various views on useful competency mapping, and how can it help organizations improve performance?; (iii) What research has been done on competency mapping assisting an organization's performance?; and (iv) What do we know about the SSS competencies?

### **California Community Colleges**

Historical data have shown that although many students enroll at CCCs, many do not complete the educational goal selected at the time of enrollment. This phenomenon has been the focus of many research studies over the last few decades, and the findings often point to systematic structures as a significant factor impacting student completion (CCCCO, 2019). The CCCs play an essential role in the State of California's economy by serving more than 2.1 million students every year (CCCCO, 2019). The students served at the CCCs come from a broad spectrum of experiences and backgrounds. These include students who are: (i) first-time

freshmen enrolling directly out of high school and seeking support in transitioning to a postsecondary environment; (ii) returning students who have been separated from a postsecondary environment requiring support readjusting to the expectations of college; and (iii) veteran students returning from military service needing support not only in transitioning to the college environment, but also dealing with potential stressors associated with accessing military educational benefits (Foundation for California Community Colleges [FCCC], 2017).

In recent years, the 115 CCCs that make up the system have been undergoing a significant transformation, as predicated by the Chancellor's Office. In 2017, the Chancellor's Office implemented the Vision for Success, the system's strategic statement of objectives, which outlines ambitious systematic goals for increasing degrees, certificates, and university transfers and pathways to employment (FCCC, 2017). The CCCs have systematically implemented new legislation designed to increase student educational goal completion within an efficient timeframe. Major strategies implemented to reach the State of California's ambitious goals embrace several system-wide initiatives, such as the Student-Centered Funding Formula (SCFF) and Assembly Bill 705, *Student Course Placement, Guided Pathways and Student Equity and Achievement* (FCCC, 2017). These strategies call for redesigning the student experience, meaning colleges need to change not only institutional policies and procedures but also shift the institutional culture to implement student-focused practices (CCCCO, 2019).

Colleges have responded by testing the effectiveness of innovative strategies to help community college students whose backgrounds put them at risk of dropping out. Across the state, programs and services have been designed or innovated to increase a student's ability to persist and complete their education goal. This can put them on pathways to higher levels of education, certifications, better jobs, higher earnings, and other outcomes that enable people to



increase their social and economic mobility (CCCCO, 2019). The interventions being implemented include those that provide direct services to students with an intentional focus on meeting their holistic needs (e.g., orientation to college services, early alert programs, learning communities, supplemental instruction, tutoring, and career counseling).

As community colleges work to adapt to these changes, community college professionals are essential to strengthen student success outcomes through intentional student-focused services and programs. A deliberate focus on how community colleges support students has also reviewed the design of student affairs programs and services. It is critical that student affairs professionals are competent to work with a diversity of students enrolled in the colleges, especially for institutions seeking to maximize their organizational success. The following section provides a description of RT and some of the philosophical perspectives that guide the formulation of this theory, as they relate to organizations. In addition, the section will present a brief review of the application of RT within organizations.

### **Silicon Valley Region**

The Silicon Valley region is the southern part of California's San Francisco Bay area. The region is comprised of the Santa Clara County, San Mateo County, Alameda County, Santa Cruz County, and the cities of Fremont, Newark, Union City, and Scotts Valley. The 2019 Silicon Valley indicators by the Institute for Regional Studies (2019) reported that the region currently has about 3.11 million residents, of which the majority are European American (34%) and Asian (34%), followed by Hispanic (25%). The smallest reported ethnicity groups are African American residents (2%) and multiracial and others (5%). More than half of the population are between the age groups 20-39 years old (29%) and 40-59 years old (27%). About 20% of Silicon Valley residents are between 60 and 79 years old (16%), whereas 45% are 80 and

older. A large portion of the population (24%) is under 20 years old. Of the 3.11 million residents, 38.2% are foreign born, originating from China (17%), Mexico (17%), India (14%), Philippines (11%), other Asian countries (11%), and Vietnam (10.5%). The remaining 17.5% of foreign-born residents originate from Europe and Other Americas.

The residents of Silicon Valley are highly educated, with about 89% of its adult population with a high school diploma. Of these educated residents, 24% have a graduate or professional degree, 27% have a bachelor's degree, 23% with some college, and 15% have a high school diploma, while only 11% have less than high school education. In terms of employment by major areas of economic activity, the United States Bureau of Labor Statistics (USBLS, 2018) reported that 49.7% come from community infrastructure and services, 26.1% from innovation and information products and services, 16.1% from business infrastructures and services, and 8.1% come from manufacturing and others.

There are, however, statistics that show alarming gaps and disparities among Silicon Valley's residents. The Institute for Regional Studies (2019) shows that incidence of unemployment is highest for African American residents (5%), followed by Hispanic or Latino residents (3%), while White and Asian residents are lower at 2.5% and 2.4%, respectively. In terms of the population living in poverty, the ACS shows that 7% are considered poor across Silicon Valley, with the incidence remarkably higher for African American (11.3%), Hispanic or Latino (10.8%), Native Hawaiian and Pacific Islander (10.7%) residents compared to Asian (6.4%) and White (4.5%). This gap is also evident in the number of households living below self-sufficiency standards: 57% Hispanic or Latino households and 45% African American households live below this level, compared to Asian and White with 26% and 18%, respectively. With Silicon Valley's median income of \$118,357 in 2017, the United States Census Bureau,

ACS also reveals a large income median disparity of \$87,767 between the highest and lowest educational attainment level is about \$87,767. Despite the growth and success reported in technology and innovation sectors, many minority residents continue to be disenfranchised due to the lack of workforce diversity and opportunities. Consequently, this leads to meager income for these ethnic groups whose could barely support a decent life. The following section provides a discussion of the theoretical framework that guides the study.

### **Role Theory and Organizational Role Theory**

RT originated from the field of social psychology and proposed the idea that individuals play various roles in life and that these roles come with certain expectations that influence an individuals' attitudes and behaviors (Biddle, 1986). How an individual acts and behaves based on these preconceived expectations can be likened to a theatrical metaphor, where the actors are "constrained to perform 'parts' for which 'scripts' were written" (Biddle, 1986, p. 68).

According to Biddle, central to RT is the connection between the parts, which represents the role that a person assumes or performs, and the scripts, which represent the expectations as understood by the person. In turn, this dynamic can influence the patterns of social behaviors exhibited by the person.

### ***Role Theory Perspectives***

Research on RT follows two significant strands of thought: the structural-functionalist view and the symbolic-interactionist perspective. The structural-functionalist perspective conceives of roles as the "shared, normative expectations that prescribe and explain behaviors" (Biddle, 1986, p. 70). Within this perspective is the belief that an individual who occupies a particular social position is part of a stable system within which he or she is presumed to have been socialized to conform to the norms associated with that assigned role (Zai, 2014). RT from

the structural-functionalist point of view proposes the need for conformity as a vehicle for preserving the order and stability within the social structure. The work by Linton (1936), Parsons (1951), Parsons and Shils (1951) and Bates and Harvey (1975) represent this school of thought.

Among their significant contribution to the discourse is the view that:

Social structures as collections of designated social positions shared norms of which govern differentiated behaviors. Some of the norms applying to a given position govern general conduct, but others govern only relationships between a focal position and a specific, counter position, and among the latter, 'roles' are, those that apply to the accomplishment of specific positions. (Bates & Harvey, 1975, pp. 70–71)

The symbolic interactionist perspective focuses on the relationships and interactions of people within an organization and how these two elements help people form a connection with their work. This theory proposes that individuals in the organization attribute value and meaning to the relationships they form in the context of delivering their work, thereby having the purpose of their work originate from this connection. Social scientists who have studied the symbolic-interactionist perspective, have looked for patterns in interactions between people, mostly using one-on-one interactions (Matresse, 2019).

### ***Organizational Role Theory***

How a specific role is organized within the context of a particular organization is best described in the ORT. ORT originated from the works of Gross et al. (1958) and Kahn et al. (1964), which have since been developed to explain the interdependence between roles and behaviors within an organization. Biddle (1986) acknowledged that this interdependence by asserting that roles are important because they promote effective functioning of behaviors in an organization. Similarly, Katz and Kahn (1966) affirmed this interdependence that roles within an

organization impact how organizations achieve their goals. In organizations, role behaviors are considered repeated patterns of actions, which are significant for positive performance in a specific role within a particular organization (Biddle, 1986).

Based on the theory of human behavior, four major assumptions reinforce ORT: (i) role taking, (ii) role consensus, (iii) role compliance, and (iv) role conflict. In an organizational context, role taking assumes that employees take the role set by the employer when accepting a job offer (Katz & Kahn, 1978). The concept of role consensus assumes that organizational roles are pre-set, approved, static, and a consensus between employee and employer can be reached (Kerr, 1978). Role compliance is enforced by human resources policies when setting performance objectives and expected behaviors, usually specified in job descriptions (Jackson & Schuler, 1992). Role conflict assumes that conflict will happen when role expectations of one role conflict with the expectations of another (Miles & Perreault, 1976). These assumptions present some confines in the use of ORT in present-day organizations. For instance, Kerr (1978) argued that role-consensus assumption overlooks the diverse and numerous roles played by employees and that roles can change over time. Elloy and Smith (2003) documented a breach in ORT, concluding that human resource management (HRM) should seek a full understanding of employees' lives outside of their work hours.

Furthermore, how employee management is designed may impact the overall effectiveness of the institution in meeting its mission. RT establishes a significant connection between achieving the outcomes of the organization and measuring how personnel in the organization assist in meeting these outcomes (Jackson & Schuler, 1992). Personnel organizational behaviors that have a positive impact on the organization are referred to as desired or needed behaviors (Kessler, 2013). In organizations, role behaviors are the recurring patterns of

actions that are considered necessary for effective functioning in that particular role and that particular organization (Biddle, 1986).

The behavioral perspective of HRM establishes that the behavior and organizational management of personnel is one of the most significant indicators of the effectiveness of an organization (Kessler, 2013). RT grounded in the behavioral perspective of HRM systems is a critical viewpoint, as it may explain differences in how organizations manage employee performance (Kessler, 2013). Naylor et al. (2013) proposed that the role behavior theory perspective offers valuable observations to describe and understand inter-organizational gaps in HRM practices and the impact these have on organizational behavior. This perspective is founded on two fundamental assumptions: (i) definition, dissemination, and reward of desired role behaviors are primary functions of HRM, and (ii) desired role behaviors are a function of organizational characteristics.

Regardless of the setting or roles one plays, whether a partner, spouse, a parent, an office worker, an administrator/manager, roles are important because they guide individuals in fulfilling their functions and responsibilities. Furthermore, roles are also context specific (Agut et al., 2003; Capaldo et al., 2006). Someone can be a parent when situated within a family structure, but the same person can play one role in one social context and another role in another context. However, no matter what roles an individual plays, institutions cannot function without them (Biddle, 1986; Katz & Kahn, 1978). Roles provide the link between individuals and organizations. The links serve to organize the individuals' functions and responsibilities within an organization.

### *Application of Role Theory Within Organizations*

Applying the concept of RT to postsecondary institutions presumes that faculty and staff performance are significant indicators of a college's ability to meet their mission of student success. Moreover, the behavioral perspective of HRM assumes that colleges must have an appropriate external environment and internal organizational conditions such as: (i) established HR systems (policies and practices); (ii) desired behaviors to meet performance criteria and organizational expectations; and (iii) stakeholder responses to observe the perspectives of others involved (Jackson, 2013). This concept is instrumental in managing employee behavior and job performance to maximize the effectiveness of employees in meeting the mission of the institution. Furthermore, organizational leaders and human resources offices must work to clearly outlined organizational goals and objectives to ensure personnel is clear on what they are working to accomplish in as a part of the institution (Kessler, 2013).

Given the major strategic transformation that the CCCs are going through to meet the State of California's student success goals, and Jackson's (2013) observation that "different strategies require different role behaviors from employees in order for those strategies to be implemented successfully" (p. 1), the study of student affairs professionals role supports the correlation between meeting the outcomes of the organization and measuring how personnel in an organization assist in meeting those outcomes (Jackson & Schuler, 1992). At large, the concept of RT in community college student success seeks to observe the effect of student affairs professionals' role within the organization and how their role could positively guide students through to completion of educational goals.

In a private-sector example of RT, Carpenter and Lertpratchya (2016) examined knowledge workers, their competence, and roles in organizations. This qualitative research study

focused on social media (communicators) in the digital age and their role in small and large organizations. The researchers defined social media communicators as organizational representatives who engage the public and publishes information on behalf of an organization on social media platforms (e.g., Facebook, Twitter, and YouTube). These positions are unique in that the role may have inconsistent or unclear expectations (role ambiguity) across many stakeholders inside and outside the organization. Their research study used RT and different research methods to measure their research constructs. Carpenter and Lertpratchya (2016) used semi-structured interviews to examine individuals in these positions, how they interacted with leadership, and how they integrated within an organization and its culture. They examined job responsibilities, organizational roles, and inquired about role conflict and ambiguity and work-life balance. Using a quantitative survey of social media communicators who are active in the profession, they emailed 416 professionals and received 126 responses (30.3% response). The respondents were diverse and experienced in social media. Carpenter and Lertpratchya (2016) created an internal survey instrument to inquire about how professionals teach themselves best practices for social media. Finally, they created a social media index of the interviews to report how the respondents instructed themselves about social media practices. The findings include: (i) social media communicators did not experience role conflict and role ambiguity; (ii) there is a declining role of organizational leadership playing a role in an employee's identity, career advancement, and occupational knowledge; and (iii) individual workers need to continually learn and share their expertise to manage their role ambiguity.

In summary, roles are useful since they function as blueprints to guide an individual's actions and behaviors. In ORT, roles were viewed as stable, static, and unchanging—not only to foster effective functioning of the social position, but also for the preservation of the norms and



traditions. While this perspective was prevalent until the mid-1970s, an alternative view emerged claiming that roles are not fixed, given the changing phenomena and interactions within the social structure (Biddle, 1986). Within a symbolic-interactionist perspective, Mead (1934) asserted that roles evolve through social interaction with others and that within an organization; they can be dynamic, as individuals make constant negotiations. While norms and expectations are associated with a social position, Biddle (1986) argued succinctly that they are, “merely a set of broad imperatives within which the details of roles can be worked out” (p. 71). The following section will provide a review of the following: competency mapping, definitions of competencies, types of competency models, competency studies on student affairs professionals, and their roles in supporting student success in colleges and institutions of higher learning.

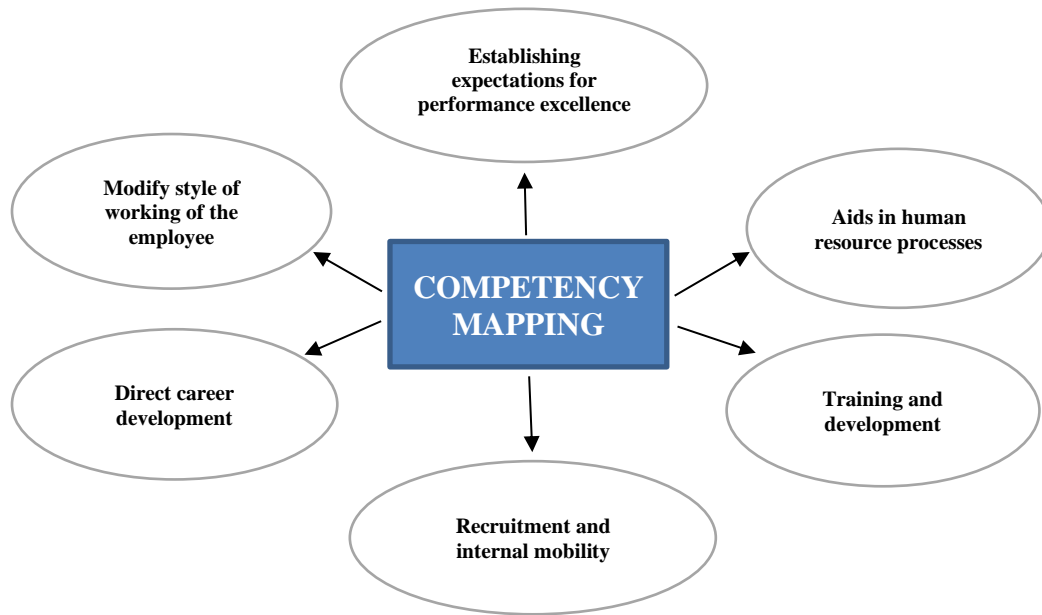
### **Competency Mapping**

While roles are useful inasmuch as they provide links between individuals and organizations, it is also critical that key competencies for those roles are identified for organizations to function smoothly and effectively. This process is referred to as *competency mapping*. The use of CM in any organization offers certain benefits particularly in the area of recruitment, evaluation, and training. Chandekar and Khatod (2015, as cited in Bhasin & Sharms, 2018) indicated that human resources use this process to help organizations in the selection of internal and external applicants who are fit for the job, as well as for appraising the performance of the employees. Competency mapping also helps administrators gain insights into the gap between the employee’s performance and expectations. The gap obtained from this process can assist both employees and organizations identify training interventions and professional development needs for employees in order to address the gap (Patel, 2014; Velayudhan & Maran, 2009). Lastly, competency mapping is also useful in monitoring labor planning,

particularly in directing employees' career pathways, as well as in understanding how career developments for employees are maximized (Yuvaraj, 2011). Figure 1 illustrates the benefits of competency mapping for organizations.

**Figure 1**

*Uses of Competency Mapping*



*Note.* From *Importance and Usage of Competency Mapping for Corporates*, by StrengthScape, n.d., (<https://strengthscape.com/importance-and-usage-of-competency-mapping-for-corporates/>).

