Understanding Academic Advising at Institutions with a First-Year Engineering Program

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Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

Doctor of Philosophy
In
Higher Education

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May 10, 2019
Blacksburg, VA

Keywords: academic advising, organizational structures of academic advising, advising program development, models of advising, orientation, major exploration, and advisor recognition, first-year engineering

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ACADEMIC ABSTRACT

Academic advising has been a part of United States (U.S.) colleges and universities since their inception, yet academic advising as we know it today is a relatively new profession. Over the last several decades, many colleges and universities have employed professional advisors, rather than teaching and learning faculty, to carry out the academic advising functions however little is known about the structures of these advising programs. Academic advisors often serve on the front lines (i.e., high student contact hours) and advocate for student success by supporting students in learning about their institutions, uncovering their personal and professional goals, and encouraging them to pursue life goals. However, the responsibility of academic advising and advisors varies at institutions of higher education across the country and this variation is not well understood.

The purpose of this research was to better understand the structures of engineering academic advising at large four-year, primarily residential institutions with a first-year engineering program. To accomplish this purpose, the following overarching research question guided my study: How do first-year engineering programs structure academic advising, and what services, programs, and support are in place for academic advisors and students? To answer this question, I used a qualitative multi-case study design to understand the landscape of advising in first-year engineering programs and the organizational structures of their advising programs. I used Habley's Organizational Models for Academic Advising (1983) as a way to categorize the structures of academic advising and Frank's (1993) Integrated Model of Academic Advising Program Development as a conceptual framework for understanding how academic

advising programs develop, the services provided, programming available, and how to enable the advisors to better support the student population. My findings include identifying: 1) several similarities between case sites' organizational structures of advising, 2) new student orientation and major exploration as main services offered at all sites, 3) a lack of formalized planning across all case sites, and 4) the prominence of advisor training with a desire to have more formal advisor recognition programs. Recommendations for future research, practice, and policy are provided along with a proposal for a new model for First-Year Engineering Advising Programs.

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GENERAL AUDIENCE ABSTRACT

Academic advising is a function within higher education that serves students by providing guidance to navigate the higher education system. Academic advisors often serve on the front lines of the higher education environment and advocate for student success by supporting students in learning about their institutions of higher education, uncovering their personal and professional goals, and encouraging them in their academic pursuit.

Academic advising has been a part of the United States (U.S.) higher education system at colleges and universities since their inception, yet academic advising, as we know it today is a relatively new profession. Over the last several decades, many colleges and universities have employed individuals to serve as professional academic advisors. These individuals spend the majority of their time and availability on the sole function of academic advising. However, the responsibility of academic advising and advisors varies at institutions of higher education across the country and this variation is not well understood.

The purpose of this research was to gain a better understanding of the responsibilities and organizations of first-year engineering academic advising programs at large four-year, primarily residential institutions with a first-year engineering program. I interviewed individuals at universities and analyzed relevant advising program documents to understand the evolution of their advising programs, the services they provide, their program goals, and professional development available to them. My research uncovered 1) several similarities among the organization of the advising programs, 2) key academic services such the onboarding process for students known as new student orientation and methods to help student select an academic

major, 3) a need to develop program planning initiatives and 4) the existence of training and lack of advising awards. Recommendations for future research, practice, and policy are provided along with a proposal for a new model for First-Year Engineering Advising Programs.

ACKNOWLEDGMENTS

Thank you to everyone who gave me confidence to pursue this work and for respecting and supporting my passions for the field of academic advising. I would like to thank my dissertation chair, Dr. Holly Matusovich for guiding me through this process and encouraging me to do great things. Thank you for taking me under your wing, providing constructive feedback, learning about my research interests, and challenging me to get my ideas and words onto paper. I learned a great deal from you about strength, character, and how to support and encourage others. I could not have done this without you and I will forever be grateful for all of your support through this journey.

To my committee members, Dr. Claire Robbins, Dr. Ken Smith, and Dr. David Kniola thank you for supporting me, and challenging me to think beyond my experiences and the bigger goals of higher education. To Dr. Stephanie Adams, I would have never thought about an advanced degree had you not encouraged me to apply, step out of my comfort zone, and go for it. You played a huge role in my journey and I appreciate all of your words of encouragement.

To my incredible colleagues on the General Engineering Advising Team and the entire Department of Engineering Education, I could not have asked for a better group of people to work with each day. It is a blessing to have such supportive colleagues, a department who fosters professional growth, and treats people with respect and dignity. To Natasha Smith, we started as colleagues, became best friends, built an award winning advising team from the ground up, and became family along the way. You pushed me, made me a better person, and literally helped me every day. You challenged me to think bigger than what people expected of us, helped me elevate the field of advising, and together we have achieved amazing things.

I also could not have completed this pursuit without the love and support of my family. Especially my parents Ronald and Jeanette who constantly asked me how my work was coming along and told me that this process will soon be behind me. My brother Jason and sister-in-law Melissa for listening to me complain on speakerphone about working on my homework or research rather doing something fun with them. To my father-in-law Dwight, mother-in-law Maretta, and brother-in-law Daniel I could not have asked for a more supportive extended family, this was a tough journey and you help me stay focused on the end game even though a lot of Sunday baseball games were missed when I started this journey. To my loving husband Joshua who proofread his share of papers over the last 7 years, wiped my tears every single semester when I wanted to quit but reminded me in his own way that we do not start something without finishing. I am so thankful to have you in my life and for pushing me to the finish line.

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Chapter 1: Introduction

1.1 Introduction/Problem Statement

Science, technology, engineering, and math (STEM) education came to the forefront of United States (U.S.) educational policy in 2012 when the President's Council of Advisors on Science and Technology (2012) released the "Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics" report. The report recommended a focus on increasing the number of college graduates in the U.S. and the Obama presidential administration upheld the council's recommendation and made the college completion goal public that same year; in addition the administration established a 10-year timeframe and deadline for completion (Feder, 2012). "*Science and innovation are key components of a strong American economy and that increasing opportunities for young Americans to gain STEM skills can both create jobs and enhance our national competitiveness"* was a sentiment expressed on several occasions by the Obama presidential administration (Feder, 2012). According to the U.S. Department of Commerce, investment in STEM education promotes economic growth that fosters technological advancements, innovation, and entrepreneurship (U.S. Department of Commerce, 2012). The Trump presidential administration reaffirmed this push for STEM education by dedicating at least $200 million per year in grant funds towards increasing access to STEM education in the K-12 schools as well as post-secondary education (The White House, 2017). Current and previous presidential administrations have been keen on providing resources for Americans to develop the skills they need to be competitive in the job market (The White House, 2017).

The national focus on STEM education should not imply that non-STEM fields are not vital to educational policy, but rather that STEM education is one area of concern that has been

identified as needing improvement to support our nation's competitiveness with other countries (U.S. Department of Commerce, 2012). In the last several years, college completion has increased the visibility of the field of academic advising through the Guided Pathways to Success publication that points to academic advising as a key to degree completion (Complete College America, 2013).

My research on academic advising places a specific emphasis on the engineering component of STEM and provides an understanding about the engineering population in a higher education context. Although there is a significant amount of research focused on engineering degree completion through the lenses of race, gender, and educational preparedness, very little research focuses on engineering academic advising at higher education institutions (Dickson, 2010; Amelink and Creamer, 2010). A focus on the engineering student population is critical as the demand for undergraduate engineering students and programs continues to increase. In 2017 the undergraduate engineering enrollment was at the highest in 10 years with 619,095 full-time engineering students, a 54 percent increase since 2008 yet the number of degrees awarded were only 124,477 (Yoder, 2017). To address the completion problem, administrators will need a comprehensive set of evidence-based student support mechanisms to bolster student success n and out of the classroom. This is particularly important in engineering fields where the number academic programs and student enrollment continues to outpace existing support.

1.2 Purpose of the study

The purpose of this research was to gain a better understanding of the structures of engineering academic advising large four-year, primarily residential institutions with a first-year engineering program. To accomplish the purpose, the following overarching research question

guided my study: How do first-year engineering programs structure academic advising, and what services, programs, and support are in place for academic advisors and students? To aid in answering my overarching question, the following research questions were included:

- RQ1: What are the organizational structures of academic advising in first-year engineering programs?
- RQ 2: What services do academic advisors describe as being offered to first-year engineering students?
- RQ 3: What efforts do academic advisors describe that are associated with coordinating advising programs?
- RQ 4: What support and professional growth opportunities do academic advisors in first-year engineering programs complete?

To conduct my research, I used a qualitative multiple-case study methodological approach (Yin, 2018). The sample for this study included educators who serve as full-time academic advisors, advising directors, and individuals in an advising administrative capacity of first-year engineering programs at three institutions of higher education. These individuals were full-time professional academic advisors. *Professional academic advisors* are defined as individuals who spend the majority of their time and availability on the sole function of academic advising and programming to assist students in their academic pursuit (Self, 2008). The case sites were universities with an engineering student entering class size of over 900, universities with four or more full-time professional academic advisors, and representing three different organizational models (split, total intake, or no best-fit). The three selected case sites are public-doctoral universities with highest research activity with total student populations ranging from 43,000-60,000. The Carnegie Classification for each case site in regards to size and setting were four-year, large, primarily residential institutions (Carnegie Classification, 2018).

1.3 Background/Frameworks

To answer these research questions, I used Habley's Organizational Models for Academic Advising (Habley, 1983) as a way to categorize the structures of academic advising and the Integrated Model of Academic Advising Program Development (Frank, 1993) as a conceptual framework to guide my research design and direct my decisions concerning data sources, participant selection, data collection, and data analysis. Habley's Organizational Models for Academic Advising include faculty only model, satellite model, self-contained model, supplementary model, split model, dual model, and total intake (King, 2008). The Integrated Model of Academic Advising Program Development consists of a four-stage cyclical model of program development and continuous needs assessment through each stage: Stage 1: Increasing Access, Stage 2: Upgrading Services, Stage 3: Coordinating Programs, and Stage 4: Enabling Advisors (Frank, 1993).

1.4 Significance of the Study and Contributions

The four research questions for this research study provided a mechanism for understanding academic advising in first-year engineering programs. In addressing these research questions, the primary contribution of my dissertation provides a body of knowledge that does not currently exist in the literature and proposes a new model for First-Year Engineering Advising Programs. This section provides insight into how the answer to each question adds to the larger body of current research and the field of academic advising.

RQ1: Although organizational models of academic advising exist, the literature on this topic is minimal. Researchers have not developed any new models for use on the topic in over a

decade. The existing models and research generally describe the concepts of the model and do not attempt to understand which models are being used in practice (Gordon et. al, 2008; Habley, 1983, 1987; Pardee, 2000, 2004). Even less literature exists within engineering or first-year programs specifically. My research addressed this issue by focusing on mapping organizational structures of academic advising to current first-year engineering advising units and providing a body of knowledge that will aid both the field of engineering and the field of academic advising on how programs are structured. Furthermore, most of the prior research conducted used surveys and quantitative methodological approaches rather than qualitative methodological approaches. The qualitative approach allowed me to provide rich thick descriptions of the structures as well as the ability to look for trends and themes in the data. My research indicated that the academic advising structures for newly admitted engineering students are similarly classified at the college level even though the models of academic advising and managing of students throughout are classified differently (Kollar, 2017).

RQ 2: Understanding the services that academic advisors offer to first-year engineering students yielded ideas for new strategies to improve and upgrade services available to students such as workshops, orientation programming, and programs targeted to special populations; improvement and upgrades are an important part of advising program development per Frank's model (1993). In fact, the Integrated Model of Academic Advising Program Development (Frank, 1993) guided the approach to answering the question and recommendations offered. Specifically, answering this question helped identify common workshops, programming, and services that are available to first-year engineering students as well as differences across sites. The common support services across all case sites such a new student orientation (Self & Aguayo, 2009), major exploration (Beggs, 2008; Gallup, 2017; Orr, Brawner, Lord, et al., 2012),

and first-year seminar courses have been previously identified as important when studied separately (as noted in the respective citations). I was also able to identify specialized programming that each case site highlighted that other sites could perhaps benefit from.

RQ 3: Efforts that academic advisors describe for coordinating their programs provide an overview of the connections that academic advisors have to their overall programmatic goals. The Integrated Model of Academic Advising Program Development (Frank, 1993) provided a framework for understanding program learning goals and objectives, the methods for disseminating core details to their student population and advising team, the connections among offices that support student success, and their academic advising approach. Again, these are noted in literature as important when considered separately (CAS, 2013; Keeling, 2010; Miller, 2012; NACADA, 2005).

RQ 4: Access to professional growth opportunities is critical to individual development and academic program development. Advising award programs provides a level of personal satisfaction for the advisor and recognition for the field of advising and the advising program. Through the Integrated Model of Academic Advising Program Development lens, my research uncovered the professional development opportunities that academic advisors are encouraged to, required to, or voluntarily seek. This focus allowed me to document what training and development programs exist and what professional networks advisors have to aid in the evolution of their academic advising program. Professional development is important for advisors like many other professions (CAS, 2013; Keeling, 2010; McClellan, 2007; Miller, 2012; NACADA, 2005; Rust, 2014). Additionally, this lens provided guidance on advisor recognition programs that allowed me to document the existing reward structures at each case site. Gordon,

Habley, and Grites (2008) indicate these reward systems as being a benefit to both the advisor and advising program.

1.5 Audience

The stakeholders or audience for this work includes university administrators, engineering administrators, first-year engineering academic advisors and administrators, and researchers in the fields of academic advising and engineering education. First, university and engineering administrators are stakeholders because the results of this study have the potential to influence the employment criteria for those who work in academic advising positions. My study examined the minimum educational criteria required for new academic advisors, whether a specific educational major is required for employment, and the number of advisors per student, which aids universities in justifying the expansion, or standards represented by other first-year engineering programs.

Second, through my research, first-year engineering academic advisors and administrators have a research sample to take to their administrators to lobby for resources and support for their program. They also have examples from other academic advising units regarding the type of programs, workshops, and development activities currently taking place at similar programs within the engineering context. Essentially, academic advisors and administrators are able to point to my study as way to support their activities or improve on their current practices.

Third, researchers in the fields of academic advising and engineering education now have a study that uses a multi-site case study approach (a qualitative methodology) to aid in future research on the topic. Moreover, the field of academic advising has a study that updates prior research on the topic of organizational structures and program development. Finally, the field of

engineering education has a groundbreaking study that explores an area of engineering education that has not been formally documented through research.

1.6 Organization

Chapter 1 provided a foundation for the study, background information about the topic, purpose, research questions, and the significance of the work. Chapter 2 provides a review of the relevant literature available related to the topic of academic advising and provides an in-depth discussion of the theoretical frameworks. Chapter 3 outlines the methods for this qualitative multi-case study, a description of the respondents, data collection procedures, and analysis techniques. Chapter 4 outlines the interviews and analysis of this study, presents the results of each research question and the assimilation of the Integrated Model of Academic Advising Program Development with the research questions. Finally, Chapter 5 provides a discussion of my research, summary of the major findings, and implications for research and practice.

1.7 Terminology

To facilitate understanding of the subsequent chapters in my dissertation, the following terms have been operationalized to keep language consistent.

Table 1-1: Terminology

Word/Phase	**Definition**
Academic Advising Structure for Newly Admitted Engineering Students	The academic advising organizational structure for newly admitted engineering students and reporting hierarchy
Academic Advising Structure Post Major Change	The organizational structure for academic advising after a student transitions into a specific engineering discipline
Academic Advising Team	The academic advising organizational structure within the overarching program
Academic Probation	When a student's cumulative grade-point average is below a 2.0 or C average this status indicates to the student that they are not meeting the academic standards set forth by their university
Table 1-1 (continued) Terminology	

Advising Programming	The key areas of focus in an academic advising program mentioned as described during the interview process
ASEE	American Society for Engineering Education
Change of Major Criteria	The criteria necessary for a student to transition from a first-year engineering program to a specific engineering discipline
College of Engineering Classification	The label given to students for their academic major once admitted to a College of Engineering
Table 1-1 (continued) Terminology	
FERPA	Family Educational Rights and Privacy Act
First-Generation Students	College students who are the first in their family to attend college
First-Year Engineering	Engineering program with a common first-year curriculum
First-Year Seminar	A course designed to provide an introduction to college, university, study skills, time management, and campus resources
Group Advising	Allows academic advisors to convey a topic in classroom instructional format where multiple participants are able to attend
International Students	Individuals who attend higher education in the United States from another country on a visa for the purposes of pursing a higher education degree in a location other than their country of citizenship
Major Exploration	Programming that allows a student to learn more about a specific major
NACADA	The Global Community for Academic Advising, formally known as the National Academic Advising Association. Serves as the leading professional organization for professional academic advisors, faculty, administrators, and students who support the field of academic advising
New Student Orientation	An onboarding transition program specifically for engineering as it related to class registration
Professional academic advisors	Individuals who spend the majority of their time and availability on the sole function of academic advising and programming to assist students in their academic pursuit
STEM	Science, Technology, Engineering, and Mathematics
University Admissions Process	The organizational structure in which a student applies for admissions to an institution of higher education

Chapter 2: Literature Review

According to the American Society for Engineering Education (ASEE) the number of engineering bachelor's degrees awarded in 2017 was 124,477, which is 10 percent higher than the year 2016 and a 68 percent increase since 2008 (Yoder, 2017). This increase provides evidence that the engineering student population is steadily increasing to meet growing demands for engineering degrees in the country, which is one area of focus in the STEM educational policy push (National Science Board, 2014). As the higher education community works to address the call for more engineering graduates in the United States (Vest, 2011), institutions of higher education are simultaneously faced with public pressures to reduce the cost of attendance (NSB, 2018) all the while improving graduation rates (Yoder, 2015); academic advising plays a critical role in all of this. This literature review will provide an overview of the field of academic advising, the organizational models of academic advising, and relevant literature on academic advising specifically for the growing engineering student population.

2.1 Academic Advising

Academic advisors often serve on the front lines of the higher education environment and advocate for student success. The responsibility of academic advising and advisors varies at institutions of higher education across the country. Historically, faculty members whose primary responsibility was to perform research and/or teaching also served as academic advisors to students. Over the last several decades, many colleges and universities have shifted responsibilities and employed professional advisors to carry out the academic advising functions (Gordon, Habley, & Grites, 2008). Essentially, academic advising has been a part of the United States higher education system at colleges and universities since their inception, yet academic advising as we know it today is a relatively new profession. Officially founded in 1979 through

the formation of the National Academic Advising Association (NACADA), the advising profession is grounded in the four pillars of academic advising: 1) The Concept of Academic Advising, 2) Statement of Core Values, 3) Core Competencies of Academic Advising and 4) Council for the Advancement of Standards in Higher Education: Standards and Guidelines for Academic Advising (National: The Global Community for Academic Advising, 2019). These pillars of academic advising ground the academic advising profession as a whole and are adapted in this research to focus primarily on the field of academic advising as it relates to advising of engineering students.

The Global Community for Academic Advising (formally known as the National Academic Advising Association) serves as the professional organization for professional academic advisors, faculty, administrators, and students who support the field of academic advising (Thurmond, 2006). The association has over 12,000 members representing all 50 states and several international countries (National, 2019). The responsibility of academic advising varies at institutions of higher education across the country although they share some general responsibilities. Academic advisors aid students in learning about their institutions of higher education, help support their goals, and encourage them to pursue their interests. Academic advising engages students beyond their own understandings while recognizing their individualities, passions, and aspirations as they matriculate through their institution (National, 2006). Academic advisors provide students with the tools necessary to successfully transition to college and empower them to develop clear pathways that lead to degree completion.

Understanding the academic advising profession requires awareness of the four pillars of advising: 1) The Concept of Academic Advising, 2) Statement of Core Values, 3) Core Competencies of Academic Advising and 4) Council for the Advancement of Standards in

Higher Education: Standards and Guidelines for Academic Advising (National: The Global Community for Academic Advising, 2019).

2.1.1 Concept of Academic Advising

The concept of academic advising has three further components: curriculum (what advising deals with), pedagogy (how advising does what it does), and student learning outcomes (the result of academic advising) which are not only part of the larger field of academic advising but are considered foundational elements of engineering advising (National, 2006).

The curriculum of academic advising includes enrollment, institutional mission, curricular and co-curricular opportunities, culture competences, course selection, goal development, and knowledge of campus resources, policies, and procedures. Academic advising (also referenced as advising throughout this study) pedagogy consists of preparing, facilitating, documenting, and assessing the academic advising exchange (National, 2006). The final component, student learning, is directed by the institutional mission, goals, curriculum and co-curricular opportunities. These elements vary significantly by institution, which makes it imperative that each academic advising unit develop their own set of learning objectives for their student population (National, 2006). Lowenstein (2007) notes that "an excellent advisor does for students' entire education what the excellent teacher does for a course: helps them order the pieces, put them together to make a coherent whole, so that the student experiences the curriculum not as a checklist of discrete, isolated pieces but instead as a unity, a composition of interrelated parts with multiple connections and relationships."

The art of academic advising, what academic advisors do, and how the work of advising is structured are the driving forces behind this study. It is my hope that this research will serve as the basis for practice for advising administrators and professionals in the area of advising organizational structures, like many of the pillars have guided advisors through their daily interactions with students.

2.1.2 Core Values of Academic Advising

In addition, the Statement of Core Values (Table 1) provides a framework for understanding the advising profession and serves as a guide for professionals in the field. The core values provide a high-level purpose of how academic advisors aid students and these purposes guide the daily work of that advisors do be it one on one appointments, email, and other communication methods, providing students with guidance on the transition to their new academic and social environment, helping students set realistic goals and expectations for their future and/or serving as advocates for change on behalf of their advisees. The core values provide six standards as an outline for professionals to shape their individual philosophies and serve as guiding principles for their practice (NACADA, 2005).

Table 2-1: Summary of the Core Values of Academic Advising

Value	Summary of Value
Core Value 1:	"Advisors are responsible to the individuals they advise"
Core Value 2:	"Advisors are responsible for involving others, when appropriate in the advising process"
Core Value 3:	"Advisors are responsible to their institutions"
Core Value 4:	"Advisors are responsible to higher education in general"
Core Value 5:	"Advisors are responsible to their educational community"
Core Value 6:	"Advisors are responsible for their professional practices and for themselves personally"

Source: NACADA, 2005

The core values of advising serve as a reference resource when new advising programs develop, as learning outcomes are established, for new advisors as they enter into the profession and for seasoned advisors to refocus their attention to the values that lead them to the field (NACADA, 2005).

In the last several years, college completion has increased the visibility of the field of academic advising and this ties directly to the work guided by the core values. Complete College America (2013) published Guided Pathways to Success, which points to academic advising as a key to degree completion. The Complete College America Boosting College Completion (2014) report indicated that navigating the complicated path through college is a difficult task for far too many. All students should develop a step-by-step roadmap and be provided with guidance for on-time completion and saving time and money. As institutions seek to improve, their graduation rates it becomes even more important for academic advisors to prepare for the challenge and help students understand the complexity of the college

environment (Compete College America, 2013). A critical element to academic advising is encouraging students to develop their personal, professional, and academic goals, interpreting institution policies, procedures, and curriculum, provide tools for decision-making about their future, and serve as gateways to campus support services and resources. This is important because dedicated, competent, and knowledgeable academic advisors are essential to student success, persistence, retention, and completion. Indeed, these same goals undergird the work of academic advisors in engineering education, thus highlighting the need to understand and include the major tenets and goals of the general academic advising literature.

2.1.3 Core Competencies of Academic Advising

The core competencies of academic advising are the newest addition to the pillars of academic advising. The competencies create a framework of understanding, knowledge, and skills that support academic advising, professional development, etc. for the field of academic advising. The core competencies address three areas: conceptual, informational, and relational (NACADA, 2017). Conceptual competencies include items that advising should understand about the profession such as the historical context, theory, approaches, and outcomes. The informational category provides areas that advisors should familiarize themselves with at an institutional level such as curriculum, legal guidelines, campus resources, and technology. Finally, the relational component incorporates skills academic advisors demonstrate such as problem solving, decision-making, planning, and relationship building (NACADA, 2017). These competencies were developed in response to the NACADA leadership's desire to provide a framework for achieving excellence in advising (NACADA, 2017).

2.1.4 CAS: Standards and Guideline for Academic Advising

The fourth pillar to academic advising as outlined by NACADA includes the Council for the Advancement of Standards in Higher Education: Standards and Guidelines for Academic Advising. These guidelines provide a structure for programs at institutions of higher education in hopes of enhancing student success (Council for the Advancement of Standards in Higher Education, 2013 and Miller, 2012). Keeling (2010) recommends that practitioners integrate the CAS standards into accreditation standards, use the standards as a guide for assessment of advising, and that all staff members should be included in planning, assessing, and structuring office programs and services to bring validity to the field of academic advising.

