A STUDY OF FACTORS IMPACTING STUDENT USE AND NON-USE OF ADVISING

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ABSTRACT

The concept of academic advising by NACADA (2006) frames advising as a consideration of the whole student, helping to form ties between their educational curriculum, their growth as a person, and their future aspirations. Forming meaningful relationships with students is essential to understanding their needs and the best ways to assist them. Meaningful relationships between students and advisors has been linked to student engagement, which is considered a more extensive connection between the student and their education. However, students must first be introduced to advising before any further relationship can be established. The question of how to bring students in for their first advising experience remains an area of struggle for some advisors, as studies indicated students may move through their undergraduate education without meeting with an advisor. Accordingly, the current study examined factors impacting student use or non-use of advising, with a focus on college advising in the context of a dual advising system. The areas of major advisors, integration of technology, and informing students about advising were used to explore how perceptions about the advising system are constructed and what influences these perceptions.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Academic advising in higher education takes place in a variety of contexts. With interactions differing in time and space, students can see an advisor for a few minutes at a reception desk to clarify a degree requirement, or for an hour in a private office to discuss how life issues can impact their time in school and beyond. Throughout these advising sessions, teaching and learning are integral to the discussion; just as a motto of NACADA (the Global Community for Academic Advising) is "advising is teaching," an advising session is not a one-way delivery of information, but both a conversation and a partnership between an advisor and student. Due to this nature of academic advising, factors beyond accurate information are deemed imperative: interpersonal communication, setting, and accessibility can also greatly impact the quality of an advising session. Acknowledging the importance of these factors, advisors often purposefully incorporate theory and practice to enhance them, such as focusing on building meaningful relationships, creating a caring and welcoming environment, and focusing on providing accurate and relevant information. Prior research has shown that student engagement with academic advisors and their satisfaction or dissatisfaction with academic advising correlates with their decision to stay at or leave the university and whether they are involved alumni after graduation (Klepfer & Hull, 2012; Nutt, 2003; Thompson, 2016; Vianden, 2016; White, 2015). However, a remaining challenge for advisors is "nonuser" students who do not meet with advisors. The issue of nonusers has been found nationally (Lynch, 2004; NSSE, 2013b).

Previous studies have shown that factors such as expectations, student perceptions of need, contacting advisors, turning to other non-advisor resources, and lack of self-direction are related to student avoidance of advising (e.g, Henning, 2009; Lynch, 2004; NSSE, 2013b; Torres, Reiser, LePeau, Davis, & Ruder, 2006; Walker, Zelin, Behrman, & Strnad, 2017). In some cases, students form perceptions of advising from assumptions and beliefs about the institution and third-party reports; while in others, expectations can be formed from perceived advisor behaviors in previous advising experiences (Vianden, 2016; Walker et al., 2017). However, student expectations for support can have a higher impact than advisor behavior (Fullick, Smith-Jentsch, & Kendall, 2013).

The structure of dual advising adds another layer to advising non-use: when students have two advisors, students may meet with one advisor and not the other. A study of dual advising requires examining not only individual actors or units in "parts," but how advising is structured as a system. This includes who advisors are, how students interact with advisors, how advisors interact and relate to each other, and how students and advisors interact with other human and non-human actors.

In this study, I explored factors impacting student use and non-use of college advising, in the context of a dual advising system at a large[1] public research university in the U.S. Dual advising is shared by *college advisors* which refers to professional advisors in an advising center, and *major advisors* including professional advisors and faculty advisors. Exemplifying a typical advising center, college advising is "where some advisors meet with students in a central administrative unit" (Pardee, 2004), whereas major advisors are located in the academic departments. Major and college advisors share student populations throughout their

[1] Carnegie Classification (Indiana University Center for Postsecondary Research, n.d.)

undergraduate career. Using a pilot study student survey, interviews and observations with major advisors, and surveys and interviews with students, three areas were examined aligning with the sub-question areas of this study: major advisors, integration of technology, and informing students. First, major advising was where a number of students had heard about college advising; however, some major advisors indicated the value or definition of college advising are unclear, the divisions between college and major advising might be blurred, and operating in different advising systems could result in a disconnect between advisors. Second, integration of technology was discussed in terms of communication (e.g. email) and automation (e.g., degree audit system). While automation was designed as a tool for advising, it may instead be perceived by students and advisors as a replacement for—and in some cases, more reliable than—college advising. The convenience of information seeking via technology also indicated the need to develop services around workflows. Third, although email seemed to have the widest reach to inform students of college advising, it did not correlate with actual use of college advising. Students use advising if they perceive a consequence or benefit, and their perception of advisors' credibility can be impacted by factors including experiences, expectations, and peer input.

1.2 Background and Statement of the Problem

The current study focused on a college-level advising center that serves undergraduate students declared in specific Arts & Sciences majors at the university. The advising center is part of a shared organizational model of dual advising, in which students are expected to see college advisors in an advising center in addition to major advisors housed in the department of the student's major discipline. In college advising, mandatory advising for all students is not practiced; rather, proactive advising has been practiced for the majority of students.[2] For example, typically, an email had been sent to all incoming students prior to the beginning of each semester inviting them to complete an incoming student advising session, and students who were about to enter their senior year were sent an email reminder to apply for graduation. Further, college advisors have made an effort to "go where students are" by participating in high school and new student workshops and events such as the university's welcome week; and had in the past, as part of a larger unit, offered advising in a student dorm, in addition to visiting classes to talk about advising. Moreover, the advising center had experienced a reorganization, which resulted in shifting student populations (students in some majors are now advised by other offices), changes in advising curriculum, in addition to "rebranding" and creating a new identity for the advising center. Due to these factors, the advising model presented a need to further define the advising system and identify ways to increase student attention and interest in advising.

For approximately ten years, the university has required mandatory advising for all freshmen and sophomores, which requires students to meet with their advisors; departments may

[2] During this study (but not related to the study) the advising center piloted mandatory advising for a small target population of students.

also practice mandatory advising past students' first two years. However, in the dual advising model studied, major departments fulfill mandatory advising duties, an agreement which accounted for the limited resources (e.g., decreasing number of advisors) of college advising in the past decade, during which the advising population was at one time (prior to reorganization) as high as 6,000 students with an advisor-to-student ratio of 1:1200. Because the advising center has not uniformly practiced mandatory advising, college advising is an option for most students rather than a requirement—some students did not meet with college advisors regularly, or at all. This is problematic because students may have missed relevant information, opportunities, and perspectives that were offered by college advising. These include curricular information, policy and procedure, and pursuing alternative career paths.

Drake (as cited in Vianden, 2016, pp. 20-21) stated, "Everyone in the institution needs to address students' deep human need to feel recognized. Advisors, in particular, play a powerful and central role in student success by providing the opportunity (sometimes the only one) for an ongoing durable relationship with someone who cares about their academic goals." Academic advising is not only a resource but a bridge between students and other areas of the university; in turn, the potential absence of this bridge when students do not meet with advisors presents an issue that is relevant not only to students and advisors, but the whole of the university. Ruffalo Noel Levitz (2017) indicated that academic advising was ranked as one of the "most important areas of the student experience" by students at four-year universities, yet results from the National Survey of Student Engagement (NSSE), which was "based on nearly 335,000 census-administered or randomly sampled first-year and senior students attending 568 U.S. bachelor's degree-granting institutions that participated in NSSE in spring 2013" (NSSE 2013a, p. 8), showed that one in ten students, or more, were not meeting with their academic advisor(s)

(NSSE, 2013b, p. 2). Lynch (2004), who examined student contact with professional and faculty advisors in a decentralized system at a large four-year public research university in the U.S., found that 10 percent of the sampled population of undergraduate students indicated they had not consulted with their advisors during the semester of study. Further, a pilot study for the current research found that over 20 percent of continuing undergraduate students in the advising center's population in the fall 2017 semester had not met with a college advisor in a regular advising appointment.

1.3 Research Questions

This study addressed the research question, *What factors impact student use or non-use of college advising?*

The following sub-questions were explored:

(1) What impact do major advisors have on student use of college advising?

(2) What impact does the integration of technology into an advising system have on student use of college advising?

(3) What impact does informing students about advising have on student use of college advising?

1.4 Purpose and Significance of the Study

According to NACADA (2006), "Regardless of the diversity of our institutions, our students, our advisors, and our organizational structures, academic advising has three components: curriculum (what advising deals with), pedagogy (how advising does what it does), and student learning outcomes (the result of academic advising)" (Preamble section, para. 1). However, as the literature illustrated, who is involved in an advising system has a significant impact in shaping the system, which includes framing the three cited components. For example, an institutional report stated that "inadequate academic advising" was indicated as a reason for students leaving the institution (Office of the Vice Chancellor for Students, Reasons for Leaving section). However, considering the campus uses different advising structures, in addition to other sources of informal advice (e.g., faculty members who are not designated advisors) further examination of who or what students referred to as "advising" and how they defined "inadequate" is imperative. Such questions can impact where and how changes can be implemented. This example demonstrated that it is essential to both identify and clarify roles and responsibilities of stakeholders, including advisors and students. Taken together, the purpose of this study was to investigate reasons why students use or do not use advising, which required examining how the advising system is constructed, who and what is involved in the advising system, and how they are connected. This involved operationalizing the actors, technologies, and outcomes in the system; and identifying both social and technical issues as parts of a larger system. Although this research reviewed literature on student satisfaction, which relied on student surveys, it should be noted that this study did not focus on satisfaction; instead, it considered how certain perceptions about the system are formed and what influences these

perceptions. In their study of advisees' expectations and perceptions of advising, Fullick et al. (2013) asserted,

> Advising and mentoring programs are typically evaluated using subjective reports from participants. Results from our study demonstrate that such data can be colored by participants' initial expectations regarding the support they expect to receive. As a consequence, we recommend that program administrators recognize that advisee reports regarding the quality of their advising relationships may reflect their own expectations and not necessarily the behavior of their advisors. (p. 62)

While student viewpoints are certainly valuable for research and practice (see Vianden, 2016) and student surveys are largely used to measure achievements for student learning outcomes (Powers, Carlstrom, & Hughey, 2014), the current research set out to include the perspectives of faculty, observe advising appointments, and address system-wide issues beyond individual appointments. This wider outlook also resulted in the emergence of themes that were still developing in the field of advising, including the impact of automated (e.g., degree audit) systems.

This study connects and contributes to two areas where literature remained limited: dual advising and non-use. A large number of institutions use a shared model of advising; for example, a 2003 national survey found that a shared model of advising was used by more institutions than centralized and decentralized models (ACT as cited by Pardee, 2004); in a 2011 national survey, respondents from "most public bachelor or master colleges and universities as well as institutions that use both full-time professional and faculty advisors employ a shared split model" (Carlstrom, 2011, Executive Summary of Advising Models section, para. 2); and in a 2014 national survey, "Nearly one half [of participants] reported use of a split model such that

both faculty and staff provide advising" (Powers et al., 2014, p. 66). Further, several institutions do not require mandatory advising for all students; Powers et al. (2014) found that in a national survey, "22.6% respondents indicated that advising requirements depend on specific situations" and "Roughly one third reported no mandates for advising" (p. 66). Therefore, the concepts of the current study may address issues of non-use in similar organizational models at other institutions.