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***Competencies***

Today, organizations recruit, train, and retain employees with specific skills sets and competencies to perform the job tasks optimally and to support the organization in achieving its goals. There have been many iterations of identifying which competencies are necessary for particular jobs. At the same time, organizations are also transforming their approach to include emerging and more relevant competencies that address new skills, new organizational roles, and

professional development needs. Adapting to these changes is necessary in supporting the objectives and strategies to be innovative and competitive in today's global environment (International Atomic Energy Agency [IAEA], 2015).

The term competency first appeared in the literature in 1953, through the work of David McClelland, a professor of psychology at Harvard University and a leader in American management theory. He was the first to distinguish the traditional aptitude and knowledge from the personal characteristics referred to as "competence" (Vazirani, 2010). McClelland (1973) asserted that these underlying and enduring personal characteristics, and not academic aptitude and knowledge, are the best predictors of on-the-job performance. McClelland was also credited for developing the concept of competency model which provides organizations with a visual representation and understanding visible knowledge, skills, and hidden traits (e.g., social role, self-image, personality, and motivations) that drive employees to excellent work performance (Yuan et al., 2011).

The terms *competence* and *competency* are fraught with confusing definitions. The English dictionary defines *competence* as the state of being suitably sufficient or fit, while the word *competency* refers to the suitability of the person in reference to his or her job (Vazirani, 2010). Page and Wilson (1994) provided a compelling definition of competencies, after reviewing more than 300 articles on competency studies: "the skills, abilities, and personal characteristics required by an 'effective' or 'good' manager" (p. 12). This definition is significant because it incorporates both knowledge and skills (directly observable and testable competencies) and personal characteristics (less observable and testable competencies). Boyatzis (1982) and Spencer and Spencer (1993) likewise offered a comprehensive definition of competencies by including five key concepts: knowledge, skill, self-concepts/values, traits, and

motives. Vazirani (2010) provided the definition of each of the five concepts as follows: (i) *knowledge* refers to the information and learning resting in a person; (ii) *skills* refer to a person's ability to perform a certain task; (iii) *self-concepts and values* refer to a person's attitudes, values, and self-image; (iv) *traits* refer to the physical characteristics and consistent responses to situations or information; and (v) *motives* are emotions, desires, physiological needs or similar impulses that prompt action.

### **Competency Models**

The mapping of the competencies required to perform a specific role within an organization, or an industry is formalized in a competency model. According to Hoge et al. (2005), a competency model is a framework in which an organization defines the sets of competencies required for the effective performance of a specific job. Others define a competency model as a descriptive tool or a behavioral job description that defines the competencies required to operate in a particular role within an occupation, organization, or industry (Fogg, 1999). In short, a competency model represents a collection of competencies organized into categories that are relevant to an organization. But regardless of the type of organization or industry, a competency model should contain the "key" or "core" competencies considered essential for all workers.

### ***Types of Competency Models***

Due to the complexity and diversity of roles, different competency models have been developed. Among the most prominent of these models are the organizational core competency model, functional competency model, job competency model, and leadership competency model. Organizational core competency model outlines the overall design of the organization as well as the functions (i.e., job roles) within that organization. In this model, the role of the human

resources manager is critical in the healthy functioning of the organization (Society for Human Resources Management, 2012). In particular, the human resources manager oversees the organization in three fundamental phases: (i) developing and implementing the job functions, (ii) measuring the validity or effectiveness of job functions, and (iii) the validation of the criterion of job functions.

A functional competency model specifically emphasizes job-related competencies, particularly those skills and attributes an employee should possess to assist the organization in meeting its goals and objectives. According to Root (2018), these skills and attributes are specific behaviors the employees possess or are in the process of developing (professional growth or development plans) to allow them to succeed in their organizational role. More importantly, job-related skills in the functional competency model are different from those outlined in a job description. Job descriptions typically outline the functions of the job to be performed and the knowledge and abilities to perform them. The functional competency model analyzes actual employee behaviors in the position. In a functional competency model, there is also an expectation for organizational processes and procedures to be aligned with employees meeting the expectations of the role and organization. This alignment occurs when human resources offices deliver clear expectations for all stakeholders within an organization by ensuring that the mission, vision, and goals of the organization are clearly communicated with all stakeholders. In addition, in a functional competency model, the human resources office not only helps describe the competencies need for each job function but also provide opportunities for growth and development.

A job competency model, which is the most common of the competency models, views all positions as a single job. This model is developed by conducting an extensive collection of

information related to the position, including questionnaire of employees, supervisors, and peers of skills, knowledge, behaviors, and abilities. In addition, the model also uses focus group discussions to gather information from the aforementioned groups. The data are then analyzed to determine a set of common job traits that are required for a given job position (Mansfield, 1996). The strength of this method is that it enables organizations to learn key job requirements and position outcomes. The drawback of this process is that it is time-consuming and costly, which can be burdensome for some organizations.

Last of the most common competency models is the leadership competency model. As the name suggests, this model is focused on the competencies that organizational leaders should possess. Williams (2017) suggested that the trust and respect for employees, as well as the level of emotional and social competencies that leaders hold, is positively correlated with organization efficiency and capacity. The strength of this model is that leaders are viewed as organization-focused because when well-defined competencies influence the knowledge and view of leadership executives in the organization (Hollenbeck et al., 2006). The weakness of this model is that there is minimal research indicating that the leader is the singular reason for increasing trusting relationships and organizational capacity. Likewise, this model does not account for the motivation and commitment each employee brings to the organization by their own drive and determination. The following section provides a review of competency studies relating to student affairs professionals.

### ***Competency Studies on Student Affairs Professionals***

Gansemer-Topf and Ryder (2017) examined the ACPA and NASPA competencies created for student affairs professionals in 2010 (and revised in 2015), which pertains to recruitment, performance, and development of professionals on college campuses. The

researchers indicated that while the competencies are relatively current and are still being adopted by college campuses, there is, however, little information known about the actual alignment of the student affairs competencies with the daily work and skills required of student affairs professionals. To address their research questions, the researchers used qualitative research method (i.e., interpretivist framework) to interview 17 mid-level professionals. The researchers employed semi-structured interviews of professionals from two-year and four-year public institutions across functional departments (e.g., admissions, counseling, disability services, financial aid, residence life, student leadership, multicultural, judicial affairs, dean of students, and campus recreation). The researchers interviewed professionals who had a minimum of three years' experience as full-time student affairs professionals (with a master's degree required) and supervision of an entry-level professional during recruitment. The interview inquired mid-level supervisors and professionals about their perceptions of the competencies needed for effective student affairs professional who are entry-level employees.

Gansemer-Topf and Ryder (2017) indicated how the supervisors described a number of knowledge and skills necessary for entry-level professionals including communication, interest in working with students, collaboration, advising skills, awareness of organizational culture and policies, professionalism, multicultural and diversity, and assessments. In addition, several themes came forward from the research participants (e.g., supervisor interviews) including an emphasis on: (i) broader skills versus specific skills in the field of student affairs; (ii) an approach to work competencies; (iii) the importance of understanding context; (iv) the ability to adapt to diverse audiences; (v) knowledge of assessment; and (vi) the ability to know and apply content. The researchers concluded that there is alignment between the knowledge and skills needed for student professionals and the 2015 student affairs competencies. However, they noted

that the supervisors did not mention the importance of historical knowledge in terms of values, philosophy, and history of student affairs practice. The researchers recommended implications for practice including how the competencies can be helpful in outlining expectations for new student affairs staff and assist in the individualization of professional development plans. For preparation of future student affairs professionals, the researchers recommend that graduate programs integrate not only the 10 student affairs competencies, but also include coursework and experience in assessment, research, and evaluation into the curriculum. The researchers noted alignment and discrepancies for administrators, staff, and campus constituents to consider.

In another study, Reynolds (2011) conducted research to identify the knowledge and skills needed by student affairs professionals to help college students effectively. The purpose of the study was to increase awareness of the core helping skills for student affairs professionals and their daily work, through inquiry and perceptions of student affairs practitioners. Consequently, their research was intended to inform graduate schools of the preparation and training needed for new student affairs professionals and to help college campuses enhance their opportunities for professional development. Reynolds utilized the Delphi study approach (multiple rounds of questionnaires) to narrow and identify core themes about effective core skills for student affairs professionals. The multiple rounds consisted of (i) an open-ended questionnaire, (ii) aggregate skills and order-rank, and (iii) final order-rank of skills. Of the total of 3,700 members of the ACPA, 460 entry-level and mid-level administrators responded to the initial round of study. Then a total of 159 professionals responded to all three rounds of questionnaires and reported mean scores and standard deviations for each area (22 total). The researcher concluded that participants identified broad list of skills from 22 areas of essential knowledge, information, core helping skills (e.g., listening, reframing, and attending behaviors),



and advanced helping skills (e.g., crisis intervention and conflict mediation). Reynolds (2011) concluded that it is essential for student affairs professional to enhance and expand their helping skills to be effective in the student affairs profession. The author recommended curriculum enhancement for graduate curriculum and on the job training and professional development opportunities for practitioners on college campuses.

Menke et al. (2018) identified competencies for entry-level academic advisors. The researchers described the evolution of college practices for academic advising by faculty and staff professionals, which included a diversity of skills, experience, backgrounds, and theoretical frameworks. To help mitigate the broad and diverse skills in academic advising, in 2016, the National Academic Advising Association (NACADA) and Council for the Advancement of Standards in Higher Education (CAS) created guiding principles for the academic advising profession. The standards included: organization and leadership; ethics; legal concerns; diversity; equity and access; internal and external relations; financial resources; technology; facility; and equipment and assessment. For this study, the researchers wanted to develop a consensus of core competencies for entry-level academic advisors. The researchers used the Delphi method by Burkard et al. (2005), which uses a multistep questionnaire to obtain responses from experts and gain consensus of essential skills for academic advisors. This method is useful because of its anonymity and to reach a large audience across a large geographic area. The researchers sent their surveys to 500 participants with 5 years or more experience working in the field. The researchers used a series of three instruments to elicit responses about essential competencies and yielded a 30% completion rate from 57 participants who completed all three rounds of questionnaires. For the first survey, participants listed competencies for entry-level advisors. For the second survey, a summary list from the first survey was sent and participants were asked to

rank-order the top competencies. For the third survey, participants were asked to review the rank-order list summary and make any changes. The researchers identified several problems finding consensus on the ratings from all the questionnaires. The researchers found three competencies that appeared most often: communication, listening, and interpersonal skills. The other competencies were worth noting (e.g., curriculum knowledge, time management, critical thinking, policies, patience, detailed oriented, etc.), but were not as mentioned as the top three. The researchers concluded that the skills for professionals in academic advising are broad and there is a need to devise a core set of competencies. Whether through campus professionals, administrators, or professional associations (NACADA and CAS), there is a need for continued research to determine effective competencies for the profession (Burkard et al., 2005).

Fiddler and Alicea (1996) also examined competencies among faculty and staff who provided academic advising in a single school within a college campus. The purpose of the study was to gain an understanding of the advising competencies include skills, knowledge, attitudes, and values. Research was conducted in the School for New Learning, which is one of eight colleges in DePaul University located in Chicago, Illinois. The researchers selected a school within a college campus due to the multiple and required advising interactions for the academic discipline. Also, the researchers wanted to compile a set of competencies to use across other schools on its campus. The researchers used a storytelling methodology to extract information about advising competencies from faculty and professional staff. This method allows participants to engage in a dialogue, reflect on the practice, and have a formal process toward developing a set of competencies. Participants were asked to draft personal stories about advising and to create a list of behaviors, skills, and attitudes for advising competencies (108 statements). In addition, 35 faculty and staff participants met in a workshop and were asked to work in small groups to

identify and refine the competencies listed. The outcomes of this storytelling research method helped the school create a list of competencies to share with the university. The competencies identified included: (i) communicating and counseling; (ii) planning and organizing; (iii) assessment; (iv) teaching and learning or facilitating learning; and (v) professional values, ethics, and development. Table 1 provides a detailed description of these five competencies.

**Table 1**

*Descriptions of the Five Competencies Reported in Fiddle and Alicea's Study*

Competencies	Descriptions
Communicating and Counseling	Skills that can establish and sustain rapport and trust with students, facilitate advising relationship, communicate programs, policies, and criteria for the assessment of learning and the performance requirements, draw on a variety of listening, verbal and nonverbal strategies to counsel and communicate with the students in a variety of contexts.
Planning and Organizing	Skills that can enhance abilities to maintain contacts, communication, accessibility to student to meet their needs; familiar with institutional policies and services relevant to student learning and professional needs and aspirations; maintain accurate, current, useful notes and records of students' progress.
Assessment	Skills that involve interpreting and evaluating data and information gained through both records and interactions with learner; emphasis is placed on promoting partnership between the learner and advisor through assessment strategies that engender students in making choices and managing their learning.
Teaching and Learning	Skills that can promote developmental learning, apply principles of experiential learning and learning-centered practices to motivate students and assist them in their goal setting, mediate student learning by reinforcing success, assist in the selection of learning experiences consistent with the learner goals, styles, interests, and program requirements, serve as a partner in learning.
Professional Values, Ethics, and Development	Skills than can articulate and act in congruence with the philosophical and ethical framework for advising, assess one's advising capabilities and limitations as a basis for decision making and can articulate one's attitudes, values, and biases with respect to diversity.

The researchers concluded that the competencies may be used to expand advisor awareness, advisor responsibility for their own role and performance, provide a framework for

professional development, review performance or credentials of new hires, and help with further research efforts to inquire about advising issues and skills.

From the review of studies that examined the competencies of student affairs professionals, two broad competencies emerged: (i) competencies related to personal qualities; which include the skill or ability to communicate effectively both oral and written; the ability to ask questions, think critically, listen, problem solve, manage time, and organize tasks; and (ii) competencies related to human relations, which include the skill or ability to work with students, to provide advice and counseling, to promote collaboration and team work, to understand the organizational culture and policies, and to exhibit multicultural competency. Other less popular competencies that were reported also include knowledge of assessment and research, knowledge of crisis management and conflict-mediation, and knowledge technology and budget management. The following section provides a brief history of student affairs profession, as well as a review of the studies on SST as it relates to the work of student affairs professionals.

## **Student Affairs Professionals and Social Support Theory**

### ***A Brief History of Student Affairs and Student Services Professionals***

The history and role of student affairs professionals in education has evolved to work in conjunction with academic curriculum to support students' sense of belonging, persistence, and completion of their educational goals. According to Long (2012), the work of student affairs professionals first began during the colonial area and the earliest years of higher education in America. During this period, colleges and universities adopted the doctrine of *in loco parentis* (Latin for "in place of the parent"), which provided college institutions the power to monitor student progress and learning through governing rules, accepted conduct and behaviors, and rules. Long goes on to explain that in 1937, the American Council on Education published the

*Student Personnel Point of View*, which emphasized a holistic approach to student development. This approach brought to the forefront the idea of student's intellect, spirit, personality and the unique needs and experiences of the students as contributors to learning. The shift from monitoring student behavior to focusing on the total development of the students has supported the work of student affairs professionals to gain a wide recognition and acceptance in educational setting. The emergence of student development theories in the 1960s and 1970s spurred another evolution in the work of student affairs professionals including the areas of education, psychology, and sociology. These development theories included Kohlberg's Theory of Moral Development (Kohlberg, 1984) and William Perry's Intellectual and Ethical Development (Perry, 1970). Followed by a new wave of psychosocial and identity theories that examined students' identity with the likes of Arthur Chickering's *Seven Vectors of Student Development* and Nancy Schlossberg's *Transition Theory*—among others—all of which supported the student affairs professional to understand how students think and behave (Long, 2012).

The 1980s and 1990s also brought forth another change as the student affairs profession began to be integrated with the faculty and instruction. The change was evident in the expansion of the focus of student affairs services with the provision of support for first-generation students, underrepresented minorities, veterans, and other diverse populations. In the 2000s and beyond, with the advent of globalization and free trade, institutions of higher learning began to see a large influx of international students attending U.S. college campuses. These changes necessitated colleges to broaden the functions of student affairs professionals by helping students from foreign countries. Furthermore, student affairs professionals have started adopting additional core values (e.g., caring, counseling, community development, social justice, and career exploration) to help them in serving students in a more holistic way. Lastly, the college

campuses have also made unique strides in improving their services particularly in the areas of admissions, enrollment management, career services, community service, service learning, disability services, Greek affairs, housing and residential services, health and counseling services, leadership programs, multicultural services, orientation and new student programs, recreation and fitness, and student activities (Long, 2012).

In 2010 and later in 2015, the ACPA and the NASPA developed professional competencies to assist the staff in their own professional development in the field of student services (ACPA & NASPA, 2015). The initial work started in 2009, when the ACPA and NASPA created a joint task force on professional competencies and standards to develop a set of professional competencies that define the broad knowledge, skills, and attitudes required and expected of professionals working in student affairs. The work culminated with the publication of the document on July 24, 2010 and a revision of the document in 2015. In particular, these two prominent organizations came up with a list of necessary competencies, which include: (i) advising and supporting; (ii) student learning and development; (iii) technology; (iv) social justice and inclusion; (v) assessment, evaluation, and research; (vi) law, policy, and governance; (vii) leadership; (viii) organizational and human resources; (ix) personal and ethical foundations; and (x) values, philosophy, and history. These organizations indicated that the purpose of these competencies is “to set out the scope and content of professional competencies required of student affairs educators in order for them to succeed within the current higher educational environment” (ACPA & NASPA, 2015, p. 7), as well to guide the student affairs professionals in making an impact on student success.

### *Social Support Theory*

Findings from research over the last 10 years highlights vast differences in students' experiences in college transition, including: socioeconomic background, elements of college costs, financial resources, academic preparedness, aspirations, and knowledge of the college environment (Bloom, 2008). Given the significance of the transition for students to the college environment, particularly students from minority and low socio-economic backgrounds, a lot of research has centered on the role of SST (Baldwin et al., 2003; Capizzi et al., 2017; Coleman, 1994; Savitz-Romer et al., 2009; Stanton-Salazar, 2011; Taylor, 2011; House et al., 1988).