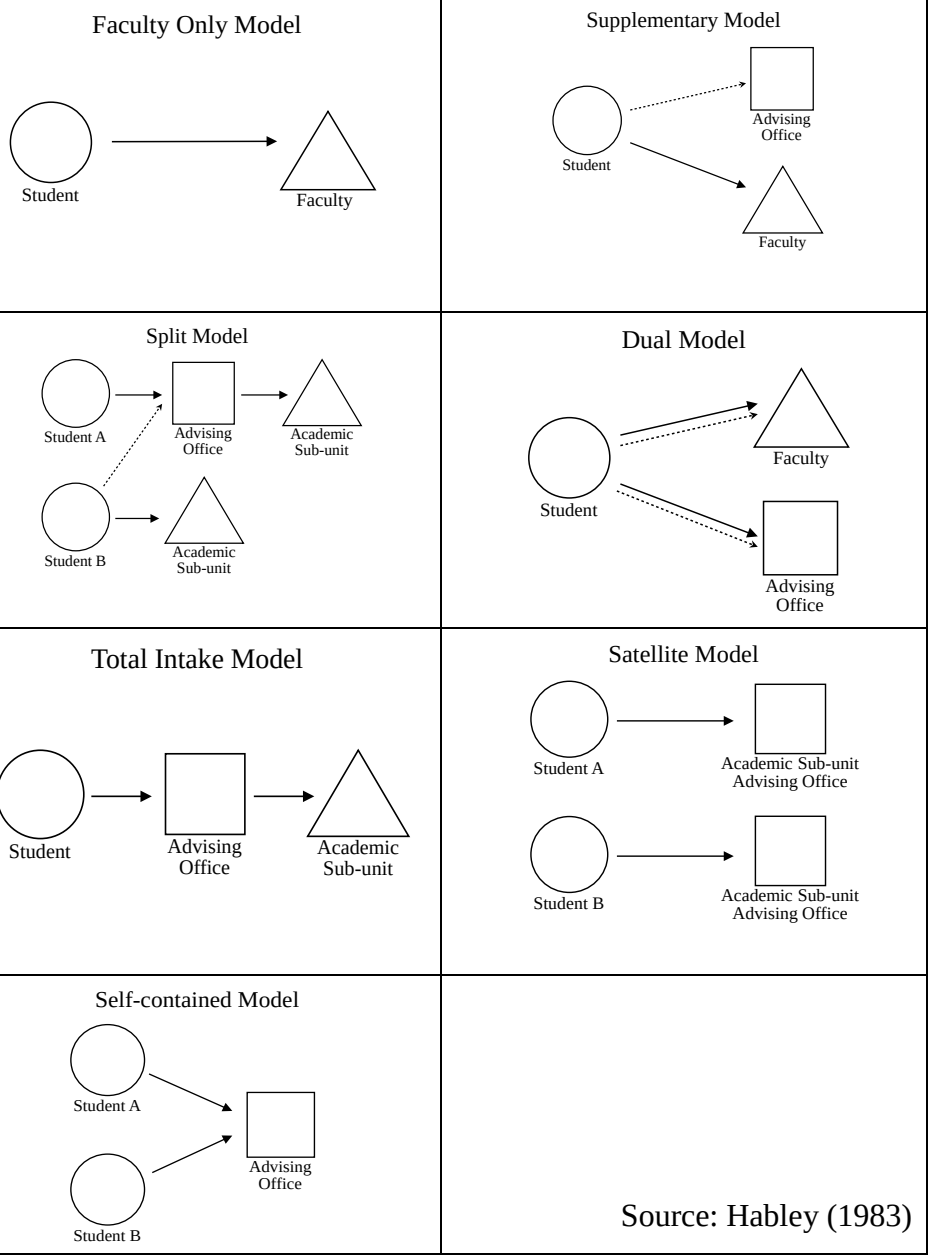
The Concept of Academic Advising, Statement of Core Values, Core Competencies of Academic Advising, and CAS standards provide a brief glimpse into the field of academic advising and the values that the professional association and those in the field attempt to uphold. Like most professions, the field of academic advising borrows theoretical frameworks from various fields to provide researchers with concepts and understanding of how previous researchers have addressed the topic (Jones et al., 2014).

2.2 Models of Academic Advising

A conceptual framework is important because it provides direction for the research purpose, why it matters, and why the study would be appropriate (Ravitch & Riggan, 2017). My research sought to understand the organizational models of academic advising in first-year engineering programs. Just as institutions of higher education can be characterized into many categories, the field of academic advising can be just as complex. In 1983 Habley addressed the need for documenting the organizational structures of academic advising services and began by

providing the field of academic advising with a formalized model (Figure 2-1) that can be categorized into three types: decentralized models, centralized models, and shared models (King, 2008). This model is still highly cited today, and is the only model that provides a way to describe the organizational structures for academic advising (Gordon et. al, 2008; Habley, 1983, 1987; King, 2008; Pardee, 2000, 2004).

Figure 2-1: Habley's Organizational Models for Academic Advising



Source: Habley (1983)

2.3 Habley's Models of Academic Advising

Habley's Models of Academic Advising are categorized into three primary models of advising: decentralized, centralized, and shared. Academic advising in a decentralized model of academic advising is occasionally centrally coordinated by a college or university level center for advising; however, the faculty and staff of academic departments provide academic advising to their student population. Centralized models of academic advising house the advising services at a central administrative unit with advisors in a single location. Academic advising through the shared model of academic advising hosts services at the administrative unit and academic departments (Pardee, 2000).

Decentralized models of advising include a faculty-only model and a satellite model. Faculty-only models are prominently utilized at private two- and four- year institutions and have faculty assigned to students as their advisor at the department level. The satellite model has advising offices housed at the college or school level with the function of advising shifting from a centralized coordination office to the faculty within the departments (King, 2008).

Centralized models of advising are self-contained and function as a total intake of all advising from orientation to departure and takes place in a centralized unit. The model can have professional advisors, counseling, and faculty advisors who are well trained in the field of advising and makes student success a priority (King, 2008).

Shared models of advising are broken into three types: supplementary model, split model, and dual model. Supplementary models usually have a coordinator who develops an advising handbook with faculty conducting the advising. Split models divide advising responsibilities between an advising office and the academic departments. The advising office advises specific populations of students, such as those exploring majors, and once specific requirements are

completed, the students are assigned a faculty member to serve as their advisor until degree completion. Dual models involve two advisors throughout the students' educational career with one advisor being at an advising office and one advisor in the academic department. The typical dual model setup includes faculty who serve as advisors for the academic department program requirements and an advising office advisor assists students with general education requirements, registration procedures, and academic policies (King, 2008). Regardless of the structure of academic advising (i.e., centralized, decentralized, or shared), academic advising is designed to help with student success at the institutions.

Habley's Organizational Models for Academic Advising as described above in the overarching categories of decentralized, centralized, and shared models consist of 1) faculty only, 2) supplementary, 3) split, 4) dual, 5) total intake, 6) satellite, and 7) self-contained. Habley and McCauley's 1987 study surveyed 396 NACADA participants to identify the organizational model in existence, demographic information, and assessment of the effectiveness of the system. Respondents indicated the use of a faculty-advising model was less prevalent than previous researchers had indicated. Of the respondents, the majority of campuses used a split advising model. Generally, the findings caution making assumptions about the best model of advising for all institutions, as the model must compliment the structure and size of the institution. This study along with the working definitions of the models of academic advising is the first and only to expand upon the need for better understanding of not only what models of academic advising exist, but how are these models used, who uses them, and which model provides the most benefits for the engineering student population as it relates to this study.

2.4 Academic Advising Approaches and Theories

Theoretical frameworks from the social sciences, humanities, and education professions have helped shape the academic advising profession (Upcraft & Cramer, 1995). Several theories and approaches to academic advising have developed over time. However in more recent years, the foundational approaches of advising practitioners include Prescriptive Advising, Developmental Advising, Intrusive Advising, Proactive Advising, and Appreciative Advising, etc. These approaches to advising help apply these and many other terms and theories to actual situations within the advisee to advisor relationship.

Of these approaches, developmental advising has been the golden standard for the advising practitioners however it is common for advisors to employ multiple approaches when working with students. Prescriptive Advising is known as one of the foundational styles of advising which requires the advisor to provide the student with the answers to their questions in a linear fashion (Crookston, 1994). This approach is often used for conveying policies and procedures to students. Developmental advising on the other hand proclaims that the advisor and student are partners in the educational pursuit (Crookston, 1994). The developmental advising approach inspires academic advisors to advise students holistically and to consider the students skills, abilities, and both personal and professional goals throughout the process (Grites, 2013). Creamer and Creamer (1994) developed a descriptive conceptual framework through a grounded approach that addressed the use of developmental academic advising and identified the outcomes of the academic advising process and goals for the student. The developmental advising framework provided prompts to help students with setting career and life goals, building self-insight and esteem, broadening interests, establishing meaningful interpersonal relationships, clarifying personal values and styles of life, and enhancing critical thinking and reasoning serve

as a frame for developmental academic advisors (Creamer and Creamer, 1994). Intrusive Advising and Proactive Advising helps connect students to resources and support before a situation occurs by providing an active concern for the student (Earl,1988). Finally, Appreciative Advising "is the intentional collaborative practice of asking positive, open-ended questions that help students optimize their educational experiences and achieve their dreams, goals, and potentials." (Bloom, Hutson, & He, 2008). This is one of the newer approaches to the field of advising and provides a framework for ensuring the advising environment is positive and welcoming and that students and advisors are able to discover, dream, design, and deliver a plan for fulfillment along their journey.

These and many other theories and approaches to advising provide academic advisors with a mechanism for working with students in an academic advising situation and provide scholarship for the field of advising. In addition, academic advisors can adapt these approaches in their advising practices and use professional judgment on the advising approach that is best suited to the student's situation. These approaches are not meant to be a one size fits all approach rather provide a starting place for understanding the historical approaches that scholars have documented over time.

2.5 Frank's Integrated Model of Academic Advising Program Development

This study also draws on a four-stage model of Academic Advising Program Development developed by Frank (1988). The four stages of Frank's model are: Stage 1) Increase Access, Stage 2) Upgrading Services, Stage 3) Coordinating Programs, and Stage 4) Enabling Advisors. Initially the need for advising services feeds into Stage 1: Increasing Access. Throughout this stage, the creation of a new advising program, reorganization of existing units, reassignment of advising responsibilities, addition of advisors, and designation of a coordinator can develop

(Frank, 1993). The need to support specific groups and to increase retentions flows into Stage 2: Upgrading Services and during this phase the formation of subunits or programs to serve target groups occurs, as well expansion of orientation programs and implementation of new strategies such as group advising, programming, and workshops (Frank, 1993). Stage 3: Coordinating Programs transitions into the need for efficient use of resources and allows an advising program to develop goals, produce advising handbooks or guidelines, develop an extensive referral network, and promote developmental advising approaches (Frank, 1993). The final needs assessment provides an avenue for growth in Stage 4: Enable Advisors through creation of training and development programs for advisors, implementation of an evaluation system, and acknowledgement through advisor recognition programs for accomplishments and opportunities for advisors to participate in professional conferences (Frank, 1993).

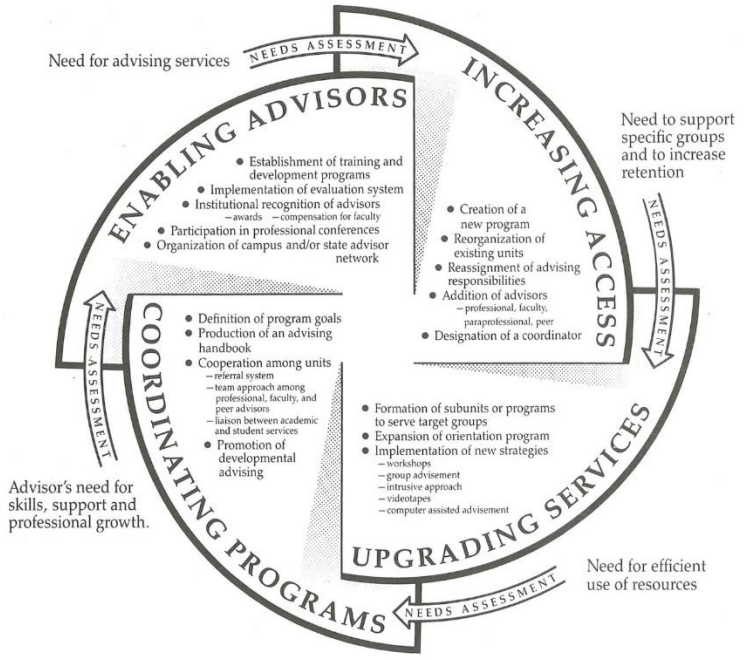
To create this model, Frank (1988) reviewed several models of developmental advising programs, the different types of advising delivery systems, and organizational structures of advising. To check the model, a one-page sheet of the Four Stage Model survey was sent to 200 NACADA members; 90 individuals contributed to the study with representation from all institutional types. Seventy two percent of participants agree that their advising program had evolved similar to the Four Stage Model of Academic Advising Program Development. Ninety four percent of respondents indicated that they could identify with at least one stage of the model. The advising program survey provided the researcher with validation of the theoretical model but it also revealed weaknesses in the structure. The model was revised in 1993 based on the feedback to reflect a continuous model rather than a separate linear stage model. Frank's (1988) study provided the field of academic advising with a model for academic program

development and suggests that it could be used as a road map for advising administrators when developing or enhancing their advising programs and structures.

Since the creation of Frank's Integrated Model of Academic Advising Program Development, researchers have consistently found many of these topics as essential to advising programs and student success. New student orientation is usually the first interaction that collegiate students have with an academic advisor, and it provides a foundation for their integration to the institution (Self & Aguayo, 2009; NODA, 2019). Advisors also have an opportunity to provide guidance through the major exploration process (Gordon, Habley, Grites, 2008). Gallup (2017) indicates this is an important process as many Americans regularly admit that educational choice is at the top of their lists of life regrets. Formal program goals can provide guidance for advising programs to determine the purpose and direction of their program (CAS, 2013; Gordon, Habley, & Grites, 2008; Frank, 1988, 1993). Knowing the available campus resources and maintaining good working relationships with campus partners to make effective referrals for students is a critical aspect of an advising program (CAS, 2013; Folsom, 2007; Gordon, Habley, & Grites, 2008). Academic advisor training for new academic advising hires, including an introduction to the field of advising, technology resources, university level training, and regulatory acts, as well as continued professional development opportunities, are important features of advising programs (Folsom, 2007; Givans Voller, Miller, Neste, 2010; Gordon, Habley, & Grites, 2008;McClellan, 2007; Rust, 2014). Recognition programs are discussed as providing confirmation of the importance of academic advising in its relationship to the institutional infrastructure (CAS, 2013; Gordon, Habley, & Grites, 2008). The Integrated Model of Academic Advising Program Development (Figure 2-2) can be used to aid advising administrators in program development and awareness of the complexities associated with

advising. Researchers have not previously used this model as a conceptual framework, yet the topics within the model have been discussed more broadly throughout the literature within the field of advising.

Figure 2-2: Integrated Model of Academic Advising Program Development



Four stage model of Academic Advising Program Development. The four-stage cyclical model includes increasing access, upgrading services, coordinating programs, and enabling advisors.

Source. Frank (1993).

This model provides a framework for how academic advising programs develop, the services provided, programming available and ability to enable the advisors to serve the student population. Frank's model served as a conceptual framework for my study and provided a platform to understand how engineering advising services are conducted. The organizational structure of advising programs and expansion of how advising programs are developed are critical to aid in our understanding of how advising is conducted on a national scale. The type of

institution, the student population, the size of the institution are all factors that need further exploration.

In addition to conducting a literature review on academic advising, I sought the advice of leaders in the field of advising through a research consultation and STEM commission meeting at a 2017 Annual NACADA conference. Conversations with professionals who advise, as well as with advising administrators, validated the need for additional research on organizational models of advising. For example, Frank's model uses some terms that are outdated and does not include actual advising approaches such as Appreciative Advising. Consequently, the profession as a whole would benefit from a critical analysis of the structures of advising to determine who is advising, and the number of students assigned to those who advise. This study also addresses the need to have research that uses models of academic advising within a research study focused on the engineering student population and allows institutions to self-selected a model of academic advising that closely relates to their daily practices. This area is of specific interest to my study as engineering students make up the largest portion of students to aid in the country's college completion goals, yet they are often lumped into the entire STEM category without further analysis.

2.6 Advising in Engineering

Colleges and universities across the United States are educating the next generation of engineers that will design and build modern structures to enhance our lives and health, grow our economy, protect our national security, and improve our country and world (Watford, 2018). Yet, the engineering student population often receives negative attention because of high dropout rates and low degree completion statistics. Specifically, sixty percent of first-year engineering

students eventually drop-out or change majors and over forty percent do not persist through year one (College Transitions, 2018). The primary reason why students drop out of engineering programs is a lack of preparedness for the high level of rigor required by engineering programs (College Transitions, 2018).

Many researchers have addressed predictors of persistence in engineering programs such as high school grade point average (GPA), algebra scores, SAT math and verbal (e.g., Levin and Wyckoff, 1995). The ability to complete physics, math, and chemistry along with a genuine interest in the field are critical factors to whether or not a student will persist (e.g., Levin and Wyckoff, 1995). When students work with professional academic advisors with the knowledge of these predictors, it can help both the advisor and student understand the situation and better inform their discussions and decisions about their academic future. In addition to engineering being a rigorous academic program students have a choice from more than 25 different engineering disciplines including Chemical, Civil, Mechanical, Electrical, Industrial, Aerospace, etc. (College Transitions, 2018). One of the many tasks professional academic advisors carry out is the ability to convey the complexity of the field of engineering and all of the choices available to the student.

There is very limited published research through NACADA that has focused on the engineering student population. However, in 1990 Jaffé and Huba conducted a study with 404 graduating engineering senior students. This study indicated that fifty percent of students reported that they used their assigned academic advisor for pre-registration, course planning, and class registration and reported higher levels of satisfaction with advising when the advising process focused on these areas (Jaffé and Huba, 1990).

Literature in the field of engineering has primarily focused on formats for online academic advising (Henderson and Goodridge, 2015; Rimbau-Gilabert, Martinez-Arguelles, Ruiz-Dotras, 2011), the development of tools to use in the advising process (Latorre-Navarro and Harris, 2015), and the acknowledgement that academic advising is an area that deserves more attention in the engineering student's higher education pursuit (Panitz, 1995). I have not uncovered literature focused on the structures of academic advising, or the services carried out by academic advisors within the engineering context. Although one might consider other STEM contexts relevant, the pre-requisite math and science courses from high school and rigid structure of engineering curricula in college have been identified as challenging for pathways into and through engineering degrees (Carrico & Matusovich, 2016). Because of this uniqueness of engineering, comparisons to other STEM contexts are not directly relevant. Given the lack of literature on this topic, I am confident that my dissertation will make meaningful contributions to research and practice related to both advising and engineering education.

Chapter 3: Research Methods

The purpose of this research was to gain a better understanding of the structures of engineering academic advising at large four-year, primarily residential institutions with a first-year engineering program. The overarching research question for my study was **How do first-year engineering programs structure academic advising, and what services, programs, and support are in place for academic advisors and students?** To aid in answering my overarching question, I answered the following sub-questions:

- RQ1: What are the organizational structures of academic advising in first-year engineering programs?
- RQ 2: What services do academic advisors describe as being offered to first-year engineering students?
- RQ 3: What efforts do academic advisors describe that are associated with coordinating advising programs?
- RQ 4: What support and professional growth opportunities do academic advisors in first-year engineering programs complete?

To answer these research questions, I used Habley's Organizational Models of Academic Advising as a way to categorize the structures of academic advising and the Integrated Model of Academic Advising Program Development as conceptual framework to guide my research design and direct my decisions concerning data sources, participant selection, data collection, and data analysis.

Habley's Organizational Models of Academic Advising include: faculty only model, satellite model, self-contained model, supplementary model, split model, dual model, and total intake (King, 2008). In the faculty only model, faculty are assigned to students as their advisor. Satellite model has advising offices housed at the college or school level with the function of

advising shifting from a centralized coordination office to the faculty within the departments (Gordon, et al., 2008). The self-contained model includes all advising from orientation to graduation (King, 2008). The supplementary model usually has a coordinator who develops advising materials with faculty conducting the advising. Split model advising responsibilities are usually divided between an advising office and the academic departments (King, 2008). The advising office advises specific populations of students, such as those exploring majors, and once specific requirements are completed, the students are assigned a faculty member to serve as their advisor until degree completion (King, 2008). The typical dual model setup includes faculty who serve as advisors for the academic department program requirements and an advising office advisor who assists students with general education requirements, registration procedures, and academic policies (King, 2008). In the total intake model, all of the initial advising occurs through one office, which could be staffed by professional advisors, counselors, faculty, or peers (King, 2008).

The Integrated Model of Academic Advising Program Development consists of a four-stage cyclical model of program development and continuous needs assessment through each stage (Frank, 1993). Initially the need for advising services feeds into Stage 1: Increasing Access. The need to support specific groups and to increase retentions runs into Stage 2: Upgrading Services (Frank, 1993). The need for efficient use of resources transitions into Stage 3: Coordinating Programs (Frank, 1993). The final needs assessment provides an avenue for advisors and their need for skills, support, and professional growth through Stage 4 Enabling Advisors (Frank, 1993).

In this chapter, I describe the research methods I used in my dissertation. First, I provide an overview of my philosophical perspective and positionality. Next, I give an overview of the research design and conclude with limitations.

3.1 Philosophical Perspective

Many authors, researchers, and faculty believe that prior to conducting research we must first become aware of how we see the world and uncover our own philosophical stance or paradigm (Jones, Torres, & Arminio, 2014; Mertens, 2010). Paradigms provide researchers with a method for categorizing their research (Mertens, 2010). Mertens (2010) outlines the four most commonly used paradigms as post positivist, constructivist, transformative, and pragmatic. Critically evaluating my perspective and worldview as a researcher has been a challenging and thought-provoking task. Although I can see the value of all four paradigms and I can see the benefits and advantages of each category, at this current stage of my life, I tend to find myself identifying with the pragmatic paradigm in most situations.

The pragmatic paradigm subscribes to the notion that relationships in research are determined by what the researcher deems as appropriate to the particular study (Mertens, 2010). The pragmatic paradigm is often associated with mixed methods approaches. Researchers typically match their research questions with the research methods (Mertens, 2010). Like other paradigms, the key concepts associated with the pragmatic paradigm include epistemology, ontology, theoretical framework, and methodology (Mertens, 2010). Epistemology challenges researchers to examine what constitutes knowledge and how knowledge is justified (Jones et al., 2014). Ontology refers to what is the nature of reality (Jones et al., 2014). The pragmatic view asserts that there is a single reality and that all people have their own understanding of reality

(Mertens, 2010). Theoretical frameworks provide researchers with concepts and understanding of how previous researchers have addressed the topic (Jones et al., 2014). Methodology refers to the approach used to collect and analyze data and guides the research design (Jones et al., 2014). The approach to inquiry from a pragmatic perspective is one that closely aligns with my views, when faced with the decision of methodology I match my method to the specific questions and purposes of research. I have also modified my research questions to match the methods as they unfolded.

3.2 Researcher Position

After learning more about the terms associated with research and paradigms, I began to reflect on my educational journey and how my upbringing and background creates my unique position as a researcher.

I grew up in rural Appalachia where I was afforded the opportunity of a public education at Council Elementary-Middle and Council High School. After graduating high school, I was faced with the decision of what was next for me. College was not something that was discussed regularly in my household or even the potential for a career. I enrolled at Southwest Virginia Community College and met an advisor who helped me enroll in my first semester of college. It was a long conversation about what I might want to explore, my interests, and the types of courses I might want to take. I started out my first semester taking broadcasting courses with a general studies curriculum.

I became savvy with the course catalog and quickly realized I could also get a degree in education by taking just a few more courses. Pragmatically I thought perhaps I would go into teaching or at least it would keep my options open. I completed a broadcasting internship and

then landed a part time job working at a local radio and television station. I quickly learned that the broadcast profession in my small rural hometown was not as glamourous as I was expecting. The hours were not desirable and the disc jockeys and production staff were barely making minimum wage. I also had an opportunity to student teach and realized that too was not a path I wanted to take. I was fortunate enough to be connected with the student services office and was able to go on four-year college visits and have a support network of people ready to help me with any and all of my questions.

I decided to transfer to Radford University to complete my bachelor's degree. There I made connections early on with the financial aid office, which helped me set up student loans to self-fund my education and also establish a work-study position in the Office of Undergraduate Admissions. As part of my undergraduate degree requirements, I completed an internship with the Office of Public Relations. The internship position fit nicely and my supervisor encouraged me to interview all of the staff in the office and explore their professional journey; that experience encouraged me to apply to a master's degree program.

I was accepted into the Corporate and Professional Communication program with a graduate assistantship in photography and graphic design. I decided that I wanted to enhance my resume and skills in other areas and thought the time in graduate school was a great opportunity to do so. I applied and received a graduate assistantship for my last year of graduate school in pre-major academic advising. I had a wonderful mentor and supervisor who really took the time to help me understand what it was like to help students transition to the university environment. I was taught the importance of listening to students concerns; really, hearing what was going on in their academic and personal lives and helping them solve their concerns. The art of knowing

when to refer the student to campus resources and the skill to know when a situation grew beyond my scope to ask for help from my colleagues.

It was during that graduate assistantship that I realized I wanted to work in higher education. I had held internships and part time jobs throughout my educational career that did not align with my perception of what I wanted out of life. I really did not know what the future would hold for me but was fortunate to receive my first full time position as an academic advisor shortly after finishing my master's degree. I really enjoyed my first full time position but started to apply for additional positions two years later to allow for advancement in my career trajectory. I received a position at Virginia Tech in University Studies where I worked for a couple of years before accepting a newly created position in the Department of Engineering Education. In 2010, the College of Engineering expected an entering first-year class of 1,200 students. However, the yield (actual enrollment) produced 1,600 students creating a colossal enrollment year for which the Department and College was not prepared. My position was created as a proactive solution to the enrollment increase of first-year students. The position allowed me to develop an advising office with another colleague from the ground up. A couple years into the position, my supervisor encouraged me to think about a terminal degree. I reviewed all of the available programs at Virginia Tech and decided that the best fit for me was in the Higher Education program.