Although the current study aimed to contribute to advising literature, this study was also designed to study practical implications and potential impacts for the research site, which included both college advising and the campus at large. The advising center has continuously sought to make connections with its student population, having created and revised advising curriculums, increased advising outreach, and adopted proactive advising practices; and professional development for advisors resulted in adapting frameworks and strategies shared through conferences, workshops, and papers, ranging from other departments and programs on campus to benchmark institutions. The current research contributes to this ongoing search for opportunities to connect students with the advising center, to strengthen student engagement. Advising organization and student engagement, further, has been a topic of discussion at both the college and campus levels at the university; because the current study is timely and relevant, it can potentially contribute to this ongoing search for opportunities to connect with students, strengthen pathways to student engagement, and both educate and contribute in decision-making and practice at these levels.

1.5 List of Terms

- *Professional advisor*: advisor whose primary responsibility is advising (e.g., full time advisor)
- *Faculty advisor*: instructional faculty who advise students in their discipline (e.g., as part of service)
- *Dual advising*: Students have two advisors (e.g., one college advisor and one major advisor)
- *College advisor*: in a dual advising structure, housed in an advising office (i.e., advising center) and advises on "general requirements, procedures, and policies" (Habley, 1997, p. 39).
- *Major advisor*: in a dual advising structure, housed in the major department of study and advises on "matters related to the major" (Habley, 1997, p. 39)
- *Allied advisor*: advisor who works with specific student populations (e.g., student-athletes, pre-professional, and honors students)
- *Nonuser:* a student who has not met with an advisor (e.g., college advisor) during a given period of time
- *Banner* (by Ellucian)[3]: Administrative software application by the Ellucian company for student information and records (including class schedule, registration, financial aid, and admission information)

[3] See the Ellucian website, https://www.ellucian.com/student-information-system

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Academic advising is an integral part of a student's relationship with their institution. Academic advising is considered an important asset in a student's educational experience that affects persistence, and prior research has shown that student engagement with academic advisors, and their satisfaction or dissatisfaction with academic advising correlates with their decision to stay at or leave the university, and whether they are involved alumni after graduation (Klepfer & Hull, 2012; Nutt, 2003; Thompson, 2016; Vianden, 2016; White, 2015). According to Habley and McClanahan (2004), academic advising is one of three main categories of "retention practices responsible for the greatest contribution to retention in four-year public colleges" (p. 6). NACADA (2006) summarized the concept of advising as follows:

> Academic advising, based in the teaching and learning mission of higher education, is a series of intentional interactions with a curriculum, a pedagogy, and a set of student learning outcomes. Academic advising synthesizes and contextualizes students' educational experiences within the frameworks of their aspirations, abilities and lives to extend learning beyond campus boundaries and timeframes. (Summary section, para. 1)

Academic advising encompasses a range of activities, from explaining degree requirements and helping students to choose classes, to clarifying career and life goals. What is addressed in an advising session differs not only by student, but by the individual advisor's experience, role (e.g., professional advisor; faculty advisor), and departmental/institutional expectations. However, as NACADA's concept of academic advising indicated, advising involves consideration of the whole student, and helps to form ties between their educational

curriculum, their growth as a person, and their future aspirations. Because of the intricacy of these ties, it is not surprising that forming meaningful relationships with students is imperative to understanding their needs and the best ways to assist them. The forming of this relationship between advisor and student is also essential in student engagement, and suggestions have been made about how to better engage students through advising. These include advisors "[knowing] their students well," striving for "meaningful interactions with students," identifying "pathways to academic and social success," (Kuh, 2006) "thinking of advising as if it were a tag-team activity," and "encourage students to seek out and learn from experiences with different forms of diversity" (Rinck, 2006). As Weimer (2009) stated, "First experiences getting help are predictive of follow-up requests for help." Student engagement, which is considered a more extensive connection between the student and their education, is linked to meaningful relationships with advisors and considered an ideal that is pursued in academic advising; however, students must first be introduced to advising before any further relationship can be established. This remains an area of struggle for some advisors: the question of how to bring students in for their important "first experience." Based on this theoretical problem, this study raised the following research question: *What factors impact student use or non-use of college advising?*

2.2 Disruptive Innovation Framework

The Disruptive Innovation framework was used to inform the pilot study in the first phase of this research, which aligned with dimensions nonconsumers, jobs, and real competitors identified in Disruptive Innovation literature. Christensen, Anthony, and Roth (2004) stated, "Whenever people can't consume education when and where they want it, they are in a nonconsuming context" (p. 102). Disruptive Innovation theory proposed looking at the "job" of the consumer as the unit of analysis, because while the consumer's disposition, in addition to their decisions about which products and services to choose, can change, the "job" remains relatively constant (Christensen, 2008, p. 45). In the context of higher education, "jobs" can vary depending on the individual student and his or her life situation; while "to learn" is a broad-level "job" that pertains to all students, there are more proximal jobs that students are trying to accomplish, such as "Help me solve a problem" and "Brand me in a way that enhances my long-term career potential" (Christensen et al., 2004, p. 102). Finally, by refocusing the unit of analysis to the consumer's "job," competitors of the proposed service or product are also reframed. Although competitors may be tangible, such as other services or products, they may also be psychological factors. This is because jobs have "emotional, functional, and social" dimensions (Christensen, 2008, p. 45). Such intangible competitors can either create barriers or drive consumers to use a product or service. Therefore, it is also necessary to recognize the beliefs, ideas, and feelings that can also have an impact on adoption.

Based on the concept that there are "nonconsumers" of advising, the pilot study examined the "jobs" and "real competitors" impacting student non-use college advising. Findings from this pilot phase informed the initial literature review and three research sub-questions.

2.3 Nonusers

The focus of this study was a population of undergraduate students identified as nonusers. Nonusers (e.g., as used by Lynch, 2004) are characterized as students who have not received advising during a given period of time. This timeframe can range from the semester to the length of their undergraduate career.

Lynch (2004) examined student contact with advisors at a large four-year public research university in the U.S. Advising took place in a decentralized system where "academic advising is delivered by full-time professional advisors in centralized advising centers, full-time professional advisors housed in individual academic departments, and faculty advisors" and students could enroll without consulting their advisor (pp. 63-64). Using a survey administered in the fall 2001 and fall 2002 semesters, the author found that 10 percent of the sampled population of undergraduate students indicated they had not consulted with their advisors during the semester.

Nationally, according to the NSSE (2013b) academic advising module, which surveyed first-year students and seniors, 9% of first-year students and 13% of seniors who responded did not have a discussion with an academic advisor during the school year (approximately 10% of the total respondents) (p. 1). Further, 34% of first-year students indicated an "assigned" academic advisor as their "primary source of advice" regarding their academic plans, while 10% indicated an advisor "available to anyone" as the primary source of advice; 33% and 10% of seniors responded in the respective categories (p. 3). Although these statistics did not differentiate between students' advising during the school year and throughout their undergraduate career, it indicated that 1 out of 10 students, or more, were not meeting with an academic advisor, and that students might be receiving competing information when planning their education.

2.4 Advising Organization

The organization of advising on a campus influences how students interact with people in an advising network. For example, academic advising can be arranged using different organizational models; such models can differ by institution, or different models can be practiced within one institution. Pardee (2004) described three organizational models: centralized ("where professional and faculty advisors are housed in one academic or administrative unit"), decentralized ("professional or faculty advisors are located in their respective academic departments"), and shared ("where some advisors meet with students in a central administrative unit (i.e., an advising center), while others advise students in the academic department of their major discipline"). Intervention models can also impact when and from whom students seek help.

2.4.1 Navigating resources. While multiple resources can further support students academically, it can also present challenges to students, such as knowing whom to ask which questions, and to faculty, who may need responsibilities clarified. Vianden (2016) highlighted some challenges and suggestion, stating, "If the individual advisor is not responsible for providing the information or not knowledgeable about the specific context, they must provide quick referrals to knowledgeable resources who can answer a student's question" and that faculty members should be trained to "meet agreed-upon standards" wherein expectations are consistent, rather than "academic advising haphazardly delivered" (p. 26). This call for accountability also illustrated that while it is important for students to understand the purpose behind advising and engaging with their education, it is important for stakeholders to also develop and intentionally participate in the collaborative shaping of this purpose. In their study, Lynch (2004) compared three types of advising—professional advisors in an advising center, professional advisors in

academic departments, and faculty advisor—and found that for the items "My advisor has a good knowledge of university and college policies and procedures or knows where to find them" and "If I have a problem, my advisor helps me or knows where to send met to get help" the professional advisors were rated "significantly higher" than faculty advisors (pp. 66-67). Further, Thompson (2016) noted, recent reports show that while students rated advising as a high priority, "campus personnel did not rate advising as high as the students did" and "Campus personnel ranked fields such as recruitment, financial aid, and instructional effectiveness higher than academic advising. This presents a slight disconnect that may need addressing with faculty advisors." Dillon and Fisher (2000), in their study of faculty perceptions on advising, found that assigning advising duties to those with desire and knowledge and more training that focused on advisor knowledge were suggested as ways to improve advising; however, "alerting students to their responsibilities and increasing their knowledge about the advisement process was a surprisingly low priority in relation to other proposals regarding improved advising" (p. 20). This can impact student use of advising, because, as Walker et al. (2017) found in their study, "Lack of understanding of the general advising process in college created a major roadblock for some advisees" with one student illustrating that they did not know "when I should go, who I should go to, or how many of those people I should go to" (pp. 46-47). Advisors are considered a resource that can engage students and connect them to a network, just as Cuseo (n.d.) asserted, "Academic advisors are well positioned to promote student persistence by educating students about the value of co-curricular participation and encouraging their involvement with student development services (p. 10). The ability to refer students to appropriate resources is an important advising skill (Roundy, 1992/2017), yet advisors may also be the ones whom students are "referred to." For example, in systems with shared advising, students may meet with a faculty

advisor (e.g., major advisor) first, prior to meeting with a professional advisor (e.g., advising center), or vice versa.

As a guide for students to navigate the system, advisors can help them to increase their social capital. Bourdieu (1986) defined social capital as,

> the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition—or in other words, to membership in a group—which provides each of its members with the backing of the collectively-owned capital, a 'credential' which entitles them to credit, in the various senses of the word. (p. 21)

Further, "The volume of the social capital possessed by a given agent [...] depends on the size of the network of connections he can effectively mobilize and on the volume of the capital (economic, cultural, or symbolic) possessed in his own right by each of those to whom he is connected" (p. 21). This is where the "strength of weak ties" (Granovetter, 1983) can also help students to navigate and take advantage of an unfamiliar system. While students who frequently interact with a single person can lead to higher levels of trust, the student may also be "confined to the provincial news and views of [people with whom they are close]" (Granovetter, 1983, p. 202). This highlights the importance of advisors' ability to refer students by identifying their expressed and implied needs, teaching them how to be prepared and ask questions, and explaining the task to reduce feelings of intimidation (Roundy, 1992/2017). Without seeking what is unfamiliar, students can "lose out" on important information and opportunities that impact their future social capital. In all organizational models, advisors are part of a network, and may be stationed at different points at different times. Recognition of the advisor's and student's roles in the network, and the ability to educate students about these roles, can impact the overall

advising experience including student participation in advising and their pursuit of information with other resources.