The concept of SST, as it applies to college success, asserts that college personnel have a direct impact on student college success because they serve as critical access points to resources and information needed to navigate the college environment (Capizzi et al., 2017). The role of student affairs professionals, such as the SSS, is critical due to the growing diversity of students in community colleges, not only in terms of race and ethnicity but also in age, enrollment status, and academic preparation. As shown by research, students in community colleges are often academically unprepared for college-level coursework, while at the same time they also struggle to balance family, work, and academic responsibilities (Nora & Cabrera, 1996).

An approach that has been utilized to address these challenges is to improve the role of SSS in assisting these groups of students. This assistance can be informational, instrumental, relational, or emotional. These types of assistance are generally noted as social support (House et al., 1988; Taylor, 2011). Researchers define social support as the awareness or understanding that one is loved, valued, cared for, supported by others, and experiencing a sense of belonging (Taylor, 2011; Wills, 1991). In academic settings, social support could be in the form of academic and nonacademic support, offering the students the opportunities to achieve their goals

regardless of their socio-economic status and educational experiences (Savitz-Romer et al., 2009).

Research suggests a strong correlation between a student connectedness with school personnel and educational goals—particularly completion rates (Coleman, 1994). Stanton-Salazar (2011) also supported this finding asserting that the relationship between college personnel and college students has a direct positive impact on a students' grades and career focused outlook. For many first-generation, low-income and minority students, their ability to acquire these connections with college personnel are oftentimes difficult. This is due to a broad scope of reasons, from students not knowing which questions to ask when they arrive on a college campus to a fear of not appearing competent in an environment where students equate asking questions with not appearing competent. For students who feel disengaged and disconnected from college environments, data suggest this is a predominant factor impacting their ability to complete their educational goals. For this reason, faculty and staff play a critical role in addressing students' needs on campus. Specifically, college personnel can make this connection with students by reaching out to students early in their college matriculation, establishing a relationship with students who typically do not seek guidance, assist students in identifying and building their social, emotional, academic and personal strengths, assist students in establishing a campus based support network, and guiding students in developing a sense of purpose not only academically but personally as they are at a critical time of personal growth (Capizzi et al., 2017). This approach is designed to ensure the college is a “home away from home” type of environment, a space where a student feels completely comfortable to engage in their academic work as well as in social and cultural connection or activities.



Although Tinto's work (1975) did not focus on the role of student affairs professional in student retention, he nevertheless provided a broad theoretical framework that examined why students persist in college. Tinto's central idea is that student persistence is dependent on their degree of academic and social integration. Broadly he posited that students drop out of college when they experience difficulties in their academic studies, unresolved educational and occupational goals, and lack of integration in the academic and social life at the university. These difficulties often result when students' goals and expectations do not match with their colleges' goals. For this reason, he recommended five conditions to promote persistence, namely: (i) expectations, (ii) support, (iii) feedback, (iv) involvement, and (v) learning. According to Tinto (1975), high expectations are a condition of success, and students are more likely to persist and graduate when they are provided with academic, social, and personal support. In addition, the use of feedback such as early warning systems and frequent assessments and evaluation on student performance can also provide important information that support student performance. The quality of involvement and contact with faculty, staff, and other students in the institution is another predictor of persistence. Lastly, institutions that foster a community that educate their students and actively involve them in their learning are likewise more likely to persist and graduate in college.

The role of SSS and other positions providing academic advising and student support cannot be overemphasized. Research has shown that student affairs professionals and academic advisors influence student success in a variety of ways including persistence in college, strengthening career and educational aspirations, development of academic skills, as well as improving their overall experience in college (Bahr, 2008; Donaldson et al., 2016; Drake, 2011; Kuh, 2006; Light, 2001; Pascarella & Terenzini, 2005; Strage et al., 2002; Tinto, 1975). In their

qualitative, single-case study, Donaldson et al. (2016) conducted in-depth interviews of 12 first-time college students at a large, urban community college in Texas. All these students were part of the Intrusive Advising Program, which requires students to meet with their assigned advisor twice every semester: before and after the midpoint of the semester.

Their findings indicated that many of the students expressed that advising encouraged them not only in participating in degree planning, but also in seeking out individualized support and guidance, and in building a relationship with their advisors. In fact, all of the students who participated in the study highlighted their positive opinions about the role of their academic advisor, particularly in the area of degree planning such as reviewing and registering for required courses, obtaining information about transfer requirements, as well as participating in career explorations. Furthermore, the authors also noted that advising afforded the students the time and opportunity to ask their advisor specific questions related to their learning and interests.

The benefit of establishing a solid relationship between the student and his or her academic advisor is well documented. Drake (2011) asserted that “good academic advising also provides perhaps the only opportunity for all students to develop a personal, consistent relationship with someone in the institution who cares about them” (p. 10). When students develop a meaningful relationship with their teachers or academic advisors, they can have a positive experience in college, and frequently, they become more academically successful. In his well-cited work published in the *Review of Educational Research*, Tinto (1975) succinctly described that student-advisor relationships could be enhanced through informal interactions and extra-curricular activities with college nonacademic and academic personnel. These interactions often translate into social and educational support that benefits the students. Also, when institutions provide advising that is focused on supporting student’s academic, social, and

personal experiences to help them navigate college—instead of just administrative and clerical support—students are more likely to persist and succeed (Cuseo, 2003; Kuh, 2006; Pascarella & Terenzini, 2005).

Several studies have also identified the impact of social support on student outcomes. For example, a study conducted by Baldwin et al. (2003) involved 106 African American college students. The authors found that when students perceived they have social support, they were significantly less academically stressed, and as a result, were more successful in achieving their academic goals and persisting. Hefner and Eisenberg (2009) conducted a study that examined the relationship between mental health and social support in a large public university involving 1,378 students. The authors reported that racial minority and low socioeconomic status students were found to be at a higher risk of social isolation. More importantly, they found that students who scored low on the quality of social support, as measured by the Multidimensional Scale of Perceived Support (Zimet et al., 1988), were more likely to experience mental health problems. In a study by Tovar (2015), the researcher utilized Bourdieu's social capital theory (1986) to examine the impact of institutional agents, such as faculty and counselors, and student support programs on the success of Latinos/as at a community college. The data were collected at a large, urban community college in California. A total of 397 Latino/a students in their second semester of college and beyond participated in the study. Using a linear regression analysis, the researcher found that that there was a small but significant impact of support programs and interactions of institutional agents on the Latino/a students' success. The author, however, recommended that faculty and counselors in community colleges should promote more intentional interactions in order to engage Latino/a students and support their success.

In sum, research showed that the student affairs professionals, such as the SSS, play a critical role in supporting student success. This occurs because they provide various support, including: (i) informational support, which help students navigate through different aspects of college life such as registration or matriculation, orientation, career explorations, and transfer requirements; (ii) instrumental support, which include memberships in campus-based academic, and nonacademic networks; and (iii) relational and emotional support, which include guidance and counseling that help them identify and build social, emotional, and personal strengths. When students receive all these types of support, students thrive and persist in college. And when they persist, their overall experience improves, which includes better grades, higher completion and graduation rates, and improved student well-being.

### **STEM Bridge Programs**

As reported by Mejia et al. (2016), many of the students entering community colleges are academically unprepared for college, particularly those students coming from low-income families with Hispanic and African American ethnic backgrounds. As a result, less than a quarter (23%) of these students earn a degree in STEM. STEM bridge programs were developed to address this problem by providing the students with support services that help them acquire the necessary academic skills to be successful in college. For instance, at Rice University, a summer bridge program funded by the National Science Foundation (NSF) was created to assist students from underprepared and low socioeconomic backgrounds, interested in STEM coursework, with their advanced math (calculus) course requirement. To assess the effectiveness of the program named as the Rice Emerging Scholars bridge program (RESP), Bradford et al. (2019) compared participant students' performance with the nonbridge students, which served as the control group. A total of 1,276 math students participated in the study for the first semester 1,697 math

students for the second semester. Their findings indicated that the program had a significant impact on the students' math performance, particularly for those enrolled in the second semester. The authors concluded the RESP program was successful in exposing STEM students to math content by providing intensive academic and peer support compared to nonbridge students.

In examining the role of learning communities in a STEM program, Xu et al. (2018) conducted a study to determine the effects of a first-year learning community at large Hispanic-serving four-year university, the University of California, Irvine. Freshmen biology students participated in this learning community called Enhanced Academic Success Experience (EASE) initiative. The program formed two groups of 30 students one in a lecture environment and another group where the students were connected to a senior bio-science major that offered mentoring academic and social support. The authors found that the academic outcomes and psychosocial benefits of the EASE were more evident for those students that received mentoring and social support compared to those students placed in the lecture environment. For this reason, the authors recommended combining both the learning community and mentoring to support the students better.

At Wesley College, a minority-serving and liberal arts institution, D'Souza et al. (2016) examined the impact of the newly designed introductory and upper-division level STEM coursework. In this program, the faculty, and administrators intentionally integrated student-oriented interventions to assist with academic learning, retention, persistence, and scholarship access for the STEM majors. These student services interventions included learning communities, mentoring groups, social events with faculty advisors, workshops and seminars from professionals and experts, academic leadership training. D'Souza et al. (2016) concluded that the results were mixed for course withdrawals, completion grades, and student overall

satisfaction regarding the new course curriculum and sequence. However, the retention rates for freshman to sophomore reported a tremendous increase from 45% averaged across academic years 2009 through 2012 to 52% during the trial year in 2013, then to 55% during the full implementation year in 2014. Given the remarkable improvement in the retention rates, the authors concluded that Wesley College students benefited from the curriculum reform, active learning pedagogies, and student services interventions.

Lastly, Ashley et al. (2017) conducted a systematic review of 30 STEM bridge programs, which is designed as a multiweek experience to help students transition into college and to improve their academic success. In this meta-analysis, the authors conducted review of published articles and non-peer reviewed literature (e.g., conference presentations/papers, dissertations, etc.). In their review, the researchers noted several iterations of design for STEM programs, including first-year college or transfer programs and were facilitated as either boot camps, summer programs, or college prep programs before the academic year begins. From more than 46 publications, the authors summarized each STEM bridge program in a table based on program characteristics, such as two-year institutions, four-year institutions, student populations, and program length. The researchers also created another table reporting program goals, academic success goals, psychosocial goals, and department goals. The researchers reported unique program goals depending on source of funding. More importantly, the authors reported many of the STEM bridge programs supported students' academic goals particularly in the areas relating to math remediation, provided foundational knowledge of STEM fields, improved research participation, maximize student grades, improved retention, and increase graduation rates. In terms of the psychosocial program goals, the authors reported that bridge programs helped improved student sense of belonging, student self-efficacy and preparedness, interest in STEM

majors, and that these programs provided an environment for networking with faculty and students. In terms of departmental goals, the researchers reported the programs also helped increase the diversity and the number of students in STEM majors.

From the review of studies that examined the impact of bridge programs in STEM education, it was evident that students who are provided with support—be it in the form of a membership, participation in a learning community, mentoring group, peer support, social events, workshops and seminars, intensive academic curriculum, or boot camps—report improved academic (e.g., grades, completions, retention, etc.) and nonacademic (sense of belonging, self-efficacy, and preparedness) outcomes. These findings provide a compelling justification why bridge programs are vital in helping students in community colleges and universities achieve their academic goals.

### **Summary**

Reports from the CCCCCO (2016) showed a consistent pattern of academic unpreparedness among students entering colleges. For this reason, colleges and institutions of higher learning have instituted initiatives and programs to support their academic goals. Among them is the California STEM Core Network, whose major goal is to support community colleges and industries, develop a STEM Core curriculum to increase the number and diversity of students in STEM education and eventually into STEM careers. An essential component to the success of this initiative is the academic and nonacademic personnel or the student affairs professionals that work in this program to support the needs of the students. These professionals are referred to as the SSS.

In the context of this study, the concept of RT and ORT was used to provide a general framework for the analysis of the SSSs' roles and functions. Then, these roles and functions were

mapped into a competency model in order to determine whether the SSS professionals have the required and necessary knowledge, skills, abilities, and traits to perform such role. The practice of competency mapping is well documented as it offers organizations guidance in the recruitment, evaluation, labor management, and training. Several studies with the focus of identifying required competencies for student affairs professionals were examined to guide the study and the 2015 Professional Competencies for Student Affairs was used as a benchmark in determining the alignment of current and emerging skills needed in these roles, particularly in the field of STEM education.

To provide a compelling argument about the critical role of SSS, the concept of SST as it applies to college and student success was also explored. SST asserts that college personnel has a direct, positive impact on student college success because they serve as critical access points to resources and information needed to navigate the college environment (Capizzi et al., 2017). Finally, a review of STEM bridge programs and other similar interventions was conducted to understand the characteristics of STEM bridge programs and the competencies implemented by faculty and staff who work in these interventions. STEM programs have been the focus of a significant amount of national research, particularly as it relates to their ability to prepare students for a career in STEM industries (D'Souza et al., 2016). These programs also have received much attention for how they support the student in navigating the college experience.



### **Chapter 3: Research Method**

This chapter describes the research methodology that was used to address the research questions on to the role of SSS in the STEM Core Model. As described in Chapter 1, many of the established core competencies for student affairs professionals have been broad in scope and have not specifically addressed those skills required in STEM Core education. For these reasons, this study focused on the role of SSS within the STEM Core Model and the outputs associated with such role. In particular, I attempted to identify the required competencies that are needed to produce those outputs and whether those identified competencies align with the 2015 Professional Competencies for Student Affairs. Specifically, this section presents a description of the sample of participants, data collection, and analysis procedures.

#### **Research Model**

I used a Delphi method to examine the perceptions of professionals about the required competencies of SSS and similar student affairs professionals working in the STEM Core Model and the outputs associated with these competencies. The use of both qualitative and quantitative data collection in the Delphi is appropriate as it allows the researcher to gain an in-depth understanding of a phenomenon that cannot be achieved with the use of statistical procedures alone (Denzin & Lincoln, 2005; Maxwell, 2013). The primarily qualitative Delphi method is useful when the analysis involves the “nonnumerical examination and interpretation of observations for the purpose of discovering underlying meanings and patterns of relationships” (Babbie, 1983, p. 537).

The Delphi method has been used in studies that explored roles and work competencies (Allen et al., 2018; Burkard et al., 2005; Hyatt & Williams, 2011; Menke et al., 2018; Reynolds, 2011; Rothwell & Cookson, 1997; Williams, 2003). Two mathematicians at the RAND

corporation developed the Delphi method to gather the perspectives of a group of multidisciplinary experts on the likely outcomes of nuclear weapons usage in warfare on the United States (Dalkey & Helmer, 1963; Gordon & Helmer-Hirschberg, 1964). While the method was originally designed for military defense projects, the Delphi method gradually gained popularity in the academic sphere during the mid-1990s (Habibi et al., 2014) and has been used in cybersecurity, healthcare, education, strategic management, and trade and industry (Davidson & Hasledalen, 2014; Green, 2014; Keeney et al., 2011; Loo, 2002; Robmann et al., 2018).

Consistent with what it was originally developed for, the Delphi method is designed to solicit the most reliable opinions and judgements, generate a collective view and often a consensus of a topic that cannot be directly observed or measured. As Linstone and Turoff (2002) described:

Delphi may be characterized as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with complex issues. To accomplish this “structured communication” there is provided: some feedback of individual contribution of information and knowledge; some assessment of the group judgment or view; some opportunity for individuals to revise views; and some degree of anonymity for the individual responses. (p. 3)

There are several defining characteristics of the Delphi method that make it appropriate for this study as described by the authors in the preceding paragraph. Round 1 of the method often involves the selection of a panel of experts in order to acquire the most reliable opinions or judgments about a complex issue. In the Delphi method, the panel is configured with the participation of individuals who have knowledge and expertise on the topic being investigated. Since experts’ opinions are of prime importance, it is critical that the researcher employing this

method establish a set of criteria when choosing the eligible members of the Delphi panel. By following this protocol, the validity of the study results is then supported (Brooks, 1979).

Another important feature of the Delphi method is the use of questionnaires which also protect the anonymity of the participants (Yousef, 2007). This feature avoids some of the subtle social pressures that influence responses in a group interview, such as being influenced by a dominant panel member. Thus, by keeping the panel members anonymous, participants have more freedom to express their own judgments and opinions without due pressure or influence from other panel members. Furthermore, they are more likely to think through the questions and respond with high quality ideas (Delbecq et al., 1975). Avella (2016) also noted that in order to maintain privacy and confidentiality of the participants' responses, members of the panel primarily communicate with the researcher. This means that interaction between the panelists is mediated by the researcher.

In addition to the aforementioned features, the Delphi method also offers several benefits to researchers conducting role and competency studies. Beyond the time that the researcher and panel of experts spend on responding to the series of questionnaires, there are minimal costs associated with the study (Williams & Webb, 1994). The use of emails and other virtual means of communication has eliminated the geographical challenges faced by the researcher in interacting with the panel members who are separated across locations. This feature makes Delphi method immensely popular among applied researchers because "it allows experts to deal systematically with a complex problem or tasks" even "among a panel of geographically dispersed experts" (Ziglio, 1996, as cited in Williams, 2000, p. 20). More importantly, the ability of the panel members to share their expert opinions and judgments without having to meet in one geographical location also maintains their anonymity, which is an important factor in

contributing to the greater validity of the study results. Through a mechanism of controlled feedback, the panel members are free to express their views and opinion without being influenced by dominant members of the panel (Avella, 2016).

Although the Delphi method involves administration of a survey-like questionnaire, it is different from a survey method for several reasons. In a survey method, the questionnaire is administered to a group of respondents that may be randomly selected and the group is a representation of the population of interest. In contrast, in the Delphi method the respondents, referred to as Delphi panel, are not typically randomly selected. Rather, the panel members are chosen purposefully because they are experts in the field of the study being investigated. In a survey method, where probability sampling is applied to select the respondents, the goal of the research is to generalize the findings to a larger group of population, while in a Delphi method, where nonprobability sampling is used, the goal is to arrive at the best and the most reliable opinions about the research of interest.