The question of what do I want to study has been the pivotal question that continues to circle my mind every day since I began my doctor of philosophy degree in Higher Education. Like many of my advising colleagues, I stumbled upon the field of academic advising as a graduate student. The desire to help others navigate the complexities of higher education has

always been a passion of mine. I have a personality that is strong, and I am not afraid to ask questions, seek clarification, and serve as an advocate for students.

To help me finalize my dissertation topic, I reviewed all previous coursework and papers that I completed on the field of academic advising, science, technology, engineering, and math education, and college completion since I began my PhD journey. This activity provided me with a glimpse into what has been important throughout my career and focused on items that I had previously analyzed, researched, and brought to life through the construction of papers and presentations. This action provided me with 56 key citations that I used as inspiration for my topic idea. I then started to reflect on what I know as a practitioner and what I want to investigate in the future as a researcher and professional. I conducted extensive searches of the literature on the field of advising, academic advising in engineering, and the frameworks that had been used by scholars before me. My initial search of the broad topic of academic advising yielded over 2,400 journal publications.

I had to take a step back and reflect on what is the key fundamental area that I wanted to be the expert on, what did I want to contribute to the field, and what population I wanted to focus my research on. I decided to look closer into the structures of advising and what had been published on the topic. This specialty area yielded much fewer results and had not been updated by scholars since the late 1990's. Once I started to develop a more focused area, I conducted an annotated bibliography that helped narrow my research interests and solidify my topic area. I used a modified version of Woodworth's (1988) rhetorical précis method. The exercise provided a strategic method for gaining insight into what previous research on the topic, what previous researchers documented, the methodologies used, the findings, the implications, and recommendations for future research and practice. Very few models of academic advising were

revealed in the literature review search, so I expanded the review to include key historical articles about the field of academic advising, types of academic advising, and articles specific to the engineering population.

When I stepped into the engineering advising role, it had previously been dominated by a faculty instructor-advising model, yet I was excited about the opportunities. I was able to strategically assess the resources available to students, determine what needed to be changed, and evaluate what I had control over at the time to make it better. One of the major initiatives that my colleague and I took on was to ensure the availability of information in a clear and concise manner. We overhauled the website, developed a communication plan, and established a plan of action for every possible academic deadline and situation our supervisor had asked to us to keep in mind. We essentially developed the strategic operational plan for the advising unit.

I am a firm believer that academic advising is an essential part of any University's commitment to helping students attain their educational and career goals. In the field of academic advising, each day can bring a new set of challenges. Whether I am faced with a first-year student struggling with homesickness, a transfer student experiencing transfer shock, or a continuing student frightened and/or excited for the road ahead, I am always honored and humbled to have the privilege of playing a small part in guiding students through the challenges and rewards of their higher education journey.

Quickly after I began my doctoral studies, I was promoted as the founding director of advising. This promotion was both a blessing and a burden for my professional journey. The question then reverted to what is next for me especially since I had achieved my original goal of advancing my career. My graduate studies have been very helpful in my transition of an academic advisor to an advising administrator. While I still serve as an advisor with an advising

case load, my focus has slowly shifted from advancing my own advising practices to elevating the profession of advising, assessing advising, developing advising training, and streamlined curriculum pathways.

My environment at a four-year public non-profit historically white institution has definitely influenced my research topic interest and focus areas. If my experiences were at different types of institutions with different student populations my research interests may be different. My current position in engineering has also been an inspiration for me but I recognize it also influences my research. For example, I have a strong desire to improve the field of engineering education through the impacts an effective advising program can have on retention, graduation, and academic success. This might cause me to overemphasize the importance of the role of advisors in providing student support services in my study. In addition, I desire to be a leader in the profession with a focus on this population, which might cause me to inadvertently prioritize models that support this idea.

Taking the time to discuss my experiences in chronological order provides clarity on perhaps why I am drawn to the field of academic advising and student services. I have had key experiences with wonderful people along my educational journey who have helped shape where I am today. My current environment in engineering also provides me with a personal connection with my spouse who is a professional engineer. This taking stock allowed me to identify specific ways my unique position may come into my research that I need to be aware of and embrace or address. In addition, I was also able to communicate with my dissertation chair, academic advisors within the field of engineering advising, faculty within higher education and engineering education, and colleagues about my initial findings as they emerged. These conversations provided confirmation to my initial thoughts and at time provided alternative

suggestions and explanation that pushed me to think harder and dig deeper into the areas that emerged.

3.3 Study Sites and Respondents

My study was conducted using a qualitative multiple-case study methodological approach (Yin, 2018). The case study provided an opportunity to focus on first-year engineering academic advising in the United States and provided a broad understanding of the academic advising profession. In this context, case study research seeks to understand a larger phenomenon using descriptive, holistic, and inductive design (Rossman and Rallis, 2012). My case study approach used a multiple case study design with three cases. The case study provided a rich description for better understanding the landscape of first-year engineering academic advising (Rossman and Rallis, 2012). During the data collection process, I used a questionnaire (Phase 1), document analysis (Phase 2), and interviewing (Phase 3). Information learned during the study was to a gain a better understanding of the case sites, not to generalize about the cases studied.

3.4 Justification of Qualitative Case Study Approach

I selected the case study approach because I wanted to ensure that my research would be taken seriously within both the fields of academic advising and engineering. The rigor of case study approaches is well received in both fields for their complexity and use of multiple data sources and perspectives (Ellis, 2014; Lee, Seimetz, and Amelink, 2014). This type of research provides thick rich descriptions that allow for transferability into real life settings and the ability for future researchers to see the application of the study design in other settings (Rossman and Rallis, 2012). The case study approach is “an especially good design for practical problems—for

questions, situations, or puzzling occurrences arising from everyday practice" (Merriam, 1998, p.11). By using the multiple case study approach, I was able to conduct cross-case analyses (Miles & Huberman, 1994) to compare the results across sites. I used Merriam's analytic approach to respect the integrity of each case while understanding the commonalities and differences across each case (Merriam, 1998).

Although this research uses multiple sources, it would not be classified as a mixed methods study. It is a case study that relied mostly on qualitative data with a questionnaire as a method for selecting case site participants and to provide supplemental information about each site and a document analysis to also provide supplemental information. Using data in this way is consistent with case study approaches whereas mixed methods studies required an intentional mixing of the data from the questionnaire, document analysis, or interviews. Creamer (2017) argues that for a study to be consistent with mixed methods the research must intentionally integrate qualitative and quantitative components, and she argues for a question directly related to the mixing. The primary data used for this research derived from the interview component in Phase 3 and did not met those criteria.

3.5 Phase 1: Questionnaire Data Collection and Analysis

My study started with an academic advising questionnaire (Appendix A) which consisted of 21 core questions (Table 3-2) and that assisted with scoping the research design and determining the institutions that were selected as cases for the follow-up interviews and content analysis. The electronic questionnaire was developed in Qualtrics and distributed through electronic mail by an anonymous link to 16 specific individuals who served in a first-year engineering advising capacity as determined by their online profile through their institution's

website. The questionnaire was also shared more broadly through the National Academic Advising Associations Science, Technology, Engineering, and Mathematics Advising Commission listserv and the First-Year Programs Division of the American Society of Engineering Education. Prior to sending the questionnaire, several academic advising colleagues who would not be participating in the study reviewed the questions and provided feedback on question clarity, flow, and timing of the entire questionnaire.

Table 3-1: Questionnaire Question Summary

Items 1-6	name, job title, supervisor structure of their director of advising, institution, link to their advising website, and confirm if they had a first-year engineering program
Items 7-13	size for their entering first-year engineering student population, how the first-year engineering students are classified, criteria needed to leave the first-year engineering program and enter into a degree-granting engineering major
Items 14-17	advising caseload and advising breakdown
Items 18-19	coordination of the academic advising experience through the new student orientation program
Items 20-21	identify another first-year engineering program for potential snowball sampling

The questionnaire asked participants to consent to their participation as required by the Western Institutional Review Board, which approved this study for human subject's research. Items 1-6 asked participants to identified their name, job title, supervisor structure of their director of advising, institution, link to their advising website, and confirm if they had a first-year engineering program. If participants did not have a first-year program, the questionnaire concluded with a question regarding their advising structure and appreciation for their participation in the study. If participants indicated that they have a first-year engineering program (i.e., all students are admitted into a general program, and then declare a specific engineering discipline later after meeting some criteria) they continued with the remaining questions.

Items 7-13 asked participants to provide an approximate size for their entering first-year engineering student population, how the first-year engineering students are classified (i.e. general engineering, engineering undecided, etc.), and the criteria needed to leave the first-year engineering program and enter into a degree-granting engineering major. The questionnaire dove deeper into the primary role of an academic advisor including asking about the number of individuals employed, their employment categories, and minimum educational criteria for new hires. The questionnaire asked participants to select from an abbreviated version of Habley's Organizational Structures of Academic Advising (year)and indicate how their advising structure would be categorized within the seven categories or describe their advising structure if none of the categories matched their advising structure.

Items 14-17 focused primarily on the advising caseload. Participants were asked to identify the number of students per advisor, if all students were officially assigned an academic advisor, how many advisors are assigned to each student, and how the advising assignments are made. In addition, if students are required to see an academic advisor during the first-year, how often, how the requirement is enforced, and how students are encouraged to seek academic advising and the percentage of students that are seen by an academic advisor.

Items 18 and 19 investigated the coordination of the academic advising experience through the new student orientation program and asked if the advising unit sought student feedback and the platform for the feedback sought. Items 20 and 21 asked participants to identify another first-year engineering program for potential snowball sampling, and if participants would like to be contacted for subsequent phases of the study.

The questionnaire yielded 39 responses. Twenty-two respondents indicated that they had a first-year engineering program, 17 indicated they did not have a first-year engineering

program, and 17 respondents who indicated they had a first-year engineering were willing to continue participation in the study (Table 3-2).

Table 3-2: Questionnaire Responses

Completed Questionnaire	39
No First-Year Engineering Program (Exit Questionnaire)	17
Yes First-Year Engineering Program	22
Yes First-Year Engineering Program Willing to Continue in Study	17

The 17 respondents willing to continue in the study self-reported as having the following job titles: 12 directors of advising/coordinators, one assistant professor, two associate professors, and two academic advisors. Respondents indicated that their director of advising reported to a variety of positions within the university structure: four department head, seven associate dean/undergraduate dean, one dean, one assistant provost, and one executive director.

The size of the first-year undergraduate entering class of willing sites ranged from 30-4,200. The official major classification ranged from undecided, first-year engineering, and specific major classifications. First-year engineering students have a variety of terms and conditions to meet prior to declaring specific degree-granting engineering majors. Those terms can vary by having specific courses, minimum grade point average (GPA), and term requirements to allowing each department within a college the ability to establish the policies and conditions.

Respondents were asked about the primary responsibility of an academic advisor. Most of the responses had a similar undertone of supporting students with selection of major, major exploration, campus navigation, self-exploration, and discovery. The number of professional academic advisors ranged from 0-28 at participating colleges and universities, 12 required a

master's degree for employment for their academic advisors, four require a bachelor's degree, and one did not have a minimum educational requirement.

When asked to label their academic advising model based on Habley's Organizational Models for Academic Advising (1983), one participant indicated a faculty only model, seven did not believe their university fit within the listed model types, two selected the self-contained model, four indicated the split model, and three related to the total intake model. Those who indicated that no best-fit models fit their advising program provided an explanation of their model, which they could see themselves fitting into multiple models due to their structure. Four indicated they identified under the split model with one program currently under a faculty model but will be changing over the next year to a dual model of academic advising and the other one indicated a dual and supplementary combination model (Table 3-3).

Table 3-3: Questionnaire Self-Selected Organizational Model of Academic Advising

Self-Selected Model Identification	Count
Faculty Only Model	1
No Best-Fit	7
Self-Contained	2
Split	4
Total Intake	3

Respondents indicated a variety of methods for determining how many students are assigned to an academic advisor. Those methods included assigning a caseload of students to advisor based on the number of students divided by the number of advisors. Respondents indicated that some programs assign the director of advising a lower number of advisees, then divide the remaining students to full time academic advisors. In general, regardless of who is the official academic advisor, most programs attempted to balance advising caseloads and ensure that students are assigned an academic advisor in their program.

I asked respondents to indicate their current advisor to student ratio or advising caseload. The responses ranged from around 25 students per advisor to 600 with several of the colleges indicating ranges that vary from approximately 32, 25-300, 1-300, 30-40, 25, 75-300, 300, 75-150, 350, and 200-500. This question provided the most discrepancy among the respondents. In addition, sites reported the structure of how students are assigned to their advisor. Their responses can be categorized into three areas: random assignment, assignments based on special populations, and alphabetical breakdown. Assigning advisors through random assignment, including assigning each advisor a group of students sorted alphabetically by last name, are relatively self-explanatory practices. For those using a special populations approach to advisor assignments they may assign a specific group of students to a specialized advisor, or assign the students to an advisor who is also their first-year seminar instructor. This specialized approach to advisor assignments allows the advising unit to balance the student population across their advising team to balance the workload of the advisors.

When it came to whether or not a site's program required the student to seek academic advising 12 respondents indicated that advising was required and five indicated it was not. After investigating those responses further for the schools who did not require academic advising, the reported range of first-year engineering students was from 1,500-2,000. The respondents who indicated that advising was required provided me with the number of times students are required to meet with their advisor. Three respondents indicated that academic advising was required once a semester, three indicated that advising was required twice a semester, one advisor indicated that advising was required three times a semester, and one respondent indicated that advising was required through a weekly seminar course. Advising requirements were enforced through (1) academic holds, which prevent a student from viewing or registering for classes

during the next term of enrollment; (2) advising flags, which is a similar mechanism; and (3) required class attendance. Only one program indicated that the requirement was not enforced. The programs that did not require advising as a mandatory action indicated that students were encouraged to schedule a meeting with their academic advisor through email, social media, and emails.

As a follow-up to the questions about advising ratio, assignment process, and enforcement of academic advising visits, I asked how many students were seen by an academic advisor. Seven respondents indicated that an academic advisor sees 100 percent of their students, two indicated 95 percent, one reported 91 percent, another indicated 85 percent, one reported 70 percent, one was not sure, and four left the question unanswered.

The 21-item questionnaire gave direction for choosing the case sites, and associated interview participants for the balance of the study. Using this questionnaire, I selected three higher education institutions who had first-year engineering programs for closer examination in research phases 2 and 3.

3.6 Selection of Specific Case Sites

Table 3-4 provides a summary of the selected interview case sites for this research phase and highlights the profiles of each case site along with the number of full-time professional academic advisors at each site, number of first-year engineering students, their advising model, Carnegie classification, student population, and Carnegie size and setting classification.

Table 3-4: Interview Case Selection Summary

Case	Number of Interviews	Number of full-time professional academic advisors	Advisors minimum educational criteria	Number of First-Year Engineering Students	Advising Model Theme	Basic Carnegie Classification	Student Population	Carnegie Classification Size and Setting
Case 1	2	8	Master's Degree	1800	Split	Public-Doctoral Universities: Highest Research Activity	47,040	Four-year, large, primarily residential
Case 2	1	6	Master's Degree	1500	Total Intake	Public-Doctoral Universities: Highest Research Activity	43,625	Four-year, large, primarily residential
Case 3	2	6	Master's Degree	1650	No Best-Fit	Public-Doctoral Universities: Highest Research Activity	58,322	Four-year, large, primarily residential

In order to select the case sites to study, I developed a series of selection criteria. The case sites who met all three criteria were included. The selection criteria were: (1) having an engineering student entering class size of over 900, (2) having four or more professional academic advisors, and (3) having a split, total intake, or no best-fit in terms of their model of academic advising. The size of the entering class criterion was selected to ensure that the cases would include similarly sized student populations. The four or more professional academic advisors' criterion was used to validate that the first-year engineering program utilized professional academic advisors. All of the professional academic advisors have a minimum educational criterion of a master's degree. This criterion was imperative to the study due to the rising trend in having professional academic advisors in the higher education setting. This criterion was also important to include cases that would have a similar personnel structure to enable comparison.

The criterion of a split, total intake, or no best-fit in terms of their model of academic advising was selected to yield three cases with similar models of academic advising structure. This was a somewhat opportunistic approach based on responses to the questionnaire but yielded

three models that represent appropriate similarities and differences to yield a meaningful case study. Split models share advising responsibilities between an advising office and the academic departments. The advising office advises specific populations of students; then, once specific requirements are completed, the students are assigned a faculty member to serve as their advisor until degree completion (King, 2008). The total intake model functions as the advising unit from orientation to departure and takes place in a centralized unit. The model can have professional advisors, counseling, and faculty advisors (King, 2008). The criteria of "No Best-Fit" if these models fit my unit" (referred to hereafter as "No Best-Fit") was selected to explore how these cases explain their models of academic advising during the interview process. I also investigated whether or not their definitions during the interview process were truly unique and could lead to the development of a new model of academic advising that could add to the body of scholarship.

In using these selection criteria, the sample of willing case sites yielded eight individual potential participants for the study. The selection criteria used to narrow the participant pool was critical to the study since the number of engineering students, number of professional academic advisors, and self-identified advising model allowed for similar cases to be explored. These purposefully selected criteria provided an avenue to ensuring that I would have at least two participants in each of the selected advising model categories.

During the initial questionnaire, two other models of advising appeared (faculty only and self-contained). However, the student population and number of professional advisors did not meet the minimum expectations for forming a similar case justification for the study. Due to internal regulations and conflict of interest, one of the participants could not be used for the study. Then, in order to balance the cases and have one in each of the categories, three of the

participants were eliminated, leaving a total of five participants for individual interviews (Table 3-4).

Once the selection criteria were established and finalists were selected, I reviewed the Basic Carnegie Classification for each site. The three selected case sites are public-doctoral universities: highest research activity with total student populations ranging from 43,000-60,000. The Carnegie Classification for each case site in regard to size and setting was four-year, large, primarily residential institutions. The size and setting classification of the selected case sites have full-time fall enrollment of at least 10,000 degree-seeking students. The campus locations have 25-49 percent of degree-seeking undergraduates living on campus and at least 50 percent attending full time at a primarily residential university (Carnegie Classification, 2018).

3.7 Phase 2: Document Analysis

To gain a better understanding of the selected cases and to prepare for interviews, I conducted an analysis of relevant documents from the three institutions in the study. Document analysis provided me with a way to evaluate documents that were publicly available electronically. I reviewed each institution's advising website, advising handbook if available, and general institutional information at the university, college, and department levels as a means of triangulation of the findings (Yin, 2018). In addition, these materials provided background information as well as historical insight into the cases being studied, assisted with the interview protocol design, provided supplementary research data, showcased the program's development, and assisted with verifying information located on general search databases (Bowen, 2009). I uncovered details confirming the institutional size, student population, advising programs, workshops, and items the advising program values by their position and placement on their

online materials. Document analysis that was conducted prior to the interviews in Phase 3 was useful in that it allowed me to gain a sense of the items that could be discussed during the interview process. Document analysis allowed me to become familiar with the details I could easily access publicly to build my base knowledge of the case sites and allowed me to focus the interviews on validation of the information, deepen my understanding, and seek clarification on items that were unclear.

3.8 Phase 3: Interviews and Analysis

Rossman and Rallis (2012) identified five reasons for conducting interviews and my study met all five; interviews helped me understand individual perspectives, deepened my understanding, generated rich, descriptive data, gathered insights into the respondents' thinking, and helped me learn more about the context. I conducted semi-structured interviews with each site, which allowed for a deep exploration of the respondent's experiences with advising in first-year engineering programs. The interviews provide information through the views of the interviewee (Creswell, 2014). The interviews conducted by telephone at the participant's convenience. The interview protocol (Appendix A) guided the interview, providing a plan for the interview process. The interview questions (Table 3-5) were developed through critical review of the existing literature and from personal experiences in the advising field.

Table 3-5: Interview Questions Inspired by the Integrated Model of Academic Advising Program Development

Stage 1: Increasing Access	Creation of a new program	When, how, and why was your advising program developed?
	Reorganization of existing units	Follow up depending on previous question: When the advising program was developed, were existing advising programs or units impacted? If so, in what way?
	Reassignment of advising responsibilities	Follow up depending on previous question: when the advising program was developed, were advisors carrying other obligations within the unit?
	Addition of advisors	As your student, population grows or declines have you been able to add to your advising team or restructure to accommodate the demands of the student population?
	Designation of a coordinator	Has there always been a coordinator of advising or has that evolved through the program's development?
Stage 2: Upgrading Services	Formation of subunits to serve target groups	Do you offer special programming to target student populations (i.e. academic probation, first generation, etc.)? If so, can you provide me with details about those programs?
	Expansion of orientation programs	Can you explain your involvement with new student orientation programs?
	Implementation of new strategies (i.e. workshops, group advisement, intrusive approach, videotapes, computer-assisted advisement)	Have you developed a new strategy for working with a specific group of students or enhanced your advising practices? Which strategy or improvement have you been able to showcase as a true impact on students, your program, or information about your program?

Table 3-5 (continued)
Interview Questions Inspired by the Integrated Model of Academic Advising Program Development

Stage 3: Coordinating Programs	**Definition of program goals**	Does your advising unit have learning goals and objectives? If so, would you be willing to share those with me either at this time or through a follow-up?
	Creation of an advising handbook	Does your advising program have an advising handbook and how often is it used and updated by your students vs. your advising team? Would you be willing to share those with me at either this time or through a follow-up?
	Cooperation among units (i.e. referral system, team approach among professional, faculty, and peer advisors), liaison between academic and student services	Will you provide me with overview of how you refer students to other offices on campus and what the most common referral receiving office would be? How is the referral process conducted? What if any involvement does faculty and peer advisors, if applicable, have in your advising program?
	Promotion of developmental advising	How would you describe your advising method with your student population (i.e. developmental, proscriptive, intrusive, etc.)
Stage 4: Enabling Advisors	**Use of new computer technology**	What type of technology do you use in your advising unit (i.e. student information system, Starfish, EAB, etc.)?
	Use of training and development programs	Does your advising unit have a training program for your new advisors? If so, can you explain the process?
	Implementation of evaluation system	What type of advising evaluation system do you have in your advising program?
	Participation in professional conferences	Do your advisors participate in professional conferences? If so, what is their preferred organization?
	Recognition of advisors through awards	Does your advising unit or university have an advisor recognition program? Can you provide additional details about the program?
	Organization of campus and/or state advisor network	Does your advising unit participate in department, college, campus, state wide advising network opportunities? Can you provide additional details about their involvement?

Western Institutional Review Board through Virginia Tech's Institutional Review Board approved all phases of the research process. I obtained informed consent prior to each interview. Each interview lasted approximately 35-45 minutes and was audio recorded and transcribed verbatim. After each of the interviews, I developed a summary of my initial thoughts or field notes. The field notes served as a way to document my initial reactions to the responses and provided context for our discussion or items I wanted to dig deeper into through document analysis. The field notes also include any distractions or other items that affected the quality of the interview. Above is a summary of the interview questions and how they map into the Integrated Model of Academic Advising Program Development. Consistent with the use of semi-structured interviews, the interview questions were adapted to match the relaxed, conversational nature of an interview (Patton, 2002).

During the data analysis process, I incorporated a modified version of Miles and Huberman's (1994) cross case analysis and synthesis through the cross case display partially ordered meta-matrices. I used a word processing table (Table 3-6) to match the transcribed responses to interview questions. The first column and row listed the Stage of the Integrated Model of Academic Advising. Columns 2-6 listed the interview participant and the corresponding case site; column 7 listed the themes uncovered through each question; column 8 captured the similarities between sites; and column 9 included the differences between sites. Row 2 listed the fully-transcribed interview question response, themes, similarities, and differences that emerged from the data.

Table 3-6: Partially Ordered Meta-Matrices Interview Analysis Table

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9
Row 1	Model Stage	Case Site 1 Interview 1	Case Site 1 Interview 2	Case Site 2 Interview 1	Case Site 2 Interview 2	Case Site 3 Interview 1	Themes	Similarities	Differences
Row 2	Interview question	Full Question Response	Full Question Response	Full Question Response	Full Question Response	Full Question Response	Theme Across All Interviews /Cases	Similarities Across All Interviews/ Cases	Differences Across All Interviews/ Cases

I grouped the interviews from Case Site 1 and Case Site 2 into a collective case site response for each of the three cases in this research. An example of this analysis for one interview question is located in Appendix B. In the analysis table, I also highlighted areas that I wanted to return to as possible quotes to use in the results as a method for ensuring that the participant's voice was incorporated and visually represent items that I wanted to reference later. In addition, I revisited the audio recordings of the interviews, my cross-case analysis table, document analysis sources, and transcripts to verify that the information that was accurate and representative of each case site.