2.4.2 Dual advising. In their study, Habley (1997) described seven models of advising, one of which was dual advising. Dual advising is defined as "Each student has two advisors. A member of the instructional faculty advises the student on matters related to the major. An advisor in an advising office advises the student on general requirements, procedures, and policies" (p. 39). Although few articles focused on the dual advising model specifically, the following studies were used to inform the current research. In their study comparing undergraduate satisfaction with faculty and professional advisors, Allard and Parashar (2013) conducted research at a mid-sized split model institution, where "The responsibilities shift from generalized professional center-based advising for undeclared first-year students and sophomores to departmental faculty advising for students in declared majors" in addition to meeting with special program advisors for students in specific sub-populations (Results section, para. 1). Although examining a split model, this study identified student issues that are relevant to other models in which students see more than one advisor: having to see multiple people to answer questions ("get more information from asking other students than from the advisers"); anticipating getting incorrect advice, which led students to seek multiple sources of advice; feeling advisors are overburdened and, as a result, turning to other non-advising faculty for advice; and experiencing "unclear communication channels" between faculty and professional advisors (Allard & Parashar, 2013). Further, Allen and Smith (2008b), who studied faculty perspectives of academic advising in a primarily decentralized faculty advising model at "doctoral-research intensive urban university" found that "Faculty agreed with each other that providing accurate information about degree requirements is the most important kind of advising

students can receive. But it was not one of the two functions for which faculty felt most responsible" and "although faculty believed that How Things Work, the other information function that involves helping students navigate the institutional landscape through understanding policies and procedures, was relatively important […], it was one of the functions for which they felt least responsible" (pp. 406-407). Based on these findings, and indications that faculty covering all advising functions was unrealistic (pp. 408-409), the authors suggested dual advising as an alternative model to pursue. However, during their discussion, the authors also raised the question of changing the advising model rather than "bolstering faculty abilities" as the focus of modification. Because their study was based on self reporting, the authors also suggested "direct observations of faculty behavior during advising encounters" as alternative measure for future studies (p. 410). In another study, Allen and Smith (2008a) compared faculty and student perspectives on advising. Again in a primarily decentralized faculty model, the authors found,

> The most striking differences were with Referral Academic [referrals to campus services providing academic support], which students regarded as among the least important advising functions but faculty rated as among those for which they felt most responsible, and How Things Work, which students rated as highly important but faculty deemed as one of the functions for which they felt least responsible. (pp. 618-620)

The disconnect between what students felt was most important and what faculty defined as most important implicated a potential area leading to student dissatisfaction. Notably, the authors also found that "students were less satisfied with the advising they receive than faculty were with the advising they provide" (p. 621), indicating faculty self-assessment was not calibrated with student expectations. Similarly, the authors suggested collaboration between faculty and student

affairs professionals as a potential channel for improvement. However, they also raised some concerns regarding a dual advising model, including the need to "delineate and communicate roles and responsibilities of each advisor to students, faculty and professional advisors," "'advisor' title for both advisors may be problematic," the need to "document what transpires in each advising session" for transparency and collaborative training, and the need to guide students through "portals" that are "open and clear" (p. 623). Myers and Dyer (2003) also studied faculty advisors at a college of agriculture in a land grant institution. The authors found that faculty ranked "helping students meet degree/program requirements, career counseling, and course scheduling" as most important roles for student advising, while "assisting students with personal issues" was ranked one of lowest (p. 256), indicating that practices and philosophies associated with academic advising were not recognized as advising duties by faculty, because "there appears to be a lack of understanding among respondents as to the definition of advising and the subsequent roles of faculty" (p. 257). Further, the authors found that faculty perceive themselves to be competent in advising in some areas but not others, yet, "nearly 80% of the respondents considered their current level of expertise to be adequate" (p. 258). Similar to Allen and Smith (2008a), this scenario also suggested that faculty self-assessment was misaligned with student needs. Because faculty may misunderstand what constitutes student advising, the authors suggested further research "to determine how faculty define their advising responsibilities" (p. 258). In relation to faculty advising, studies also showed that there was a "lack of support for ongoing, quality faculty-advisor development programs"; data from a 2011 national survey "suggest that limited internal and external training and development opportunity are available to most faculty advisors" and "10% of respondents reported that they do not know the training and development activities available to them" (Wallace, 2011, Professional Development section,

para. 3). Likewise, Academic Impressions (2012) in a 2012 survey of academic deans, department chairs, and directors of advising found that "less than one-fifth of those institutions surveyed devote 'sufficient resources' toward improving faculty advising" (para. 2). Waters (2002), in a survey of faculty advisors, found that information sources included "colleagues, deans, chairs, and students" and "other" sources; additionally, in interviews, participants "indicated that the campus advising center or office was often a source of advising-related information" (p. 23). There was also a significant difference between how much time was allocated for advising duties to faculty compared to advising staff (Habley, 1997; Lynch & Stucky, 2000), and views of compensation for advising (e.g., toward tenure and promotion) differed between faculty and administrators (Dillon & Fisher, 2000; He & Hutson, 2017; Wallace, 2011).

Everett and Perez-Colon (2015) examined a program that changed from faculty model to dual advising in a College of Engineering at a public research university. The change was deemed necessary due to a dramatic increase in students, with which "The College recognized that one of its hallmarks—the successful integration of academic and career advising by faculty—had become difficult to sustain" and "While retention remained high, the college decided to prevent any future drop by proactively improving the advising program" (p. 26.693.4) The dual advising model was introduced to first-year students, who saw a first-year advisor for prescriptive advising, and faculty mentors who were "discipline-specific" advisors in the student's major for developmental advising. In this study, the first semester transition was considered a success "as indicated by students' ability to find support services" (p. 26.693.12). However, a "significant number of students interacted with their discipline-specific advisor concerning assistance with scheduling/registration and selecting courses for the next term, two

topics that should be discussed with the first-year advisor" (p. 26.693.10). As a result, the authors suggested providing a guide to faculty, so they would direct students to the first-year advisor and emphasizing the role of first-year advisor in class as potential solutions.

Another recent study of dual advising by Cheung, Siu, and Shek (2017) examined students at a Chinese university whose advising was split between a central advising office (advising on general education requirements) and advisors in the program-of-study departments (advising on major requirements). Responses indicated that while the majority of students (93%) had met with the central advising office, a lesser number (70%) had met with their major advisor. An interesting correlation to this was that "Students did not express strong expectations for advisors from their own program-of-study department to engage in relationship building with them; their motivation to meet more frequently with these advisors was not particularly strong" (p. 27). This paralleled findings that students value having a relationship with their advisors (e.g., Mottarella et al., 2004), but this study also indicated that low expectations of relationship building could have a measurable impact on student meetings with advisors. Such findings can give further insight into unserved students, as the authors indicated:

> Several reasons may explain the study findings about faculty advisors. First, university students in Hong Kong may believe that they should manage their own studying independently and that they do not need to see advisors frequently. Second, they may think that only weak students need to see advisors. Third, students may be wary about revealing their personal issues and concerns to advisors who are members of the academic staff; that is, they may feel apprehension about the effect of any divulged personal issues on the grading of their academic performances. (p. 27)

These implications reflected motivational factors such as self-assessment and self-worth as potential reasons students did not meet regularly with some advisors more than others, just as proposed by Henning (2009); it also implicated the possible impacts of power dynamics and trust, as the duality between an advisor as a resource to confide in and the ability of the advisor to evaluate the student could appear to be in opposition. Such factors can be further impacted by sociocultural expectations and norms.

2.4.4 Intervention models. Types of advising interventions used by advisors is another example of a systematic factor that impacts student pursuit of advising. Proactive advising, also called intrusive advising, was shown to be an effective practice related to student persistence and success (Cuseo, n.d.; Tennant, 2013). In proactive advising, students are contacted by advisors early in their academic careers, encouraging students to seek advising. This umbrella term describes the process in which advisors are "*initiating* contact with students and aggressively bring support services *to them*, rather than offering services *passively* and *hoping* that students will come and take advantage of them on their own accord" (Cuseo, n.d., p. 11). This form of advising helps to build early relationships with students, learn about the student and connect them to resources, ultimately having a lasting relationship with the student (Cannon, 2013; Cuseo, n.d.). Proactive advising practices can range from sending students reminder emails, to meeting them in residence halls and informal campus events, to mandatory advising. Tennant (2013) stated, "Intrusive advising is an effective retention approach because it demonstrates care for students, connects students to resources, and facilitates decision-making skills that help prepare students to be successful beyond college" (p. 15). However, because proactive advising is not always mandatory (Schwebel, Walburn, Klyce, & Jerrolds, 2012), one challenge that remains is, "although personnel are reaching out to students, students may not respond to these

intrusions. In that sense, intrusive contacts are only as successful as students allow" (Tennant, 2013, p. 27). Another concern is that proactive advising may be too intrusive by overstepping boundaries perceived by students and faculty (Tennant, 2013, pp. 27-28). Despite this challenge, as Scwhebel et al. (2012) found in their study, even non-mandatory proactive advising outreach that "encourages students to attend advising appointments is, in fact, effective at increasing the frequency of student advising appointments" (p. 41). Further, Schneider, Sasso, and Puchner (2017), in their study of intrusive advising, found, "more academic advisers than faculty are familiar with the concept of intrusive advising, indicating that if the institution chose to initiate an intrusive advising model, faculty members would need training and/or information on the model" (Discussion section, para. 1). This paralleled the importance of clarifying an advisor's role (e.g., faculty advisor), context, and standards, which relates to the organization of advising (Dillon and Fisher, 2000; Teasley and Buchanan, 2013; Thompson, 2016; Vianden, 2016).

A type of proactive advising is mandatory advising. Mandatory advising has been one proposed solution to meet with all students. To ensure regular meetings with students, advising offices may choose to conduct mandatory advising initiatives where, for example, students who do not meet with advisors by a deadline have a registration hold put on their account until they receive advising. However, advising offices may choose not to enforce mandatory advising due to lack of resources, or philosophical reasons, such as the need to building students' self-efficacy and addressing individual student needs (Creveling & Edelman, 2009; The Mentor, 2012). There has also been the concern that "While students want advisors to be concerned about them as individuals and to spend time to get to know them beyond test scores, grades and transcripts, they do not want to go back to the days of *in loco parentis*" (Winston & Sandor, 1984, p. 12).

While these are just some examples of factors that impact how advising is introduced and communicated to students, they illustrated that students can follow different paths to advising. Themes discussed that can impacting student engagement included who is advising (e.g., advising structure); what they are advising; what learning, assessment, or incentives are available to advisors; and how advising is being delivered: this encompasses how advising is being communicated, where and when advising is offered, and what incentives are available to students. While no one method works for all campuses and departments, as McFarlane (2017) suggested, when choosing the type(s) of advising intervention, an important question is, "What vehicle does the campus have for helping students meet desired advising outcomes?" As the reviewed literature suggested, both the desired advising outcomes and the "vehicle" to help students meet the outcomes need to be understood and shared, to create a clear path that can be followed and avoid confusion and contradiction. Therefore, this study addressed advising organization and intervention in major and college advising at the study site by learning about advisor role, context, and standards, advising processes, advisor knowledge and networking, perceived value of advising, and social and cultural dynamics, through interviewing major advisors and observing advising sessions.

2.5 Technology

The different ways in which the concept of technology can be appropriated for advising may result in different meanings for different advisors. Examples of technology embodying different concepts can be found in NACADA; in the framework of academic advising core competencies, "Technology Use" was listed under the "Communication and interpersonal skills (relational)" competency category (NACADA, 2017a), while later, "Information Technology applicable to relevant advising roles" was listed under the "Informational Component" core competency area, with technology no longer mentioned in the "Relational Component" area (NACADA, 2017b). While the phrase "technology in advising" (which also serves as NACADA's commission taxonomy) has been used, it can describe a range of applications, including social media and degree audit programs (e.g., NACADA, 2017c).