Furthermore, the purpose of a Delphi method is not to make a statistical generalization, so a large sample size is not required. In quantitative research, statistical generalization is considered the gold standard for evaluating the quality of a study (Kerlinger & Lee, 2000; Shadish et al., 2002). However, in qualitative research *analytic generalizability* can be achieved if the qualitative researchers “develop conceptualizations of processes and human experiences through in-depth scrutiny and higher-order abstraction” (Polit & Beck, 2010, p. 1453). These authors further clarified that if the study has undergone a rigorous analysis that employs the use of confirmatory strategies to arrive at credible conclusions, generalizability of this kind is attainable in qualitative research. For this reason, in qualitative research like Delphi studies, the sample size is typically between 10 and 18 experts (Akins et al., 2005; Malone et al., 2005; Okoli

& Pawlowski, 2004; Somerville, 2007). In addition, the respondents in the survey method are always anonymous to each other and are often anonymous to the researcher. In the Delphi method, although the respondents are anonymous to each other, they are not anonymous to the researcher. Because Delphi studies need expert opinions, it is critical that the researcher has knowledge about the experts, their qualifications, and backgrounds. Furthermore, in any survey method, the richness of the data is often achieved based on the depth of the questionnaire and a possible follow-up interview. In contrast, in the Delphi method, the richness of the data is achieved not only from the elicited responses of the experts, but also from the multiple rounds of questionnaires and controlled feedback.

In summary, the use of Delphi method was appropriate for the current study because it addressed the qualitative nature of the research questions, thereby allowing the needed degree of exploration. Furthermore, the goal of the current study was to gather expert opinions on a complex topic without dealing with communication barriers and other issues related to one-on-one and group interviews, and such goal was achieved using Delphi method approach (Linstone & Turoff, 2002). The study's design, which involves the data collection procedures and instrumentation, also allowed for the use of the Delphi method, particularly in terms of the different phases that were undertaken to solicit the responses, beginning with the administration of a mixed-type questionnaire (closed and open-ended formats) and consensus-building. More importantly, there is an extensive body of literature documenting the use of the Delphi method in studies that examined the roles and competencies of professionals in education (Burkard et al., 2005; Hyatt & Williams, 2011; McLagan, 1989; Menke et al., 2018; Reynolds, 2011; Rothwell & Cookson, 1997; Williams, 2000, 2003).

## Participants

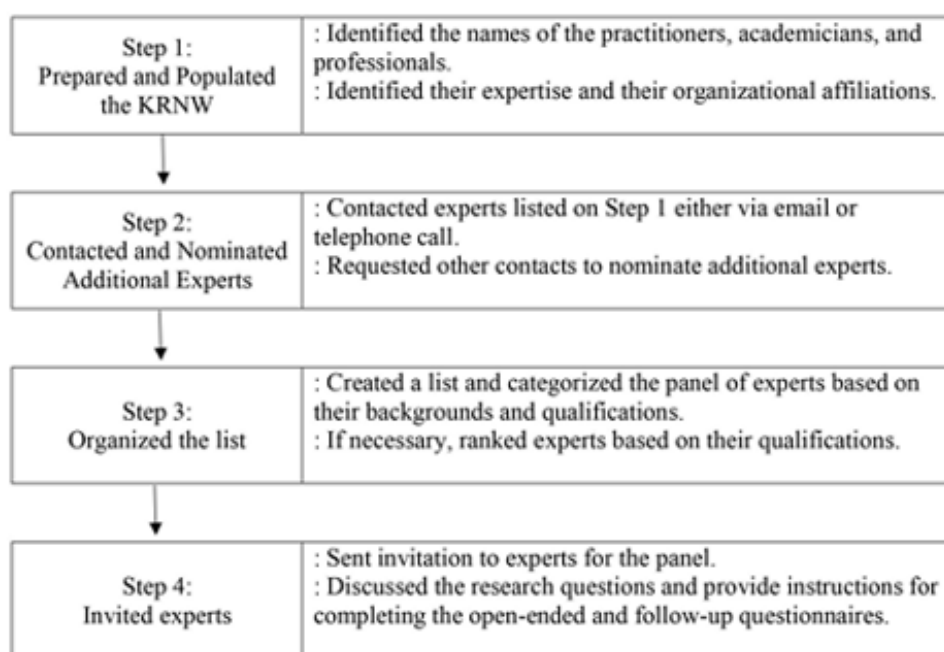
In selecting the members of the Delphi panel, researchers suggest that they should be “highly trained and competent within the specialized area of knowledge to the target issue” (Hsu & Sandford, 2007, p. 4). The process of selecting participants based on their expertise on the subject matter being investigated is often referred to as expert sampling (Etikan & Bala, 2017). Expert sampling is a nonprobability sampling method and was appropriately applied for this study because the members of the Delphi panel were selected based on their expertise on the subject under study. Selecting the panel members based on the above criterion was critical as this increases the validity of the study results. Because the goal of a Delphi study was to explore dissension and move towards consensus among experts, the use of probability sampling was not recommended. Furthermore, the use of random sampling does not guarantee the selection of expert respondents who can provide the most reliable opinions on the topic being investigated.

To ensure the identification and the selection of qualified experts, the Delphi method requires that the researcher follows a procedure for forming the panel. With some minor modifications, I adopted the selection protocol developed by Okoli and Pawlowski (2004) known as the Knowledge Resource Nomination Worksheet (KRNW). Figure 2 identifies the four steps that were implemented for the selection of the Delphi panel. Following the protocol as described by Okoli and Pawlowski (2004), I sought participation from both academic and nonacademic personnel within community colleges that piloted the STEM Core Model. These community colleges are all located within Silicon Valley, California. In particular, all the participants have direct experience working in STEM bridge programs such as the STEM Core Model and have either previously worked or are currently working as professionals supporting students in these programs or in supervisory roles of others supporting the students. The inclusion of individuals

holding academic and nonacademic positions was consistent with the idea of assembling a heterogeneous group of experts with a broad range of knowledge and specialties in the topic being investigated (Avella, 2016; Habibi et al., 2014; Melynk et al., 2009). Specifically, the participants were identified by recommendations from professional peers who have been working in the area of student affairs, particularly those who have experience in supporting students entering or in community college.

## Figure 2

### *Procedure for Selecting the Panel Members*



*Note:* Adapted from “The Delphi Method as a Research Tool: An Example, Design Considerations and Applications,” by C. Okoli and S. D. Pawloski, 2004, *Information & Management*, 42(2), p.21 (<https://doi.org/10.1016/j.im.2003.11.002>). Copyright 2020 by Elsevier. Reprinted with permission.

Furthermore, to provide more heterogeneity and expertise on the issue being investigated, the study also sought the participation of deans of science, mathematics and engineering divisions from those nine community colleges, as well as other professionals who were involved in the STEM Core program. This included STEM Core faculty members, vice presidents, direct

supervisors, regional managers of SSS, state monitoring team, STEM Core partners, and human resource managers.

With all the protocol features being considered and with the approval of the Institutional Review Board (IRB; see Appendix E), a letter of invitation (see Appendix A) was sent to the study's initial list of 20 to 25 panel members with the goal of recruiting at least 15 to complete the three rounds of data collection. This number falls within the range that was suggested by Delphi method experts, as well as those found in previous Delphi studies (Akins et al., 2005; Malone et al., 2005; Okoli & Pawlowski, 2004; Somerville, 2007; Strasser et al., 2005). Delphi studies do not require large sample sizes because the intent of the study is to get an in-depth understanding of the topic of interest and not to generalize the findings to a larger group. After finalizing the list of panel members, each expert was contacted via email and was informed about the topic of study and the procedures for the data collection. From an initial number of 43 target participants, a total of 24 experts were invited to participate, of which 21 signed the Informed Consent Form. To minimize attrition, the panel members were requested to commit some time to complete all the questionnaires at all phases of the study.

For each of the rounds (Round 1 through Round 3), all panel of experts were provided with instructions and web links to complete the respective survey questionnaires on Survey Monkey. All communication with the panel members was done electronically or by phone. Each panel member was notified by email at the beginning of each round and periodically during the round to ensure timely completion of the survey questionnaire.

### **Data Collection and Analysis Procedures**

As previously explained, the Delphi method employs multiple rounds in generating expert opinion on an area of inquiry (Dalkey & Helmer, 1963).



Figure 3

## Data Collection Procedures for Round 1 Through Round 3



*Note:* Adapted from "Identifying software project risks: An international Delphi study," R. C. Schmidt, K. Lyytinen, M. Kiel, and P. Cule, 2001, *Journal of Management Information Systems*, 17(4), p.13 (<https://doi.org/10.1080/07421222.2001.11045662>). Copyright 2020 by Taylor & Francis Online. Reprinted with permission.

The rounds that were implemented in this study are described in detail in Figure 3 above. Round 1 specifically involved the generation of the lists of outputs and competencies from exciting job descriptions.

The goal of Round 1 was to create a “start list” and to gain a baseline understanding of the experts’ opinions of the relevant topic (Day & Bobeva, 2005; Hasson et al., 2000; Miles & Huberman, 1994). Linstone and Turoff (1975) referred to this round as the “exploration” stage where the investigator conducts a review of relevant literature and other pertinent documents to identify the issues or topics that should be addressed by the Delphi method. In Round 1 specifically, job competencies and outputs were compiled from the review of existing job descriptions for SSSs and other related positions. From the job description documents that were collected, eight documents were selected from which the researcher reviewed the functions and responsibilities of the relevant professionals line by line and translated them into categories that described competencies and outputs. This coding process was necessary because job descriptions are typically stated in functions and responsibilities, rather than in actual competencies and outputs. Then a study advisor reviewed the categories generated by the researcher and compared them to the raw data. Again, the raw data were statements from the job descriptions enumerating the functions and roles of SSS and other closely related positions. The inclusion of a study advisor was essential in providing validity check for the categories identified by the researcher. The validity check is critical, as it involves the process of determining whether the items being considered represent the constructs that the study attempts to investigate. Iterations of comparison and revision were undertaken with the researcher being the “lone-wolf coder” and the advisor as “rigorous examiner and auditor” (Saldaña, 2013, p. 35).

After finalizing the initial list generated from the job descriptions, the panel of experts were asked to review the list of outputs and competencies by indicating “include,” if they thought they were relevant to the job, and “exclude” if they were not. A comment field was also provided to the panelists to add outputs and competencies that were not in the list. When refining and validating the categories of outputs and competencies for use in Round 1 survey administration, the use of content analysis as suggested by Kenney et al. (2011) was applied. Content analysis is a qualitative technique that is used to summarize or consolidate many words of text into fewer categories based on explicit rules of coding (Krippendorff, 1980; Weber, 1990). More specifically, the process is done where the researcher divides the data (i.e., texts) into units and code using labels or categories that incorporate the panelists’ words (Saldaña, 2013).

The responses from Round 1 were compiled and analyzed. Two separate analyses were conducted for Round 1 data, namely:

(1) For the section of the survey in which the panelists had to select which competencies and outputs to include or exclude, a simple inter-rater reliability (IRR) was calculated. IRR is a simple measure of raters’ level of agreement. Items with an IRR value of less than 0.60 (or 60%) were excluded from the list.

(2) For the section of the survey in which the panelists had to provide comments and suggest additional items for competencies and outputs, content analysis was also adopted similar to the process that was undertaken in selecting the categories for job competencies and output. Also, duplicate responses were removed from the analysis. A duplicate response is noted when at least two panelists suggested or wrote the same competency or output. The final lists of competencies and outputs were then used to construct the survey questionnaire for Round 2. As

Isaac and Michael (1995) and Ziglio (1996) described, the first round is used to generate items, answers, and comments about the problem in broad terms. The questionnaire for Round 1 is shown in Appendix B.

Round 2 of the process often involves administering a survey questionnaire to the panel of experts, coupled with controlled opinion feedback (Dalkey & Helmer, 1963). Specifically, in Round 2, the panel of experts were involved in rating the importance of the outputs and competencies followed by an open-ended comment field for panelists to add or comment on the outputs and competencies (see Appendix C). The questionnaires were sent to the panelist via a Survey Monkey web link to rate the output and competencies based on importance, with 1 being “not important” and 5 being “essential.” The panelists’ responses were consolidated and the median and interquartile range (IQR) were calculated for both competencies and outputs. Items for competencies, as well as for outputs, with an IQR value of one or less than one, were considered items with high consensus, while items with greater than one IQR were items with low consensus (Heiko, 2012; Kabaci & Cude, 2012). In conjunction with the IQR, the median score for items were also used to identify the raters with divergent views. Specifically, raters with a rating of two scales below or above the median were considered having low agreement with the panel members. The IQR and the corresponding median was used because they are less affected by extreme scores particularly in small sample-sized groups (Gall et al., 1996), and have been used in previous Delphi studies that focused on achieving raters’ consensus (Drain, 1998; Hahn et al., 1999). Like Round 1, the comments of the panelists on the relevant competencies and outputs were also analyzed for commonality of themes using abbreviated content analysis in order to identify the recurring themes and issues. The results of these analyses (quantitative and

qualitative) were validated by a study advisor and were shared with the panelists to adjust their ratings. Experts, however, may not change their rating if they decide not to do so.

For this study, a 5-point Likert scale was constructed to determine the importance of each of the two lists: one for the outputs and another for the required competencies. The use of a 5-point Likert scale has been recommended, as it provides stronger correlations with *t*-test results (Lewis, 1993), and has been used in Delphi studies investigating competencies of student affairs professionals (Burkard et al., 2005; Reynolds, 2011). It is important to note that when few response categories are used, such as in a Likert-scale questionnaire (e.g., having three response categories such as agree, neutral, and disagree), the correlation of these responses will be weaker due to the restriction of range and fewer response categories often lead to less variation in responses. A sample 5-point Likert-scale item is illustrated in Figure 4.

**Figure 4**

*5-Point Likert Scale*

Not important	Slightly important	Moderately important	Very important	Essential
1	2	3	4	5

Round 3 is conducted to provide the panel of experts the opportunity to resolve areas of disagreements and to achieve consensus (Isaac & Michael, 1995; Ziglio, 1996). In some scenarios, this phase is also ideal for exploring divergent views of the panel members (Hacker, 1988; Linstone & Turoff, 1975). After the rating of importance in Round 2, a total of 43 competencies and 41 outputs were included in Round 3 survey (see Appendix D). Note that both questionnaires (outputs and competencies) were reviewed by external experts before they were sent to the panelists. Round 3 survey questionnaire was sent to the panelists to review their rating

for listed competencies in comparison to the group rating (median and IQR). The panelists had the opportunity to adjust their rating or leave their rating the same with an explanation. More importantly, this round provided the panelists with an opportunity to offer open-ended feedback about the total group outputs and competencies identified by the entire panel. Thereafter, the data were compiled and re-analyzed. Because of their median and IQR scores, the items were ranked and the top and bottom competencies and outputs for the SSS role were identified. Lastly, the final report was shared to the panelists. Round 1 and Round 2 surveys were made available to the panel of experts for three days, while Round 3 survey was open for two weeks. Each round (Round 1 through Round 3) required each panelist an average of five to 10 minutes to complete.

### **Summary**

In summary, this chapter described the methodology, sample of participants, instrumentation, data collection, and data analysis employed for this research study. The chapter included the research method that was used to address the research questions pertaining to the role of SSSs in the STEM Core Model, the required competencies for such role, the outputs associated with these competencies, and the alignment of these required competencies with the 2015 Professional Competencies for Student Affairs.

## Chapter 4: Results

This Delphi study was designed to identify the competencies and outputs associated with the SSS role with a specific focus on student affairs professionals working in STEM bridge education programs in local community college districts in the Silicon Valley region. The intent of this study was to provide insights to educational leaders, administrators, and professionals involved in the planning and hiring of SSS positions, as well as in creating professional development programs to support individuals in this role.

This chapter begins with a description of the demographics of the members of the Delphi panel, followed by a presentation and analysis of results related to the research questions:

RQ1: Given the emerging role of the SSS within the STEM Core Model, what are the outputs expected of this role?

RQ2: Given the growth of STEM Core Model implementation, what are the emerging competencies needed to produce those outputs?

RQ3: How do these SSS competencies associated with the STEM Core Model compare or align with the 2015 Professional Competencies for Student Affairs?

### Expert Panel Demographics

For this study, expert sampling technique was used to select the members of the Delphi panel. This is an essential process because the method requires members of the panel to be “highly trained and competent within the specialized area of knowledge” (Hsu & Sandford, 2007, p. 4) that is being investigated. Specifically, three criteria were employed to select the panel: (i) the experts should be an academic and nonacademic personnel working with the community colleges that piloted the STEM Core Model; (ii) the experts should have direct experience working in or with STEM bridge programs as student advisors or as supervisors of

advisors; and (iii) the experts should be willing to participate and commit to complete the three rounds of survey questionnaire administration. The third criterion was necessary because a Delphi study typically involves at least three rounds of survey administration and it is critical that members of the panel understand the process and the time required to complete the data collection process.

Based on the initial list of 43 target participants, a total of 24 individuals were invited to participate in the study, of which 22 signed the Informed Consent Form and expressed willingness to participate. The Informed Consent Form provided a description of the study, the different data collection phases and their rights, the confidentiality of their responses, views, and opinions relevant to the topic being investigated. Through Round 3, 19 of 22 experts (a 90% response rate) participated in the data collection. Reflective of the nature of work in the academy, many of the panel members (84%) were female, while only 16% were male (see Table 2). Two of the male panel members were MAPin coaches (like SSS roles), while the third was an administrator for student affairs. MAPin is a program under the San Jose Evergreen Community College District, which provides student-centered wrap-around services that support academic, personal, and professional success at all levels.