During the data analysis process, I uncovered specific themes as they correlate to research question 1-4. My initial questionnaire addressed the organizational structures of academic advising in first-year engineering programs (RQ1), but the interviews and document analysis provided details beyond the category of structure. The interviews and document analysis yielded details about when, how, and why each advising program developed and provided a more holistic perspective of the program's development. Through the analysis process, I uncovered specific details about the services academic advisors provide to their student population (RQ2). Given that the target student population for this research is first-year engineering students admitted into a common first-year curriculum, services such as major exploration workshops were uncovered. I also wanted to learn about the coordination of the advising programs and uncovered the lack of official learning goals across all case sites but also the type of units that academic advisors describe

as key partners in their referrals (RQ3). In addition, themes related to professional development administered through the National Academic Advising Association and on-campus support (RQ4). The data analysis process helped me understand academic advising in first-year engineering programs and addressed the specific research questions related to the purpose of this dissertation and study. The major research themes (Table 3-7) helped me develop the overarching categories for the results outlined in chapter 4.

Table 3-7: Major Themes

Research Question and Framework Stage	Major Themes
Structure Stage 1 & RQ1	Structures of Advising • University Admissions Process • College of Engineering Classification • Academic Advising Structure for Newly Admitted Engineering Students • Academic Advising Team o Current Advising Team o Historical Growth o Habley's Organizational Models for Academic Advising • Change of Major Criteria • Academic Advising Structure Post Major Change
Services Stage 2 & RQ2	Services for Students • New Student Orientation • Major Exploration • First-Year Seminar Course
Coordinating Programs Stage 3 & RQ3	Program Efforts • Program Goals • Advising Handbook • Common Academic Advising referrals • Advising Approach
Support and Professional Growth Stage 4 & RQ4	Support for Advisors • Training and Development Programs • Implementation of an Advisor Evaluation • Institutional Recognition • Professional Conferences

3.9 Research Quality

This case study approach uses reliability and validity as measures of research quality (Yin, 2008). The case study protocol during the data collection process was the primary tactic for reliability. My case study protocol documented the study and provided a structured approach to help me minimize errors (such as failing to see alterative explanations) and recognize biases (Yin, 2008). For example, to enable future researchers to follow my procedures and arrive at the same conclusions, and to promote the integrity of this study, I made my research procedures as explicit as possible, maintaining consistency and repeatability. I also linked the chain of evidence from the data collected to the original research questions (Yin, 2008).

To ensure the study is a quality research design, I used the four tests of construct validity, internal validity, external validity, and reliability (Yin, 2008). Construct validity uses multiple sources of evidence through the data collection (Yin, 2008). I was able to use a questionnaire as a measure for selecting my case sites, document analysis as a method for uncovering details about the selected sites prior to the interview, and interviews as my primary source of data collection. Internal validity was illustrated during the data analysis process by explanation building as the primary tactic (Yin, 2008). External validity was conducted by using replication during the research design process (Yin, 2008). Although commonly associated with quantitative studies, Yin supports these measures for use with case studies regardless of specific methods (qualitative and quantitative). Moreover, these measures have been used in practice with qualitative case study approaches (Matusovich, Streveler, and Miller, 2010).

In addition, I selected the multiple case study method because it is regarded as being a robust and rigorous research approach and provides compelling evidence to support the topic

being explored (Yin, 2008). The case studies within a multiple-case design provides a similar comparison to the capacity to conduct three experiences on a related topic (Yin, 2008). The selected cases (Figure 3-1) for this study allowed me to make connections in the findings.

Figure 3-1: Multiple Case Design

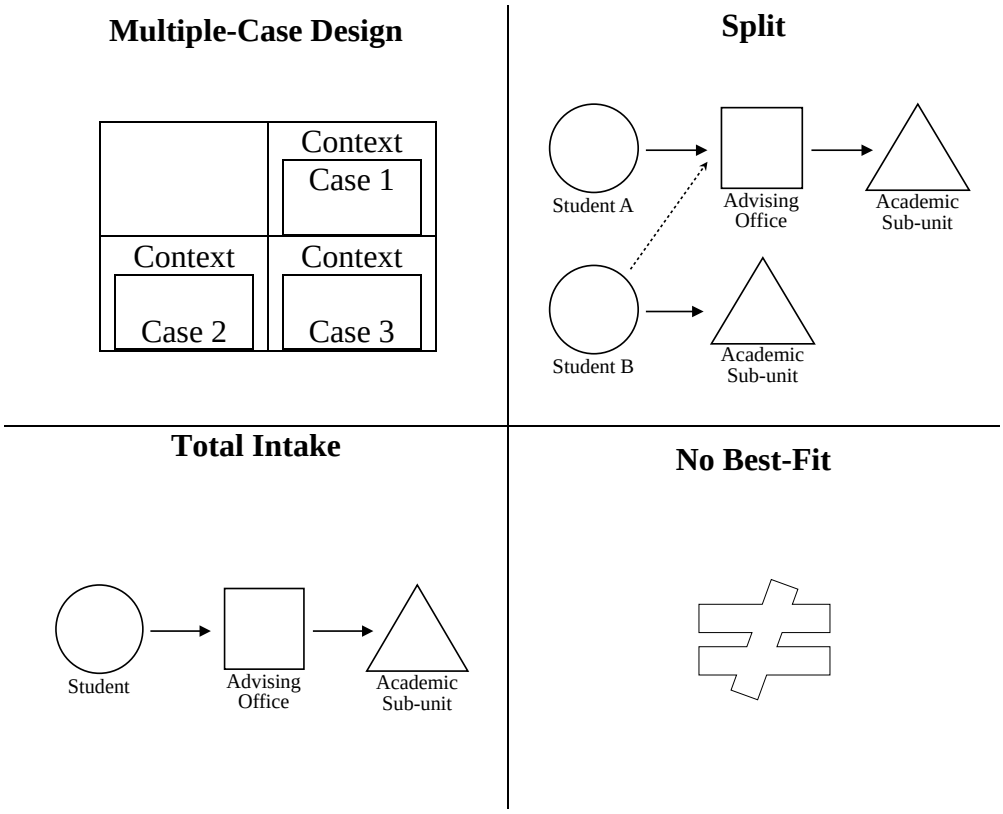


Figure 3-2: two respondents/cases from split, total intake, and no best-fit.

Source. Yin, 2018; Habley, 1983

3.10 Limitations

Although my investigation yielded rich data during analysis, the study includes several limitations that limit the conclusions I can draw. My research was limited to single interviews with five participants at three institutions. In addition, responses to the interview questions may

have been limited to the specific timing of the interview in relation to the academic calendar. On several occasions the respondents did not specifically mention a key service or referral they provide to their student population however document analysis during the research phase indicated those items are offered at their institution within their specific advising unit. Therefore, I make mention that the lack of a response to a specific question does not necessarily mean that a particular service is not provided yet it may have not been the most prevalent to the respondent during the interview phase. The majority of the data used to conduct this research was obtained from interviews and document analysis of online materials from three institutions. Future researchers could focus on gaining insights from more institutions rather than multiple interviews at fewer institutions. Future research could also take an ethnographically-informed approach and more deeply examine the experiences of an advisor at a single institution across an academic year.

This research was limited to participants from the same institutional type of four year, large primarily residential public doctoral universities with highest research activity. Future studies could be designed to incorporate multiple institutional types and sizes. Only three of the seven models of organizational structures of academic advising were represented in the study. Future studies could investigate the remaining organizational structures of academic advising.

My study was limited to institutions with a first-year engineering program and focused on the advising programming for first-year engineering students. Future studies could investigate programs that admit students directly into a specific engineering discipline and additional student populations such as transfer students. In spite of these limitations, this study developed detailed insights that can be used to establish a baseline for future research and to inform recommendations for the field of academic advising.

Chapter 4: Results

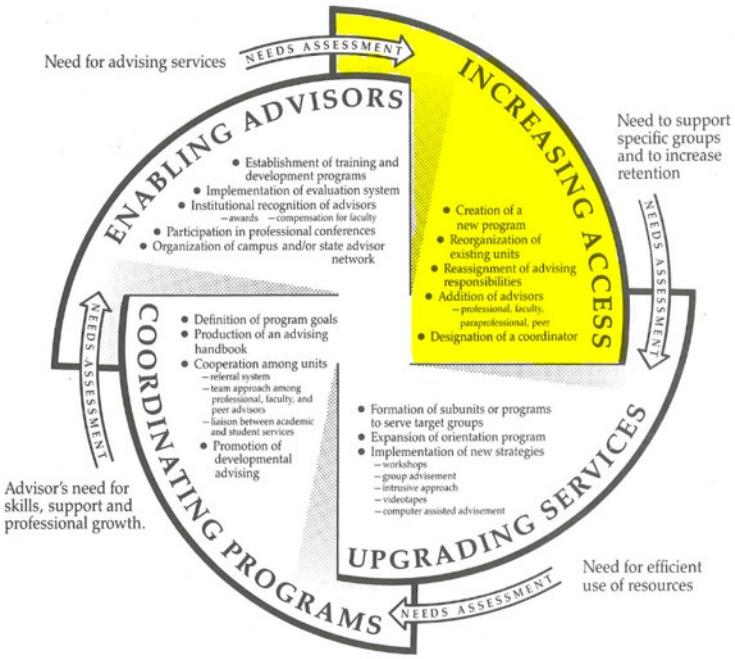
During *Phase 3: Interviews and Analysis*, interviews with five total individuals (Table 3-4) were conducted across three site locations to address the overarching research question of how do first-year engineering programs structure academic advising, and what services, programs, and support are in place for academic advisors and students. The primary data sources for this chapter derive from the interviews and document analysis phase. Specific interview questions addressed all four stages of the Integrated Model of Academic Advising Program Development. Responses to the research questions from the five interviews were combined and represented as a collective case site response (i.e. two interviews from Case Site 1, one interview from Case Site 2, and two interviews from Case Site 3).

- RQ1 (what are the organizational structures of academic advising in first-year engineering programs) addressed stage 1: increasing access.
- RQ 2 (what services do academic advisors describe as being offered to first-year engineering students) addressed stage 2: upgrading services.
- RQ 3 (what efforts do academic advisors describe that are associated with coordinating advising programs) addressed stage 3: coordinating programs.
- RQ 4 (what support and professional growth opportunities do academic advisors in first-year engineering programs complete) addressed stage 4: enabling advisors.

4.1 RQ1 & Stage 1: Increasing Access

Stage 1 of the Integrated Model of Academic Advising Program Development focuses on increasing student access to advising. To understand access, it is important to describe the organizational structure of academic advising and in this study, it is in the context of first-year engineering programs (RQ1). Results from Stage 1 describe the foundation for the creation of advising programs, the addition of advisors, and the designation of an advising coordinator or director to the structure, etc.

Figure 4-1: Integrated Model – Increasing Access



Source. Frank (1993)

This is the first known, published research study to comparatively document the organizational structures of three specific advising programs at institutions that have a first-year engineering program in the U.S. Table 4-1 provides an overview of the Structures of Advising at each case site. Gray highlighting indicates similarities across sites. The results describe the structure from the point of admission to when students move into a specific engineering discipline. The results include the admissions process, the student's major classification label within the College of Engineering, the advising structure for student's prior to entering a specific discipline, the change of major criteria, and the advising structure after students enter their specific discipline.

Table 4-1: Structures of Advising Summary

Case 1 • Split 2 Split/Dual Model	**Case 2** • Total Intake 2 Advising Model	**Case 3** • No Best-Fit 1/Split Advising
University Admissions Process • Central Admissions Office Makes Admissions Decisions for the College of Engineering	**University Admissions Process** • Central Admissions Office Makes Admissions Decisions for the College of Engineering	**University Admissions Process** • Central Admissions Office Makes Admissions Decisions for the College of Engineering
College Of Engineering Classification • Students are Admitted To Engineering as “Pre-Major” • ~ 1800 newly admitted first-year students	**College Of Engineering Classification** • Students are admitted to Engineering “Engineering First-Year or Engineering Undeclared" • ~1500 newly admitted first-year students	**College Of Engineering Classification "Student Admitted to Engineering"** • "Engineering Undecided" or "Pre-Major (Specific Discipline)” • ~1650 newly admitted first-year students
Academic Advising Structure for Newly Admitted Engineering Students • Central College Advising Center	**Academic Advising Structure for Newly Admitted Engineering Students** • Central College Advising Center	**Academic Advising Structure for Newly Admitted Engineering Students** • Central College Advising Center • Discipline Specific Advisors
Academic Advising Team • Director of Engineering Advising Center & Pre-Major Programs • 8 Full Time Advisors • Faculty Supplemental Hours	**Academic Advising Team** • Director • 6 Full Time Professional Academic Advisors	**Academic Advising Team** • Central College Advising Center • "Engineering Undecided" • Director of Advising • 5 Full Time Professional Academic Advisors • Discipline Specific Advisors • "Pre-Major (Specific Discipline)" • 23 Faculty and Professional Academic Advisors
Change of Major Criteria • Six courses, competitive GPA, must be in before 59 credits, guarantee GPA of 3.2	**Change of Major Criteria** • Complete at least one full term, C or better in 8 courses, 2.0 overall GPA	**Change of Major Criteria** • Each department establishes their own criteria. The specifics vary based on overall GPA, grades in specified classes, GPA competitiveness, and occasionally an essay.
Academic Advising Structure Post Major Change • Mixed Advising Model: Faculty Advising and Professional Advising • 16 disciplines	**Academic Advising Structure Post Major Change** • Mixed Advising Model: Faculty Advising and Professional Advising • 17 Disciplines	**Academic Advising Structure Post Major Change** • Mixed Advising Model: Faculty Advising and Professional Advising • 14 Disciplines

4.1.1 University Admissions Process

Respondents from all three case sites indicate they have a central undergraduate general admissions process where students submit an application to enter the respective university and college. The central admissions office manages the admission decisions for the College of Engineering in all three sites. None of the case site's Colleges of Engineering have direct involvement in the daily operations of the central admissions office or their admissions decisions.

Table 4-2: Structure Overview- University Admissions Process

Case 1 • Split 2 Split/Dual Model	**Case 2** • Total Intake 2 Advising Model	**Case 3** • No Best-Fit 1/Split Advising
University Admissions Process • Central Admissions Office Makes Admissions Decisions for the College of Engineering	**University Admissions Process** • Central Admissions Office Makes Admissions Decisions for the College of Engineering	**University Admissions Process** • Central Admissions Office Makes Admissions Decisions for the College of Engineering

4.1.2 College Of Engineering Classification

When a student is admitted to the College of Engineering the students' major classification label differs at each case site. The major classification used at Case Site 1 is pre-major, Case Site 2 uses engineering first-year or engineering undeclared and Case Site 3 labels their students as engineering undecided or pre-major with a specific discipline. For example, a participant at Case Site 3 said:

> *"All of our students are pre-majors, based upon what they put in their admissions application. They could specify that they're interested in mechanical engineering, so they're all admitted as a pre-mechanical, if they specify that they are unsure they would be an engineering undeclared student and not in a department yet, but they are in the College of Engineering." Case Site 3*

Table 4-3: Structure Overview- College of Engineering Classification

Case 1 • Split 2 Split/Dual Model	**Case 2** • Total Intake 2 Advising Model	**Case 3** • No Best-Fit 1/Split Advising
College Of Engineering Classification • Students are Admitted To Engineering as “Pre-Major” • ~ 1800 newly admitted first-year students	**College Of Engineering Classification** • Students are admitted to Engineering “Engineering First-Year or Engineering Undeclared" • ~1500 newly admitted first-year students	**College Of Engineering Classification "Student Admitted to Engineering"** • "Engineering Undecided" or "Pre-Major (Specific Discipline)” • ~1650 newly admitted first-year students

4.1.3 Academic Advising Structure for Newly Admitted Engineering Students

All interview respondents indicate that once a student is admitted, initial academic advising is available through a college level academic advising program. The college level-advising program is also responsible for facilitating new student orientation, class registration processes, and academic programming to support students as they transition to the college environment. This was a common finding across all three case sites.

Table 4-4: Structure Overview- Academic Advising Structure

Case 1 • Split 2 Split/Dual Model	**Case 2** • Total Intake 2 Advising Model	**Case 3** • No Best-Fit 1/Split Advising
Academic Advising Structure for Newly Admitted Engineering Students • Central College Advising Center	**Academic Advising Structure for Newly Admitted Engineering Students** • Central College Advising Center	**Academic Advising Structure for Newly Admitted Engineering Students** • Central College Advising Center • Discipline Specific Advisors

4.1.4 Academic Advising Team

Examining the composition of the academic advising team highlights the similarities and differences across the case sites with particular attention given to the current advising team, historical growth, and details about the self-selected organizational models of academic advising and my re-assessment of the organizational models of academic advising. The current advising

team focuses on the coordination of advising and number of advisors at each case. Historical growth looks at how each advising team grew over time and the ways in which they advocated for their growth. Habley's organizational models of academic advising (1983) provides an overview of the self-selected organizational models of academic advising and my re-assessment of the models from details obtained during the interviews of case site participants.

4.1.4.1 Current Advising Team

The interviews and analysis process indicate that all case sites have a Director or Coordinator of Academic Advising leading their academic advising team. This individual provides leadership to the advising team, which consists of professional advisors ranging from six to eight across the three case sites. The advising team is responsible for the first-year engineering advising process including new student orientation, the change of major process, and other academic program coordination. The advising caseloads, the ratio of students to advisor, range from 100 to 450 students, and the directors or administrators often had a reduced caseload.

Table 4-5: Structure Overview- Academic Advising Team

Case 1 • Split 2 Split/Dual Model	**Case 2** • Total Intake 2 Advising Model	**Case 3** • No Best-Fit 1/Split Advising	
Academic Advising Team • Director of Engineering Advising Center & Pre-Major Programs • 8 Full Time Advisors • Faculty Supplemental Hours	**Academic Advising Team** • Director • 6 Full Time Professional Academic Advisors	**Academic Advising Team** • Central College Advising Center • "Engineering Undecided" • Director of Advising • 5 Full Time Professional Academic Advisors	• Discipline Specific Advisors • "Pre-Major (Specific Discipline)" • 23 Faculty and Professional Academic Advisors

4.1.4.2 Historical Growth

Based on the interview responses at all three case sites, the responsibility of academic advising shifted organically over the years from faculty to individuals whose primary role was to serve as a professional academic advisor. Previously, these functions were split between faculty serving in the advising role and administrative assistants completing the coordination of new student orientation and class registration. Case Site 3 noted that the transition to professional academic advising was a product of a greater understanding of the field of academic advising. This transition opened the opportunities for professional academic advisors who wanted to focus a career dedicated to the advising component of the educational experience for students. This shift was also seen an opportunity to ease the time constraints on faculty and allowed them the ability to prioritize their attention on teaching and research.

At all three institutions the student population has grown over time and all institutions have been adding to the advising structure by hiring additional full-time academic advisors, either within their unit or within their college. None of the case sites had a top-down directive to shift from faculty advising to professional academic advising.

Case Site 1 argued for growth in the advising structure by citing the national averages of student to advisor ratios according to the literature and the overall averages at their university across departments and colleges. As Case Site 1 grew their student population they lobbied to upper administration to grow their professional advising team on the basis that students were not being served consistently and cited that faculty had too many other competing responsibilities to serve in the academic advising role.

> "*A couple of the things that I presented were the case load, the student to advisor ratio of our college compared to other colleges at [Case Site 1]. That was an easier comparison to make than advising loads to other peer institutions, but I did cite the academic advising literature that calls for roughly 250 per full-time advisor, to compare that to. So, I made both references. I referenced comparison to individual academic colleges and the*

overall average of those students to advisor ratios. Then I also used the metric from advising literature of 250."

Respondent from Case Site 3 indicated they argued to decrease the student to advisor ratios based on ABET accreditation standards which called for the need to have more dedicated advisors hired for the growth of departments. ABET is the national accreditation organization for engineering programs. At Case Site 3 the engineering accreditation structure also assisted some departments within the College of Engineering to gain additional advising support.

"There have been other departments within the College of Engineering that I have seen increase their advisors based upon need. So it's the growth of the students. Some of it has come out of ABET accreditation that our population in those particular areas were so large that we were instructed that we need to hire more advisors, but that was a great outcome from that. Some of it was just even seeing the department starting to shift from seeing these advisors" Case Site 3

Case Site 2 indicated they have added additional advising positions over the last 10 years but did not have historical context surrounding the reasons for the growth. Case Site 1 elaborated on the impact of their growth in more detail than Case Site 2 and Case Site 3 during the interview process. Adding additional professional academic advisors also allowed Case Site 1 opportunities to expand their services and ways they interact with students. Advisors were able to take on additional projects and think outside of traditional one on one appointments.

"Up until just this last year, we've not had the latitude to do anything except reactive advising because the numbers were just staggering. There is so many things our advisors now feel empowered to be able to think about or do, that they could not even imagine doing because they were just in back, to back, to back, to back appointments all the time, putting fires out. One thing that they have started is group advising sessions to address points of specific concern where instead of having to do one-on-one meetings; they can give the information out in bulk." –Case 1

"Adding positions has given us a chance to let folks take on additional projects and maybe have that area of specialty. We are starting to be in a model where I have someone who has a specialty working with our international students who are sponsored

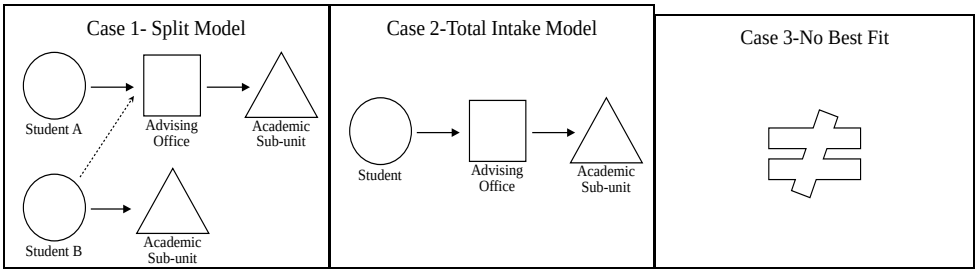
by their government or their country because that is a specific population here and it is quite large. So everyone can meet with the students, but I have one person who's attending extra training and is more of a liaison with the departments I guess might be a good word for it. It's allowed me to have some staff members teach first-year seminars, which is a requirement here that students take a first-year seminar. So that's helped make that connection that advising is more than just helping you pick your classes. They are being seen in the classroom now." - Case 1

Each site mentioned a desire to serve students in a more thorough manner and advocated to achieve that through the addition of professional academic advisors.

4.1.4.3 Habley's Organizational Models for Academic Advising

Through the initial screening questionnaire (Phase 1), first-year engineering academic advising programs categorized their advising program into one of seven organizational models of academic advising. Case Site 1 indicated that they believed they were a split advising model. The split advising model has advising responsibilities divided between an advising office and the academic departments. The advising office advises specific populations of students, such as those exploring majors, and once specific requirements are complete, the students are assigned a faculty member to serve as their advisor until degree completion (Habley, 1983). Case Site 2 selected the total intake-advising model. The total intake advising has all of the initial advising occurring through one office. Case Site 3 indicated that they do not believe they are in any of the pre-determined organizational models of academic advising (Habley, 1983).

Figure 4-2:Self-selected organizational models of academic advising



Source. Habley (1983)

During the interview phase (Phase 3), I further explored the organizational structures at each of the case sites finding a mismatch between two of the cites pertaining to their rating and my assessment according to Habley's Organizational Models for Academic Advising. While I believe the respondent from Case Site 2 self-identified correctly as a total intake model, I found discrepancies between how Case Site 1 and Case Site 2 self-identified their model and my assessment of their model.

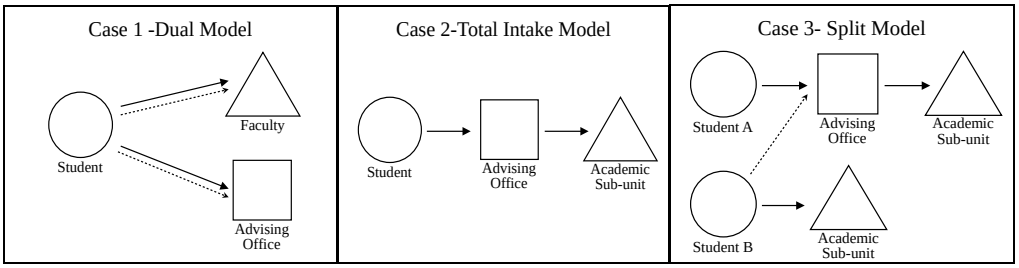
My findings consider Case Site 1 as a dual advising model instead of the split model. The dual advising model setup includes faculty who serve as advisors for the academic department program requirements and an advising office advisor assists students with general education requirements, registration procedures, and academic policies (Habley, 1983). This assessment is based on Case Site's 1 model of advising using a central college advising office as the core advising structure, while also having faculty office hours within their advising program to provide students with an opportunity to engage with faculty and learn more about discipline specific constraints and career opportunities.

Case Site 3 initially did not identify their structure as fitting into any of the organizational models of academic advising, however upon review their model closely resembles the split advising model. In the split advising model, advising responsibilities are usually divided

between an advising office and the academic departments. The advising office advises specific populations of students, such as those exploring majors, and once specific requirements are completed, the students are assigned a faculty member to serve as their advisor until degree completion (Habley, 1983). I consider Case Site 3 in this category because as indicated by Figure 4-2 a student can enter into the college and receive academic advising through a central college advising office then transition into an academic sub-unit (in our case academic sub-units would be specific degree-granting or discipline specific advising services). At that same institution, a student could receive academic advising services directly from the academic sub-unit and not seek advising services from the central academic advising office.