2.5.1 Communication in advising. Golubski (2009), in their study of a pre-orientation summer initiative for incoming freshmen prior to their arrival on campus, found that "The concern that was expressed most often by staff members was if virtual communication would cause a reduction in students' face-to-face communication skills" (p. 187) and the author recommended that "The full-scale initiative should be discontinued once students arrive on campus and exchanged for in-person interactions and communications" (p. 188). Joslin (2009), in interviews with veteran advisors, found that "some [advisors] discussed the ways computers and technology are interfering with one-on-one communication between advisors and advisees" (pp. 70-71) and that technologies such as email and social networking, while providing more accessibility to information, could be a barrier to students meeting with advisors; the author quoted another respondent, who said, "Not that I do not use technology in advisement but I still demand face to face weekly interaction" (p. 72). Additionally, Taylor, Jowi, Schreier, and

Bertelsen (2011) found that undergraduate students did not prefer computer-mediated communication (defined as email) with faculty advisors to achieve interpersonal instrumental, relational and presentational goals (Discussion section, para. 2), and, similarly, Noonan and Stapley (2015), in their study of student communication preferences, found that students "prefer to email their advisors to make an appointment to meet or to ask a short, simple question. For all else, most students prefer to sit down and chat in their advisor's office" (para. 5). Even Gaines (2014), which painted a positive picture of videoconferencing technologies used to create a "modified face-to-face" method (p. 43), and which also noted that "More respondents [...] indicated a preference for Skype interactions with an academic advisor than indicated they do not like using it," found that most respondents still "chose face-to-face appointments for interacting with an academic advisor" and "Skype as the least-preferred" choice (p. 46). When advisors differentiate "technology" and "truly interpersonal communication," (Rawlins & Rawlings, as cited in Vianden, 2016, p. 20) there is cause for concern that interpersonal relationships will be lost. However, just as Gaines (2014) noted, "neither advisors nor advisees need to choose between electronic or face-to-face communication as the desirable features of each can be overlaid upon the other" (p. 43). Notably, in a 2011 national survey, "E-mail, as reported by over 99% of respondents, was the most common technology employed to communicate with students" (Pasquini, 2011, Communicating with Students section, para. 1) and in a 2013 national survey, 98.87% of advisor respondents indicated they used email daily, which was a higher frequency than face-to-face interaction (90.83%) (Pasquini & Steele, 2016, p. 8).

Junco, Mastrodicasa, Aguiar, Longnecker, and Rokkum (2016) found that most students (61%) communicate with their advisors by email, in contrast to text messages, IM, Facebook, and Twitter (p. 59) and, of the forms of communication, two media predicted student advising

experience: “Using e-mail to communicate with advisors was positively predictive of advising experience, whereas using Twitter was negatively predictive of advising experience. In this model, the communication methods (Twitter and e-mail) demonstrated equivalent strength of predicting advising experience” (p. 60). However, rather than dismissing social media as an ineffective way of communication, as Junco et al. (2016) asserted,

> Advisors must understand that students are open to communicating with them using a wide range of modalities and that the modalities are not the strongest predictors of success. For instance, the ways advisors relate to undergraduates through platforms such text messaging, Facebook, and Twitter matter more than the modality used; just as many advisors conduct face-to-face meetings with students, not all advisors effectively leverage these meetings to support student growth. (p. 63)

Technology can be used to give the important “first contact” with students to introduce them to advising, and from which point a relationship can be further built. For accessing information, Gaines (2014) found that “students expressed a strong preference for accessing important information, such as deadlines, via student e-mail as opposed to announcements on Facebook, Twitter, or podcasts” (p. 46). Carroll (2010) also illustrated a mixed method of advising. In one case, students who cannot attend mandatory group workshops “must sign up for advising appointments, view a video about the nursing curriculum, and complete an assessment rating their understanding of video content.” This shows an integration of both in-person advising and use of technology to educate students. In another case, a system required students to “view their online academic evaluations prior to being released for registration. The process is self-service and involves simple mouse clicks to view evaluations and release the registration hold.” However, while this system is fully online, and therefore students can continue without

meeting with an advisor face-to-face, the advising center "experiences an increase in appointments" when the hold is placed, "the result of students coming face-to-face with their academic histories, number of hours earned, areas satisfied, and remaining graduation requirements." In this case, technology has been used to require the student to review their academic record as a proactive advising method to incentivize student self-assessment; with a degree of freedom, the student can choose if they want to meet with an advisor face-to-face. Carroll's study demonstrated that technology can be used for different purposes, whether it is to "nudge" students to review their academic record to assessing their knowledge of their degree requirements; technology can also be used as an independent tool or as part of a mixed method with in-person advising.

2.5.2 Technology-based systems in advising. In addition to direct communication methods such as email and social media, advising technologies have been studied from the perspective of technology-based systems, including automation. A 2011 national survey found that "more survey respondents working at places with mandatory advising for some students as well as those from large and public doctoral institutions reported using automated degree-audit systems" (Pasquini, 2011, Managing Student Information section, para. 1). Additionally, a 2013 national survey found that only 35.55% of advisor respondents used "degree audit system-developed by institution" daily compared to 47.99% who "never" used the technology (Pasquini & Steele, 2016, p. 8).

Yanosky (2014), in a benchmarking study of an integrated "shared ownership" information and services system, found, "Though not necessarily assuming that technology involves a loss of human advisor contact, students typically described connecting with a concerned advisor as the best thing in their advising experience; they were adamant that they did

not want such contact to be sacrificed" (p. 11), and advisors were especially concerned that "'there is an assumption that students will respond more to technology, when in reality they crave the human touch and the human interaction'" (p. 27). Kalamkarian and Karp (2017), also studying an integrated information and services system, found that "The vast majority of students in our sample felt that technology-based advising tools could not provide them with the personalized feedback and developmental instruction that they believed was essential, especially for advising tasks that are more cognitive in nature" (Students Were Skeptical of Technology-Based Delivery of Cognitive Supports section, para. 1), but students also "preferred technology-based delivery of systemic supports" that "did not require instruction from an advisor" such as online course registration (Students Preferred Technology-Based Delivery of Systemic Supports section, para. 3).

2.5.3 Automation bias and errors. Lee and See (2004) define automation as "technology that actively selects data, transforms information, makes decisions, or controls processes" (p. 50). While studies found that student preferences for human interaction remain strong despite introduction of technology, studies also show that the presence of automation changes people's behaviors and beliefs. Parasuraman and Manzey (2010) stated,

> Research has shown that automation does not simply supplant human activity but rather changes it, often in ways unintended and unanticipated by the designers of automation […]. Thus, the benefits anticipated by designers and policy makers when implementing automation – increased efficiency, improved safety, enhanced flexibility of operations, lower operator workload, and so on – may not always be realized and can be offset by human performance costs associated with maladaptive use of poorly designed or inadequately trained-for automation. (p. 381)

Further, Parasuraman and Riley's (1997) asserted, "Given that no designer of automation can foresee all possibilities in a complex environment, one approach is to rely on the human operator to exercise his or her experience and judgment in using automation.[…] This approach, however, tends to define the human operator's roles and responsibilities in terms of the automation" (p. 232). These indicated that the intentions of automation may not match the actual outcomes, and human roles can become subordinate.

In their study of airline pilots in high-tech cockpits, Mosier, Skitka, Heers, and Burdick (1998), stated that despite generally positive effects of automated systems such as "increased efficiency and data storage and manipulation" where "computers can assimilate more information and processes it faster than humans" they also "introduce opportunities for new decision-making heuristics and associated biases." (p. 48). One such bias is automation bias, which is "a term describing errors made when human operators use automated cues as a heuristic replacement for vigilant information seeking processing (Mosier et al., 1998, pp. 50-51). In other words, it occurs when people take automated recommendations without confirming the information given to them by the aids. Mosier et al. (1998) described two types of errors associated with automation bias, referred to as "omission errors" and "commission errors." Omission errors "result when decision makers do not take appropriate action because they are not informed of an imminent problem or situation by automated aids" whereas commission errors "are errors made when decision makers inappropriately follow automated information or directives (e.g., when other information in the environment contradicts or is inconsistent with the automated cue)" (p. 51).

Alberdi, Strigini, Povyakalo, and Ayton's (2009) found that "specific situations with high degrees of uncertainty, especially when other more reliable sources of information are missing,

may make operators vulnerable and cause them to rely on computer support more than they would normally do, even if they do not trust its reliability" (p. 26). When users do not have other reliable sources to turn to, automation becomes a default option. If they are less confident in their own ability to perform without the automated aid, technology credibility increases because "people in unfamiliar situations or who have already failed at the task when relying only on themselves perceive a computing technology as more credible" and "In general, people who lack expertise seem less willing or able to be skeptical about a computing technology designed to help them" (Tseng and Fogg, 1999, pp. 43-44). Uncertainty, or lack of ability, is both a factor in increasing reliance on technology and reducing recognition of errors. On one hand, Skitka et al. (1999) found, "when automated monitoring aids operated properly, their presence led to an increase in accuracy and a reduction in errors over not having an aid" (p. 1002); on the other, in the same study, the authors found, "when the automation yielded a 'miss' (i.e. failed to detect an event), the presence of an automated aid led to an increase in errors on vigilance tasks relative to non-automated contexts" (p. 1002). Further, Merritt, Lee, Unnerstall, and Huber's (2014) found, "The strongest predictor of failure detection in our data set did not concern appraisals of the automation. Instead, it concerned participants' ability to perform the task unaided" (p. 44). With higher confidence in one's own abilities, user reliance on automation can decrease. Those with lower self-confidence may perceive higher trust in automation. In their review of automation bias studies in health, Goddard, Roudsair, and Wyatt (2012) found, "…increased confidence in the user's own decision decreased reliance on external support, whereas trust in the [automated system] increased reliance," and, "Trust is possibly the strongest driving factor in over-reliance, when trust is incorrectly calibrated against system reliability" (p. 124). Similarly, Merritt, Heimbaugh, LaChapell, and Lee (2013) stated, "When automation performance was ambiguous,

users' implicit attitudes toward automation and propensity to trust combined additively to predict trust" (p. 529) and "When performance was unclear, users interpreted the information in line with their implicit attitude" (p. 530). Additionally, Madhavan, Wiegmann, and Lacson (2003), in their study of trust comparing easy and difficult tasks with automated aids, found that users' trust and reliance in automation was "severely" undermined when automation failed in "tasks easily performed by operators" (p. 338). However, Lee and See (2004) argue that trust and reliance, while related, are not equivalent; they stated, "Trust influences reliance on automation; however, it does not determine reliance" and "More generally, trust seems to be an example of how affect can guide behavior when rules fail to apply and when cognitive resources are not available to support a calculated rational choice" (p. 76).

Experience may be a key factor in calibrating one's trust in an automated system; as Hoffman et al. (2013) suggested, "Experts have sufficient experience with their technology to calibrate their trust, moving within the space defined by unjustified trust and unjustified mistrust. That is, they have sufficient experience with the technology to understand its competence envelope" (pp. 85-86). However, while experience can impact trust, it is not a "cure" for automation bias; in one example, bias was attributed to experience. In their study involving flight simulations, Mosier et al. (1998) described "phantom cues" that were experienced by pilots, who, when asked to recall what happened during an emergency situation demo, "remembered" cues being provided by the system which were not actually present (pp. 58-59). Experts are knowledgeable of the types of cues that should be present in certain situations, and because of those expectations, they project these expectations as false memories (i.e., perceiving cues that were not there).