The identified roles of the panel members are quite heterogeneous, with 39% of them being administrators, 19% had been administrators and SSSs, 16% SSS or coach, 8% counselors, 8% had been both counselor (faculty position) and SSS, 4% SSSs, and 4% student assistant (entry-level position). Note that many of the members had overlapping roles or had held various related roles throughout their career, as evidenced by the dual roles reported in the survey.



**Table 2***Demographic Characteristics of Expert Panel*

Characteristics	<i>f</i>	%
Gender		
Male	3	16
Female	16	84
Primary Role		
Administrator	6	39
Counselor	2	8
Counselor/SSS	2	8
Student Assistant	1	4
SSS	1	4
SSS/Administrator	3	19
SSS/Coach	4	16
Educational Institution(s)		
Career Education District	1	5
Community College	14	74
Community College Consortium	1	5
Community College & High School District	1	5
Department of Education	1	5
University & Community College	1	5
Year of Experience		
1 - 3	4	21
4 - 6	2	11
7 - 10	5	26
> 10	8	42

For instance, in some community colleges, a panel member was an administrator and had also served as an SSS or a coach, while in other colleges the panel member was a counselor and had previously been an SSS. In terms of their educational affiliation, a majority of the panel (74%) are currently or have previously worked at a community college in the Silicon Valley region, while the rest were associated with the community colleges in the Silicon Valley by working either at career education district, community college consortium, high school district, or university. Almost half of the panel members (42%) have more than 10 years of work experience at the community colleges, while 26% have seven to 10 years of experience, and about 32% have less than seven years of experience.

## **Outputs Associated With SSS Role**

The following section addresses the first research question: given the emerging role of the SSS within the STEM Core Model, what are the outputs expected of this role? The section begins with a description of the processes involved in the identification of the final list of outputs. After identifying the final list, the panel of experts rated each of 40 outputs in terms of their importance using a 5-point Likert-scale from 0 = “Not Important” to 5 = “Essential.”

### ***Identifying the Outputs***

The initial list of outputs, shown in Table 3, was generated from the job descriptions of SSS and other closely related positions. Other closely related positions include academic advising specialist (a staff position usually entry-level), academic advisors (faculty in student’s chosen major), student affairs specialists (e.g., housing, student leadership, and counseling). The job descriptions of these professionals were included in the qualitative review because they were deemed similar to the functions and responsibilities of an SSS. It is often the case, too, that community colleges may have the same exact position but only the title of the said position was different. For this reason, the job descriptions of these positions were included in the review to make the list of competencies as comprehensive as possible for the SSS position. A qualitative document analysis, as described in Chapter 3, was used to obtain these categories for the outputs expected of the SSS role. The initial list, which contained 36 outputs, was included in the survey questionnaire administered in Round 1 for panel members to determine whether they were relevant to the said role. The survey questionnaire was administered on Survey Monkey and the panel of experts reviewed each of the 36 outputs by indicating “include” if it was relevant and “exclude” if it was not. For Round 1, a total of 22 experts responded to the questionnaire. After generating the outputs, a study advisor reviewed the list for content validity.

**Table 3***Round 1 List of Outputs Generated From Job Descriptions*

Item Number	Description
1	Academic support & assistance
2	Activities coordinated
3	Advice on study habits & study skills
4	Academic advising
5	Assessment reports
6	Agenda/meeting minutes/other documentation
7	Budget and financial reports
8	Career coaching
9	Case resolution & case management
10	Collaboration is developed or promoted
11	Communication/correspondence prepared
12	Coordination with faculty
13	Ensure classroom policies are followed
14	Ensure collaboration is developed/promoted
15	Ensure communication is accomplished
16	Ensure data are organized, tracked, & managed
17	Ensure deadlines are met
18	Ensure policies are explained
19	Ensure student records are managed
20	Ensure study skills are implemented
21	Ensure support services are communicated, provided, & in place
22	Evaluation report
23	Incident report
24	Information materials created & prepared
25	Interview materials
26	Marketing & outreach strategies
27	Program compliance
28	Program materials prepared & developed
29	Program participation
30	Program report
31	Project/program management delivery
32	Research report or updated report
33	Revised policies & protocols
34	Scheduled meetings
35	Statistical report
36	Student progress or evaluation report

*Note.* This is a list and outputs are not ranked in their importance.

To identify which of the 36 outputs should be included in the list of required outputs for the succeeding round, a simple IRR was calculated. An IRR, which is an indicator of “agreement among raters,” was calculated by dividing the total number of respondents indicating “include” by the total number of panel members. For instance, if there are 20 out of 22 panel members who

indicated that an item should be included, then that item has a 91% ( $20/22 \times 100\%$ ) level of agreement among raters. Then, the IRR was calculated for each of the 37 outputs and items in which the rate of agreement or consensus was lower than 60% (considered a weak consensus) were eliminated. McHugh (2012) noted that an IRR value of 0 to 0.20 means no consensus, 0.21 to 0.39 minimal consensus, 0.40 to 0.59 weak consensus, 0.60 to 0.79 moderate consensus, 0.80 to 0.90 strong consensus, and greater than 0.90 almost perfect consensus. Using the interpretation provided, two items in the initial list were then excluded. These outputs were Item 7 (“agenda/meeting minutes/other documents”) with an  $IRR = 0.45$  and Item 12 (“coordination with faculty”) with an  $IRR = 0.55$ . It was not expected that Item 13 was excluded in the initial round of data collection and this is addressed in Chapter 5.

There were three items that were candidates for exclusion as they had a moderately weak rate of consensus but were allowed to be included in the succeeding round for the experts to make further determination. These outputs were Item 11 (“communication and correspondence prepared”), Item 32 (“Research report & updated report”), and Item 34 (“scheduled meeting”), which all had an  $IRR = 0.64$ . In addition, Item 4 (“academic advising”) was merged with Item 1 (“academic support & assistance”) because of its conceptual similarity.

Round 1 survey questionnaire also required the panel of experts to add or suggest any outputs they believed were not included in the list. Thus, after analyzing the panel’s comments and suggestions using a qualitative technique, seven additional items that were relevant to the output associated with SSS role were included. This brought the total of outputs to 40, which were individually rated by the panel for their importance in Round 2. Table 4 displays the list of outputs included in Round 2 survey questionnaire and the calculated experts’ ratings summarized by median and interquartile range (IQR) scores. Unlike the survey questionnaire in Round 1, the

outputs for Round 2 survey were rated on a 5-point Likert scale, with 1 = “Not Important” and 5 = “Essential.”

**Table 4**

*Round 2 Panel of Experts’ Ratings of Outputs by Median and IQR*

Item Number	Description	<i>Mdn</i>	IQR
1	Academic support & assistance	5	1
2	Activities coordinated	4	0
3	Advice on study habits & study skills	4	1
4	Assessment reports	4	1
5	Budget and financial reports	3	2
6	Counseling provided (course registration, selection, etc.)	4	1
7	Career coaching	4	2
8	Case resolution & case management	4	2
9	Communication/correspondence prepared	4	1
10	Ensure classroom policies are followed	4	1
11	Ensure collaboration is developed/promoted	5	1
12	Ensure communication is accomplished	5	1
13	Ensure data are organized, tracked, & managed	4	1
14	Ensure deadlines are met	4	1
15	Ensure policies are explained	4	1
16	Ensure student records are managed	4	1
17	Ensure study skills are implemented	4	2
18	Ensure support services are communicated, provided, & in place	5	1
19	Evaluation report	4	1
20	Incident report	4	1
21	Information materials created & prepared	4	1
22	Interview materials	4	1
23	Marketing & outreach strategies	4	0
24	Participation in program activities	4	1
25	Program compliance	5	1
26	Program materials prepared & developed	4	1
27	Program report	4	2
28	Project/program management delivery	4	2
29	Research report or updated report	4	1
30	Revised policies & protocols	4	1
31	Scheduled meetings	4	1
32	Statistical report	4	1
33	Student progress or evaluation report	4	1
34	Feedback and interventions based on the data	4	1
35	Students in the program develop study skills	4	1
36	Students participate in the program	4	1
37	Job/internship interview training/guidance	4	1
38	Program success outcome are met (program review)	5	1
39	Institutional procedures for evaluation report and incident report are followed	4	1
40	Welcoming and friendly environment for students is fostered	5	1

### ***Rating the Importance of Outputs***

There were two purposes for Round 2 survey administration. The first purpose was to allow the panel of experts to rate the importance of the 40 outputs, while the second purpose was to examine the rate of consensus among the panel of experts. With many items considered, it was expected that experts would report divergent opinions regarding some outputs included in the list. The IQR was used to identify the outputs in which experts had diverging opinions in terms of rating the importance. While the IQR is popularly known as a measure of dispersion, researchers have suggested its use for measuring degree of agreement or consensus among raters (Hahn et al., 1999; Heiko, 2012; Raskin, 1994). Thus, the IQR was calculated for each output and their values were displayed in Table 4. As with the IQR, the median was calculated for each of 40 outputs to identify their ranking. The median was used in conjunction with the IQR because of its appropriateness for ordinal-scaled data such as the data used in this study (Argyrous, 2005; Hyatt & Williams, 2011).

### ***Round 2 Results***

For Round 2, a total of 21 experts completed the survey questionnaire. Table 5 displays the top outputs associated with the SSS role as identified by the panel of experts. As shown in the table, seven out of the 40 outputs received a rating of 5 (“Essential”) with an IQR value of 1 or less than 1. This means that these outputs were not only considered essential, but it also indicates consensus among the panel of experts (that they are essential deliverables or work associated with the function of an SSS professional). Specifically, there was almost a perfect consensus (IQR = 0.50) among experts that Item 40 (“welcoming and friendly environments for students is fostered”) as the most essential output for an SSS with a rating of 5. Other outputs that were also highly rated with consensus among experts included: Item 1 (“academic support

and assistance”), Item 11 (“ensure collaboration is developed and promoted”), Item 12 (“ensure communication is accomplished”), Item 18 (“ensure support services are communicated, provided, and in place”), Item 25 (“program compliance”), and Item 38 (“program success outcomes are met”).

**Table 5**

*Top Outputs Based on Median and IQR*

Item Number	Description	<i>Mdn</i>	IQR
40	Welcoming and friendly environment for students is fostered	5	0.5
1	Academic support and assistance	5	1
11	Ensure collaboration is developed and promoted	5	1
12	Ensure communication is accomplished	5	1
18	Ensure support services are communicated, provided, and in place	5	1
25	Program compliance	5	1
38	Program success outcomes are met (program review)	5	1
2	Activities coordinated	4	0
23	Marketing and outreach strategies	4	0

In addition to the seven outputs, two more outputs were included in Table 5: Item 2 (“activities coordinated”) and Item 23 (“marketing and outreach strategies”) as they were rated 4 (“very important”) while having a perfect consensus (IQR = 0) among the panel of experts. An IQR value of 0 indicates a perfect consensus or agreement among raters (Heiko, 2012; Raskin, 1994; Rayens & Hahn, 2000). The inclusion of the two items in the list of top outputs indicate that across campuses, where the panel of experts work and have worked, these items were an important deliverable that every SSS should be able to accomplish.

On the other hand, the panel of experts also reported low consensus on several outputs. As shown in Table 6, six of the 40 outputs reported an IQR > 1. An IQR value of greater than 1 indicates low consensus among raters (Hahn et al., 1999; Heiko, 2012; Raskin, 1994). The lowest rated output was Item 5 (“budget and financial report”) with a median score of 3 and an IQR = 2. Not only was this item rated low, but there also seemed to be a wide variability in the

experts' opinion about the significance of this output to the work of an SSS. Other items that had high variability in experts' opinions (i.e., low consensus) were Item 7 ("career coaching"), Item 8 ("case resolution and case management"), Item 17 ("ensure study skills are implemented"), Item 27 ("program report"), and Item 28 ("project/program management delivery").

**Table 6**

*Lowest Ranked Outputs Based on Median and IQR*

Item Number	Output	<i>Mdn</i>	IQR
7	Career coaching	4	2
8	Case resolution and case management	4	2
17	Ensure study skills are implemented	4	2
27	Program report	4	2
28	Project/program management delivery	4	2
5	Budget and financial report	3	2

**Round 3 Results**

In Round 3, the experts were shown a summary of the Expert Panel's ratings (median and IQR) in comparison to their individual rating of outputs. In this round, all the 21 experts were invited to complete a demographic information survey, of which 19 experts responded to it. However, only the 13 experts were invited to re-rate items as these were the experts who had divergent views on low-consensus items. As with any Delphi study, this round was conducted to allow for consensus-building among the experts, particularly those with an IQR rating of greater than 1. Results of the Round 3 re-rating are displayed in Table 7. As noted earlier, the lowest ranked outputs were the same outputs that the panel of experts reported a low level of consensus. As shown in Table 6, there were six outputs with an  $IQR > 1$  (low consensus) prior to re-rating. After the re-rating, the experts reached consensus on two items: Item 7 ("career coaching") and Item 27 ("program report"). The four remaining items did achieve consensus because 12 raters did not change their previous ratings; thus, their ratings of importance remained unchanged.



**Table 7***Lowest Ranked Outputs Based on Median and IQR After Re-Rating*

Item Number	Output	<i>Mdn</i>	IQR
8	Case resolution and case management	4	2
17	Ensure study skills are implemented	4	2
28	Project/program management delivery	4	2
5	Budget and financial report	3	2

An important feature of the collection method for a Delphi study is the use of survey protocols that protect participants from subtle pressures that influence their response from dominant panel members. Specifically, the experts that were identified to participate in the re-rating round were only interacting with the researcher. Thus, the undue pressure from other experts were practically nonexistent. Of the six outputs with low consensus, Item 5 (“budget and financial reports”) generated the most experts ( $n = 6$ ) with divergent opinions. One of these experts explained: “being a SSS in a STEM major, I have never found a need to provide a budget or financial report. Neither can I think of a reason for when that would be needed unless one is in a higher position that manages the money.” On the other end of the spectrum is the opinion of another expert, who commented: “I believe critically important to retain grants and funding.” These two substantially divergent ideas point to the fact that Item 5 (“budget and financial report”) was a low consensus item.

Item 17 (“ensure study skills are implemented”) also had an expert expressing his or her opinion why he or she did not change her rating: “I think from experience that we should teach study skills but it is not our role to ensure these they have implemented the skills I think we have a role in observing the skills that they have adopted but not our job to ensure. Study skills are different for every individual and students learn skills from instructors and from experience of what works for them.” An expert who left her or his rating for Item 28 (“project/program

management delivery”) unchanged wrote: “I assume there is a program manager responsible for reporting. The SSS role is more focused on student services.” In summary, after the final round where the experts were provided with the opportunity to re-rate the low-consensus items, 36 out of the 40 outputs (90% agreement) achieved consensus. With the exceptions of the four outputs (see Table 6), the panel of experts largely agreed that those 36 items were important outputs or deliverables that are relevant to the work of SSS professionals.

### **Competencies Associated With SSS Role**

The following section addresses the second research question: given the growth of STEM Core Model implementation, what are the emerging competencies needed to produce those outputs? Like the outputs, these competencies were generated both from job descriptions of SSS and other closely related positions, as well as from suggestions and recommendations by the panel of experts. After identifying these competencies, the expert panel rated each of the 43 competencies in terms of their importance on a 5-point Likert-scale from 0 = “Not Important” to 5 = “Essential.”

#### ***Identifying the Competencies***

The initial list of competencies was generated from the review of job descriptions of SSS and other closely related positions (see Table 8). These job descriptions were obtained from several human resource offices of community colleges in the Silicon Valley region. The competencies shown in Table 8 were generated using a qualitative technique described in Chapter 3. Prior to including these competencies in the survey questionnaire, the list was reviewed by a study advisor for content validity. A total of 28 competencies were then included in the survey questionnaire administered in Round 1. The survey questionnaire, which was administered on Survey Monkey, asked the panel of experts to select “include” if they thought

the competency was relevant to the role and “exclude” if they were not. A total of 21 experts completed the survey questionnaire.

**Table 8**

*Round 1 List of Competencies Generated From Job Descriptions*

Item Number	Description
1	Ability to make independent judgment
2	Administrative skills
3	Academic advising/counseling skills (career, academic, etc.)
4	Collaboration skills
5	Communication skills
6	Data analysis skills
7	Editing skills
8	Facilitation skills
9	Interpersonal skills
10	Interviewing skills
11	Knowledge of budget and financial records
12	Knowledge of case management
13	Knowledge of classroom policies and course requirements
14	Knowledge of evaluation and assessment
15	Knowledge of institutional policies and academic requirements
16	Knowledge of organizational resources
17	Knowledge of research
18	Knowledge of study skills/learning theories & development
19	Knowledge of technology
20	Organizational skills
21	Planning skills
22	Presentation skills
23	Project reporting skills
24	Project/program management skills
25	Public relations skills
26	Record-keeping skills
27	Software skills
28	Supporting/helping skills

*Note.* This is a list and competencies are not ranked in their importance.

In identifying which of the 28 competencies should be included in the required competencies for the succeeding round, a simple IRR was calculated. An IRR is an indicator of “agreement among raters” and was calculated by dividing the total number of respondents indicating “include” by the total number of panel members. For example, if there are 20 panel members in a study and 19 indicated that an item should be included, then the item has an IRR of

95% ( $19/20 \times 100\%$ ) level of agreement among the raters. This calculation was applied for each of the 28 competencies and items with an IRR value of less than 60% were eliminated from the list (McHugh, 2012). Based on the calculated IRR values, two items were eliminated from the initial list. These competencies were Item 11 (“knowledge of budgets and financial records”) and Item 17 (“knowledge of research”) which had the same IIR = 0.45. While Item 7 (“editing skills”) had a moderately weak rate of agreement at IRR = 0.64, this competency could be included in the succeeding round for the experts to make the final determination.