The below figure illustrates the re-assessment of the organizational models for academic advising.

Figure 4-3: Re-assessment of the organizational models for academic advising



Source. Habley (1983)

This research focuses specifically on the organizational models of academic advising and while I believe the initial questionnaire provided truthful data from the respondents my interpretation is that they used the initial quick definition about the models to respond and may not fully understand how Habley's models of academic advising are categorized.

4.1.5 Change of Major Criteria

All three case sites revealed during the interview phase that they facilitate the change of major process from the first year to a degree-granting program. Once a newly admitted engineering student enrolls in courses at their specific university, they must complete specific coursework and earn specific grades prior to having their classification changed into a specific engineering discipline. The change of major criteria is different at each of the case sites, and not all majors have a set admission criterion. At Case Site 3 the specific entry department reviews the applications, whereas at Case Site 1 and Case Site 2 the criteria are independent of the disciplines and is a set criterion based on coursework and grade point average (GPA).

Prior to earning 59 credits at the university, Case Site 1 requires the completion of six courses and a competitive GPA. Students with a GPA at or greater than a 3.2 receive their choice of engineering major regardless of any enrollment constraints in a specific department, this is referenced as a "guarantee GPA" in Table 4-1 and 4-6. The change of major criteria is voted on by the faculty senate and approved prior to each academic year for Case Site 1. This process is completed prior to new student orientation for each group of students. Students at Case Site 2 complete at least one full term, must earn a C or better in eight courses, and a minimum 2.0 overall GPA to change into a specific discipline. At Case Site 3, each department establishes their own change of major criteria. The specifics vary but include an overall GPA, grades in specified classes, GPA competitiveness, and occasionally an essay component.

Table 4-6: Structure Overview- Change of Major Criteria

Case 1 • Split 2 Split/Dual Model	**Case 2** • Total Intake 2 Advising Model	**Case 3** • No Best-Fit 1/Split Advising
Change of Major Criteria • Six courses, competitive GPA, must be in before 59 credits, guarantee GPA of 3.2	**Change of Major Criteria** • Complete at least one full term, C or better in 8 courses, 2.0 overall GPA	**Change of Major Criteria** • Each department establishes their own criteria. The specifics vary based on overall GPA, grades in specified classes, GPA

		competitiveness, and occasionally an essay.

4.1.6 Academic Advising Structure Post Major Change

Once a newly admitted engineering student completes the change of major criteria and moves into a specific discipline, the advising structure at each case site changes. All three case sites use a mixed advising model comprised of faculty and professional advisors. Administratively housed in the specific discipline departments, faculty and professional advisors work with the students in their discipline until they complete their respective degrees.

Table 4-7: Structure Overview- Academic Advising Structure Post Major Change

Case 1 • Split 2 Split/Dual Model	**Case 2** • Total Intake 2 Advising Model	**Case 3** • No Best-Fit 1/Split Advising
Academic Advising Structure Post Major Change • Mixed Advising Model: Faculty Advising and Professional Advising • 16 disciplines	**Academic Advising Structure Post Major Change** • Mixed Advising Model: Faculty Advising and Professional Advising • 17 Disciplines	**Academic Advising Structure Post Major Change** • Mixed Advising Model: Faculty Advising and Professional Advising • 14 Disciplines

4.1.7 Summary

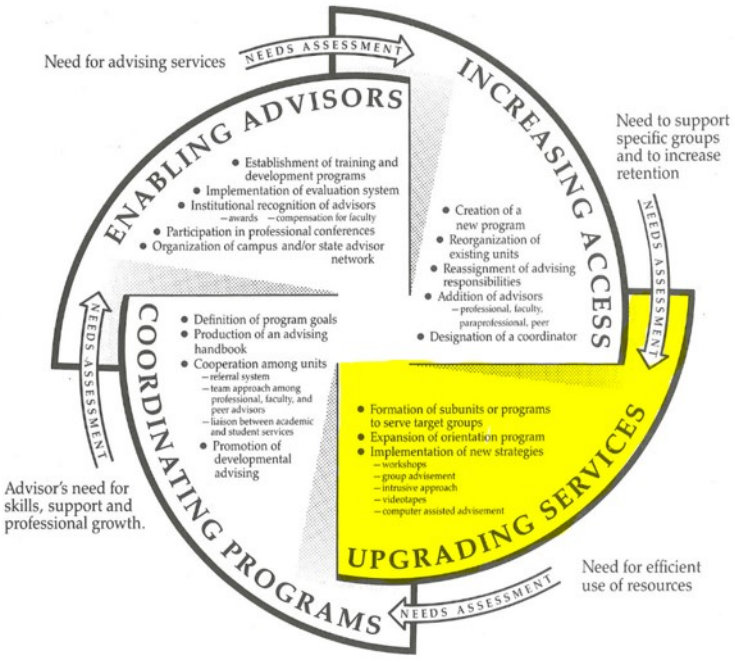
RQ1 addressed the organizational structures of academic advising at each of the case sites. The Academic Advising Structure for Newly Admitted Engineering Students through a Central College Advising Offices were common among all three case sites with a team of academic advisors reporting to a director or coordinator of advising. However, there were slight variations in the students' major classification, academic advising team structure, and change of major criteria. With similarities for each case site once students moved into a specific discipline, departments had their own academic advising structures primarily devolved through a mixed advising model. This research question was vital to our understanding of the structure of academic advising in the selected first-year engineering programs for this study. It provides a level of knowledge not documented previously and provides a way for others to understand how

advising programs are administratively structured at large four-year, primarily residential institutions with a first-year engineering program. It also highlights the similarities and differences regardless of the advising model.

4.2 RQ2 & Stage 2: Upgrading Services

During Stage 2 of the Integrated Model of Academic Advising Program Develop, the focus is on upgrading advising services through programming and workshops, and identifies these focus areas as vital to the academic advising program's evolution. Answering RQ2 identified the services that academic advisors provide to first-year engineering students.

Figure 4-4: Integrated Model – Upgrading Services

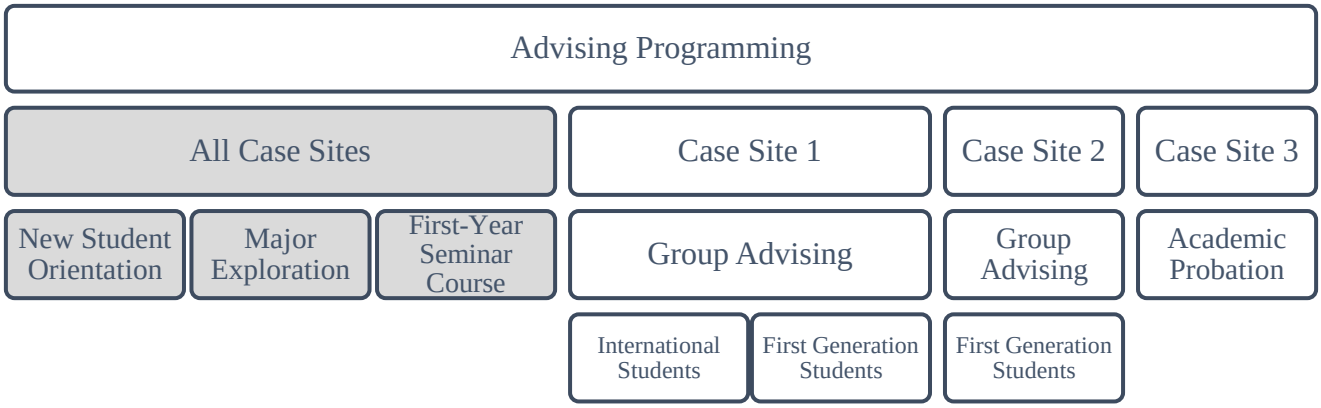


Source. Frank (1993)

The organizational structures of academic advising (RQ1) at the case sites build a foundation for understanding the field of first-year engineering academic advising. The role of academic advisors and the services they provide (RQ2) showcase the activities that are

highlighted by the case sites as key services they provide to their student population. The case sites identified that their advisors and program added to their daily advising operations as they have grown and added additional academic advisors to their structure. Currently case sites facilitate the new student onboarding through their new student orientation, students have the ability to enroll in a first-year seminar course, and advisors focus their programming on major exploration, in addition to working one-on-one with their advisees. Case Site 1 highlighted during the interview phase that they host group-advising sessions for first generation college students and international students. Case Site 2 develop specialized programming for first generation college students and Case Site 3 specifically highlighted their programming for students who are on academic probation. Figure 4-5 below highlights the key services that each case site discussed during the interview phase of this research:

Figure 4-5: Services for Students



Academic advisors at each case site explain the primary role of an advisor at their institution and the methods they deem most important for enhancing their advising services.

> *"To provide guidance and support in a variety of areas as students learn to navigate the higher education system and explore engineering as a possible major." Case 1*

> *"Helping students navigate first-year challenges, explore interests, and find their academic home (major)." Case 2*

> *"To serve as a guide for students navigating their academic and co-curricular path through college. This includes listening to students, providing options and context, guiding them through their assessment and decision process, and identifying strategies and resources to best serve them where they are." Case 3*

As identified by each case site, the core role of an advisor is to serve the students and help them navigate their path through college. Case Sites 1 and 2 placed emphasis on the advising role through exploring interests and majors. Case Site 3 highlights the decision-making process and strategies to help students be successful.

4.2.1 New Student Orientation

At all case sites, new student orientation is an onboarding process that occurs over a two- or three-day time span, and provides students and families with an introduction to campus life, life in and outside the classroom, and class registration. The National Association for Orientation Transition Retention in Higher Education (NODA, 2019) defines orientation as "deliberate programmatic and service efforts designed to facilitate the transition of new students to the institution; prepare students for the institution's educational opportunities and student responsibilities; initiate the integration of new students into the intellectual, cultural, and social climate of the institution; and support the parents, partners, guardians, and children of the new student." The below chart illustrates the engineering advising orientation summary at each of the case sites. Items highlighted in grey are similar across each location.

Table 4-8: New Student Orientation Summary

New Student Orientation Summary	Case Site 1	Case Site 2	Case Site 3
Central Orientation Office	Yes	Yes	Yes
Organizes the engineering portion of student orientation	Yes	Yes	Yes
Number of days per orientation session	2	2	3
Number of Students per Orientation	50-70	45	90
Class Registration	One-on-one based on intended major	One-on-one based on intended major	One-on-one based on major clusters
Computer Lab for Class Registration	Yes	Yes	Yes
Students are Required to Attend	Yes	Yes	Yes
Involvement of disciplines at Orientation	No	No	Yes

New student orientation is usually the first interaction that collegiate students have with an academic advisor. Typically, advisors and students are able to work quickly to resolve their immediate class registration concerns prior to the start of their first year in college during this program. Orientation may include, but is not limited to single or multiple day programs, welcome weeks, camps, outdoor programs, special-population programs, summer bridge programs, online programs, family programs, courses, first-year seminars, workshop series, mechanisms and strategies of communication from institutions to incoming students (NODA, 2019).

During new student orientation, all case sites first-year engineering advising programs coordinate the engineering component of orientation. The engineering component of orientation usually occurs on day two or three of the university program schedule. Topics of the engineering orientation program include an overview of the college, evaluation of expected transfer credits (i.e. advanced placement, dual enrollment, etc.), and math, English, and chemistry placement to

determine appropriate proficiency in their courses. In addition, class schedule recommendations based on the individual student and their intended engineering major(s) and the process of changing from their current major to a specific discipline within engineering are discussed.

> *"Individual review of any credits they're bringing in, AP transfer credits, math placement scores that they have to take to place them into their initial math course and their chemistry course. That's when we're also asking what is your intended major is the word we use, so they can say, "I'm intending mechanical engineering." We can document that. Most of the courses we're recommending are the same, but we'll talk about what they will look like. So our focus is still on that first semester and getting them into the correct courses for that first semester that's they're scheduling." Case Site 1*

At each case site the central new student orientation office manages the logistics of the university orientation programming and the number of students that can attend each session. Case Site 1 hosts engineering orientation for two days and sees around 50-70 students at each orientation session.

> *"We try to keep it around 45 to 50 because if we go higher than that we have to run two rooms. But unfortunately, with our numbers, there several weeks during the summer where we are at 70, which means we basically split it in half and run two sessions simultaneously." Case Site 1*

Case Site 2 hosts orientation for three days and hosts around 45 students per session. Case Site 3 orients 90 first-year students over a two-day span. All case sites advise students in a one-on-one capacity during the orientation program.

All interview respondents indicate that the main orientation office coordinates orientation programming for parents and students that is applicable to all students at the university regardless of their academic major (i.e. campus resources, partnerships, traditions of the university, etc.).

> *"Orientation is managed centrally on campus by an office called the Office of New Student Programs. They coordinate a basically three-day orientation program for all students. They start beginning of June and they run through the end of August. It's like*

> *ten weeks of orientation that happens over the summer. Every student comes for a three-day program within those ten weeks." Case Site 2*

Then each of the central college advising centers coordinates the class registration and academic advising component of orientation. Case Sites 1 and 2 advise engineering students in a general sense based on coursework toward the students intended major.

> *"We start as a large group and give the overall of the college and give them all their enrollment controls. And while they start working on their schedule, we actually pull them out one by one and go over their individual record and their transfer credits and give them individualized recommendations of their classes, and then they go back and continue working on that." Case Site 1*

Case Site 3 disclosed that they advise students in a cluster approach with the assistance of advisors from degree-granting advising units. The cluster system are populations that Case Site 3 saw the most switches between student's major choice. For example, there is a cluster for chemistry that focuses on biomedical, chemical, and material science and other clusters such as food, agriculture, computers, and physics, which group majors that have similar curriculum and career options together. This cluster advising approach used during new student orientation allowed the central college advising centers the ability to focus their training on the clusters rather than requiring all advisors in the college to be familiar with all majors. It also allowed the students some flexibility in their class schedule in the event they changed their intended major choice to a major within a cluster. Additionally advisors within the disciplines to learn more about the curriculum for the majors within their orientation clusters. This design provided the discipline advisors with more confidence when students in their major wanted to discuss changing into another major. Rather than simply referring the student to the new major for course selection advising, they felt more comfortable with those conversations. Case Site 3's cluster approach to orientation advising allows advisors to be cross-trained with like disciplines

and allows students to switch their coursework with similar disciplines without wasting coursework. Because all three sites are responsible for new student orientation, students are able to connect within their advising programs through that avenue early on in their collegiate careers.

In summary, all locations have a central orientation office that plans the logistics of the orientation program and the central engineering advising office organizes the engineering portion of student orientation. Students are required to attend new student orientation, use a computer lab to facilitate the class registration process. The differences are the number of days per each orientation session, the number of students per orientation session, and the involvement of specific disciplines for the engineering orientation process. At all three case sites participation in the orientation program is a mandatory activity for newly admitted students whereas one-on-one academic advising after the academic semester begins is not a required activity at any of the case sites.

4.2.2 Major Exploration

Major exploration was acknowledged as a key area of focus during the interviews at all three case sites and their advising program structure. Major exploration allows the student to learn more about the specific engineering major they wish to pursue and opportunities available to them in their intended discipline.

> *"I think probably our most important job is to take students who are coming undeclared and really help connect them to different people and resources that are going to help them explore majors and help them find their academic home. That's a big thing that we talk about a lot, is helping you find your path." Case Site 2*

The chart below provides a summary of the engineering major exploration resources that each of the sites identify that they use in their advising practices. The items shaded in grey outline the common items at each of the sites.

Table 4-9: Engineering Major Exploration Resources

Case Site 1	Case Site 2	Case Site 3
Major Information Sessions/Fair	Major Information Sessions/Fair	Major Information Sessions/Fair
Exploring Engineering Major Website	Exploring Engineering Major Website	Exploring Engineering Major Website
Easily Accessible Curriculum	Easily Accessible Curriculum	Easily Accessible Curriculum
Career Opportunities	Career Fairs /Internships	Online career resources (i.e. career cornerstone, try engineering, O-Net)
Engineering Student Organizations	Discipline specific advising Offices	Professional Associations
	Peer Interviews	Conversations with people (i.e. family, friends, and peers).

All case sites identified either during the interview process or through document analysis their online resources that they host major exploration information sessions for their student population to learn more about the specific engineering disciplines. Usually these information sessions are during the first semester of enrollment and provide students with the opportunity to learn from departmental representatives details about the discipline, career opportunities, and ways to uncover more information about the field of engineering they are interested in pursuing.

> *"We did a major exploration fair…we would bring all the engineering majors there, as well as STEM-related areas or business, or something that we knew we had a lot of traffic to. We'd open it up to the entire university community... So, that was a nice opportunity for students to walk around and get a lot of information in the same place." Case Site 3*

All three case sites also had specific websites dedicated to exploring engineering majors. Case Site 1 focuses their major exploration web resources on providing students with a brief summary about the disciplines available, career opportunities, ways to get involved with the engineering organizations, and general campus student organizations. Case Site 2 provides students with a comprehensive major exploration checklist with instructions on how to gather information about engineering majors through majors' fairs, departmental website reviews, advising offices, speaking with students who have already declared their major, career networking opportunities, career fairs, internships, reviewing the curriculum and how to make a plan on declaring the specific major. They also provide a strong reference to the curriculum review in which all three majors have term specific curriculum guidelines that were easily accessible on the website for students to use and explore. Case Site 3 focuses their website resources on talking with people in the field that the student wants to pursue such as family, friends and peers. They provide students with a list of online career resources such as Career Cornerstone, Try Engineering, and O-Net along with specific resources for exploratory students at their university. Professional associations and foundational engineering coursework are also highlights of their online resources for students to utilize during the major exploration process.

All three-case site have access to their curriculum on their website for students to explore. The curriculum is available for students to review at each of the case sites either by providing a detailed list of courses that are required for each major or a degree flow chart that provides a diagram for each major and the courses that are requirements. Case Site 1 provides curriculum flow charts that provide a list of the course requirements, term offerings, and pre-requisites for each course. Case Site 2 provides a sample list of the courses that are typical for each student to take for degree completion, a google sheet for students to modify their specific

plan, and videos of each major's research areas. Case Site 3 provides curriculum sheets that list the term offering of each course and a suggested path for degree completion.

All three case sites highlight their major information sessions, web resources, and curriculum as ways to explore in more detail the major options available to each student. In addition, all sites indicated a connection to career opportunities, career fairs or online resources for major exploration however; each site provided varying details about how to use that type of resource. The other items provide variations at each of the case sites from the interview and online resources that they specify around the topic of major exploration.

4.2.3 First-Year Seminar Course

All three case sites have the opportunity for students to engage in a first-year seminar course. In general, the seminar provides students with a 1-credit course structure as an introduction to college, time management, campus resources, peer engagement and ways to explore engineering majors. During the interview phase Case Site 1 disclosed that the seminar is a requirement for all students at their university. Some of the advisors at Case Site 1 also teach in the first-year seminar.

> *"some staff members teach first-year seminars, which is a requirement here that students take a first-year seminar. So that's helped make that connection that advising is more than just helping you pick your classes. They're being seen in the classroom now." Case Site 1*

The structure of the courses provides students with an introduction to the college, university, study skills, and time management resources. Case Site 2 provides an optional 1-credit course that roughly one quarter of their engineering students enroll in to explore details about the types of engineering majors and academic plan. This course does not have an

engineering advisor as the instructor of record, however, this was an opportunity for students to select to explore the engineering majors in more detail. Case Site 3 requires that all students enroll in a 1-credit course that introduces students to college life, university experiences, major exploration, time management, campus resources, and peer engagement. Most of the advisors at the university teach this course as the instructor of record tailored to the specific student populations.

> *"we have a lot of conversations about how do you search, explore, and really figure out which areas of engineering you fit into. As well as talking about managing your time, understanding university policies, navigating resources on campus, connecting with peers and learning how to engage with faculty, all of those different conversations happen in that class. So that's really where we put a lot of our energy into providing very thoughtful communication and programming for them. But beyond that, our office does host at least once a year, an exploring majors fair. We bring all of the college of engineering departments as well as majors outside of the college of engineering that we see our students often switch into … so our undeclared or any other interested students can come and talk with the different departments to be able to compare." Case Site*

The table below illustrates the details of the course, whether or not the course is required or optional, the credit hour, topics, and advisor involvement at each of the case sites.

Table 4-10: First-Year Seminar Course Summary

Case	Required or Optional	Credit	Course Content Summary	
Case Site 1	Required	1 credit	Introduction to college, university, study skills, time management, and campus resources	Some advisors serve as the instructor of record for this course
Case Site 2	Optional	1 credit	Intro to engineering majors, career paths and academic planning	Advisors are not involved in teaching the course
Case Site 3	Required	1 credit	Intro to college, university, major exploration, time management, campus resources, and peer engagement	Most of the advisors serve as the instructor of record for this course

During interviews, Case Site 3 provided the most detail about the first-year seminar course and the tie to their advising practices. The respondent from Case Site 1 briefly mentioned the seminar course and now that they have more advisors in their program they are able to take on additional projects such as teaching the seminar course. Case Site 2 did not directly mention the course in the interview phase however through the document analysis process and email communication the details align with the other two case sites.

4.2.3.1 Group Advising

Case Sites 1 and 2 were able to enhance their advising programming by offering group advising. Group advising is more closely related to classroom teaching and less aligned with counseling than one-on-one advising is (Woolston and Ryan, 2007). Group advising allows academic advisors to convey a topic in classroom instructional format where multiple participants are able to attend. Group advising provides an opportunity to convey information to a larger audience rather than repeating the same details individually through one-on-one advising (Gordon, Habley, & Grites, 2008). The review of general education requirements, class registration, course selection, policies and procedures are often items than can be covered thoroughly in a group advising setting (Gordon, Habley, & Grites, 2008).

Group advising topics indicated by the case sites include specialized programming for working with special populations. Special populations vary at each case site depending on the demands of each advising program. The case sites identified group advising as a viable tool for aiding international students, first-generation students, and students on academic probation. Group advising was introduced at Case Site 1 through advising topics that include study abroad and class registration sessions:

> *"Something else we've started in the last two years is group advising sessions now that I have more staff. We present different topics throughout the year, and we run them in early afternoon or early evening and the topics are varied. We will have one about studying abroad. We will have some about some topical things like selecting your classes for next semester. We also tried group advising targeted to international students and first-generation students. We found attendance at those were poor, but it was our first attempt, so we are going to look at different ways to reach those populations." Case Site 1.*

Furthermore, Case Site 1 continues to upgrade their advising services (Stage 2) by offering additional support to their international student population. The international students attending colleges and universities in the United States has increased significantly in the past few years (Gordon, Habley, & Grites, 2008). International students tend to attend higher education in from another country in the United States on a F1 visa status. Case Site 1's welcome programming for this population is a collaboration with their university's multicultural and outreach office. Their program is providing an outreach to this student population beyond their one on one advising hours. They went beyond class registration activities and provided students with a friendly slower pace welcome event that allowed the advisors and students an opportunity to take a pause from the rush and hustle that was previously experienced in their programming. Advisors re-evaluated their programming to include only critical information that students would need during their first few weeks of classes rather than their entire time at the university.

Respondent at Case Site 2 shared they are working to add additional programming for first-generation students. First-generation college students are those who are the first in their family to attend college (College Board, 2019). Case Site 2 is in the process of launching an experiential learning opportunity with funding, study abroad, and mentoring and networking opportunities for this population. The programming will provide guidance about these areas and

allow the first-generation college students to take advantages of these opportunities that they may not have considered previously.

4.2.3.2 Academic Probation

Interview respondent at Case Site 3 acknowledged they increased access to their advising program by offering workshops to their students on academic probation. Academic probation, as defined by Case Site 3, is when a student's cumulative grade-point average is below a 2.0, or C average, and indicates to the student that they are not meeting the academic standards set forth by their attending university. As their enrollment numbers grew, the required in-person workshops were transitioned to an on-line workshop module.

> *"An alternative [to the online module] though, a student can have a one on one meeting to talk about that specifically with advisors so we can navigate them through resources and how are they approaching their academics the next semester, so hopefully they'll be more successful." Case Site 3*

This provided a streamlined way to clarify the probation terms, provide reflection on the past semester, set goals for the future semester, and explore the resources available to achieve their academic and personal goals. Failure to complete the probation online module results in an academic hold on the student's account that locks class registration for future semesters until the activity is complete. Students who need additional support can engage in an academic intervention and meet one on one with their academic advisor. During the one on one meeting, the academic advisor helps the student navigate their priorities and the academic resources available. They introduce a study skills and academic success class to provide the students with a structured way to improve their academic success while expanding on their academic skills. During the document analysis phase, I uncovered that each of the case sites have a similar outreach to student on academic probation however, Case Site 1 and Case Site 2 may have not

specifically mentioned this as a service to their students based on the specific timing of the interview and when they work with this student population.