Expectations of system performance, or knowledge of errors, does not correspond with calibrating trust and decreased automation bias; Pop, Shrewsbury, and Durso (2015), who studied differences between users with high automation expectancy (that the system would perform accurately) and low expectancy found that "high expectancy operators were indeed more sensitive to change in reliability of automation; however, this sensitivity did not always result in better calibration. Operators with high automation expectancy had better calibrated adjustment when the capability of the automation increased, but poorer calibrated adjustment when the capability decreased" (p. 553). In addition, Dzindolet, Peterson, Pomranky, Pierce, and Beck (2003) in their study, found that "Merely telling participants that the automated aid is not perfect was not effective in reversing the effect of obvious errors on automation reliance" (p. 710). However, accountability has some impact on performance: In their study of accountability with automation users, Skitka, Mosier, and Burdick, (2000) found that "…social accountability only led to increased vigilance and verification behavior when people were made to feel accountable for monitoring behavior and accuracy, and not when they were made to feel accountable for task not requiring increased vigilance or information gathering" (pp 715-716). Further, Mosier et al. (1998) also found, "Results indicated that those subjects who felt more accountable […] were less likely to make omission errors than those who did not feel as accountable for their performance" (p. 58). Taken together, while both social and internal accountability impact performance, internal accountability may have a higher impact.

Skitka et al. (2000) stated, "…the vast proportion of evidence seems to be pointing to the fact that automation is used as a decision-making short cut that prematurely shuts down situation assessment more than a fundamental belief in the relative authority of automated aids" (p. 714) and Mosier et al. (1998) asserted, "The availability and automated decision aids feeds into the

general human tendency to travel the road of least cognitive effort" (p. 49). Hardré (2016), described the concept of diminished vigilance as "When individuals believe that someone or something else is watching or monitoring a situation, they become subconsciously less watchful of it themselves" and "When people trust digital systems to monitor for error or invasions, to identify threats, they relax their own monitoring, fact-checking, and judgement, relinquishing their decision making to the technology" (p. 91). Mosier et al. (1998) described, "When an automated aid is introduced[…]it disrupts the pattern of cue utilization. Automated aids present new, powerful cues. These cues are readily available, are widely believed to be accurate, and are a highly salient source of information. The computational, system observation, and diagnostic capabilities of automated aids are advertised as being superior to that of their human operators," and a combination of factors such as "time pressure" and "activation of one 'most powerful' cue" may "contribute to the perception that automated aids do not provide 'just another cue,' but rather are more important, more diagnostic, and more reliable than previously utilized, conventional information sources" (p. 49). Taken together, these studies indicated that diminished vigilance, because subconscious, and a result of the presence of automation, cannot be completely prevented.

Sutherland et al. (2016) suggested that implementing costs might curb effects of passive use that can lead to automation bias. However, they also warned that consequences can also be serious. Using the example of GPS, they stated,

> …designers must be cautious in applying these recommendations for implementing costs. For example, implementing costs for a GPS could lead to negative consequences. If users must constantly request advice or interact with their GPS while driving, their attention would be distracted and could lead to accidents from a failure to pay attention to their

> surroundings. For these types of tasks, it may be beneficial to have large upfront costs (asking a series of preliminary questions to calculate a route), but then have the costs decrease for later interactions, minimizing later diverted attention. (p. 31)

Despite errors associated with automation, Dzindolet, Pierce, and Beck's (2003) asserted, "Costs [of manual operation, such as workload, fatigue, and boredom of the task] will only affect automation use […] if they are deemed greater than the importance of the outcome. If the importance of the outcome is deemed greater than the cost, outcome value will be high, thereby increasing effort" (p. 14). Further, Alberdi et al. (2009) asserted,

> Automation is increasingly taking on the role of *supporting* knowledge-intensive human tasks rather than directly *replacing* some of the human's functions. This actually makes the problem of computer-related human errors subtler. The responsibility for correct action rests with the user. One might think that user mistakes can be reduced by simple training or, sometimes, by a user interface that prevents those mistakes. But in practice computers and their users form human-computer systems, or 'socio-technical systems', which need to be assessed as whole systems. (pp. 1-2)

2.5.4 Comparing humans and automation. A study by Dzindolet, Pierce, Beck, and Dawe (2002) found, "Clearly, people's expectations of the capabilities of human partners and automated partners are not the same" and "not only did the participants expect their automated partners to outperform human partners, they expected their automated partners to outperform them" (p. 84). Dijkstra et al. (1998), in their study of perceptions of advice given by humans in comparison to automated expert systems, found, "Given the same advice, subjects thought an expert system to be more objective and rational than a human adviser, especially when the expert system advice was given in a production rule format" (pp. 160-161). McKnight, Carter,

Thatcher, and Clay (2011), similarly, stated, "Trust in people and trust in technology differ in terms of the nature of the object of dependence. With the former, one trusts a person (a moral and volitional agent); with the later, one trusts a specific technology (a human-created artifact with a limited range of capabilities that lacks volition (i.e., will) and moral agency" and "Because technology lacks volition and moral agency, IT-related trust necessarily reflects beliefs about a technology's characteristics rather than its will or motives, because it has none" (p. 12:5). Merritt et al. (2013), additionally, stated, "…we characterize implicit attitude toward automation as an attitude (i.e., an association with good/bad) as opposed to an emotion (i.e., affect). Specifically, an attitude is defined as an overall evaluation of an object on a latent scale ranging from *very bad* to *very good*" (p. 522). This indicated that while judgment of the automation is based on "overall evaluation," the affective characteristics of human-human interaction can result in judgment based on affect (e.g., the advisor's perceived attitude).

Li, Hess, and Valacich (2008) also found that in context of promoting a new technology system, "Social influence showed the most significant effect on trusting beliefs. In the absence of first-hand knowledge or experience, the trusting beliefs of a few may have a far-reaching impact on the overall trusting beliefs of a group" (p. 56). McKnight (2005) also points out, "institution-based trust in IT means a belief that success with the specific technology is likely because, regardless of the characteristics of the specific technology, one believes either that the technical situation is favorable or that structural conditions like guarantees, contracts, or other safeguards exist" (para. 13). However, McKnight et al. (2011), in their study, stated, "our findings imply that when individuals rely on knowledge-based trust, they draw less on institution-based beliefs, and make decisions based on trusting beliefs about characteristics of the technology itself" and "the trust in the vendor often does not influence continued usage" (pp. 12:13-12:14). They

offered the example of people who use Office products even if they are not necessarily fans of the Microsoft brand, because of the utility of the product. In the current study, the utility of the system as perceived by the user through first-hand experience, rather than the institution or third-party credibility, can create trust in the product itself based on its characteristics.

Likewise, lack of trust in the institution can lead to lack of trust in the system, where automation is perceived as an extension of an institution, as Lee and See (2004) argued that "Although automation does not exhibit intentionality or truly autonomous behavior, it is designed with a purpose and thus embodies the intentionality of the designers" (p. 66). Further, Li, Rong, and Thatcher (2012), in their study of user trust in merchants versus websites, found that "While there are an increasing number of technologies being used to replace human presence, users are still aware of human actors [e.g., merchants] behind the technology, and still rely on trust in the human actors when forming intensions that lead to online behavior" (p. 32).

Further, Parasuraman and Riley (1997) caution against automation abuse, defined as "the automation of functions by designers and implementation by managers without due regard for the consequences for human (and hence system) performance and the operator's authority over the system" or a "technology centered" approach (p. 246). The authors provide examples of issues with this approach, including "In many cases, it has reduced operators to system monitors, a condition that can lead to overreliance" (p. 247). Citing Billings, they point out the importance of an "operator who is aware of the environmental conditions the system is responding to and the status of the process being performed" rather than being a "consequence of the application of automation" (pp. 247-248).

As literature illustrates, although the incorporation of technology can play an essential role in advising, it is only one of several shifting parts in a sociotechnical system.

2.6 Information Seeking

2.6.1 Convenience. While students might prefer face-to-face interaction, convenience—including the amount of time required and ease of access—can impact how they ultimately seek information. Choy and Park (2016) proposed identifying "hassles" experienced by consumers, suggesting that "finding a way to reduce or remove hassles occurring in consumers' lives causes the beginning of the creation of attractive products" (p. 9). The authors named hassles in three essential categories, of which two were waste (e.g., "money and time") and inconvenience (e.g., "complicated processes, difficult usage, and inefficiency") (p. 9). In other studies, these concepts were interrelated. Connaway, Dickey, and Radford (2011), in their study of convenience with library virtual reference services (VRS), found that although convenience played different roles for different situations, "Different contexts and situations for information needs did not detract from the centrality of convenience in making choices between specific resources" and "Convenience was a leading feature every time VRS users were asked in surveys and interviews to evaluate reasons for choosing one service over another kind of information resource" (p. 187). Convenience and speed were linked together, as some nonusers perceived VRS to be less convenient and slower than other information resources (Connaway, Radford, and Dickey, 2008, p. 27). Catharine (2013), in a study of educational use of smart phone technology, also found that the majority of respondents used search engines compared to only 4.3 percent who used libraries or databases (p. 429). The author asserted the convenience of a resource "is the overriding consideration for choosing a source when gathering information" (p. 430) and suggested that no learning curve, availability without cost, and "good enough" content of Internet resources were factors in convenience (p. 431). Likewise, Fast and Campbell (2005) also found that "the concepts of time and effort were a recurring theme and closely related" (p. 143). Students

preferred Web searching because it took less time and effort (e.g., did not require training) compared to the library catalog and "Undergraduates disliked leaving their rooms and going to the library" (p. 143). Further, a suggestion by Sutherland, Harteveld, and Young (2016) lends context: "If a decision must be made immediately, then requiring a user to wait for advice, no matter how much the decision accuracy might become, could have negative consequences. Therefore, opportunity costs must be considered" (p. 31). If students perceive they are able to find information themselves, they may avoid seeking any mediation, as suggested by Connaway et al.'s (2011) finding, "…a large majority (62%) responded that they would find the information themselves, making the potentially time-saving choice to avoid any mediation in their information seeking. Almost all of the remaining interviewees (with some overlap to the 'find it myself' answer) responded with some form of electronic resource (33% cite the Internet, 15% Google, 5% Wikipedia)" (p. 186).

2.6.2. Framing effect. Another factor in the extent to which students seek information is how information is framed. Tversky and Kahneman (1981) proposed that "different frames can lead to different choices" (p. 454) and Kahneman (2003) stated, "The basic principle of framing is the passive acceptance of the formulation given. Because of this passivity, people fail to construct a canonical representation for all extensionally equivalent descriptions of a state of affairs" (p. 1459). Kahneman (2003) further stated, "…where a choice between two options A and B is affected by designating either A or B as a default option. The option designated as the default has a large advantage in such choices, even for decisions that have considerable significance" (p. 1459). In one study, Tversky and Kahneman (1981) presented two versions of a "Asian disease" problem, finding that when the description of options changed from lives saved to lives lost, respondent favored risk aversion with one version and risk-seeking with the other

(p. 453). When a problem is presented, how options are framed can impact the answer chosen. In another study, Tversky and Kahneman (1981) found when the outcome is certain rather than probable, certainty can "exaggerate" loss or gain. The authors labeled this the "certainty effect" which they described as "a reduction of the probability of an outcome by a constant factor has more impact when the outcome was initially certain than when it was merely probable" (p. 455).