Prior to including these competencies in the survey questionnaire, the list was reviewed by a study advisor for content validity. A total of 28 competencies were then included in the survey questionnaire administered in Round 1. The survey questionnaire, which was administered on Survey Monkey, asked the panel of experts to select “include” if they thought the competency was relevant to the role, and “exclude” if they were not. A total of 21 experts completed the survey questionnaire.

In addition, Round 1 also required the panel of experts to make additional suggestions regarding the competencies they thought were not in the initial list. Their comments and suggestions were analyzed using a qualitative technique described in Chapter 3. Results of the coding analysis resulted in the addition of 16 new competencies to the initial list, and at the height of pandemic one competency was added, which brought the total number of competencies to 43. Table 9 displays the complete list of competencies that were included in survey questionnaire administered in Round 2 and the calculated ratings of experts summarized by median and IQR scores. Unlike the Round 1 survey, these competencies were rated using a 5-point Likert scale with 1 = “Not Important” and 5 = “Essential.”

**Table 9***Round 2 Panel of Experts' Ratings of Competencies by Median and IQR*

Item Number	Description	<i>Mdn</i>	IQR
1	Ability to make independent judgment	4	1
2	Ability to identify students' strengths	4	1
3	Administrative skills	4	0
4	Academic advising and counseling skills (career, academic)	4	1
5	Collaboration skills	5	1
6	Communication skills (Oral & Written)	5	1
7	Data analysis skills	4	1
8	Editing skills	3	1
9	Facilitation skills	4	1
10	Interpersonal skills	5	0
11	Interviewing skills	4	1
12	Knowledge of case management	4	1
13	Knowledge of classroom policies and course requirements	3	1
14	Knowledge of evaluation and assessment	3	1
15	Knowledge of institutional policies and academic requirements	4	1
16	Knowledge of organizational resources	4	2
17	Knowledge of study skills/learning theories & development	4	1
18	Knowledge of technology	4	2
19	Organizational skills	5	1
20	Planning skills	4	1
21	Presentation skills	4	1
22	Project reporting skills	4	2
23	Project/program management skills	4	2
24	Public relations skills	4	2
25	Record-keeping skills	4	1
26	Software skills	4	1
27	Supporting/helping skills	5	1
28	Analytic and problem-solving skills	5	1
29	Creativity and visionary skills	4	1
30	Cultural competence	5	1
31	Active learning skills	5	1
32	Socio-emotional skills	5	1
33	Marketing skills	3	1
34	Grant-request and management skills	3	2
35	Ability to identify students' potentials	5	1
36	Knowledge of equity and inclusion	5	1
37	Knowledge of STEM career infrastructure	4	1
38	Knowledge of institutional structure and critical student support services	4	1
39	Knowledge of student learning outcomes	4	0
40	Student development skills	5	1
41	Understanding and appreciation of diversity	5	1
42	Time management skills	5	1
43	Adaptability to support students via advanced information technology	5	1

### ***Rating the Importance of Competencies***

For Round 2, a total of 21 experts participated in the survey. Round 2 data collection had two goals: (i) to allow the panel of experts to rate the importance of the 43 competencies, and (ii) to assess their level of consensus on whether or not these competencies are relevant to the SSS role. The median was calculated for each of the 43 competencies in order to determine the ranking of importance. The IQR was also calculated to identify competencies that had a low level of consensus among the panel of experts. The median and IQR for the 43 competencies are shown in Table 9. As suggested by researchers, items with an IQR  $> 1$  were considered items with low consensus, while those with an IQR of 1 or less were considered items with high consensus (Hahn et al., 1999; Heiko, 2012; Raskin, 1994). This study used the median along with the IQR because of its appropriateness for ordinal-scaled data (e.g., Likert scale) and for studies with small sample size such as in Delphi studies study (Argyrous, 2005; Hyatt & Williams, 2011).

### ***Round 2 Results***

Table 10 displays the top competencies as identified by the panel of experts, based on the calculated median and IQR. Of the 43 competencies, 15 were rated 5 (“Essential”) by the panel. Not only were these items highly regarded as essential competencies for an SSS role, the experts were even in consensus about their importance as indicated by the IQR values of one or less than one. Of these top competencies, Item 10 (“interpersonal skills”) was ranked number one with a median score of 5 along with an IQR = 0, which indicates perfect consensus. This result is expected considering the fact that having the ability to relate to students and other people is not unique to this particular position, rather it is an essential, general competency that a professional should possess when working in a position that provides support to students.

**Table 10***Top Competencies Based on Median and IQR*

Item Number	Description	<i>Mdn</i>	IQR
10	Interpersonal skills	5	0
5	Collaboration skills	5	1
6	Communication skills (Oral and Written)	5	1
19	Organizational skills	5	1
27	Supporting/Helping skills	5	1
28	Analytical and problem-solving skills	5	1
30	Cultural competence	5	1
31	Active listening skills	5	1
32	Social-emotional skills	5	1
35	Ability to identify students' potential	5	1
36	Knowledge of equity and inclusion	5	1
40	Student development skills	5	1
41	Understanding and appreciation of diversity	5	1
42	Time management skills	5	1
43	Adaptability to support students via advanced information technology	5	1
3	Administrative skills	4	0
39	Knowledge of student learning outcomes	4	0

Other top competencies worth mentioning, which are supported by literature, include Item 5 (“collaboration skills”), Item 6 (“communication skills”), Item 27 (“supporting and helping skills”), Item 28 (“analytical and problem-solving skills”), Item 30 (“cultural competence”), Item 31 (“active listening skills”), Item 35 (“ability to identify students’ potential”), Item 35 (“knowledge of equity and inclusion”), Item 40 (“student development skills”), Item 41 (“understanding and appreciation of diversity”), Item 42 (“time management skills”), and Item 43 (“adaptability to support students via advanced information technology”).

Experts perceived these as essential competencies that are critical and not unique to the role. In addition to the list were two competencies that had a median rating of 4 (“Very important”) with a perfect consensus (i.e., IQR = 0). While these two competencies may not be as essential as those on the top list, they were perceived by experts as “Very important,” with perfect consensus.

Table 11 displays the competencies in the bottom list with their corresponding median rating and IQR values. While expert consensus was observed on those top competencies, results also indicated diverging expert opinions on other competencies.

**Table 11**

*Lowest Ranked Competencies Based on Median and IQR*

Item Number	Description	<i>Mdn</i>	IQR
16	Knowledge of organizational resources	4	2
18	Knowledge of technology	4	2
22	Project reporting skills	4	2
23	Project/program management skills	4	2
24	Public relations skills	4	2
8	Editing skills	3	1
13	Knowledge of classroom policies and course content	3	1
14	Knowledge of evaluation and assessment	3	1
33	Marketing skills	3	1
34	Grant-request and management skills	3	2

Of the 43 competencies that experts rated, four competencies (Items 8, 13, 14, and 33) had a median rating of 3 (“Moderately important”), of which experts were in unanimous agreement with their opinions as shown by an IQR = 1. On the other hand, five items (Items 16, 18, 22, 23, and 24) had a median rating of 4 (“Very important”), but experts were not in unanimous consensus about their importance. One explanation for this was that, for some experts, these competencies may not be as relevant to the work of SSS professionals in their campuses as others. Contextual differences such as experts’ work experiences and campus affiliations might have played an important factor as to why divergent views were noted in these competencies.

***Round 3 Results***

As with the outputs, in Round 3 the experts were shown a summary of the expert panel’s ratings (median and IQR) in comparison to their individual ratings of the competencies.



Likewise, in this round, all 21 experts were invited to respond to a demographic information survey, of which 19 experts completed it. As with any Delphi study, this round was conducted to allow for consensus building. For this reason, four experts with divergent views on low-consensus competencies (Items 16, 18, 22, 23, 24, and 34) were invited to participate in the re-rating. Specifically, these experts were the ones who had IQR scores of greater than 1 on competencies.

Results of Round 3 re-rating are displayed in Table 12. Of the six competencies (Items 16, 18, 22, 23, 24, and 34) that were re-rated, only Item 16 (“knowledge of organizational resources”) was adjusted to achieve consensus among experts. All the remaining items did not reach consensus because experts did not modify their ratings. For this reason, their rank in terms of the importance did not change as well. Hence, for some experts these competencies were not relevant with respect to the required functions that SSS professionals do in their respective campuses. Among the low-consensus competencies with unchanged ratings include Q18 (“knowledge of technology”). As one expert argued, “In my opinion, I feel like if someone is not knowledgeable in technology, they can still be efficient and successful using means they are comfortable in and hopefully develop their knowledge gradually.” Another expert who did not change his rating on Item 24 (“public relations skills”) explained:

To me public relations means having the ability to message, to communicate to stakeholders. I don’t believe that SSS need to be fully versed in PR, but they should have some skills – which is why I rated it at 2 (“slightly important”). I do not wish to change my rating unless you have another definition of public relations.

**Table 12***Lowest Ranked Competencies Based Median and IQR After Re-Rating*

Item Number	Description	<i>Mdn</i>	IQR
18	Knowledge of technology	4	2
22	Project reporting skills	4	2
23	Project/program management skills	4	2
24	Public relations skills	4	2
8	Editing skills	3	1
13	Knowledge of classroom policies and course content	3	1
14	Knowledge of evaluation and assessment	3	1
33	Marketing skills	3	1
34	Grant-request and management skills	3	2

In summary, after the final round where the experts were provided with the opportunity to re-assess their position on the low-consensus items, 34 out of the 43 competencies (79% agreement) have achieved consensus. Except for the nine competencies (see Table 12), the panel of experts agreed that those 34 competencies were essential competencies required of SSS professionals, particularly when working with students in the STEM Core Model.

### **Competencies Alignment With Professional Competencies for Student Affairs**

The following section addresses the last research question: How do these SSS competencies associated with the STEM Core Model compare or align with the 2015 Professional Competencies for Student Affairs? The section begins with a review of the final list of competencies that emerged from the study. This is followed by a brief description of the 10 competency areas stated in the 2015 ACPA/NASPA document, and lastly, an assessment of the degree of alignment of the study-generated competencies with the professional competencies student affairs. Table 13 displays the final competencies generated from this study alongside the competency areas described in the 2015 Professional Competencies for Student Affairs Educators.

**Table 13***Study-Generated Competencies Versus 2015 ACPA/NASPA Competencies*

Item Number	Study's Competencies	2015 ACPA/NASPA Competencies
10	Interpersonal skills	Leadership
5	Collaboration skills	Leadership
6	Communication skills (oral and written)	Organizational and Human Resources
19	Organizational skills	Organizational and Human Resources
27	Supporting/helping skills	Advising and Supporting
28	Analytical and problem-solving skills	Advising and Supporting
30	Cultural competence	Social Justice and Inclusion
31	Active listening skills	Advising and Supporting
32	Socio-emotional skills	Personal and Ethical Foundations
35	Ability to identify students' potential	Student Learning and Development
36	Knowledge of equity and inclusion	Social Justice and Inclusion
40	Student development skills	Student Learning and Development
41	Understanding and appreciation of diversity	Social Justice and Inclusion
42	Time management skills	Leadership
43	Ability to support student via advanced information technology	Technology
3	Administrative skills	Organizational and Human Resources
39	Knowledge of student learning outcomes	Assessment, Evaluation, and Research
1	Ability to make independent judgement	Personal and Ethical Foundations
2	Ability to identify students' strengths	Student Learning and Development
4	Academic advising and counseling skills	Advising and Supporting
7	Data analysis skills	Assessment, Evaluation, and Research
9	Facilitation skills	Organizational and Human Resources
11	Interviewing skills	Organizational and Human Resources
12	Knowledge of case management	Organizational and Human Resources
15	Knowledge of institutional policies/academic requirements	Law, Policy and Governance
16	Knowledge of organizational resources	Organizational and Human Resources
17	Knowledge of study skills/learning theories & development	Student Learning and Development
20	Planning skills	Organizational and Human Resources
21	Presentation skills	Organizational and Human Resources
25	Record keeping skills	Assessment, Evaluation, and Research
26	Software skills	Technology
29	Creativity and visionary skills	Leadership
37	Knowledge of STEM career infrastructure	Organizational and Human Resources
38	Knowledge of institutional structure and critical student support services	Organizational and Human Resources

The first column identifies the item number for the competency. The second column contains the 34 competencies that were generated through the third round of data collection and analyses. These competencies were the results of the quantitative analysis of experts' ratings, as well as the qualitative analysis of experts' suggestions and job descriptions. The third column of

the table provides the competency area that captures the corresponding study-generated competency on the second column. For example, the first entry on the table is Item 10: interpersonal skills. Using the general descriptions of each of the 10 competency areas provided in Table 14, the Item 10 was matched with *Leadership* with the reasoning that interpersonal skill falls under this competency area. This crosswalk analysis was done for the each of the remaining study-generated competencies listed in the second column of Table 13. A crosswalk analysis is often employed in a study where the goal is to identify similarities or differences between two different systems to achieve understanding, decision making, and planning (Results-Based Accountability: Implementation Guide, n.d.). Note that the order of the list in Table 12 reflects the order of ranking of importance among the competencies. This means that of the 34 final competencies, Item 10 (“interpersonal skills”) was ranked first and Item 38 (“knowledge of institutional structure and critical student support services”) was ranked last among the required competencies for an SSS role.

While the goal of the crosswalk analysis was to map the actual competencies to the professional competencies described in the 2015 ACPA/NASPA document in order to identify the major themes generated in the study, such analysis was done with the caveat that comparison or matching was not always analogous to a one-to-one correspondence. For some study-generated competencies, the matching was evident, but for others it was not. This occurred because the competency areas in the 2015 document were described in broad and general terms and were specifically designed for educators and not SSS.

**Table 14***Descriptions of Competency Areas in the 2015 ACPA/NASPA Document*

Competency Area	Description
Advising and Supporting	Addresses the knowledge, skills, and dispositions related to providing advising and support to individuals and groups through direction, feedback, critique, referral, and guidance. Through developing advising and supporting strategies that take into account self-knowledge and the needs of others, we play critical roles in advancing the holistic wellness of ourselves, our students, and our colleagues.
Assessment, Evaluation, & Research	Focuses on the ability to design, conduct, critique, and use various AER methodologies and the results obtained from them, to utilize AER processes and their results to inform practice, and to shape the political and ethical climate surrounding AER processes and uses in higher education.
Law, Policy, and Governance	Includes the knowledge, skills, and dispositions relating to policy development processes used in various contexts, the application of legal constructs, compliance/policy issues, and the understanding of governance structures and their impact on one's professional practice.
Leadership	Addresses the knowledge, skills, and dispositions required of a leader, with or without positional authority. Leadership involves both the individual role of a leader and the leadership process of individuals working together to envision, plan, and affect change in organizations and respond to broad-based constituencies and issues. This can include working with students, student affairs colleagues, faculty, and community members.
Organizational and Human Resources	Includes knowledge, skills, and dispositions used in the management of institutional human capital, financial, and physical resources. This competency area recognizes that student affairs professionals bring personal strengths and grow as managers through challenging themselves to build new skills in the selection, supervision, motivation, and formal evaluation of staff; resolution of conflict; management of the politics of organizational discourse; and the effective application of strategies and techniques associated with financial resources, facilities management, fundraising, technology, crisis management, risk management and sustainable resources.
Personal and Ethical Foundations	Involves the knowledge, skills, and dispositions to develop and maintain integrity in one's life and work; this includes thoughtful development, critique, and adherence to a holistic and comprehensive standard of ethics and commitment to one's own wellness and growth. Personal and ethical foundations are aligned because integrity has an internal locus informed by a combination of external ethical guidelines, an internal voice of care, and our own lived experiences. Our personal and ethical foundations grow through a process of curiosity, reflection, and self-authorship.
Social Justice and Inclusion	While there are many conceptions of social justice and inclusion in various contexts, for the purposes of this competency area, it is defined here as both a process and a goal which includes the knowledge, skills, and dispositions needed to create learning environments that foster equitable participation of all groups while seeking to address and acknowledge issues of oppression, privilege, and power. This competency involves student affairs educators who have a sense of their own agency and social responsibility that

Competency Area	Description
Student Learning and Development	includes others, their community, and the larger global context. Student affairs educators may incorporate social justice and inclusion competencies into their practice through seeking to meet the needs of all groups, equitably distributing resources, raising social consciousness, and repairing past and current harms on campus communities. Addresses the concepts and principles of student development and learning theory. This includes the ability to apply theory to improve and inform student affairs and teaching practice.
Technology	Focuses on the use of digital tools, resources, and technologies for the advancement of student learning, development, and success as well as the improved performance of student affairs professionals. Included within this area are knowledge, skills, and dispositions that lead to the generation of digital literacy and digital citizenship within communities of students, student affairs professionals, faculty members, and colleges and universities as a whole.
Values, Philosophy, and History	Involves knowledge, skills, and dispositions that connect the history, philosophy, and values of the student affairs profession to one's current professional practice. This competency area embodies the foundations of the profession from which current and future research, scholarship, and practice will change and grow. The commitment to demonstrating this competency area ensures that our present and future practices are informed by an understanding of the profession's history, philosophy, and values.

Table 15 displays the results of crosswalk analysis using the ACPA/NASPA descriptions of professional competencies as a guide in classifying the study-derived competencies. Results indicated that student affairs professionals should possess skills, knowledge, and competencies that were relevant to organization and human resources. The 2015 ACPA/ NASPA document describes this competency area as one which:

Includes knowledge, skills, and dispositions used in the management of institutional human capital, financial, and physical resources. This competency area recognizes that student affairs professionals bring personal strengths and grow as managers through challenging themselves to build new skills in the selection, supervision, motivation, and formal evaluation of staff; resolution of conflict; management of the politics of organizational discourse; and the effective application of strategies and techniques

associated with financial resources, facilities management, fundraising, technology, crisis management, risk management and sustainable resources. (ACPA/NASPA, 2015, p. 13)

**Table 15**

*Study-Generated Competencies Based on the NASPA Competency Areas*

Themes	<i>f</i>	%
Organizational and Human Resources	11	32
Advising and Supporting	4	12
Student Learning and Development	4	12
Leadership	4	12
Assessment, Evaluation, and Research	3	9
Social Justice and Inclusion	3	9
Personal and Ethical Foundations	2	6
Technology	2	6
Law, Policy, and Governance	1	3
TOTAL	34	100

Based on the above description and examination of the example outcomes for this competency area, 32% of the total study competencies accounted for this theme. The matching was conducted by the researcher and was validated by a study advisor. The competencies that were classified under organization and human resources include Item 11 (“interviewing skills”), Item 12 (“knowledge of case management”), Item 16 (“knowledge of organizational resources”), Item 19 (“organizational skills”), Item 20 (“planning skills”), Item 21 (“presentations skills”), Item 3 (“administrative skills”), Item 37 (“knowledge of STEM career infrastructures”), Item 38 (“knowledge of institutional structure and critical student support services”), Item 6 (“communication skills”), and Item 9 (“facilitation skills”).