4.2.4 Summary

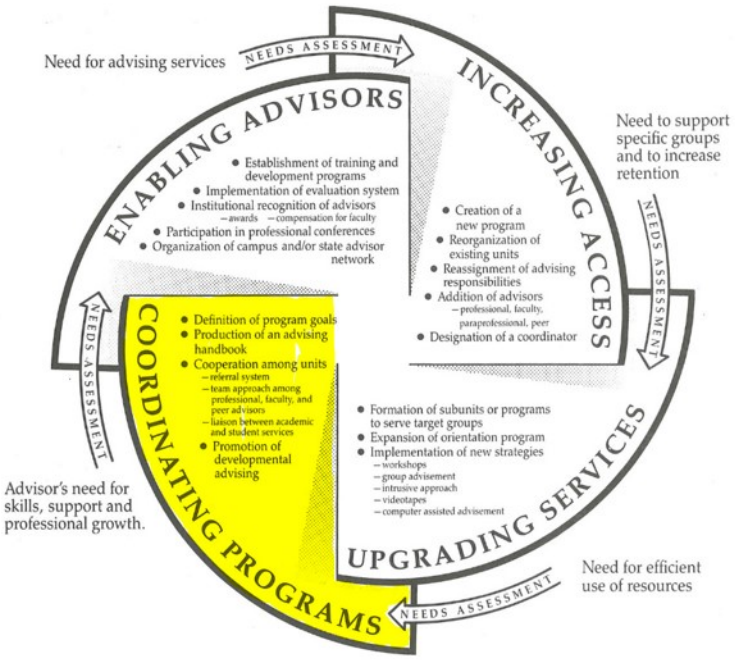
Research question two highlights the activities that academic advisors describe as being available to first-year engineering students. This question relates to the Integrated Model of Academic Advising Program Develop in Stage 2: Upgrading Services, as the activities in which academic advisors focus their time and energy to support students. This research uncovers seven areas that first-year engineering programs focus their attention on: 1) new student orientation, 2) group advising, 3) programming for international and first-generation students, 4) support for students on academic probation, 5) major exploration, 6) web resources and curriculum, and 7) the opportunity to engage in a first-year seminar course. These programs support students' transition to college through new student orientation, focus attention on target student populations, and garner support for the importance of major exploration in first-year engineering programs.

My research uncovered that the engineering new student orientation programing was coordinated by the Central College of Engineering Advising Offices regardless of the students' academic major for all of the case sites at their respective universities. Major exploration programming was identified at each case site as a key academic advising programming initiative across all case sites. First-year seminars were also mentioned across all case sites to support student success. Case Site's 1 and 2 specifically address the use of group advising as an intentional focus. Case Site 3 also highlighted programming for students on academic probation.

4.3 RQ3 & Stage 3: Coordinating Programs

Stage 3: Coordinating Programs of the Integrated Model of Academic program Development suggests a needs assessment through the coordination of units that support student success through the development of program goals, advising handbooks, common referrals, and daily advising practices. Answering RQ3 identified the lack of formalized program learning goals, the use of websites instead of formal advising handbooks, key referrals across the case sites institutions, and their advising approaches.

Figure 4-6: Integrated Model – Coordinating Programs



Source. Frank (1993)

4.3.1 Program Goals

Program goals provide a guide for the advising program and helps identify key strategic outcomes. The consensus across all case sites revealed that none of the case sites have formal

learning outcomes or program goals for their engineering advising unit. Case Site 1 indicates that they have a strategic plan in place and try to identify and focus on new projects for the year.

> *"We have a strategic plan, which is how we identify new projects that we want to work on. And we have a I guess I'll use the word mission statement that overarchingly helps us define those with the assistance of our assistant dean. So, I report to the assistant dean and the college of engineering, and I'm actually co-located her office. She helped us with her priorities and the deans to get a strategic plan and our mission statement. We use that to get new projects or start to prioritize what we want to work on each year." Case Site 1*

Case Site 2 identifies several items they focus on as their goals, and work toward achieving those items throughout the year.

> *"I would say that's a work in progress…We had a retreat where we did a ton of strategic planning. Right now, I would say we don't necessarily have learning goals, but what we did do is we created plans for… we have an assessment plan now, a technology plan, a professional development plan. Then we just looked at those plans actually this past week at our team meeting. We were like okay, of those goals, what are we going to prioritize this year? We have these buckets that we're focused on right now and we've identified priorities for the year within those buckets. That's as close as we've gotten to learning goals." Case Site 2*

Respondent at Case Site 3 indicates that they develop focus areas for the year based on their advising team's planning.

> *"these are not necessarily learning objectives per se, but things we focus in on them are, the focus on transition to college, study skills, course preparation, test taking strategies, time management, having a understanding of the first year curriculum and choosing an engineering major, scheduling and course selection, examination of major options and major requirements, in depth exploration of career and academic interest, applying to your major and curricular planning through their college career, so helping them understand how to apply to their major and then do curricular planning." Case Site 3*

4.3.2 Advising Handbook

Advising handbooks provide an overview of the program's timeline, expectations, and are a guide for students and advisors. Advising handbooks are designed for academic advisors as

a training guide, for students to learn about academic policies and procedures, or include components for both populations. Case Site 2 provides all new students with an advising handbook at new student orientation in hard copy. This handbook is referenced throughout their time in the advising unit during their one on one advising interactions. The handbook contains details regarding course planning and charts indicating the Advanced Placement and International Baccalaureate equivalences. This handbook at Case Site 2 acts as a guide for students and advisors to capture the important topics of their program.

> *"My team puts that together. We give students a hard copy of that when they come to orientation. It's everything we think they need to know for their first year. We make the PDF available on our website too. We used to have, like for example, we use there's a page in the back now that's like a course planning worksheet. We'll fill that out together at orientation. There's a page in the middle that's like the AP/IB credit chart. They can look at that quickly and see what kind of credit am I going to get for the classes I did in high school. Those certain sections we use quite a bit at orientation." Case Site 2*

In lieu of an advising handbook as mentioned in the Integrated Model for advising, all three sites have an advising website that they use to disseminate information to their student population. Case Site 1 and 2 uses their website as a primary resource for students to locate the curriculum sheets, understand the criteria for admission into a specific major, and details about their major choices.

> *"We have updated our website over the last year to try to make it more where students would go look at things. Also, the college had the communications and development office do an overhaul of the whole college's website. So, it gave us the opportunity to look at it, and we realized a lot of things were where we would go to look for something, so more advisor facing. So, we've tried to make it more student facing and what would a student call it. We tried to use some students. So, we're trying to use the technology to our advantage that way." Case Site 1*

The websites provide a way to highlight the items that they value and want students to learn about, and are used as a resource for them to gain a better understanding of their structures, policies and procedures.

4.3.3 Common academic advising referrals

Common referrals are the offices or support structures in which academic advisors commonly recommend that a student seek out to gain additional support for their success. Advisors often have to provide students with resources such as online information, handbooks, and referrals to offices to support their student population and aid in their academic success. It is critical for advisors to maintain good working relationships with campus partners to make effective referrals for students and connect students to the resources needed (CAS, 2013). When asked about common referral offices, all three case sites indicated a different resource they use based on their experiences and student population.

Case Site 1 is referring students to their student disability resource office. Their first-generation and underrepresented students make regular connections through the outreach and inclusion office to make connections on campus along with common referrals to professor office hours and referral tips for how to talk to professors and use them as a resource.

> *"A lot of times we are sending students to our **student disability resources** office. We're finding we have a lot of students who come in and maybe had an IEP in high school and decided that they were going to try college without it. Then they get into calculus and physics and realize maybe that wasn't such a good idea and maybe you had that accommodation for a reason. So we make a lot of referrals that way. Also, with some of our first-generation students or our under-represented students, we make a lot of referrals to our **outreach and inclusion office**, who also will help them get connected on campus. I would say those are our biggest ones. Also, referring back to the **professors and office hours** and how to approach and talk to a professor seems to be a lot of what we do." Case Site 1*

Case Site 2 refers students most often to mental health and counseling, study abroad, career services offices within engineering, financial aid, academic tutoring specifically for math and physics, financial aid, and crisis management.

> *"As you would guess…our **Counseling** and Psychology Services. We refer a whole lot to our **career centers**, so we have our own engineering career resource center. Engineering also has its own **study abroad** office. We refer students there a lot. We refer them to the **Academic Help** Center. Engineering has one called the Engineering Learning Center…. There's a math one, a physics one, a science one. These are help centers. We refer students there a lot.…**Financial aid**. We have our own caseworkers up here in engineering. It's like **crisis management** team. We'll refer students there if it's a crisis situation. I think those are the most common ones." Case Site 2*

Case Site 3 makes common referrals to departmental advisors in specific degree-granting majors to explore majors, counseling and consultation services, tutoring specifically in math and physics, career counseling to learn more about the student's strengths as associated with the strength's assessment and major exploration, and the wellness center that focuses on stress and resiliency.

> *"the most common referral is for them to be **meeting with advisors** of other departments. … I talk a lot with our students about our **counseling and consultation** services. I talk with them a lot actually about... We have quite a few really strong **tutoring opportunities**. We have what we call our math and staff learning center. That is actually probably one of my most often referral. They provide tutoring, but lots of online support. So, we have that office, that department, but then we have tutoring in chemistry. Making sure students know how to navigate that. Tutoring in physics. But then we also have several other outlets, like the learning center that provides tutoring in all those different areas. The residence halls provide tutoring, so lots of focus on tutoring and academic resources. We do have a **career counseling** office as well, so if they are starting to think outside of the college of engineering and want to start to explore things that are in line with their strengths, that's a great office to help them explore that. I do refer students quite a bit to our university exploration, which is our larger undecided, so outside of engineering, but our larger undecided advising office because they can help them navigate all the majors on campus. We do have a **wellness center** as well so that maybe counseling isn't quite right for them, our wellness center has wellness coaches that are often students or master's or doctorate students that can talk with them about the elements of their wellness and can be a good first go-to if they're particularly struggling with stress or just balancing themselves. A department that's been, it's relatively new, but I've been doing a lot more referrals to…focuses on **stress and resiliency** and so they do…assessment for*

students to start to understand how they manage stress, but they also provide meditation trainings for students, and just again, that focus on their stress and their stress management." Case Site 3

Case Sites 2 and 3 provide routine referrals to counseling and tutoring shown in the table below in grey. Tutoring assistance specifically for math, chemistry, and physics are the common subject areas for this type of referral. While this response should not imply that Case Site 1 does not make these referrals, it simply provides a starting point to understand that at the specific time of the interview that these were the top referrals on the minds of the interviewees. In addition, each of the case sites top referrals could vary depending on the needs to the student and duration of the academic calendar. It also should not imply that the referrals made by Case Site 1 are not made by Case Site 2 and 3 and vice versa. These referral offices are consistent with support areas in the literature as areas that advisors should be familiar with and make connections with at their respective institutions.

Table 4-11: Common academic advising referrals

Case Site 1	**Case Site 2**	**Case Site 3**
Disability Resource Office	Counseling	Departmental Advisors
Outreach and Inclusion Office	Career Services	Counseling
Professor Office Hours	Study Abroad	Tutoring
	Tutoring	Career Services
	Financial Aid	Wellness Center
	Crisis Management	Stress and resiliency

The ability to effectively refer students to appropriate resources and be knowledgeable about the options available to students are vital to the role of an academic advisor (CAS, 2013; Folsom, 2007; Gordon, Habley, & Grites, 2008).

4.3.4 Advising Approach

In addition to the methods they use for working with students, the use of developmental advising practices provides academic advising programs with a method of conducting academic advising services beyond advisors responding to the student's inquiries and nothing more. This method for advising introduces advising professionals to the theory logic on how to conduct their advising practices that stems from student development research that focuses on a holistic approach to working with students. During this research, each case site's advising program indicates that they use a different advising approach with each student and are hesitant to put a label on their advising practices.

> *Case Site 1 indicated that advising first-year engineering students is: "unfortunately a lot of prescriptive advising, but I do think I have staff that are trained well enough and have interest well enough that we do a good chunk of intrusive advising as well when it gets to students that are having difficulty and getting them some other assistance."*
>
> *Case Site 2 indicates: "I feel like we each have our own approach. It's something that we, before I got here, my predecessor was really into appreciative advising. There was a lot of conversation on the team when I arrived, around appreciative advising and using that in the office. That's one that I think they used. I don't think any of us on a daily basis are really actively thinking about our approach. "I don't know that any of us could pick a label and put it on a student. We talk a lot about growth mindset. We do a lot of coaching with students around things like resilience and growth mindset."*
>
> *Case Site 3 notes: "we do have a significant amount of training and resources to help the advisors decide what their step is… for me, I focus on being more developmental and really looking at our students' individual needs."*

Case Site 1 indicated that they use prescriptive and intrusive advising with the engineering student population. Case Site 2 believes each of their advisors have their own approach to advising including appreciative advising and using a growth mindset. Case site 3 indicated that there was a good amount of training on advising approaches but for them

personally and not necessarily for the entire program, they used a developmental advising approach for working with their student population.

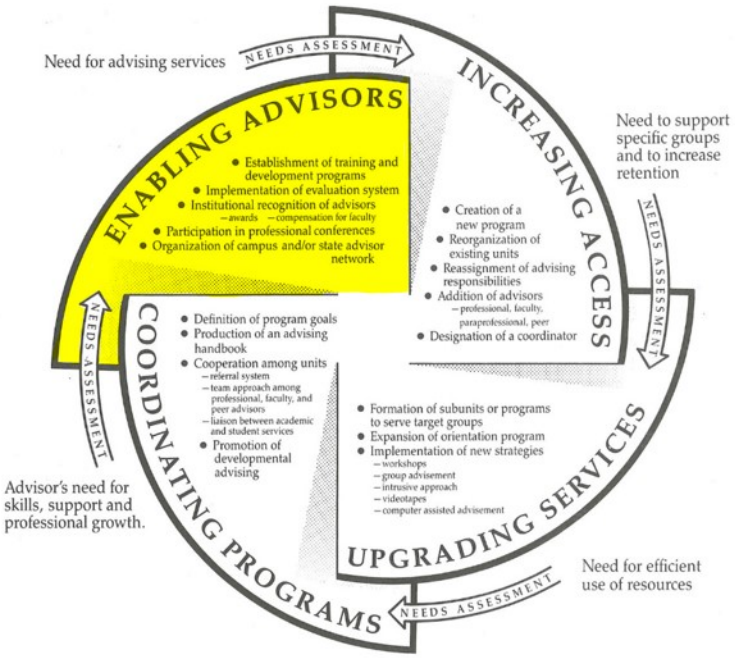
4.3.5 Summary

All advising programs in my study indicated they do not have formal learning outcomes for their advising program but indicated strategic plans or focus areas. Learning outcomes would help frame their daily advising practices and also enable better assessment of their practices. In addition, all case sites mention that they often make suggestions to students to support offices such as counseling and tutoring when they believe these outside referrals would be beneficial to the student's overall success. Finally, each of the case sites had the opportunity to address their approach to academic advising in which each identify as having a different approach depending on the student situation. Much of the curriculum advising is prescriptive in nature, which focuses on providing students with one-directional information however, the use of development and holistic approaches were identified.

4.4 RQ 4 & Stage 4: Enabling Advisors

Stage 4 of the Integrated Model of Academic Advising Program Develop, identifies services for advisors to grow professionally for the benefit of their program development. RQ4 (what support and professional growth opportunities do academic advisors in first-year engineering programs complete) is at the heart of academic advisor skill development and addresses the importance of advisor evaluation, training, and professional development.

Figure 4-7: Integrated Model – Enabling Advisors



Source. Frank (1993)

All three case site respondents indicated that they place an emphasis on ensuring academic advisors are properly trained before working directly with students at their institutions. The methods discussed include the establishment of training and development programs, implementation of an evaluation system, institutional recognition of advisors, participation in professional conferences, and the organization of professional opportunities on campus and through regional and national associations.

4.4.1 Professional Development

Case Site 1 training program provides all new advisors with a mentor in which one of the senior advisors provides guidance and advice to them on a regular basis as a means for internal professional development opportunities at their institution. They also provide technology training, Family Educational Rights and Privacy Act training, and university level training. They

also request that the new advisors meet all the engineering departmental advisors and gain knowledge about the specifics of each major they will be advising students on in the future. Prior to allowing the new advisor to meet with students they implement a shadowing program which allows the new advisor, to sit in on advising sessions with other seasoned advisors. After a period of time from which the new advisor gains a comfort level with the advising process, they switch roles with the new advisor taking the lead on appointments, which allows for observed student interaction that promotes growth and confidence in transitioning the new advisor to providing unilateral or unassisted advising services. Once the shadowing program is complete, the new advisor takes on their own roster of appointments.

Case Site 2 is providing professional development for their advisors in the college with a brown bag series and educational talks about different topics. The idea is to provide an environment where the departmental advisors are engaged with the college level advisors to provide a connection to the larger mission of advising across the college as a whole.

Case Site 3 provides new advisors with a month of training where they shadow other advisors, meet with departmental advisors, and review the basics of the unit's advising philosophy. For advisors without a background in higher education, they also review developmental theories to have a lens into advising from a theoretical perspective for working with undecided, exploring populations, and focus on first-year students. In addition, they have a university-wide training that focuses on the general education, how advising is structured, campus resources and support offices. Each of the case sites highlight the importance of advisor training and development. An introduction to the disciplines and advisor shadowing is common at Case Sites 1 and 3 along with the university's support of a university wide training opportunity. Case Site 2 stresses the importance of continuing the training through professional

development activities beyond just their advising unit to create a sense of purpose among all the advisors in their college of engineering.

All of the cases indicated a participation with the National Academic Advising Association (NACADA) as a means for external professional development opportunities however all indicated a local involvement on their own campus either through a university wide structure of college level brown bag lunches focused on an advising topic.

> *"We're all members of NACADA. I would say we sporadically go, like I have a team member going to national NACADA. We're looking at the regional NACADA. We're involved to an extent. I don't think any of us right now have leadership roles in this organization, so we're members and we go to a conference when the budget allows. I'm also a member of NASPA [National Association of Student Personnel Administrators], but again, I'm not a leader in that yet. I think that's a real area where we can grow." Case Site 2*

While all three case sites mentioned they were involved in NACADA. Case Site 1 specifically referenced on campus seminars as another way for the entire advising office to be involved whereas NACADA was not necessarily something that the entire office goes to each year. Case Site 2 references involvement with the National Association of Student Personnel Administrators when the budget allows and mentioned that professional development is something that falls off the plate, because of the volume of students they carry. Professional development type of activities is hard to carve out time for and make an intentional effort to attend. Case Site 3 is heavily involved in professional development opportunities through their institution's professional association, the American College Personnel Association, and NACADA.

4.4.2 Implementation of an Advisor Evaluation System

The implementation of an advisor evaluation system in Stage 4 of the Integrated Model of Academic Advising Program Development provides an opportunity to investigate how each case site handles the evaluation of academic advisors. Case Site 1 uses a university evaluation governed by their central Human Resources office. They can tailor the evaluation using individual goals for each advisor specifically within the categories of their position. The advisors at Case Site 1 are staff at levels 2, 3, or 4 within the university classifications of 1-4. Level 2 is the basic master's degree entry-level requirement; level three would be more experience and so on. As Case Site 1 was able to create new advising positions, they were also able to advance some of their more senior advisors through the level promotional opportunities. Outside of employee evaluations, Case Site 1 is working to advocate for an annual evaluation of advising similar to course evaluations. They recognize the challenges of such an evaluation and the thin line between advisor satisfaction and the assessment of advising practices and support for students. They are reviewing the advising literature and working to uncover if other universities have a similar mechanism.

> *"Many times our advisors have to deliver bad news, so we have to be really careful how we frame those questions. I would really like to get some kind of feedback from the student about whether they feel supported or whether the information has been accessible and things like that." Case Site 1*

The Fair Labor Standards Act (FLSA) is one of the programs that allowed Case Site 3 to restructure their advising program in terms of employee evaluations and salary standards. Their yearly evaluations are all department specific but through a central Human Resources system similar to Case Site 1. However, changes to the FLSA caused the university to implement a university wide reclassification to make advising salaries and positions more consistent across

the campus. This new classification has a ladder for progression for advisors who are doing direct advising, because previously the only way to advance professionally is to supervise someone. There are three different levels: advisor one, two, and senior, where it is not required that they move to a new position to get that promotion. It recognizes the performance of that person, and their deepening skills and abilities and contributions to student success as they grow in their roles. Due to limited time constraints during the interview of Case Site 2, this question was not asked.

4.4.3 Institutional Recognition

Advisor recognition was identified in the Integrated Model for Academic Advising Program Development in Stage 4 as a method for enabling and recognizing advisors through awards. My study identified that all three cases have a system in place for advisor recognition, however, two of the cases indicated a displeasure with the structure. Case Site 1's university advising awards are only for faculty whereas the advisors are eligible for spirit awards.

> *"We do, but what's interesting is by definition, the advising award is only for faculty. So, my staff are eligible for other awards, service to students and spirit awards, but as of this moment, they are not eligible for the excellence in advising award. And that's been a source of contention." Case Site 1*

Case Site 2 recognition programs are not open to engineering because when it comes to advising they are a smaller group on their specific campus and one of the other colleges have their own advising awards that engineering is not eligible for participation.

> *"Here's the weird part about the way advising is structured here, because [another college-X] is such a base of an operation, they do awards for their own advisors. Advisors in engineering don't qualify for those. There aren't any campus-wide advising awards right now that my team can actually qualify for because we're not in [college X]. I think we could be better, frankly, around recognition. It's something I'm trying to get*

> *done in the college level, even if we could get some kind of awards at the college level for advisors." Case Site 2*

Case Site 3 has a university wide program that includes recognition and an awards banquet within the undergraduate education office that advisors are eligible to receive:

> *"we have an annual banquet process to provide recognition and award for advisors, so that's something that happens every year. Within the College of Engineering, there is a staff recognition banquet and ceremony as well. There isn't one specifically for academic advisors, but they are focusing on supporting students and that tends to be where I think a lot of our advisors really shine." Case Site 3*

The institutional advising award structure needs to evolve to recognize professional advising in addition to faculty advising at two of the case sites. With the growing number of professional advisors, it is appropriate that they improve those recognition options.

4.5 Summary

This research provides a glimpse into the organizational structure of academic advising in first-year engineering programs (RQ1) at three case sites. It uncovers the common organizational structures and the differences at each of the location. It provides a start to understanding how the administrative structure of academic advising and the models of academic advising are both similar and different at large four-year, primarily residential institutions with a first-year engineering program. I was also able to document the services that academic advisors in first-year engineering programs describe as being offered to their student population (RQ2). Advising programming such as new student orientation, group advising for target student populations (i.e. international and first-generation), support for students on academic probation, major exploration, and first-year seminars were identified. My research also identified the lack of formalized program learning goals, the use of websites in lieu of formal advising handbooks, key referrals that academic advisors describe as essential, and their advising approaches (RQ3).

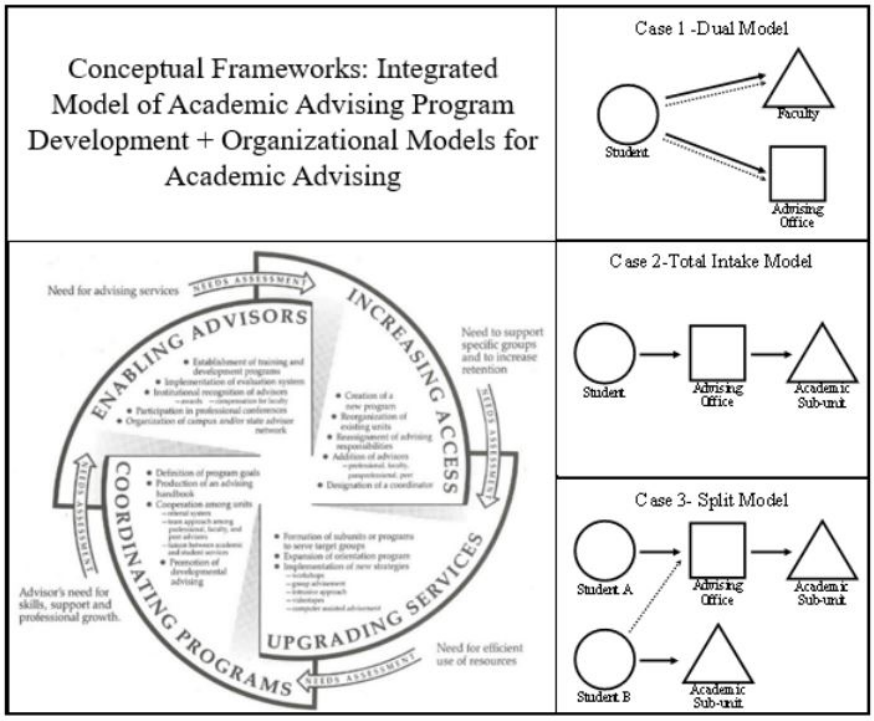
In addition, this research describes the Support for Advisors through professional growth opportunities, training programs, the use of advisor appointment shadowing, and meeting with departmental advisors to learn more about the profession and disciplines the advisors will be explaining to students. Professional development opportunities were also identified such as involvement in NACADA and on campus professional development opportunities and the lack of recognition programs tailored to advisors at the case sites were explored (RQ4).

Chapter 5: Discussion and Conclusions

5.1 Introduction

The purpose of this research was to gain a better understanding of the structures of engineering academic advising at large four-year, primarily residential institutions with a first-year engineering program. To accomplish the purpose, the following overarching research question guided my study: **How do first-year engineering programs structure academic advising and what services, programs, and support are in place for academic advisors and students?** I addressed this purpose by conducting a multi-case study to qualitatively investigate the four stages of the Integrated Model for Academic Advising Program Development and identification of Habley's Organizational Models for Academic Advising from the perspective of advising administrators.