Further, when features are framed as highly accessible and visible, they are perceived as default options, just as Kahneman (2003) stated,

> Absent a system that reliably generates appropriate canonical representations, intuitive decisions will be shaped by the factors that determine the accessibility of different features of the situation. Highly accessible features will influence decisions, while features of low accessibility will be largely ignored—and the correlation between accessibility and reflective judgements of relevance in a state of complete information is not necessarily high (p. 1459).

Therefore, when students need to choose between options, default options have an advantage "even for decisions that have considerable significance" (p. 1459). Similarly, Sutherland et al. (2016) asserted, "Users may be willing to rely on advice if it is freely available or if they do not have to spend much time, money, or effort to receive it, enduring unnecessary costs and leading to suboptimal outcomes" (p. 29).

Thomas and Millar (2012), in their study of reducing the framing effect in older and younger adults, found that both indirect priming and direct instruction eliminated the framing effect in both groups. Further, recommendations can help students find new options they had not previously considered, but recommendations that lack diversity can also be limiting. Just as

stated by the Wharton School of the University of Pennsylvania (2015), research examining recommendations and consumer choice revealed,

> For consumers, we find that these [recommendation] systems are great at helping us as individuals discover new products, but at the aggregate level, we're not seeing that diversity, which is not necessarily troublesome for consumers, but it does suggest that there are products out there that could be this needle-in-the-haystack, perfect product for you, which may not be surfaced by recommendations. So, one has to be open to other sources of discovery as well.

2.6.3 Satisficing. Tversky and Kahneman (1981) defined the term "decision frame" as "the decision-maker's conception of the acts, outcomes, and contingencies associated with a particular choice. The frame that a decision-maker adopts is controlled partly by the formulation of the problem and partly by the norms, habits, and personal characteristics of the decision-maker" (p. 453). This indicated that a decision frame is not only influenced by how a scenario is presented (e.g., high or low risk), but also by other factors such as personal and social beliefs and habits. The framework of satisficing addresses influential norms, habits, and personal characteristics. Satisficing, is defined as "using experience to construct an expectation of how good a solution we might reasonably achieve, and halting search as soon as a solution is reached that meets the expectation" (Simon, 1990, p. 9).

Satisficing beliefs and behaviors have been found in high school students; Hadar (2011), in their study of student learning conceptions, discussed the frequency that students connect categories with learning such as getting good grades and completing assignments rather than process learning. The author found that the most dominant descriptions of learning by students reflected satisficing, and "…the current adequate school performance factor can validate the

notion of a ‘merely satisficing school performance’ factor as central to students’ conceptions of learning” (p. 208). The author concluded, “The fact that this satisficing factor is the most dominant in student description of learning, and of what it means to be a good learner, is troubling” (p. 208).

Satisficing can also lead to positive results; as Parker, de Bruin, and Fischhoff (2007), in their study comparing satisficers and maximizers, found, “While good advice can improve decisions, consultation can also undermine effective decision making […] Perhaps reflecting these contrary possibilities, self-reported dependence on others is unrelated to decision-making competence or outcomes” (p. 348). Therefore, satisficing can have benefits over maximizing. Warwick, Rimmer, Blandford, Gow, and Buchanan (2009) called this “strategic satisficing,” a stage of development in which students “knew how to find sufficient information as quickly as possible using their extant skills” and “students are aware of what is needed to fulfill the demands of a task, but use their skill and ingenuity to construct simpler search goals that exploit ingrained skills” (Warwick et al., 2009, p. 2409).

2.6.4 Ignorance. The Dunning-Kruger effect, which is defined as “those who are incompetent, for lack of a better term, should have little insight into their incompetence” (Dunning, 2011, p. 260) is a theoretical framework that explains why those who are unskilled in certain domains lack the ability to recognize their shortcomings. This theory posits that “the double burden of incompetence” is a result of “the act of *evaluating* the correctness of one’s (or anyone else’s) response draws upon the exact same expertise that is necessary in *choosing* the correct response in the first place” (p. 261). Both advisors and students can be impacted by the described effects. Just as Dunning (2011) stated, “there is a threshold that has to be met for people to make inappropriate claims of expertise. They have to have some fragments of

information, enough scaffolding based on domain-specific or general world knowledge, to allow them to cobble together a plausible response" (p. 259). Access to some information, or partial knowledge, can therefore be misconstrued as competency when one's perception of competence is misaligned with actual competency.

Further, when errors occur, those lacking skill may not recognize their incompetence as a cause. In their studies, Kruger and Dunning (1999) compared perceived and actual ability of undergraduate students in different tasks; they found that lowest performing participants overestimated their ability compared to that of their peers, and their ability to self-assess did not improve in even after being made aware of the higher ability of their peers. The authors stated,

> …even if people receive negative feedback, they still must come to an accurate understanding of why that failure has occurred. The problem with failure is that it is subject to more attributional ambiguity than success. For success to occur, many things must go right: The person must be skilled, apply effort, and perhaps be a bit lucky. For failure to occur, the lack of any one of these components is sufficient. Because of this, even if people receive feedback that points to a lack of skill, they may attribute it to some other factor. (p. 1131)

Replicating this study in the context of information literacy, Gross and Latham (2012) found similar results for community college students' ability to assess their performance and compare them to those of their peers, with students "largely unable" to recognize the difference between a right and wrong answer. Gross (2005) pointed out that for those without skill, "their lack of skill also keeps them from being able to perceive competence in others. So instead of proceeding with caution, they advance with confidence" and therefore, "the incompetent are unable to use social comparison as a way of learning about themselves" (p.156). Latham and Gross (2013) also

asserted, unskilled students, “because they do not recognize their deficiencies, are unlikely to seek help to improve their skills, nor are they able to recognize expertise in others” (p. 432). In the context of community college students with below-proficient information literacy skills, the authors found that students “would not be likely to attend an information session if they felt they already had the skills and/or they felt the class has no personal relevance to them” (p. 441). Since those who are unskilled do not recognize their need, may not recognize the expertise of others, nor what they can learn from those experts, they do not seek the help they need. Because these approaches are unsuccessful, building competence has been identified as having a countereffect (Dunning, 2011; Gross, 2005; Kruger and Dunning, 1999).

2.7 Experience and Expectations

Ruffalo Noel Levitz (RNL) (2017), in its National Student Satisfaction and Priorities Report, indicated that academic advising is ranked first in the "most important areas of the student experience" by students at public four-year universities (p. 8). However, discrepancies remain between student scores for importance and satisfaction in areas of advising. Advising-related indicators for which importance is scored highly, but satisfaction is scored lower, include the following, as reported in Appendix A of RNL (2017):

- "My academic advisor is concerned about my success as an individual." (83% importance vs. 57% satisfaction) (p. 6)
- "Academic support services adequately meet the needs of students." (78% importance vs. 52% satisfaction) (p. 7)
- "My academic advisor helps me set goals to work toward." (77% importance vs. 50% satisfaction) (p. 7)
- "I seldom get the 'run-around' when seeking information on this campus." (77% importance vs. 42% satisfaction) (p. 7)

Just as Vianden (2016) and Walker et al. (2017) found that unsatisfactory advising experiences can impact future help seeking, the gaps between student importance and satisfaction in the RNL report further indicated areas that link student dissatisfaction with not pursuing further advising. Although "some scholars assert that satisfaction measures reflect student bias created by unrealistic or uniformed expectations of the advisor" and measures may not directly reflect impacts on student outcomes, Vianden (2016) asserted that "student satisfaction is inextricably linked to positive student outcomes" (p. 19).

2.7.1 Prior experience. Prior literature has examined academic advising factors that satisfied or dissatisfied students, and the impact this has had on students perception of advising and advising use (e.g., Lynch, 2004; Vianden, 2016; Walker et al. 2017). Such research, framed by student surveys, addressed past experience and the impact on future actions. Vianden (2016) found that student satisfaction correlated with returning to advising and unsatisfied students were less likely to return to advising. For example, "unresponsive advisors" led to a feeling of unimportance, and resulted in students avoiding contact with their advisor (pp. 23-24). Additionally, "advisors who provided uninformed or incorrect advice" led to students feeling disregarded and disrespected, and could be emotionally distressing, as one student described crying for hours after finding out they were short on graduation credits (p. 25). Using Student Relationship Management theory to frame these findings, Vianden (2016) suggested, "Because student perceptions of advising can affect their satisfaction with their college experience and institution, advisors need to provide inspirational advising and avoid behaviors that breed dissatisfaction among students" (p. 25). Walker et al. (2017), similarly, found that student experience impacted their perception of advising. Notably, the authors found that expectations formed through high school experience can impact student expectations of advising. For example, students may find it difficult to differentiate between a counselor (which they met with in high school) and an academic advisor (pp. 45-46). As one student described, a counselor "helped me with everything" (p. 46). This highlights the extensive and comprehensive personal attention the student received, with a counselor representing a "one stop shop." As the authors point out, "Because of the structured nature of position assignments in high school settings, many students received advice from the same guidance counselor for sufficient time to develop a personal relationship" (p. 46). How student-advisor relationships are formed, and potentially

higher expectations by advisors for student self-efficacy, can result in a very different type of relationship than those with a high school counselor. As an interesting contrast, however, the authors also found that not returning to an advisor can be a result of a positive experience. They stated, "some students did not feel the need to return to advisors, particularly those who reported that advisors showed them how to schedule classes online and took the time to discuss long-term course requirements. One student explained, 'As long as I know what the requirements are, I don't think I need your help'" (p. 46).

Mottarella, Fritzsche, and Cerabino (2004), found that student expectations are based on previous experience with advisors, and that students tended to prefer the type of advising they were used to. For example, students who received prescriptive advising in previous advising encounters preferred prescriptive advising approaches (p. 58). This finding, taken together with satisfaction literature (Vianden, 2016; Walker et al., 2017), indicated that satisfaction and expectations that are constructed based on meeting with one advisor may impact expectations and satisfaction for future advising sessions with others. Student satisfaction and subjective feedback can drive advising procedures and practices, but it must be noted that advising has the ability to change student behaviors and expectations. For example, in contrast to satisfaction studies, Fullick et al. (2013) found that students' expectation of support can impact their perception more than the behavior of the advisor. As Teasley and Buchanan (2013) asserted, "the common understanding of student perceptions about advising sessions needs to be retooled" (p. 12).

2.7.2 Relationships. Another related area is relationships between students and advisors. Perspectives on relational values were mixed. On one hand, Winston and Sandor (1984) found that the majority of students preferred developmental advising throughout their undergraduate

career with “interest and support from advisors regarding academic matters and out of class activities, but did not want their freedom curtailed” (p. 12); on the other, Teasley and Buchanan (2013) asserted that prescriptive advising is also viewed favorably by students, citing research examples such as “students from other cultures may feel more comfortable with an authority figure directing their path” and “some students may only want prescriptive functions from their advisors rather than a relationship and rank these services higher than developmental services” (p. 5). Cheung et al. (2017), in their study of Chinese university students, found that students at the university preferred developmental advising and wanted to be seen as partners in their education with choices in developing their education rather than following a set of instructions. Students’ highest areas of need was for advisors to “provide information about the career aspects of their program of study; give them advice when they encounter academic problems; and discuss their academic, career, and personal goals” (p. 26): areas that require advisors to be familiar with the students’ background and “look ahead” to talk about the student’s future. Mottarella et al. (2004) found that “Having a more established relationship with the advisor was the most important cue in participants’ satisfaction judgments” (p. 55) and accordingly asserted that the “advisor’s approach is more important than advising approach” (p. 57) because caring advisors were not limited to a single advising approach. However, while Walker et al. (2017) also found that some students expressed “A major source of dissatisfaction stemmed from the belief that advisors did not know their advisees” there were others who “expressed contentment with their lack of personal connection or felt comfortable with their superficial relationship with an advisor” (p. 48).