Three equally important themes that emerged second in terms of the number of competencies were advising and supporting, student learning and development, and leadership. Each of these areas accounted for 12% of the total study generated competencies. In particular, four items that relate to advising and supporting were reported, including Item 10: interpersonal skills, Item 27 (“supporting and helping skills”), Item 28 (“analytical and problem-solving

skills”), Item 31 (“active listening skill”), and Item 4 (“academic advising and counseling skills”). All the items under this theme, except for Item 4 (“academic advising and counseling skills”), were in fact among the top study competencies (see Table 9).

As with advising and supporting, competencies related to student learning and development also reported four items including Item 17 (“knowledge of study skills and learning theories and development”), Item 2 (“ability to identify students’ strengths”), Item 32 (“socio-emotional skills”), Item 35 (“ability to identify students’ potential), and Item 40 (“student development skills”). As described in the ACPA/NASPA (2015) document, this theme “addresses the concepts and principles of student development and learning theory, [which] includes the ability to apply theory to improve and inform student affairs and teaching practice” (p. 14).

The ability to provide advising and support, as well as having the knowledge to apply the concept of learning theories and development, was important. Experts also considered leadership competencies as critical to the role of an SSS. The professional competencies document defines *leadership* as:

Addresses the knowledge, skills, and dispositions required of a leader, with or without positional authority. Leadership involves both the individual role of a leader and the leadership process of individuals working together to envision, plan, and affect change in organizations and respond to broad-based constituencies and issues. This can include working with students, student affairs colleagues, faculty, and community members. (p. 13)

Having the ability to work with students, faculty, and community members is a leadership quality that is necessary for professionals in the field of student affairs. As shown in Table 14,



leadership accounted for 12% of the total study competencies, which included items such as Item 10 (“interpersonal skills”), Item 29 (“creativity and visionary skills”), Item 42 (“time management skills”), and Item 5 (“collaboration skills”).

Both competency areas related to social justice and inclusion and assessment, evaluation, and research had three competencies each (accounting for 9%), while personal and ethical foundation and technology had two each (accounting for 6%), and law, policy, and governance, had only one competency each (accounting for 3%). Two competencies related to technology namely Item 26 (“software skills”) and Item 43 (“adaptability to support student via advanced information technology”) were reported as among the required competencies for an SSS role.

Overall, the competencies generated from the study aligned with the 2015 ACPA/NASPA professional competencies. More importantly, 33% of these competencies were relevant to organizational and human resources, 36% were related to advising and supporting, student learning and development, and leadership, 18% were related to assessment, evaluation, and research, and social justice and inclusion, while another 15% were relevant to personal and ethical foundations, technology, and law, policy, and governance—all of which are critical to the role of SSS professionals who support the holistic development of the students in STEM Core Model.

In summary, most of the top competencies that emerged from the study highlighted a broad range of responsibilities that emphasize high student contact and interpersonal competencies (such as supporting/helping skills, collaboration skills, communication skills, active listening skills, socio-emotional skills, problem-solving skills, knowledge of equity and inclusion, cultural competence, and ability to identify students’ potentials). These are typical competencies that involve personal attributes, but they are not unique to STEM Core

environment. Furthermore, these are also competencies that are often reported in existing literature, more particularly for entry-level student affairs professionals (Burkard et al., 2005; Kretovics, 2002).

## **Chapter 5: Discussion, Implications, and Recommendations**

The purpose of this study was to identify the outputs and competencies required for the work of SSS at a STEM Core Model in community colleges in the Silicon Valley region. In generating the lists of required competencies and outputs, job descriptions of SSS and other related positions were reviewed and coded using a qualitative technique. To provide expert opinion on the topic being investigated, a panel of experts was created consisting of professionals and employees working in the field of student affairs and STEM profession. These experts responded to a series of survey questionnaires, and data were analyzed using qualitative and quantitative techniques. After compiling the lists of required outputs and competencies, the researcher determined their alignment with the professional competencies as described in the 2015 ACPA/NASPA document. Study results indicated that the competencies generated greatly aligned with the professional competencies. In this section, a discussion of findings, implications, as well as recommendations are presented. The last section provides a summary of the findings and their relevance to theory and practice.

### **Discussion**

In identifying the outputs associated with the function of SSS professionals, the panel of experts recommended 34 from a pool of 40 outputs (see Table 6). The low consensus on these items can be attributed to the contextual differences among the panel of experts. While some experts rated these outputs as “very important,” for others that was not the case. For some experts, these outputs may be typical in their own district, but for others they may not be relevant at all. The differences in the nature of work that SSS professionals engage in (or the types of services they provide to their students) likely explains why these items had a low consensus score. Even though the panel of experts have experience working with STEM bridge programs,

they come from different campuses. These campuses have designated the SSS roles and responsibilities differently and have different personnel infrastructures, causing them to have diverging views in some areas.

It is also important to note that in Round 1 of the data collection where the list of outputs was being identified for inclusion in Round 2, Item 13 (coordination with faculty) was excluded due to its low consensus rating among the panel of experts. While it was surprising that this output was not included, the data showed that all panel experts who chose to exclude this item—except for one—were experts who have either worked as counselors or student affairs managers. For the contrary, panel members currently in SSS roles, in similar roles, or managing academic and affairs programs opted to include this item. It seems that their experience in both academic and affairs areas could be the reason that these experts value the integration of student support services with academic affairs—in this case via SSS roles and faculty coordination. In addition, the item wording could have also played a role in the selection, as the word “coordination” seemed too broad, which possibly generated ambiguity among raters.

A close examination of the items indicate that these outputs were much more associated with the functions performed by an administrator rather than an SSS (e.g., Item 8: case resolution and case management; Item 27: program report; Item 28: project/program management delivery; and Item 5: budget and financial report). Considering that these outputs are viewed as more of an administrator-type of work, it was not surprising that experts diverged in their opinions about these items. Likewise, some experts also thought that these outputs are not typically expected of them, as their functions were more focused on assisting and supporting students instead of managing programs, disputes, budgets, and financial reports.

A case in point was Item 5 (“budget and financial reports”), in which six experts expressed divergent opinions through their scores. When asked if they were to re-rate this item after seeing how their scores deviated from the panel group’s score, one expert strongly stated:

Being a SSS in a STEM major, I have never found a need to provide a budget or financial report. Neither can I think of a reason for when that would be needed unless one is in a higher position that manages the money.

On the other end of the spectrum is the opinion of another expert who argued: “I believe it is critically important to retain grants and funding.” These two substantially divergent ideas point to the reason why Item 5 (“budget and financial report”) was one of the lowest ranked outputs in terms of importance and consensus.

For the study-generated competencies, those rated in the top were mostly the same competencies reported in previously published competency studies. Of the 17 top competencies, Item 10 (“interpersonal skills”) was ranked first with a median score of 5 and an IQR = 0, which indicates absolute consensus, or full and unanimous agreement. This result is expected considering the fact that having the ability to relate with students and other people is not unique to this particular position, but rather it is an essential, general competency that a professional should possess when working in a position that provides support to students. In his study of competencies of academic advisors, Hughey (2011) highlighted the importance of interpersonal skills, claiming that advisors should be continually provided with training and strategies to enhance these skills as these professionals are under significant pressure to perform a wide variety of functions that pertain to student support. He also added that the value of interpersonal skills cannot be overemphasized, particularly at a time when institutions of higher learning are facing challenges in improving student outcomes such as retention and graduation rates.

Recognizing the importance of this skill, Beres (2010) noted that the CAS (2008) has incorporated “interpersonal competence” in student learning and development outcomes, as well into the standards for education preparation programs for academic advisors. They claim that the integration of this competency in the curriculum is critical so that educational institutions can effectively design strategies to enhance proficiency in “interpersonal relations.” Alongside “interpersonal skills,” the study found other essential competencies that were relevant to the role of an SSS, including “collaboration skills;” “communication skills;” “organizational skills;” “supporting and helping skills;” “analytical and problem-solving skills;” “cultural skills;” “active listening skills;” and “knowledge of equity and inclusion,” among other things. More importantly, these top competencies were consistent with those found in previous competency studies. For example, Burkard et al. (2005) and Lovell and Kosten (2000) both conducted a study on the competencies of student affairs professionals and found the importance of the following competencies: human relations, collaborations, communication, working with diverse populations of students, problem-solving skills, empathy, caring, and flexibility.

The top competencies that emerged from the study were supported by competency studies reported in extant literature. For example, Burkard et al. (2005) and Lovell and Kosten (2000) both examined the competencies of student affairs professionals and emphasized the importance of the following competencies: human relations, collaboration, communication, working with diverse population of students, problem-solving skills, empathy, caring, and flexibility. However, it is interesting to note that during the time that both studies were conducted, competencies related to research and program evaluation were not highly regarded, which mirrors the findings of this study. Furthermore, research and program evaluation were also considered not as important. In fact, “knowledge of research” was removed from the Round 2 list

because its median and IQR scores were among the lowest, while “knowledge of program evaluation” was among the lowest ranked competencies (see Table 11). It is also worth mentioning that five competencies (Items 16, 18, 22, 23, and 24) had a median rating of 4 (“very important”), however, experts were not in unanimous consensus in their ratings, as shown by the items’ IQR values of greater one. The low level of consensus can be due to the experts’ differences in contexts. Experts who rated these items high may have found them relevant to the work that SSS professionals do in their campuses, while for others that might not be the case. Contextual differences (such as experts’ work experiences and campus affiliations) might have played an important role in the reporting of divergent views.

After identifying the essential competencies for the SSS position, a crosswalk analysis was conducted to compare the study-generated competencies to the 2015 ACPA/NASPA professional competencies. The goal of the analysis was to determine the degree of alignment between the study competencies and the professional competencies, but with the caveat that the matching was not always analogous to a one-to-one correspondence. For some study-generated competencies, the matching was evident, but for others it was not straightforward. This was because the competency areas in the 2015 ACPA/NASPA professional competencies document were described in broad and general terms and were designed for educators, while the study-generated competencies were specific and highly contextualized because they were derived from the job descriptions of professionals working in student affairs.

Gansemer-Topf and Ryder (2017) used this process of matching in their study when they examined mid-level supervisors’ perceptions of the skills needed for entry-level student affairs work. After generating a list of competencies through individual interviews and follow-up interviews, the researchers compared the responses to the 2015 ACPA/NASPA professional

competencies in order to generate the themes which became their basis for assessing whether or not their study-generated competencies aligned with the professional competencies as described in the 2015 document. As was stated above, the matching for some competencies was quite challenging due to conceptual overlaps in the descriptions between or among competency areas. For instance, “cultural competence” was obviously categorized under social justice and inclusion; however, for items like “analytical and problem-solving skills,” its classification cuts across competency areas such as organizational and human resources, law, policy, governance, technology, or even advising and supporting. Similarly, “communication skills,” is a highly-ranked competency that can be categorized under organizational and human resources, although it is also possible to put it under advising and supporting, or any other competency area where such skills were required and necessary. “Time management skills” is another item that cuts across several competency areas, but it can be classified as leadership, organizational and human resources, or perhaps under values, philosophy and history. Being able to manage time is an essential component of professionalism at work. Likewise, items such as “knowledge of institutional policies” were classified under law, policy, and governance although it was also possible to put them under organizational and human resources. In general, many items that were difficult to classify were general competencies (e.g., interpersonal skills, collaboration skills, and communication skills as English fluency) that underlie role-specific competencies. As Gansemer-Topf and Ryder (2017) reported, these are general competencies often included in entry-level position job descriptions.

A major theme that emerged in the crosswalk analysis was the advising and supporting, which accounted for 12% of the total competencies. These competencies included (i) interpersonal skills, (ii) supporting skills, (iii) analytical and problem-solving skills, (iv) listening



skills, and (v) academic advising and counseling skills. However, among these five competencies, only “academic advising and counseling skills” was not in the top competencies. One reason could be that most community colleges have separate departments that specifically handle support like academic advising (i.e., academic tutorial) and counseling (i.e., counseling department).

Among the least cited competencies were related to personal and ethical foundation; law, policy, and governance; and technology. With respect to technology-related competencies, one expert, however, shed light into this issue saying: “In my opinion, I feel like if someone is not knowledgeable in technology, they can still be efficient and successful using the means they are comfortable in and hopefully develop their knowledge gradually.” Maybe for most experts, the SSS professionals working in their own contexts are only required to know the bare minimum knowledge of technology, such as MS Office and Student Information System, which basically involves data entry and reporting.

### **Limitations**

The Delphi method is a useful technique for exploring and examining issues pertaining to the required competencies and associated outputs related to the work of SSS professionals. The use of web-based platforms in collecting data (as well as in interacting with the panel of experts) has reduced both the time and cost of conducting the study. The use of email and virtual communication has not only enhanced the ease of communication; it has also maintained the independence of experts in expressing their opinions. While these, without a doubt, were valid benefits for using Delphi method, the lack of opportunity to probe issues that require clarification and validation was wanting. The comments and opinions they provided in the qualitative section

of the questionnaire were not always straight forward and often the short explanations were not sufficient.

This was further complicated by the occurrence of the COVID-19 pandemic, during which Rounds 2 and 3 of data collection were conducted. During these rounds, the academic and nonacademic staff in community colleges in the Silicon Valley were already overwhelmed with work related to transitioning from office to home-based work, and from in-class to online class instruction. The additional workload brought about by the COVID-19 lockdown might have impacted the amount of time the experts put into responding the survey questionnaires for Rounds 2 and 3.

As stated previously, this study identified the outputs and competencies related to the roles of SSS professionals in community colleges in the Silicon Valley region. The competencies identified in the study originated mainly from the review of job descriptions of SSS and other similar jobs, including academic advising specialist (a staff position, usually entry-level), academic advisor (faculty in student's chosen major), and student affairs specialist (e.g., housing, student leadership, counseling). Thus, the list of competencies did not include those that were identified and reported in extant studies. For this reason, the list of competencies generated in this study were limited to those described in the job descriptions of community colleges included in the study.

Scrutiny of the competencies generated in this study—particularly the top competencies—indicates that they are broad and general in nature. This implies that these competencies can be loosely applied to any profession, be it academia and beyond. If the focus of analysis is more geared towards a specific group of students (e.g., STEM students), then a

more specific skillset should be expected from these SSS professionals, above and beyond mere basic competencies.

### **Implications and Recommendations**

In qualitative study that employs the Delphi method (such as this study), it is important that trustworthiness of the results is established (Hasson & Keeney, 2011). A potential threat to the validity and trustworthiness can occur when interpretations of the study findings remain wanting due to the lack of opportunity to confirm and clarify some of the issues brought up during the data collection and analysis. In the context of the study, the multiple data collection stages were sufficient, but a focus group discussion with the most experienced panel members would have further enhanced the validity and trustworthiness of the study results.

Galloway and Ishimaru (2017) used focus group discussions with a smaller group of participants after they collected data using electronic surveys for Rounds 1 and 2. In this study, the authors examined high-leverage practices in educational leadership that promote equity. Notably in Round 3, the authors conducted two focus group discussions to critically examine and deliberate on the results of the Round 2 survey. During these sessions, the authors asked critical and clarifying questions such as: Why do you think these items (behaviors) have consistently identified as high leverage leadership behavior? What, if anything, strikes you about the practices that had the most consensus from Round 2? What behaviors or contents are we missing, if any? Thus, for this study, the focus group discussion would have provided an excellent avenue for experienced experts to provide contexts and rationale for why divergence in ratings occur. More importantly, the focus group discussions would have also been useful in exploring the reasons why specific and highly situational competencies required for work in STEM have rarely been cited. In cases where they were cited, it would also have been informative to hear reasons

from the experienced experts why these competencies were not considered as essential as other basic and general competencies. Similar to what Galloway and Ishimaru (2017) implemented in their study, questions such as those raised in this study would have been addressed had there been an opportunity to gather a smaller group of experts to discuss those questions.

The competencies reported in this study were limited to the competencies described in the job descriptions of SSS and other similar roles. It is recommended that the current study be extended to include competencies reported in previous studies rather than just those found in job descriptions. In this regard, job descriptions should be viewed more as a dynamic document that reflects not only those competencies traditionally regarded in the past, but also those that are emerging, taking into account the current skills demanded by industries and educational institutions. In organization RT, this points to the idea that roles are not only meant to preserve the order and stability in the social structure, but they also reflect the changing interactions and relationships between workers and organizations. When job descriptions consider the changing and emerging skills reported in empirical studies, human resource administrators and supervisors will be more informed about these issues. This information reflects those of the practitioners (i.e., experienced counselors, SSSs, supervisors, administrators, and deans) working in the field of student affairs.

While most of the competencies generated from the study aligned with those found in extant literature, for future research it is suggested that a more focused and homogeneous group of experts should be studied in order draw more specific competencies that are closely associated the work of SSS professionals in STEM education. In fact, Jones (2002) recommended a more homogeneous Delphi panel to carefully explore the divergence of opinions among experts. As

shown in the study results, most of the top competencies rated and cited by the panel of experts were broad and general in nature.