Figure 5-1: Conceptual Frameworks



Source. Frank (1993)/Habley (1983)

In this chapter, I interpret the prominent findings presented in Chapter 4 related to the conceptual framework and a summary of those findings. I propose a new model for first-year engineering academic advising programs. I then provide implications for practitioners and researchers, and suggest recommendations for future work that will allow us to continue advancing the practice and scholarship of engineering advising programs. Finally, I present the conclusions from this research concerning first-year engineering advising programs.

5.2 Research Summary

The three primary research phases of this study include: 1) Questionnaire, 2) Document Analysis, 3) Interviews and Data Analysis. An electronic questionnaire was the first step in developing the case study selection criteria. Participants self-reported if they had a common first-year engineering program, the approximate size of their entering first-year engineering population, students' classification, and the criteria needed to leave the first-year engineering program and enter into a degree-granting engineering major. The questionnaire provided an opportunity to uncover the primary role of an academic advisor, including asking about the number of individuals employed in their structures, their employment categories, and minimum educational criteria for new hires. The questionnaire asked participants to identify how their program would be categorized using Habley's Organizational Structures for Academic Advising. The final selection criteria for the case sites included universities with an engineering student entering class size of over 900, universities with four or more professional academic advisors, and those who indicated they had a split, total intake, or no best-fit model of academic advising.

This selection criterion provides the basis for the cases selected for the interview phase of this research.

In Phase 2, I conducted document analysis of online materials including websites to provide a greater understanding of each case site prior to the interview phase. I reviewed each institution's advising websites, advising handbooks if available, and general institutional information at the university and college levels. I was able to gain an impression of the materials electronically available to students and a general idea of the items that each of the locations valued and wanted to publicly share.

In Phase 3, I conducted semi-structured interviews of five total advising administrators at three site locations. The interviews provided a deep exploration of the respondent's experiences with advising in first-year engineering programs. After the interviews, I looked at the raw data, organized it, and prepared it by transcribing interviews. I combined the interviews with field notes, and organized all visual materials used throughout the research. I organized the data into themes around each interview question across each of the case sites and provided a list of similarities and differences in the responses. I then organized my findings through the conceptual framework of the Integrated Model of Academic Advising Program Development and my core research questions. I revisited document analysis of online materials to clarify responses and to dig deeper into each of the case site locations after the interview phase. This process allowed me to validate my understanding further and to explore advising materials that were publicly available such as major exploration resources, advising handbooks, and change of major criteria.

5.3 Discussion of Results

Through this inquiry the following four main findings aid in the understanding of first-year engineering advising programs by: 1) providing an overview of the structure of first-year engineering advising along with their similarities and differences, 2) identifying the academic programing in place for students in these advising structures (i.e. new student orientation and major exploration), 3) understanding program coordination efforts such as program goals and common academic advising referrals, and 4) describing the advisor professional growth mechanisms including advisor training as a means to support and provide advisors with recognition. The major findings are described in detail in the following sections. While many findings could be discussed, I selected the two most prominent findings from each research question to elaborate on as key findings from this study.

5.3.1 Structures of Advising

I used Stage 1 of the Integrated of Academic Advising Program Development to guide answering RQ1 and uncovered the organizational structures of academic advising at three first-year engineering programs (case sites). This research describes the structure by providing an outline of the university admissions process, college of engineering classifications, academic advising structure for newly admitted engineering students, academic advising team (structure, historical growth, and models for academic advising), change of major criteria, and academic advising structure post major change. The similarities of the three case sites (Table 4-1) include university admissions process, central college advising center, director of advising and academic advising post major change. The differences discovered include the college of engineering

classification, academic advising team, and change of major criteria. The similarities and differences are explained in more detail below.

5.3.1.1 Similarities of the Advising Structure

All three case sites have a central university admissions office that manages the admissions decisions for the Colleges of Engineering. The academic advising structures for newly admitted engineering students are also centralized through a college-level advising center with a director of advising overseeing the daily operations. This finding was consistent with Kollar's (2017) literature on centralized advising models and Pardee's (2000; 2004) descriptors of advising structures. The academic advising structure post major change was also parallel at each case site with the core function of academic advising facilitated through a mixed academic advising model of faculty advisors and professional academic advisors. This was also consistent with Pardee's (2000; 2004) descriptors of advising structures. Even though the organizational models for academic advising are different at each case site these core functions were similar throughout their structures.

5.3.1.2 Differences in the Advising Model

The engineering major classification label at each case site was referenced differently across all case sites along with the academic advising team structure and change of major criteria. The differences of major classification were simply in the nomenclature of the label. The specifics for the change of major criteria varied based on overall GPA, grades in specific classes, GPA competitiveness, and occasionally an essay component, however, information was well organized and publicly available for all three case sites. Once students are officially admitted to their major through the change of major process, individual departments manage the academic advising. The academic advising at the department level is usually a mixed advising model with faculty and professional advisors functioning as academic advisors. This mixed advising model was more prevalent early on in academic advising (Gordon, Habley, Grites,

2008); models focused on professional advising have been slowly phased in beginning with the first-year.

5.3.2 Services for Students

RQ2 and Stage 2 of the Integrated Model of Academic Advising Program Development focuses on upgrading advising service through programming and workshops and identifies these focus areas as vital to the academic program's evolution (Frank, 1993). My research uncovered that the central college advising center coordinates the engineering new student orientation programing regardless of the students' engineering academic major and the advising programs organizational model for academic advising. In addition, major exploration programming initiatives were similar across all case sites. These findings correlate to existing literature on the importance of orientation as a successful method of transition to the university environment (Self and Aguayo, 2009; NODA, 2019) and major exploration for helping students make informed choices on their academic discipline (Gordon, Habley, Grites, 2008). These areas are examined further in the following.

5.3.2.1 New Student Orientation

New student orientation for newly admitted students was centrally coordinated through the first-year engineering advising program. All case sites coordinate and facilitate the engineering component of their new student orientation. Topics of the engineering orientation program included an overview of the college, evaluation of expected transfer credits, course placements, individual class schedule recommendations, and the process of changing from their current major to a specific discipline within engineering (NODA, 2017). These topics are consistent with effective practice recommendation (NODA, 2017). Because all three sites are

responsible for new student orientation, students are able to connect with their advising programs and College of Engineering early in their collegiate careers. All of the locations use a central first-year orientation office that plans the logistics of the orientation program and the central advising office organizes the engineering portion of student orientation. A strong coordinated effort aids in the overall planning, partnerships, and outcomes of orientation (Self and Aguayo, 2009). Students are required to attend new student orientation and use a computer lab to facilitate the class registration process. The differences are the number of days for each orientation session, the number of students per orientation session, and the involvement of specific disciplines for the engineering orientation process. Even though the organizational structures of advising are different at each of the case sites, they all manage the orientation process for their student population even at the case site in which students receive academic advising directly from their pre-engineering major.

5.3.2.2 Major Exploration

Major exploration was an integral part of all three case sites academic advising programming. Major exploration allows the student to learn more about the specific major they wish to pursue and opportunities available to them in their intended discipline. The major exploration process occurs through multiple avenues including major exploration information sessions for the student population. These sessions provide an opportunity for students to learn more about the specific engineering disciplines, career opportunities, and ways to uncover more information about the field of engineering they are interested in pursuing. Even for the students who enter the College of Engineering thinking they want to pursue a specific engineering path, the major exploration emphasis provides an opportunity for them to learn more about the major

and future careers, related majors, skills, and ways to learn more about their future options. It can be a beneficial activity for all students, not just those who are undecided or exploratory about their path. It can provide more clarity for students who feel they are certain about their decision and provide information about those paths they may have not considered in the past. The general concept around major exploration is to help students make informed decisions when choosing an engineering major.

Major exploration is important. When it comes to life regrets many Americans regularly admit that educational choice is at the top of their lists (Gallup, 2017). Beggs (2008) indicated that selecting a "good" major that coincides with the interests, skills, and abilities of the students is an important decision and suggests that institutions should allow the choice of major to be delayed further into their academic career. In some cases, changing majors may require additional time for completion which increases the cost of attendance (Beggs, 2008), and could lead to students staying in their current major, even if they feel it is not a good fit. Engineering programs with a common first -year curriculum allow more fluidity for students without the consequences of falling behind in the curriculum and extending graduation, and thereby reduces the impact on cost of attendance (Orr, Brawner, Lord, et al., 2012). Engineering programs with first-year programs also have higher 4-year graduation rates than those who direct admit and students are less likely to change their mind once they declare a major after completion of their first year (Orr et al., 2012). This research also provides examples about how three engineering schools are helping students select a major, which was a call to action in the On Second Thought: U.S. Adults Reflect on Their Education Decisions Gallup Report (2017).

5.3.3 Coordination of Advising

RQ 3 and Stage 3: Coordinating Programs of the Integrated Model of Academic Program Development seeks to investigate the academic advising support through the development of program goals, advising handbooks, common referrals, and daily advising practices. My research identified the lack of formalized program learning goals and key referrals across the case sites institutions.

5.3.3.1 Program Goals

Program goals can provide guidance to an advising program and help identify key strategic outcomes. None of the case sites in my study use formal learning outcomes to guide their advising program. In lieu of formal learning outcomes, new projects and initiatives are agreed upon by the team as a focus for their advising program for the academic year. The use of formal program goals could be incorporated at each of the case sites to provide measures for their academic programs and tracking of their impacts on student success and different services and programming offered (CAS, 2013; Gordon, Habley, & Grites, 2008; Frank, 1988, 1993). These formal goals would provide a mechanism for advising programs to outline student-learning outcomes, which is a core concept of academic advising (National, 2006). During the interview phase I wasn't surprised that advising units did not have formal learning outcomes which challenged me to reflect on the reasons that this might be the case. I personally suggest that perhaps the educational background of individuals joining the field of advising is varied and those individuals might not have formal training in assessment and evaluation. In addition all of the respondents of the case sites were administratively housed within a central college advising structure which may have a different expectation than my own experiences surrounded daily

with research faculty who challenge me professionally in a positive way to align the practices of our advising team to learning outcomes and assessments. This particular component of my research has given me reason to uncover more about the professional accreditation standards and uncover how advising programs can use those to leverage the development and enhancements of their advising program.

5.3.3.2 Common Academic Referral

Common referrals are the offices or support structures in which academic advisors commonly recommend that a student seek out to gain additional support for their success. Advisors often have to provide students with resources such as online information, handbooks, and referrals to offices to support their student population and aid in their academic success. It is critical for advisors to maintain good working relationships with campus partners to make effective referrals for students and connect students to the resources needed (CAS, 2013; Gordon, Habley, & Grites, 2008). When asked about common referral offices, all three case sites indicated different resources they use based on their experiences and knowledge of student population.

5.3.4 Support for Advisors

Stage 4 of the Integrated Model of Academic Advising Program Develop, identifies services for advisors to grow professionally for the benefit of their academic advising program development. Academic advisor skill development, training, and professional recognition are important areas for academic advisors to engage in as a way to enhance their personal knowledge and skills to better support their personal and professional growth and to provide students with the most accurate information possible during their interactions. Existing literature affirms

academic advisor training (Folsom, 2007; Givans Voller, Miller, Neste, 2010; Gordon, Habley, & Grites, 2008; McClellan, 2007; Rust, 2014) and recognition programs (CAS, 2013; Gordon, Habley, & Grites, 2008) as important influencers of an effective advisor.

5.3.4.1 Advisor Training

Academic advisor training for new academic advising hires was highlighted throughout each of the case sites. An introduction to the field of advising, technology resources, Family Educational Rights and Privacy Act (FERPA) training (Rust, 2014), along with university level training were common areas of focus. Knowledge about the engineering departments through advisors within the disciplines and specifics of each major on which advisors will be talking to students in the future were also mentioned. In addition, prior to allowing the new advisor to meet with students, all case sites implement a shadowing program which allows the new advisor to sit in on advising sessions with other seasoned advisors. After a period of time from which the new advisor gains a comfort level with the advising process, they switch roles with the new advisor taking the lead on appointments, which allows for observed student interaction that promotes growth and confidence in transitioning the new advisor to providing unilateral or unassisted advising services. Once the shadowing program is complete, the new advisor takes on their own roster of appointments. In addition to local training and development, all of the cases indicated a participation with the NACADA as an outlet for professional development and connection to other professionals in the field of advising. These findings align with literature outlining the need for continuous training and professional development programs specifically for academic advising (Folsom, 2007; Givans Voller, Miller, Neste, 2010; Gordon, Habley, & Grites, 2008; McClellan, 2007; Rust, 2014). Additionally, these findings align with the core

values of academic advising regarding the responsibility of advisors to their educational community, their professional practices, and for themselves personally (NACADA, 2005).

5.3.4.2 Advisor Recognition

The second main finding from research question 3 is the irregularity of the recognition and awards structure of academic advisors across the three case sites (CAS, 2013; Frank, 1993). Each have a system in place for advisor recognition and awards however, two of the cases indicated a displeasure with the structure. The eligibility criteria at Case Site 1 prevents professional academic advisors from qualifying for academic advising awards since the criteria is only for faculty whereas Case Site 2 did not have a university level advising recognition program. Case Site 3 did however have a university wide program, as well as a recognition and awards banquet within the undergraduate education office, and all academic advisors are eligible to apply. This data was surprising given the growth of professional advising at each of the case sites but the recognition was not in alignment. Clearly through discussions with each case site those individuals who serve in an academic advising capacity desire the ability for recognition for their service to their institutions and the students that they serve. Literature discusses the need for advising recognition, both to increase visibility of the academic advising profession as well as providing a level of fulfillment and satisfaction to the individual advisor (CAS, 2013; Gordon, Habley, & Grites, 2008).

5.4 Summary of Findings

The answers to the research questions are presented as a summary of findings in Table 5-1.

Table 5-1: Summary of Prominent Research Findings

Research Questions	Prominent Research Findings
RQ1: What are the organizational structures of academic advising in first-year engineering programs?	The organizational models of academic advising vary at each case site, however there were many similarities (i.e. university admissions process, central college advising center, director of advising, and academic advising post major change) and few differences (i.e. college of engineering major classification, academic advising team structure, and change of major criteria).
RQ 2: What services do academic advisors describe as being offered to first-year engineering students?	New student orientation and major exploration are common advising services across all three case sites.
RQ 3: What efforts do academic advisors describe that are associated with coordinating advising programs?	A lack of formalized advising programming goals was represented in the data however; the art of referring students to resources and support to aid in their academic success was mentioned at each case site. The specific referring offices did differ as well based on student population.
RQ 4: What support and professional growth opportunities do academic advisors in first-year engineering programs complete?	Advisor training was prominent at all three case sites along with involvement with professional development locally and through national professional organizations. The desire to have a more formal advisor recognition program was referenced at two of the three case sites to provide acknowledgment on their campuses for the services they provide as professional academic advisors to their students.

5.5 Model for First-Year Engineering Advising Programs

During the questionnaire phase of the research (Phase 1) individuals were asked to self-select how their advising unit was categorized based on a short descriptor of Habley's Organizational Models for Academic Advising. Participants were also given the option to indicate that none of the seven models describe their advising unit, and several participants disclosed that their structure did not fit into one of the given descriptions. During the interview and analysis phase of this research (Phase 3) I was able to gain more details about the subject case sites advising structures. During the interview process respondents described their organizational structure in detail which allowed me to re-assess their initial self-selected model of advising. Case Site 2 self-identified correctly as a total intake model, however I found discrepancies between how Case Site 1 and Case Site 3 self-selected their model and my assessment of their model. I believe the initial questionnaire provided truthful data from the respondents however my interpretation is that they used the initial quick definition about the models in their questionnaire responses and may not have fully understood how Habley's Organizational Models for Academic Advising are categorized. My research confirmed that Habley's Organizational Models for Academic Advising are still valid and relevant for the field of academic advising.

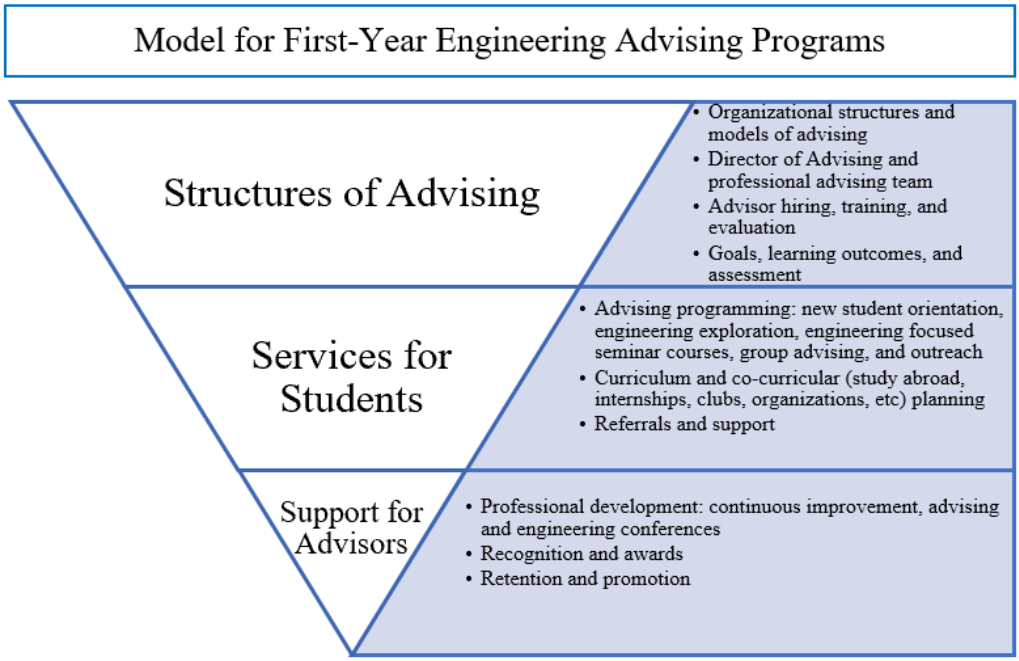
In addition, I used Frank's Integrated Model for Academic Advising Program Development as conceptual framework and a means for advising program development. This model was initially developed in 1988 then updated in 1993. It provided a structured way to conduct my research through stages and helped me develop four research questions that guided my study. After using the Frank model to frame my study I am proposing the creation of a new

model of academic advising programs for first-year engineering advising to update and align new terminology, processes, and data gathered from my case sites.

One of the driving forces of this research was to uncover the organizational structures of advising at large four-year, primarily residential institutions with a first-year engineering program and I was able to outline six overarching areas that outline the organizational structures of academic advising at each of the first-year engineering advising case sites. 1)The University Admissions Process was similar across all three case sites. Each case site has a central admissions office that makes the admissions decision for their College of Engineering's initial undergraduate enrollment. 2) The College of Engineering Classification nomenclature at each of the three class sites were different with cases classifying students as pre-major, engineering first-year, engineering undecided, and pre-specific major. 3) The Academic advising structure for Newly Admitted Engineering Students all receive initial academic advising contact through a central College Advising Center. 4) The Academic Advising Team structure allowed for all cases to have a director of advising and professional academic advisors however the number of professional academic advisors and their models of academic advising varied. Since all three case sites have a common first year program each institution has a process for declaring a specific major. This process is fundamental to the first-year program and students' matriculation. 5) The Change of Major Criteria included a set of courses, specific grade point averages, and occasionally an essay requirement but the courses and additional criteria varied at each site. 6) After a student completes the change of major criteria all case sites conduct academic advising in their disciplines through a mixed advising model which consists of both professional academic advisors and faculty advising at each of the site locations. These documented structures provide a new advising program with a method for seeing the whole

system from entry major to major declaration, and for an existing advising program it allows practitioners to uncover any gaps in their current system.

After operationalizing Frank's Integrated Model for Academic Advising Program Development for this research through case study design focusing on interviews and document analysis, I recommend a new model tailored specifically for large four-year institutions with a first-year engineering program. The Model for First-Year Engineering Advising Programs incorporates three areas: Structures for Advising, Services for Students, and Support for Advisors.



The Structures of Advising would include the organizational structures of advising and Habley's Organizational Models for Academic Advising with leadership from a director of advising and use of professional academic advising team to serve as advisors in the first-year program. In addition I place emphasis on advisor hiring, training, and evaluation as a means to having a strong structure of advising with goals, learning outcomes, and assessment that matches the learning outcomes. Frank's Integrated Model for Academic Advising Program Development

includes coordinating programs in its own stage however I would merge Frank's stage 1 and 3 into a newly developed Structures of Advising section to incorporate not only the foundational structures of how programs develop but how they grow and thrive. The hiring, training, and evaluation of new advisors ties into the program's goals, learning outcomes, and assessment as an overarching basis for any new program.

My research documents key advising services such as new student orientation and major exploration services that are provided to each of the three case site's engineering student populations. This allows first year programs to see the critical services described by other first year programs and allows for practices to be shared rather than reinventing the entire engineering focused structure. My model provides an overarching Services for Student section to stress the importance of advising programs such as new student orientation, engineering exploration, seminar courses, group advising, and outreach. Additionally my model incorporates the curriculum and co-curricular activities that advisors often refer students to and actively promote and support.

My research uncovered a need to redefine Stage 4 of Frank's Integrated Model for Academic Advising Program Development from Enabling Advisors to Support for Advisors. This area describes the support and professional growth opportunities that academic advisors complete. These would include involvement in academic advising associations and provide an opportunity for the engineering associations to target academic advisors who work in first-year engineering programs as a means for enhancing the practices of academic advising within the engineering context. In addition, it allows for ways to provide recognition and awards for advisors and methods for retention and promotion. The proposed three stage model aligns with the data conducted in this research with a focus on first-year engineering advising.

5.6 Implications for Practitioners

This research provides an opportunity for practitioners, including university administrators, engineering administrators, and first-year engineering academic advisors, to see how other first-year engineering advising programs are structured in a quick to follow structural chart. It also identifies the minimum educational criteria that professional academic advisors hold at three case sites. This knowledge is important when determining the criteria needed to hire new advisors and is often a question that arises when adding to advising team structures. It outlines the importance placed on specific programming for their student population. It provides a glimpse into how new student orientation is structured and the key elements to the class registration logistics of the programming. In addition, the research illustrates the importance that others place on specific student populations at their universities. The research outlines the key academic programming that was mentioned and documented publicly online for each of the case sites. I am optimistic that practitioners are able to use my research to uncover ideas that case sites presented in the interviews as examples of critical services necessary for this student population and borrow those idea for their own work and future enhancements.

The study also provided an opportunity for engineering advising programs to connect on a practical level and seek best practices from one another through an external listserv sharing experience. In fact, my study started that initiative and provided encouragement for engineering advising programs to share ideas about how they work with specific student populations and activities rather than re-creating a system; several engineering programs are now connected and seeking the advice of others in their field and implementing those ideas on their respective campuses.

In the field of advising literature and research, many efforts are made to provide a greater understanding of large-scale concerns within the field of advising, such as the core values (NACADA, 2005) and student populations with which we should be concerned (Gordon, Habley, Grites, 2008). However, the lack of logistical, concrete methods for practitioners to use is apparent and my study can provide a starting point for the basics of key programming used at advising programs within first-year engineering programs. I was pleased to document the through put of students from offer of admission to declaration of a specific major as a key starting point to the structure of advising within first-year engineering programs.

I am also hopeful that my research will inspire practitioners to learn about ABET standards and see how those standards could help in developing formalized learning outcomes for their advising programs which was lacking at all three case sites.

5.7 Implications for Researchers and Future Research Suggestions

This research is the first to use the Integrated Model of Academic Advising Program Development in conjunction to Habley's Organizational Models for Academic Advising to frame this area of research. This research provides a foundational level for future researchers to be able to build on and dig deeper into the layers of the conceptual model and expand the model from entry into a specific major to graduation. Each finding throughout the model could be expanded and provide a roadmap for new and existing advising programs. My research focuses on the structure of advising for engineering schools with first-year engineering programs. This research also developed a new Model for First-Year Engineering Advising Programs. Future research could examine and test the model for its usefulness in both research and practice.

Future research could also explore engineering programs without first-year engineering programs such as those universities and colleges with direct admit policies where a student does

not have a common first-year engineering experience. The entry point of all first-year students at each of the case site were similar and structured at a college level whereas once a student progresses the advising structure is essentially the same and managed at the department level at all of the case sites. Future research could explore why the first-year engineering students have a different advising structure than students in a degree-granting specific major. In addition to exploring advising models in place within a single institution across specific disciplines.

College transition programs, such as new student orientation, is a vital component of the onboarding of new students to each of the case sites. This research provided base operational understanding but future researchers would need to investigate this specific topic further to operationalize the orientation structures and system as a whole.

College major choice and the ways in which a student learn about a major has been explored previously by researchers, however future researchers could focus more on the engineering student population, especially at universities with a common first-year engineering program. The research could uncover whether or not the initial college major choice is captured at a pre-college admissions level and whether or not that major is the major that students ultimately declare and graduate in.

More attention could be given to the awards structures of academic advising and the campus cultures to support the professional academic advisor. Future research could explore the ways in which universities and colleges acknowledge outstanding service. In addition, future research could uncover the ways in which their practices should improve to ensure individuals are being appreciated for their contributions to the goals of the institution. In addition, research from the student perspective should be conducted to help understand program effectiveness.