These examples are further associated with strong ties and weak ties (Granovetter, 1983). Granovetter (1983) stated, “Weak ties provide people with access to information and resources

beyond those available in their own social circle; but strong ties have greater motivation to be of assistance and are typically more easily available" (p. 209). Students who are satisfied with a superficial relationship (as described in Walker et al., 2017) can be said to enter a relationship that is bridged by a weak tie, expect the tie to remain weak, and therefore remain satisfied with the tie. However, students who may enter a relationship that is bridged by a weak tie and expect the tie to grow into a strong tie may be unsatisfied when the tie remains weak. Weak ties can help students by introducing them to knowledge and opportunities beyond their immediate social circle, while strong ties further engage students. Therefore, while students indicated they want caring advisors, the depth of the relationship can differ; while some students prefer in-depth relationships, others are satisfied with surface-level relationships.

2.7.3 Barriers. While satisfaction studies such as Vianden's address prior experience in which students are initially "communicative and diligent with advisors," there are other students who do not seek advising services, and therefore do not meet with an advisor.

Torres, Reiser, LePeau, Davis, and Ruder (2006), in their study of first-generation Latino/a students, found that some students may turn to alternative sources for advice, such as their peers or pamphlets, until they experience an "academic crisis" or "cognitive dissonance" that prompts the student to seek academic advising. If students do not experience cognitive dissonance, they may rely on other sources rather than visiting an advisor throughout their academic career (pp. 67-68). This correlates with NSSE (2013b) findings in which 14% of first-year students reported that "friends or other students" were the "primary source of advice" for their academic plans and 17% indicated family as the primary source (p. 3). Therefore, an interesting outcome of the study was that students may not "recognize advisors as expert authorities" (Torres et al., 2006, p. 67), compounding other issues including viewing "seeking

out an authority figure as a risk" and not wanting "to experience feelings of discomfort or looking foolish," (p. 67), which parallels Henning (2009). Further, students whose parents did not attend college may not be provided with the "tacit college-knowledge or specific help in the enrollment process" (Stephan, 2003, p. 4) that comes with previous experience. This may relate to some reasons "students fail" in college, as studied by Cherif, Adams, Movahedzadeh, Martyn, and Dunning (2014), identified by surveyed faculty as not knowing what steps to take to succeed, underestimating level of commitment, and life outside the classroom including financial and family obligations. These reasons, which relate to lack of guidance in navigating college life, may further contribute to students not seeking advising.

In other cases, although students know about advising services, they may be avoiding them due to perceptions of low competency. Henning (2009), in the frame of self-worth theory, suggested that academically at-risk students (e.g., those who are on academic probation) who, although aware that they need help, may not seek it because "by seeking help, they may feel as if they are admitting to having low competency" (p. 23). Kirk-Kuwaye and Nishida (2001), similarly, found that academically at-risk students had "often said that they were ashamed about their academic performances" (p. 44). Therefore, while in hindsight students may find relief in discussing their issues with advisors (Kirk-Kuwaye & Nishida, 2001), students may not see this as a cause to meet with an advisor.

Lynch (2004), examining student contact with faculty and professional advisors, found that the three most frequently cited reasons for "noncontact" with an advisor were "the advisee felt that he or she did not need to confer with his or her advisor"; "advisee consultation with a faculty or staff member other than her or his academic advisor"; and "advisee's inability to make contact with the advisor" (pp. 64-66). Further, "Of those not receiving advising, advising-center

advisors had the highest percentage (22%) of nonusers who indicated that they had tried to contact their advisor but had failed to make a connection" (p. 68). Vianden (2016), also noted the importance of word of mouth; negative publicity can impact how others perceive student services. Citing Voss, Vianden (2016) stated, "more dissatisfied students engaged in word-of-mouth communication about their institution than did satisfied students" (p. 21). This indicated that students who have not yet been advised may fail to do so based on negative feedback from a peer.

2.8 Conclusion

The reviewed literature highlighted relevant concepts and guided the direction of the study. Starting with Disruptive Innovation concepts that led to a pilot study, nonconsumers were defined as nonusers, the student group of focus in the current research.

Navigating resources involved helping the student or referring the student to where they can get help. This includes recognizing this function as an advisor responsibility and educating students about resources, including being prepared to ask questions. Dual advising issues such as disagreements between advising functions and responsibilities, communication gaps between advisors, and training were also examined, in addition to the impact of intervention models, specifically focusing on proactive advising.

Technology in advising literature discussed student preferences for "human contact" with advisors and concerns such as loss of face-to-face communication skills. Positive aspects such as advisor accessibility and the ability to "nudge" students using online tools were discussed, in addition to errors and biases introduced by automation, illustrating how technology can be perceived in different ways.

Information seeking impacts how students choose to pursue some resources over others, how their perceptions of information are formed, and whether they decide to continue seeking information. The frameworks of convenience, framing effect, satisficing, and ignorance provided insight into these factors.

Experience and expectations included how students form expectations about advising, such as satisfaction or dissatisfaction that can impact whether students pursue future advising. Student motivations for "needing" and seeking advising are also contrasted with reasons students avoid advising such as feelings of low competency, or difficulty in accessing advising services.

By considering these areas, this study examined how an advising system is constructed. As the reviewed literature suggested, just as the expectations of students shape the adoption of theoretical frameworks and practices, advising can also change people's beliefs and attitudes. This change presents possibilities for new behaviors to develop and evolve. In turn, as these new behaviors and trends become part of the advising process, the system will need to also undergo revision to support them.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This study was designed to explore the research question *What factors impact student use or non-use of college advising?* In developing the dissertation proposal, I had initially suggested that the framework of disruptive innovation can apply to academic advising to study nonusers as "nonconsumers" of advising. Accordingly, a pilot study that was conducted in the early proposal stages had used the dimensions "jobs," and "real competitors" identified in disruptive innovation literature for a survey to gauge reasons students have not met with college advisors. After gathering potential reasons for non-use of college advising through the survey, the following sub-questions were formed:

(1) What impact do major advisors have on student use of college advising?

(2) What impact does the integration of technology into an advising system have on student use of college advising?

(3) What impact does informing students about advising have on student use of college advising?

To address these sub-questions, for the current research, data was collected using a mixed methods design including fixed and emergent elements (Creswell & Plano, 2011, pp. 54-55). Mixed methods were chosen because I was interested in exploring how participants experience advising, and to triangulate potential problems and solutions from more than one viewpoint, with the anticipation that there might be unexpected results. To address the first sub-question, the practices, philosophies, and concerns of major advisors were examined through interviews and observations; as suggested by Myers and Dyer (2003), this included how faculty (and other major advisors) define their advising responsibilities. The themes expressed in these interviews and observations also led to findings for the sub-questions of integration of technology and informing students. Student survey responses also

addressed the sub-questions; due to the exploratory nature of the study, student interviews were instrumental in addressing multiple and sometimes differing perspectives of technology integration that had been raised by major advisors.

Table 1 illustrates concepts identified in the literature review that were used to inform the current study.

Table 1

Concepts Identified in the Literature Review

Concepts	**Themes**	**Sample Articles**
Advising Organization		
Navigating resources	Knowing policies/procedures or where to find the info; where to go for help; explaining advisement process	Dillon and Fisher (2000); Lynch (2004); Thompson (2016)
Dual advising	Problems such as "unclear communication channels," different understanding of what advising means, motivation to meet with college/major advisor	Allard and Parashar (2013); Allen and Smith (2008a); Myers and Dyer (2003); Everett and Perez-Colon (2015); Cheung et al. (2017)
Intervention models	Advantages of proactive advising; reasons not to enforce mandatory advising	Creveling and Edelman (2009); Cuseo (n.d.); Schwebel et al. (2012); Tennant (2013);
Technology in Advising		
Communication	Direct communication methods and tools used by advisors and students	Golubski (2009); Taylor et al. (2011); Noonan and Stapley (2015); Junco et al. (2016)
Automated systems in advising	Student preference for human contact rather than replacing with automated system	Kalamkarian and Karp (2017); Yanosky (2014)

Bias and errors in automation	Presence of automation changes people's behaviors and beliefs; reliance on automation even with presence of errors	Alberdi et al. (2009); Dzindolet et al. (2003); Merritt et al. (2014); Mosier et al. (1998)
Comparing humans and automation	Expectations between humans and automation may not be the same	Dijkstra et al. (1998); Li et al. (2012); McKnight et al. (2011); Merritt et al. (2013)
Information Seeking		
Convenience	Time and effort needed to access information/help	Catharine (2013); Connaway et al. (2011); Fast and Campbell (2005)
Framing effect	How options are presented can impact student choices	Kahneman (2003); Thomas and Millar (2012); Tversky and Kahneman (1981)
Satisficing	To what extent the student searches for information	Hadar (2011); Parker et al. (2007); Simon (1990); Warwick et al. (2009)
Ignorance	Those who lack skill are unable to correctly assess their performance	Dunning (2011); Gross and Latham (2012); Kruger and Dunning (1999); Latham and Gross (2013)
Experience and Expectations		
Prior experience	Reasons for student satisfaction and dissatisfaction and expectations formed from them	Mottarella et al. (2004); Vianden (2016); Walker et al. (2017)
Relationships	Different types of relationships (e.g., established versus surface-level) preferred by students	Cheung et al. (2017); Mottarella et al. (2004); Walker et al. (2017); Winston and Sandor (1984)
Barriers	Beliefs and expectations that deter students from seeking advising	Henning (2009); Kirk-Kuwaye and Nishida (2001); Torres et al. (2006)

3.2 Setting and Sample

The site of this study is a large four-year public research university in the U.S. Although the various units and departments at the university achieve learning outcomes using a diverse range of practices, they share institutional learning objectives for baccalaureate programs. The university uses various advising models (Habley, 1997) corresponding to levels of advising: at the campus level, satellite advising is practiced, in which "each school, college, or division within the university has established its own approach to advising" (Habley, 1997, p. 39). For prospective students, a split model is used; for example, students see "exploratory" advisors prior to declaring a major, and a "transfer" advisor prior to transferring from the university system's community colleges. At the college and department levels, dual advising (meeting with at least two advisors, e.g., college and major), self contained (e.g., "one stop shop"), and split advising (e.g., "pre" major to declared major) are practiced. Modified dual advising is also practiced, in which students meet with allied advisors who work with specific student populations (e.g., student-athletes, pre-professional, and honors students) in addition to college/department level advisors. The focus of this study is a college-level advising center (what is referred to as *college advising*) that serves approximately 1300 undergraduate students in specific Arts & Sciences disciplines at the university. The advising center was formed after a reorganization of advising, which divided a larger college advising unit into smaller college advising units. College advising works in a dual advising partnership wherein students are expected to meet both with a *college advisor* (who, for example, advises on general education and non-major requirements, educational and academic planning, and progress toward graduation) at the advising center and a *major advisor* (who, for example, advises on major requirements and planning, and connecting students to on-campus, community, and professional opportunities related to their disciplines)

housed in the department of study. Students are introduced to college advising through several points including new student orientations, individual appointments (e.g., meeting with a major advisor who refers them to a college advisor), and direct outreach from the advising center (e.g., emails). Although specific student populations may also receive advising through the respective allied advisors, the advising center is the graduating unit of all students in this population. College advising employs professional advisors and peer advisors who are undergraduate students; major advisors are a mixed group of faculty, professional advisors, graduate students, and staff who advise in addition to other duties. Further, college advisors do not practice mandatory advising for all students, whereas major advisors practice mandatory advising. Students can make an appointment by phone or in-person, primarily through the service desk staff, and types of appointments range from "express" advising (for quick questions, 10 minutes or less) to one-hour planning appointments. College advisors also use email and electronic advisor notes (in the degree audit system) as communication tools; the university's degree audit system is also used to supplement an advising appointment (treated as advising material, much like a worksheet). During this study, the number of professional advisors at the advising center fluctuated between two and five (inclusive of the advising center director) due to changes in staffing; 20 major advisors were listed as main points of contact on the university's degree program worksheets, although major departments also assign students to advisors who are not listed as main advising contacts, resulting in a larger population of major advisors.