Given the lack of specificity in the competencies generated, college campuses can take the findings of this study and tailor them to suit their own campus needs and infrastructure to find a more specific list of competencies and outputs for their respective SSS professionals. Because each campus serves different populations and student needs, customizing the list of outputs and competencies is critical in addressing the need for specificity of the skills required of SSS professionals as well as the services that they deliver.

As an offshoot of the above recommendation, a framework should be developed that helps identify and classify competencies that are considered basic and general (universalist's view) and specific and contextual (situationalist's view; Capaldo et al., 2006; Ulrich et al., 2012). A framework that makes a clear distinction between general and contextual skillset will be much more relevant to competency studies examining alignment between the academician's and practitioner's view. It will also provide valuable information to managers and supervisors making decisions related to hiring, training and development, and talent management.

Furthermore, a review of SSS professionals' job descriptions indicated a lack of emphasis on skills related to technology integration in student affairs professional work. While most required and essential competencies are directly related to supporting and assisting students, Barrett (2003) noted that SSS professionals are becoming increasingly responsible for using technology to provide information and services to students. For this reason, it is recommended that human resources review and keep the job descriptions up to date to ensure that emerging competencies—including technology-related competencies—are incorporated in the statement of SSS roles and responsibilities. For SSS working specifically in STEM core model (or any

environment where their role is critical to STEM education), human resource departments should require more specialized and highly contextualized skills, not only basic knowledge of technology—if community colleges want the SSS to succeed in their role.

Considering the limitations of this study, community colleges in the Silicon Valley should consider the top competencies as a guide in the selection of their staff, but with the caveat that they also consider other specific, specialized competencies that are essential to the needs of special population of students, such as those in the STEM Core. Because the STEM Core Model is more catered to a specific group of students, human resource departments should consider striking a balance between a universalist- and a situationalist-focused approach in identifying competencies (Capaldo et al., 2006; Ulrich et al., 2012). A universalist approach emphasizes the need for general competencies that apply across workplaces, while a situationalist approach focuses on competencies that are highly context dependent. The learning environments for students in STEM education need SSS professionals who have basic knowledge and skills, but who also are proficient in context-specific competencies. As shown in the study results, few of the competencies generated from study were specialized. For this reason, hiring supervisors and managers should ensure that other equally essential competencies that are specific to the needs of the students being served are also considered.

Institutions of higher learning—particularly community colleges—should consider developing assessments of key skills and professional growth opportunities for SSS. The 2015 ACPA/NASPA document provides key competencies and associated outcomes (akin to the outputs generated in this study) that an SSS professional should be able to perform ranging from foundational, intermediate, and advanced skills. In particular, community colleges can use these classifications as a framework for determining the skill level of their staff, as well as a basis for

determining the appropriate professional training and development suited for the staff on basis of the skill assessment.

## **Conclusion**

Based on the analysis results, the following can be concluded. First, that top outputs associated with the SSS role were largely related to students, such as: fostering a welcoming environment; ensuring collaboration and communication; and ensuring support services and academic assistance are in place, among others. These outputs are all associated with the work of an SSS, and as such, administrators, supervisors, and managers should ensure that personnel are provided with appropriate training and professional development to be equipped with these types of work.

Second, three outputs that emerged from the study were not considered critical, including case management, program management delivery, and budget and financial report. For most experts, these outputs are more aligned with the role of managers, administrators, and supervisors. This study finds that SSS working in STEM bridge programs in community colleges should instead focus on the delivery of services that are more focused on the needs of the students rather than the needs of the management.

Third, the competencies essential to the work of SSS professionals in the STEM Core Model in the community colleges were generally human-related competencies, such as: interpersonal skills; collaboration and communication skills; organization and supporting skills; cultural competence and knowledge of equity and inclusion; and ability to identify students' potential as well as analytical and problem-solving skills. As explained earlier, these are foundational skill sets that are typically required for entry-level student affairs professionals.

Fourth, the findings of the study mirrored some of the findings from previous studies conducted by Burkard et al. (2005) and Lovell and Kosten (2000), including the lack of competencies related to research, assessment, and program evaluation. These skills were not as essential as human-relation skills when it comes to SSS professionals working in STEM bridge programs. Lastly, the Delphi method is an appropriate technique for studying competencies and outputs for SSS. The use of web-based survey instruments (such as Survey Monkey) has reduced the time needed to administer and collect the data. The ease of extracting the data once the data collection is completed is an added advantage. This web-based feature not only improves the efficiency of collating responses, it also makes the process accurate.



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## Appendix A: Letter of Invitation

Dear Sir or Madam:

I am inviting you to participate in the study, "*Identifying Roles, Competencies, and Outputs of SSSs in STEM Core Models in California.*" I have identified you as an expert practitioner in the area of student affairs or STEM.

The purpose of this study is to identify the outputs and competencies associated with the work of the SSSs (SSS) who support students in STEM bridge programs such as the STEM Core model. The results of this study will help us clarify the role of SSS, improve the job descriptions, and support the learning and development of SSS in their work with students. If you choose to participate, I will send you an executive summary of the results, upon your request.

In this study, I will use a multi-round procedure to gather your views and opinions about the aforementioned topic. I estimate it will take three survey rounds to collect the appropriate data. In each round you will receive an electronic questionnaire that will take 10-20 minutes to complete. There will be about a week between the questionnaires as I compile the results of the expert panel. Details about the survey rounds will be provided to you upon receipt of your acceptance to participate in this study. I plan to begin the study February 10, 2020 and complete it by March 20, 2020.

For this reason, may I request that you reply to this email if you would like to participate in this study? Regardless of your response, thank you for your contributions to the field as an expert in student affairs profession.

Sincerely yours,

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Alexandra C. Duran

Department of Organizational Leadership  
College of Graduate and Professional Studies  
Abilene Christian University

## Appendix B: Round 1 Survey Questionnaire

### Instructions

- I. Please review the following list of competencies that I have compiled from existing SSS or similar job descriptions in STEM bridge programs. For each of the competencies, please write a check to indicate whether the relevant competency should be included or excluded in the study. Also, in the space provided below the table, write any relevant competencies that are not provided in the list.

Competencies	Include	Exclude
Ability to Make Independent Judgment		
Administrative Skills		
Academic Advising/Counseling Skills (Career, academic, etc.)		
Collaboration Skills		
Communication Skills (Oral & Written)		
Data Analysis Skills		
Editing Skills		
Facilitation Skills		
Interpersonal Skills		
Interviewing Skills		
Knowledge of Budget and Financial Records		
Knowledge of Case Management		
Knowledge of Classroom Policies/Course Content		
Knowledge of Evaluation/Assessment		
Knowledge of Institutional Policies/Academic Requirements		
Knowledge of Organizational Resources		
Knowledge of Research		
Knowledge of Study Skills/Learning Theories & Development		
Knowledge of Technology		
Organizational Skills		
Planning Skills		

Presentation Skills  
 Project Reporting Skills  
 Project/Program Management Skills  
 Public Relations Skills  
 Record-Keeping Skills  
 Software Skills  
 Supporting/Helping Skills

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In the comment field provided below, please write/add competencies that you think should be included in the list.

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II. Please review the following list of outputs that I have compiled from existing SSS or similar job descriptions in STEM bridge programs. For each of the competencies, please write a check to indicate whether the relevant output should be included or excluded in the study. Also, in the space provided below the table, write any relevant outputs that are not provided in the list.

Outputs	Include	Exclude
Academic support/assistance		
Activities coordinated		
Advice on study habits & study skills advice		
Academic advising		
Assessment reports		
Counseling provided		
Agenda/meeting minutes/other documentation		
Budget and Financial Reports		
Career coaching		

Case resolution/case management  
Collaboration is developed/promoted  
Communication/correspondence prepared  
Coordination with faculty  
Ensure classroom policies are followed  
Ensure collaboration is developed/promoted  
Ensure communication is accomplished  
Ensure data are organized/tracked/managed.  
Ensure deadlines are met  
Ensure policies are explained  
Ensure student records are managed  
Ensure study skills are implemented  
Ensure support services are communicated/in place/provided  
Evaluation report  
Incident report  
Information materials are created/prepared.  
Interview materials  
Marketing and outreach strategies  
Program compliance  
Program materials prepared/developed  
Program participation  
Program report  
Project/Program management delivery  
Research report/updated report  
Revised policies and protocols  
Scheduled meetings  
Statistical report  
Student progress/evaluation report

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In the comment field provided, please write/add outputs that you think should be included in the list.

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## Appendix C: Round 2 Survey Questionnaire

### Instructions

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I. In Round 1, a total of \_\_\_\_ competencies and \_\_\_\_ outputs were generated from the review of job descriptions and from your comments and additions. These competencies and outputs are now incorporated in this questionnaire.

II. For each of the competencies, please rate (by circling the number) their importance for effectiveness in doing the job using the seven-point Likert scale as shown below:

- 1 = Not important
- 2 = Slightly important
- 3 = Moderately important
- 4 = Very important
- 5 = Essential

Please note that this will not be your final opportunity to rate the importance of each competency and output. You will have the opportunity to re-rate them in the next round after you see the expert panel average. “Importance” indicates whether the competency is necessary in the effective functioning of the SSS role.

Competency	Rating Scale				
Ability to make independent judgment	1	2	3	4	5
Ability to identify students’ potentials	1	2	3	4	5
Ability to identify students’ strengths	1	2	3	4	5
Administrative Skills	1	2	3	4	5
Academic advising/counseling skills (Career, academic, etc.)	1	2	3	4	5
Active listening skills	1	2	3	4	5
Analytical and problem-solving skills	1	2	3	4	5
Collaboration skills	1	2	3	4	5
Communication skills (Oral & Written)	1	2	3	4	5
Cultural competence	1	2	3	4	5
Creativity and visionary skills	1	2	3	4	5
Data analysis skills	1	2	3	4	5
Editing skills	1	2	3	4	5
Facilitation skills	1	2	3	4	5

Grant-request and management skills	1	2	3	4	5
Interpersonal skills	1	2	3	4	5
Interviewing skills	1	2	3	4	5
Knowledge of case management	1	2	3	4	5
Knowledge of classroom policies/course content	1	2	3	4	5
Knowledge of evaluation/assessment	1	2	3	4	5
Knowledge of equity and inclusion	1	2	3	4	5
Knowledge of institutional policies/academic requirements	1	2	3	4	5
Knowledge of institutional structure and critical student support services	1	2	3	4	5
Knowledge of organizational resources	1	2	3	4	5
Knowledge of study skills/learning theories & development	1	2	3	4	5
Knowledge of STEM careers infrastructure	1	2	3	4	5
Knowledge of student learning outcomes	1	2	3	4	5
Knowledge of technology	1	2	3	4	5
Marketing skills	1	2	3	4	5
Organizational skills	1	2	3	4	5
Planning skills	1	2	3	4	5
Presentation skills	1	2	3	4	5
Project reporting skills	1	2	3	4	5
Project/program management skills	1	2	3	4	5
Public relations skills	1	2	3	4	5
Record-keeping skills	1	2	3	4	5
Socio-emotional skills					
Software skills	1	2	3	4	5
Student development skills	1	2	3	4	5
Supporting/helping Skills	1	2	3	4	5

Time management skills	1	2	3	4	5
Understanding and appreciation of diversity	1	2	3	4	5
Adaptability to support students via advanced information technology	1	2	3	4	5

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III. For each of the outputs, please rate their importance using the seven-point Likert scale as shown below:

- 1 = Not important
- 2 = Slightly important
- 3 = Moderately important
- 4 = Very important
- 5 = Essential

Outputs	Rating Scale				
Academic support/assistance	1	2	3	4	5
Activities coordinated	1	2	3	4	5
Advice on study habits & study skills advice	1	2	3	4	5
Assessment reports	1	2	3	4	5
Budget and financial reports	1	2	3	4	5
Counseling provided (course registration, selection)	1	2	3	4	5
Career coaching	1	2	3	4	5
Case resolution/case management	1	2	3	4	5
Collaboration is developed/promoted	1	2	3	4	5
Communication/correspondence prepared	1	2	3	4	5
Coordination with faculty	1	2	3	4	5
Ensure classroom policies are followed	1	2	3	4	5
Ensure collaboration is developed/promoted	1	2	3	4	5
Ensure communication is accomplished	1	2	3	4	5
Ensure data are organized/tracked/managed.	1	2	3	4	5

Ensure deadlines are met	1	2	3	4	5
Ensure policies are explained	1	2	3	4	5
Ensure student records are managed	1	2	3	4	5
Ensure study skills are implemented	1	2	3	4	5
Ensure support services are communicated/in place/provided	1	2	3	4	5
Evaluation report	1	2	3	4	5
Feedback and intervention based on the data	1	2	3	4	5
Incident report	1	2	3	4	5
Information materials are created/prepared.	1	2	3	4	5
Institutional procedures for evaluation report and incident report are followed	1	2	3	4	5
Jon/internship interview training/guidance	1	2	3	4	5
Interview materials	1	2	3	4	5
Marketing and outreach strategies	1	2	3	4	5
Participation in program activities	1	2	3	4	5
Program compliance	1	2	3	4	5
Program materials prepared/developed	1	2	3	4	5
Program report	1	2	3	4	5
Project/Program management delivery	1	2	3	4	5
Program success outcomes are met	1	2	3	4	5
Research report/updated report	1	2	3	4	5
Revised policies and protocols	1	2	3	4	5
Scheduled meetings	1	2	3	4	5
Statistical report	1	2	3	4	5
Student progress/evaluation report	1	2	3	4	5
Students in the program develop study skills	1	2	3	4	5
Welcoming and friendly environment for students is fostered	1	2	3	4	5

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## Appendix D: Round 3 Survey Questionnaire

### Instructions

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I. In Round 2, you were asked to rate the importance of each competency and output. After gathering all the panel members' responses, the median and interquartile range (IQR) were calculated to assess the panel members' level of consensus. In the table below, you will see your rating on each of the competencies and outputs and whether your rating falls outside of the IQR. If your rating falls outside of the IQR (as indicated by a red bold mark), you will be given the opportunity to adjust or leave your rating score the same. However, if you leave your rating the same, please provide a brief explanation for why your perception of importance may differ from others.

For your reference, the seven-point Likert scale used in Round 2 is shown below:

- 1 = Not important
- 2 = Slightly important
- 3 = Moderately important
- 4 = Very important
- 5 = Essential

Output	Expert Panel IQR	Individual Rating	Individual Re-rating	Comments/ Explanations
Academic support/assistance				
Activities coordinated				
Advice on study habits & study skills advice				
Assessment reports				
Budget and financial reports				
Counseling provided (course registration, selection)				
Career coaching				
Case resolution/case management				
Collaboration is developed/promoted				
Communication/correspondence prepared				
Coordination with faculty				
Ensure classroom policies are followed				
Ensure collaboration is developed/promoted				

Ensure communication is accomplished  
Ensure data are organized/tracked/managed.  
Ensure deadlines are met  
Ensure policies are explained  
Ensure student records are managed  
Ensure study skills are implemented  
Ensure support services are communicated/in  
place/provided  
Evaluation report  
Feedback and intervention based on the data  
Incident report  
Information materials are created/prepared.  
Institutional procedures for evaluation report  
and incident report are followed  
Jon/internship interview training/guidance  
Interview materials  
Marketing and outreach strategies  
Participation in program activities  
Program compliance  
Program materials prepared/developed  
Program report  
Project/Program management delivery  
Program success outcomes are met  
Research report/updated report  
Revised policies and protocols  
Scheduled meetings  
Statistical report  
Student progress/evaluation report  
Students in the program develop study skills

Welcoming and friendly environment for students is fostered

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Competencies	Expert Panel IQR	Individual Rating	Individual Re-rating	Comments/ Explanations
Ability to make independent judgment				
Ability to identify students' potentials				
Ability to identify students' strengths				
Adaptability to support students via advanced information technology				
Administrative Skills				
Academic advising/counseling skills (Career, academic, etc.)				
Active listening skills				
Analytical and problem-solving skills				
Collaboration skills				
Communication skills (Oral & Written)				
Cultural competence				
Creativity and visionary skills				
Data analysis skills				
Editing skills				
Facilitation skills				
Grant-request and management skills				
Interpersonal skills				
Interviewing skills				
Knowledge of case management				
Knowledge of classroom policies/course content				
Knowledge of evaluation/assessment				

Knowledge of equity and inclusion  
Knowledge of institutional  
policies/academic requirements  
Knowledge of institutional structure and  
critical student support services  
Knowledge of organizational resources  
Knowledge of study skills/learning theories  
& development  
Knowledge of STEM careers infrastructure  
Knowledge of student learning outcomes  
Knowledge of technology  
Marketing skills  
Organizational skills  
Planning skills  
Presentation skills  
Project reporting skills  
Project/program management skills  
Public relations skills  
Record-keeping skills  
Socio-emotional skills  
Software skills  
Student development skills  
Supporting/helping Skills  
Time management skills  
Understanding and appreciation of diversity

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## Appendix E: IRB Approval Letter

### ABILENE CHRISTIAN UNIVERSITY

*Educating Students for Christian Service and Leadership Throughout the World*

**Office of Research and Sponsored Programs**

320 Hardin Administration Building, ACU Box 29103, Abilene, Texas 79699-9103  
325-674-2885



March 2, 2020

Alexandra Duran  
Department of Business Management  
Abilene Christian University

Dear Alexandra,

On behalf of the Institutional Review Board, I am pleased to inform you that your project titled "Identifying Roles, Competencies, and Outputs of Student Support Specialists in STEM Core Models in California",

(IRB# 20-018 ) is exempt from review under Federal Policy for the Protection of Human Subjects.

If at any time the details of this project change, please resubmit to the IRB so the committee can determine whether or not the exempt status is still applicable.

I wish you well with your work.

Sincerely,

*Megan Roth*

Megan Roth, Ph.D.  
Director of Research and Sponsored Programs