5.8 Conclusion

This research provides a glimpse into the structures of academic advising in first-year engineering programs (RQ1) at three case sites. It uncovers the common organizational structures and the differences at each of the location. It provides a start to understanding how the administrative structure of academic advising and the models of academic advising are both similar and different at universities that have first-year engineering program. I was also able to document the services that academic advisors in first-year engineering programs describe as being offered to their student population (RQ2). Key advising programming was identified such as new student orientation and major exploration. I was able to uncover that all three case sites used electronic resources for students as a means for providing clear information about their program and services and the types of referral that they commonly recommend for students to seek (RQ3). In addition, this research describes the support and professional growth opportunities that academic advisors in first-year engineering programs complete (RQ4. Training programs were shown to use advisor appointment shadowing and meeting with departmental advisors to learn more about the profession and disciplines the advisors will be explaining to students. Professional development opportunities such as involvement in NACADA and on campus professional development opportunities were discussed. The lack of recognition programs tailored to advisors at the case sites were explored. Finally, it provides a proposal for a new model for first-year engineering academic advising programs.

This qualitative inquiry contributed not only to my own understanding but will also be of value to key stakeholders of university administrators, engineering administrators, first-year engineering academic advisors and administrators, and researchers in the fields of academic advising and engineering education. This study provides a high-level overview of organizational

structures, key advising services, common referrals, and professional development opportunities that others in this field of first-year engineering advising are employing. It can serve as the basis for understanding common practices, allows stakeholders a glance into the advising services at three different institutions, and strategic areas for consideration when developing a new advising program or enhancing services at established advising programs. In my own practice this research provided immediate benefits to my knowledge base of the structures of advising being employed at similar size and type institutions. In addition, I gained a greater understanding of the critical services that are being facilitated and ways in which students are being served. I really appreciated the ability to learn from advising colleagues around the country and the ability to share ideas and practices being used.

References

Amelink, C. T., & Creamer, E. G. (2010). Gender differences in elements of the undergraduate experience that influence satisfaction with the engineering major and the intent to pursue engineering as a career. *Journal of Engineering Education*, 99*(1)*, 81-92.

Beronia, T. & Bee, R. (1986). Investigating the Motivations of the Pre-Engineering Major. *NACADA Journal*. *6*(2). 83-92. doi: http://dx.doi.org/10.12930/0271-9517-6.2.83

Bloom, J. L., Hutson, B. L., & He, Y. (2008). The appreciative advising revolution. Champaign, IL: Stipes Publishing. Retrieved from: http://apps.nacada.ksu.edu/conferences/ProposalsPHP/uploads/handouts/2014/C224-H06.pdf

Bowen, G. A., (2009). Document Analysis as a Qualitative Research Method. *Qualitative Research Journal*, 9(2), 27-40. DOI 10.3316/QRJ0902027.

Carnegie Classification (2018). *Size & Setting Classification Description*. Retrieved from: http://carnegieclassifications.iu.edu/classification_descriptions/size_setting.php

Carrico, C., & Matusovich, H. M. (2016). A Qualitative Examination of Rural Central Appalachian High School Student Knowledge of the College Processes Needed to Meet Career Goals. *Journal of Women and Minorities in Science and Engineering*, 22(3), 259-280. doi:10.1615/JWomenMinorScienEng.2016013308

College Board (2019, January 26). First Generation Students. Retrieved from https://professionals.collegeboard.org/guidance/prepare/first-generation

College Transitions (2018, May 23). So you want to be an engineer… Retrieved from https://www.collegetransitions.com/blog/so-you-want-to-be-an-engineer/

Compete College America. (2013). *Guided Pathways to Success.* Retrieved from: http://completecollege.org/?s=guided+pathways

Compete College America. (2014). *Boosting College Completion*. Retrieved from: http://completecollege.org/?s=Boosting+College+Completion

Council for the Advancement of Standards in Higher Education. (2013). *Academic Advising Programs: CAS Standards and Guidelines*. Retrieved from http://standards.cas.edu/getpdf.cfm?PDF=E864D2C4-D655-8F74-2E647CDECD29B7D0

Creamer, E.G. (2017). *An Introduction to Fully Integrated Mixed Methods Research*. Thousand Oaks, CA: Sage Publications

Creamer D. & Creamer E. (1994). Practicing Developmental Advising: Theoretical Contexts and Functional Applications. *NACADA Journal*. *14*(2). 7-24. doi: http://dx.doi.org/10.12930/0271-9517-14.2.17

Creswell, J.W. (2014). *Research Design Qualitative, Quantitative, and Mixed Methods Approaches*. Thousand Oaks, CA: Sage Publications

Crookston B. (1994) A Developmental View of Academic Advising As Teaching. *NACADA Journal*: 14(2). 5-9. doi: https://doi.org/10.12930/0271-9517-14.2.5 reprint from *Journal of College Student Development*, 1972

Dickson, L. (2010). Race and gender differences in college major choice. *The ANNALS of the American Academy of Political and Social Science*, *627*(1), 108-124. doi: 10.1177/0002716209348747

Earl, W. (1988) Intrusive Advising of Freshmen in Academic Difficulty. *NACADA Journal*. 8(2). 27-33. doi: https://doi.org/10.12930/0271-9517-8.2.27

Ellis, K. (2014). Academic Advising Experiences of First-Year Undecided Students: A Qualitative Study. *NACADA Journal,* 34(2), 42-50. doi.org/10.12930/NACADA-13-001

Feder M. (2012, December 18). The White House. Office of Science and Technology. *One decade, One million more STEM graduates*. Retrieved from http://www.whitehouse.gov/blog/2012/12/18/one-decade-one-million-more-stem-graduates

Folsom, P. (2007). *The new advisor guidebook: Mastering the art of advising through first year and beyond.* Manhattan, KS: National Academic Advising Association

Frank (Pardee), C. (1988). The Development of Academic Advising Programs. *NACADA Journal*. *8*(1), 11-28. doi: http://dx.doi.org/10.12930/0271-9517-8.1.11

Frank (Pardee) C. (1993). An Integrated Model of Academic Advising Program Development. *NACADA Journal*. *13*(1) 62-73. doi: http://dx.doi.org/10.12930/0271-9517-13.1.62

Gallup, Inc. (2017). On Second Thought: U.S. Adults Reflect on Their Education Decisions. Retrieved form https://stradaeducation.gallup.com/reports/208535/gallup-strada-education-ecp-inaugural-report-2017.aspx?utm_source=link_newsv9&utm_campaign=item_220091&utm_medium=copy

Givans Voller, J., Miller, M., and Neste, S. (2010) *Comprehensive Advisor Training and Development Practices* That Deliver (2nd ed.). Manhattan, KS.

Gordon, V. N., Habley, W. R., & Grites, T.J. (2008) *Academic Advising: A Comprehensive Handbook* (2nd ed.). San Francisco, CA: Jossey-Bass.

Grites T. (2013). Developmental Academic Advising: A 40-Year Context. *NACADA Journal*. *33*(1) 5-15. doi: http://dx.doi.org/10.12930/NACADA-13-123

Habley, W. R. (1983). Organizational structures for academic advising: Models and implications. *Journal of College Student Personnel*, 24(6), 535-540. (as cited in King, 2008)

Habley W. & McCauley M. (1987). The Relationship Between Institutional Characteristics and the Organization of Advising Services. *NACADA Journal*. 7(1). 27-39. doi: http://dx.doi.org/10.12930/0271-9517-7.1.27

Henderson, L.K and Goodridge, W. (2015). AdviseMe: An Intelligent Web-Based Application for Academic Advising. *International Journal of Advanced Computer Science and Applications (IJACSA)*, 6*(8)*, DOI: 10.14569/IJACSA.2015.060831

Himes H. (2014). Strengthening Academic Advising by Developing a Normative Theory. *NACADA Journal.* 34(1) 5-15. doi: http://dx.doi.org/10.12930/NACADA-13-020

Jaffé, W. and Huba M. (1990). Engineering Students' Use of and Satisfaction With Faculty and Professional Academic Advising Systems. *NACADA Journal*. *10*(2). 37-43. doi: http://dx.doi.org/10.12930/0271-9517-10.2.37

Jones, S. R., Torres, V., & Arminio, J. L. (2014). *Negotiating the complexities of qualitative research in higher education: Fundamental elements and issues.* New York: Routledge.

Keeling, S. (2010). The Influence of the CAS Standards on Academic Advisors and Advising Programs. *NACADA Journal*. *30*(2) 9-18. doi: http://dx.doi.org/10.12930/0271-9517-30.2.9

Kollar, E.A. (2017, December). Before creating a centralized advising office at the college level. Academic Advising Today, 40(4). Retrieved from

https://www.nacada.ksu.edu/Resources/Academic-Advising-Today/View-Articles/Before-Creating-a-Centralized-Advising-Office-at-the-College-Level.aspx

King, M. (2008). Organization of Academic Advising Services. In Gordon, V. N., Habley, W. R., & Grites, T.J. (2nd ed.), *Academic Advising: A Comprehensive Handbook* (242-252). San Francisco, CA: Jossey-Bass.

Latorre-Navarro, E. and Harris, J.G. (2015). An Intelligent Natural Language Conversational System for Academic Advising. *International Journal of Advanced Computer Science and Applications (IJACSA)*, 6(1), DOI: 10.14569/IJACSA.2015.060116

Lee, W. C., Seimetz, C. N., & Amelink, C. T. (2014). *Examining the transition to engineering: A multi-case study of six diversity summer bridge program participants.* Paper presented at the American Society of Engineering Education Annual Conference and Exposition, Indianapolis, IN.

Levin, J. & Wyckoff, J. (1995). Predictors of Persistence and Success in an Engineering Program. *NACADA Journal*. *15*(1). 15-21. doi: http://dx.doi.org/10.12930/0271-9517-15.1.15

Lowenstein, M. (2007, February 12). The curriculum of academic advising: What we teach, how we teach, and what students learn. The Mentor: An Academic Advising Journal. Retrieved from http://dus.psu.edu/mentor/old/articles/proc01ml.htm

Matusovich, H., Streveler, R. and Miller, R. (2010). Why do students choose engineering? A qualitative longitudinal investigation of students' motivational values. Journal of Engineering Education, 99 (4), 289-303.

McClellan, J.L. (2007). Content Components for Advisor Training: Revisited. Retrieved from NACADA Clearinghouse of Academic Advising Resources Web site:

http://www.nacada.ksu.edu/Resources/Clearinghouse/View-Articles/Advisor-Training-Components.aspx

Merriam, S. B. (1988). *Qualitative research and case study applications in education* (Rev. ed.) San Francisco: Jossey-Bass.

Mertens, D. M. (2010) *Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods* (3rd ed.). Thousand Oaks, Calif: Sage Publications.

Miller, M. (2012). *Interpreting the CAS standards for academic advising*. Retrieved from http://www.nacada.ksu.edu/Resources/Clearinghouse/View-Articles/Interpreting-the-CAS-Advising-Standards-.aspx#sthash.YCnr2Lke.dpuf

NACADA. (2005). NACADA statement of core values of academic advising. Retrieved http://www.nacada.ksu.edu/Resources/Clearinghouse/View-Articles/Core-values-of-academic-advising.aspx

NACADA: The Global Community for Academic Advising. (2017). NACADA academic advising core competencies model. Retrieved from https://www.nacada.ksu.edu/Resources/Pillars/CoreCompetencies.aspx

NACADA: The Global Community for Academic Advising. (2019). NACADA Pillars of Academic Advising. Retrieved from https://www.nacada.ksu.edu/Resources/Pillars/CoreCompetencies.aspx

National Science Board. (2018). Science & Engineering Indicators 2018. Chapter 2: Higher Education in Science and Engineering. Characteristics of the U.S. Higher Education System. Retrieved from: https://www.nsf.gov/statistics/2018/nsb 20181/report/sections/higher-education-in-science-and-engineering/highlights

National: The Global Community for Academic Advising. (2006). *NACADA concept of academic advising*. Retrieved from http://www.nacada.ksu.edu/Resources/Clearinghouse/View-Articles/Concept-of-Academic-Advising-a598.aspx

National Association for Orientation Transition Retention in Higher Education (NODA). (2019). OTR Definitions. Retrieved https://www.nodaweb.org/page/otr_definitions?&hhsearchterms=%22cashe%22

Orr, M., Brawner, C. Lord, S., Ohland, M., Layton, R. Long, R. (2012). Engineering Matriculation Paths: Outcomes of Direct Matriculation, First-Year Engineering, and Post-General Education Models. *Frontiers in Education Conference* doi: 10.1109/FIE.2012.6462357

Panitz, B. (1995). Academic Advising: Clearing Paths to Success. *ASEE Prism*, *4*(6), 18-21. Retrieved from http://www.jstor.org.ezproxy.lib.vt.edu/stable/24153150

Pardee, C. (2000). *Organizational models for academic advising*. Academic Advising: A comprehensive handbook (pp. 192-210). San Francisco: Jossey-Bass.

Pardee, C. (2004).Organizational structures for advising. Retrieved from the NACADA Clearinghouse of Academic Advising Resources Web site: http://www.nacada.ksu.edu/Resources/Clearinghouse/View-Articles/Organizational-Models-for-Advising.aspx

Patton, M.Q. (2002). *Qualitative Research and Evaluation Methods* (3rd ed.). Thousand Oaks, CA: Sage.

President's Council of Advisors on Science and Technology. (2012, February). Report to the President. *Engage to excel: Producing one million additional college graduates with*

degrees in science, technology, engineering, and mathematics. Retrieved from http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-executive-report-final_2-13-12.pdf

Ravitch, S. M., & Riggan, M. (2017). *Reason & rigor: How conceptual frameworks guide research* (2nd ed.). Los Angeles, CA: Sage.

Rimbau-Gilabert,E Martinez-Arguelles, M. Ruiz-Dotras E. (2011). Developing models for online academic advising: Functions, tools and organization of the advising system in a virtual university. *International Journal of Technology Enhanced Learning*. 3(2). 124-136. DOI: 10.1504/IJTEL.2011.039397

Rossman, G. B., & Rallis, S. F. (2012). *Learning in the field: An introduction to qualitative research* (3rd ed.). Thousand Oaks, CA: Sage.

Rust, M. M. (2014). FERPA and its implications for academic advising practice. Retrieved from the NACADA Clearinghouse of Academic Advising Resources website: http://www.nacada.ksu.edu/Resources/Clearinghouse/View-Articles/FERPA-overview.aspx

Self, C. and Aguayo, T. (2009). Preparing Academic Advisors for Orientation Programs. Retrieved from http://www.nacada.ksu.edu/Resources/Clearinghouse/View-Articles/Preparing-academic-advisors-for-orientation-programs.aspx

Self, C. (2008). Advising Delivery: Professional Advisors, Counselors, and Other Staff. In Gordon, V. N., Habley, W. R., & Grites, T.J. (2nd ed.), *Academic Advising: A Comprehensive Handbook* (267-278). San Francisco, CA: Jossey-Bass.

The White House, (2017, September 27). The White House. *President Trump Signs Memorandum for STEM Education Funding.* Retrieved from

https://www.whitehouse.gov/articles/president-trump-signs-memorandum-stem-education-funding/

Thurmond, K. C. & Miller, M. A. (2006). *The history of National Academic Advising Association: An update*. Retrieved from http://www.nacada.ksu.edu/Resources/Clearinghouse/View-Articles/History-of-NACADA.aspx#sthash.kple2YZ6.dpuf

United States Department of Commerce. (2012, January). The competitiveness and innovative capacity of the United States. Retrieved from http://www.commerce.gov/sites/default/files/documents/2012/january/competes_010511_0.pdf

Upcraft, M & Kramer, G. (1995). *First-Year Academic Advising: Patterns in the Present, Pathways to the Future*. Monograph Series Number 18. National Resources Center for The Freshman year Experience & Students in Transition. Retrieved from https://files.eric.ed.gov/fulltext/ED388142.pdf

Vest, C. (2011, October 16). Engineers: The Next Generation - Do we need more? Who will they be? What will they do? [2011 National Academy of Engineering Annual Meeting]. Retrieved from https://www.nae.edu/53074.aspx

Watford, B. (2018). Letter from ASEE President Regarding Higher Education Act Reauthorization. Retrieved from: https://www.asee.org/documents/about-us/ASEE-Comments-on-HEA.pdf

Woodworth, M.K. (1988). The rhetorical précis. *Rhetorical Review, 7*, 156-164.

Yin, R. K. (2008). *Case study research: Design and methods* (4th ed.). Thousand Oaks, CA: Sage.

Yin, R. K. (2018). *Case study research an applications: Design and methods* (6th ed.). Thousand Oaks, CA: Sage.

Yoder, B. (2015). Engineering by the numbers. Retrieved from https://www.asee.org/papers-and-publications/publications/college-profiles/15EngineeringbytheNumbersPart1.pdf

Yoder, B. (2017). Engineering by the numbers. Retrieved from https://www.asee.org/documents/papers-and-publications/publications/college-profiles/2017-Engineering-by-Numbers-Engineering-Statistics.pdf

Appendices

Appendix A: Questionnaire

The following list of questions make up the questionnaire. Format was modified for ease of reading when entered into the Qualtrics electronic software.

1. Name

2. What is your job title (i.e. director, assistant director, etc.)?

3. Who does the director of your advising unit report to at your institution (i.e. department head, dean, etc.)?

4. Name of your institution

5. Link to your advising unit's website

6. Do you have a common first-year engineering program? (I.e. all students are admitted into a general program, and then declare a specific engineering discipline later after meeting some criteria).

    a. If yes, continue with survey
    b. If no, what if your advising structure? Then thank you for your time.

7. What is the approximate size of your entering first-year engineering student population?

8. How are the first-year engineering students classified at your university (i.e. general engineering, engineering undecided, etc.)?

9. What are the criteria needed for an engineering student to leave your first-year program and declare a degree-granting engineering major?

10. What do you see as the primary role of an academic advisor?

11. How many individuals are employed in your advising unit from the categories below?
    a. full-time professional academic advisors _____
    b. part-time professional academic advisors_____
    c. research/teaching faculty who conduct academic advising_____
    d. graduate students who conduct academic advising _____
    e. undergraduate students who conduct academic advising_____
    f. Other_____
        1. Employment classification of other

12. What is the minimum educational criteria for a new professional academic advising hire?
    g. High School Diploma

h. Bachelor's Degree
i. Master's Degree
j. Doctoral Degree
k. No minimum required

13. Which best describes the structure of advising in your unit?
    a. *Decentralized model:*
        1. Faculty-only model: faculty assigned to students as their advisor.
        2. Satellite model: has advising offices housed at the college or school level with the function of advising shifting from a centralized coordination office to the faculty within the departments.

    b. *Centralized model:* self-contained and function as a total intake of all advising from orientation to graduation.

    c. *Shared model*:
        1. Supplementary model: usually has a coordinator who develops advising materials with faculty conducting the advising.

        2. Split model: advising responsibilities are usually divided between an advising office and the academic departments. The advising office advises specific populations of students, such as those exploring majors, and once specific requirements are completed the students are assigned a faculty member to serve as their advisor until degree completion.

        3. Dual model: the typical dual model setup includes faculty who serve as advisors for the academic department program requirements and an advising office advisor assists students with general education requirements, registration procedures, and academic policies.

        4. Total Intake Model: all of the initial advising occurs through one office which could be staffed by professional advisors, counselors, faculty, or peers.

    d. None of the above describe my advising unit:
        1. Please describe your advising structure_____

14. How are the number of students per advisor determined (i.e. advising caseload)?

15. Are all first-year students in your advising unit officially assigned to an academic advisor?
    a. Yes
        1. how many advisees are assigned to each advisor
        2. how are advising assignments made (e.g. alphabetic breakdown, randomly, special populations, etc.)
    b. No

1. how are advising responsibilities distributed

16. Are students required to see an academic advisor during the first-year?
    a. Yes
        1. How often _____
        2. How is this requirement enforced_____
    b. No
        1. How are students encouraged to seek academic advising_____

17. Roughly what percentage of students in your advising unit are seen by an academic advisor at some point?

18. Does your advising unit coordinate an advising and registration session during new student orientation?
    a. If not, who facilitates this session for newly admitted students?

19. Do you solicit feedback from students about their advising experiences?
    a. what kind of feedback do you solicit?
    b. how do you use this feedback?
    c. how do you collect this feedback?

20. Name one other institution that has a first-year engineering program

21. If you would like to be contacted about the possibility of your advising unit participating in the subsequent phase of this study, please provide your name and email address:
    Name:
    Email Address:

Appendix B: Interview Protocol

Sample interview protocol – actual interviews will be semi-structured and actual questions will depend on the flow of the conversation though they will address this general content.

The purpose of this study is to understand the landscape of academic advising in first-year engineering programs.

Date:
Location:
Interviewee Name:
Interviewer:
Consent Form:

Thank you for taking time to speak with me today. I am interested in understanding the landscape of academic advising in first-year engineering programs. Please think of this interview as a conversation about items related to your involvement in the field.

Consent (audio recording)

Is it ok to audio record this conversation? (assuming yes, turn on recorder). Ok, now with the recorder on, I am verifying you are ok with recording this conversation. I would also like to verify you received and read the consent form? Do you have any questions regarding the consent? Do you provide consent? Only researchers on the project will have access to these recordings and we will erase them when the project is complete. I will use a pseudonym to protect your identity and ensure the confidentiality of our conversation.

Interview Questions:

Thank you so much for completing my initial questionnaire regarding understanding academic advising in first-year engineering programs. During the questionnaire, you indicated… "*provide a summary of their responses that directly relate to the below questions…*"

Stage 1: Increasing Access

1. When, how, and why was your advising program developed?

2. As your student population grows or declines have you been able to add to your advising team or restructure to accommodate the demands of the student population?

3. Have there always been a coordinator of advising or has that evolved through the program's development?

Stage 2: Upgrading Services

1. Do you offer special programming to target student populations (i.e. academic probation, first generation, etc.)? If so, can you provide me with details about those programs?

2. Can you explain your involvement with new student orientation programs?

3. Have you developed a new strategy for working with a specific group of students?

4. Have you enhanced your advising practices in general? Which strategy or improvement have you been able to showcase as a true impact on students, your program, or information about your program?

Stage 3: Coordinating Program

1. Does your advising unit have learning goals and objectives? If so, would you be willing to share those with me either at this time or through a follow-up?

2. Does your advising program have an advising handbook and how often is it used and updated by your students vs. your advising team? would you be willing to share those with me either at this time or through a follow-up?

3. Will you provide me with overview of how you refer students to other offices on campus and what the most common referral receiving office would be? How is the referral process conducted?

4. What if any involvement does faculty, peer advisors if applicable have in your advising program?

5. How would you describe your advising method with your student population (i.e. developmental, proscriptive, etc.)

Stage 4: Enabling Advisors

1. What type of technology do you use in your advising unit (i.e. student information system, starfish, EAB, etc.)

2. Does your advising unit have a training program for your new advisors? If so, can you explain the process?

3. What type of advising evaluation system do you have in your advising program?

4. Do your advisors participate in professional conferences? If so, what is their preference organization?

5. Does your advising unit or university have an advisor recognition program? Can you provide additional details about the program?

6. Does your advising unit participate in department, college, campus, state wide advising network opportunities? Can you provide additional details about their involvement?

Caseload

1. During the questionnaire, you had mentioned that your advising caseload was determined by… "*revisit their specific response from the questionnaire"* can you elaborate on that process for your advising program?

Demographic Questions:

How long have you been in the field of academic advising?

What race would you identify as?

What gender would you identify as?

That concludes our interview for today. Thank you very much for your time.

Appendix C*:* Partially Ordered Meta-Matrices Interview Analysis Sample

Stage 1: Increasing Access	Case Site 1 Interview 1	Case Site 1 Interview 2	Case Site 2 Interview 1	Case Site 2 Interview 2	Case Site 3 Interview 1	Themes	Similarities	Differences
Sample Question: When, how, and why was your advising program developed?	**Summary Response:** I do not have that entire context. I am in a brand-new position. This is my fifth academic year. From my understanding, prior to that the assistant dean for undergraduate education had direct oversight of our advising center, which is crazy given our numbers.	**Summary Response:** Pre 2000, all of our advising was handled by faculty. Between then and say 2005, 2006-ish, that we transitioned into having a full-time advisor in that office, still incorporating faculty advisors. The real meat behind professional advising came around 2010, 2011, when we started adding more professional advisors to our advising center. It was purely the will of our Assistant Dean, which is the person who had the role before me.	**Summary Response:** We have five professional advisors in our group. In addition, that includes the director of advising for the college of engineering, oversees our department.	**Summary Response:** Structure is historical context, as opposed, necessarily, the most, like, strategic way to leverage advisement services for student success. A lot of it is where it kind of grew up, somewhat individually in the department.	**Summary Response:** My sense is my predecessor was in the role about five years, and then before him I know who the predecessor was for that too, so I feel like this center I think has been around, I would guess, for at least 10, if not more years, but I don't know how it came to be and how long it's been in existence. …in general, that is somewhat how it has somewhat organically happened in engineering.	Faculty Advising Professional Advising Organically developed Shift from faculty advising to professional academic advising	The responsibility of academic advising shifted organically over the years from faculty to individuals whose primary role was to serve as a professional academic advisor. I did not get the feeling that any of the sites had a directive to make the shift. The sites mentioned the desire to serve students in a more thorough method and having an advocate to make that happen. First-year advising at the case sites is conducted by professional academic advisors	Case Site 1 had a champion for their advising structure change. Case Site 2 evolved out of historical context. Case Site 3 Organically evolved.

Appendix D*:* Model for First-Year Engineering Advising Programs