This study began with an examination of nonusers, which characterizes students who have not received advising during a given period of time. For this study, the parameters of *nonuser* were determined by college advisors as students who have not yet met with a college advisor. College advisor was defined as the advising center advisor; students may have met with

other advising offices, including Arts & Sciences advising prior to the reorganization, but these were considered to be outside the parameters of college advisor. A meeting was defined as a *regular appointment* (30 to 60 minutes), because a regular appointment was deemed to be "significant" communication, which differed from advising in "express" appointments, at the advising center's service desk, or email correspondence.

3.3 Data Collection

3.3.1 Pilot study. A pilot study was conducted in the Fall 2017 semester to explore potential reasons students are not meeting with college advisors. Although previous studies and literature could be used to identify potential barriers and competitors, it was important for this research to directly reach out to the students who had not yet received advising from the advising center for two purposes: to be sure that the relevant issues being addressed directly related to the students for whom advising interactions would be designed (because these student may have different needs than those who have come in for advising, in addition to other considerations such as social backgrounds and location of the campus that might not be reflected in previous research), and to examine results for potential emergent factors that may not have been previously identified. Further, Giglierano, Vitale, and McClatchy (2011) stated, "Traditional market research where the prospective customer is asked whether they like or want a product (a product that is still being developed) can be very misleading, since the customer has no real experience with it" (p. 34). Consequently, the current research opted to not ask direct questions about potential advising programs and services because student responses, prior to the experience, would not be appropriate in this phase. Therefore, a questionnaire that asked students three questions aligning with the Disruptive Innovation concepts "jobs" and current barriers (potential competitors) was sent to continuing students who had not completed advising yet with the advising center. Competitors represent potential reasons that students do not meet with advisors, and indicate obstacles that advisors should remove or address through intervention (e.g., address advising referrals, or remove doubts about the usefulness of advising). Table 2 illustrates student questionnaire items and how they relate to the dimensions.

Table 2

Phase 1 Student Questionnaire Items

Question	Dimension
1) Please tell us some reasons preventing you from meeting with an advisor in the advising center.	Competitors
2) From whom/where do you currently get your "advising"? Select all that apply. (Friends, family, major advisor, Honors program, Student Athlete Academic Services, [IDS], Other)	Competitors
3) What would you want to get out of advising? (Some examples: signing up for classes, career/life plans, learning about extracurricular opportunities)	Jobs

The sample used for the questionnaire was drawn from the advising center's student population. Because sampling involved non-public data, a data sharing request was approved by the university's Institutional Data Governance program. The questionnaire was initially designed as an internal survey tool with the advising center, to inform program development. The professional advisors of the advising center and an undergraduate student were consulted to refine and finalize questions prior to distributing the questionnaire. IRB approval to use the data as exempt "existing data" was obtained due to unexpected results (as discussed below) that changed the direction of the study.

Since incoming students would not have sought advising because they were not yet "on campus," the population was filtered for continuing students who had been enrolled in the university during the previous semester and were enrolled in the Fall 2017 semester (993 students). From this filtered population, a purposive sample of individual student records were examined to determine if they had not previously met with a college advisor; because college advisors always enter advisor notes in the institution's degree audit system (referred to here as

IDS) after completing a regular appointment, students without advisor notes documenting a regular appointment were considered nonusers. A total of 207 students were then contacted through email by either their major advisor or myself, with an introductory statement and link to an online survey. A total of 21 students responded to the questionnaire.

It was assumed that access to college advisors would be a major factor in students not meeting with a college advisor. However, only two students indicated access as a barrier. Other barriers indicated included miscommunication (i.e., being told they did not need an appointment, or not being called back), not knowing about college advising, having received information elsewhere (e.g., major advisor; online), and intending to make an appointment but not having made one yet (e.g., waiting for paperwork). Responses implicated the following:

- Information about advising is not organized or difficult to find
- Students do not know who college advisors are (e.g., thought they already met with advising center, not sure how differs from major advisors) and what they do
- Students feel content with information they receive elsewhere

The following responses were also surprising.

- Did not want to "bother" the "super busy" advisors
- Word of mouth from classmates that advising is not helpful
- Fear of calling people (to make an appointment)

The majority of students (17) indicated they met with their majors advisors, nine students indicated they were "advised" by the institution's degree audit system, five students indicated they were "advised" by family and/or friends, one student indicated they were advised by allied advisors and one student indicated "self" advising. Ten students indicated multiple advising sources (e.g., major advisor and the degree audit system).

In response to the third question, ten students indicated they would want assistance with some form of career, future, and life planning (e.g., including graduate school programs and finding internship opportunities). Six students indicated they would want assistance with course selection, and three students included longer term planning (e.g., four year plan, timely graduation). Three students mentioned graduation-related help and two students mentioned extracurricular activities.

These results indicated that while some potential programs or practices are within the control of the advising center (e.g., communication and marketing), others would require the participation of major advisors, implicating a need for system-wide involvement.

3.3.2 Proactive advising interventions. Proactive advising interventions, consisting of two emails, a flyer and phone calls, were used for this study. The sample defined as nonusers was drawn from the advising center's population of students in specific Arts & Sciences disciplines (referred to as AS1). Records for continuing students in the spring 2018 semester (1174 students) were examined. After excluding students who had applied for spring 2018 or summer 2018 semester graduation, and multiple major duplicates, 194 students remained.

The advising center uses email for proactive advising with student populations such as incoming and academically at-risk students, and sends general reminders to all students. To differentiate emails for nonusers for this study, messages were designed specifically for this student group, addressing the barriers indicated by survey responses. The first email described how advising works, who the college advisors are, why students should see college advisors, what college advisors can do to help students, and how college advising is different from other resources such as major advisors, the degree audit system, and friends (see Appendix A for an email excerpt). By including these points, the email directly addressed the issues claimed by

students in the pilot study. The advising center also used this email intervention to introduce the addition of Skype advising to students, which was a new service offered as part of the current study. Although survey responses did not indicate the lack of online advising as a barrier, the offering of the alternative advising method was included to address the potential barrier of access. However, because no students used Skype, data was not gathered regarding actual use of the platform in advising appointments.

Further, students typically had to make same-day appointments to meet with professional advisors; for nonusers, a code word was included, which students could use to make an advanced appointment. The first email was sent to the initial group of 194 students on February 20, 2018. A flyer was also created, with abridged information from the email message. Flyers were posted on bulletin boards near major advisor offices around the time the first email was sent.

A second email was sent on March 12, to 186 remaining nonusers. The format of this email was significantly different from the first email, with the hope that students might be more responsive; rather than a longer informational email, the second email only contained two sentences, included a link to a 5-question quiz, with a message priming students to visit college advising after they completed the quiz (see Appendix B for email quiz questions).

I worked collaboratively with the college advisors and staff to create the content and design of the interventions. Through this process, the discussions helped to clarify how frequently college advisors should and can meet with students (considering student needs and advising resources), the need to be prepared for students who might not have questions to make the meeting worth their time, and the capacity to talk about what is not apparent in the student's record, including degree-career connections and student's career and life plans. Further, advising

center staff suggested to offer phone appointments in addition to Skype (typically phone was only offered to distance students) to compare what students prefer.

Although phone outreach was not initially planned as part of this intervention, at the end of March, an advising center staff member suggested to call students because very few of the nonusers had responded by that point. The staff member had recalled that students who were called directly for other advising center programs seemed to be more responsive. Because of this suggestion, the college peer advisors were tasked with calling the remaining nonusers who were not affiliated with other programs[4] (after approximately April 6), inviting these students into the advising center for an appointment with a standard message assigned by the advising center's director.

The nonuser population was tracked from February 20 to July 11 to see how many students from the original nonuser group had met with an advisor.

3.3.3 Major advisor interviews and observations. During March through June in 2018, I interviewed 15 advisors in 14 departments[5] from Arts & Sciences colleges at the university. These colleges practice dual advising but have different systems: for the first group (AS1), mandatory advising is practiced by major advisors[6] who advise on major requirements; some enforce mandatory advising using registration holds, while some do not use holds. In AS1, college advisors do not practice mandatory advising except in special cases. In the second group (AS2), mandatory advising, enforced by holds, for all freshmen and sophomores is practiced by

[4] See 4.3.1 for further details.
[5] Two advisors from the same major, MA13 and MA14, did a joint interview.
[6] Mandatory advising can range from the first two years, to the student's entire undergraduate career.

college advisors, who also advise on major requirements[7], and major departments can choose whether to practice mandatory advising. Initially, I emailed 20 major advisors from AS1 and 10 major advisors from AS2. Major advisors were contacted by email using information listed on their degree program worksheets available on the university's website, except for one college advisor[8] from AS2 who was contacted as an alternative to avoid researcher conflict of interest with the listed major advisor. Ten major advisors in AS1 and four in AS2[9] responded that they would participate in the research. Interviews were conducted in person, by email, and via video conferencing; real-time interviews lasted approximately 30 minutes to one hour.

Rowley (2012) asserted that interviews are useful when the "researcher is interested in collecting 'facts,' or gaining insights or understanding of opinions, attitudes, experiences, processes, behaviours, or predications" (p. 261). Further, the strengths of interviews include obtaining information from a few key players; "The research objectives centre on understanding experiences, opinions, attitudes, values, and processes; there is insufficient known about the subject to be able to draft a questionnaire; the potential interviewees might be more receptive to an interview than other data gathering approaches" (Rowley, 2012, p. 262). Interviews were therefore used as a method to better understand the system of advising within the colleges; it was important to gain an understanding of how major advising "works" within their respective departments from their viewpoint. Although college advisors may have a general understanding of major advising, a better understanding of how and why major advisors use their techniques and processes to advise students is needed to identify strengths and needs, in addition to examining "realistic" functions that may be carried out by the major departments. The interviews

[7] Excludes mentoring or answering questions about specific courses.
[8] Although a college advisor, referred to as MA.
[9] One of the interviewees was not part of the group that was emailed.

were semi-structured; all interviews started with grand tour questions (Harrell and Bradley, 2009, 36-37) as seen in Table 3, however, due to the conversational nature of the interviews and varied availability of advisors, in some cases not all questions were asked, similar themes became subsumed with responses to other questions, and/or emergent topics were discussed. Open-ended questions were used with the aim to give respondents an "authentic voice" with which they can assign meaning to dimensions using their own words and concepts; native language, or the interviewee's own terminology (Harrell and Bradley, 2009, 37), also emerged and was used in analysis. I had originally planned for major advisor focus groups, with the intent to obtain reactions between major advisors; however, due to difficulty of scheduling a meeting based on the major advisors' schedules[10], the semi-structured interview presented an alternative method to follow up and expand on emergent topics.

Table 3 illustrates advisor interview items and how they relate to concepts identified from the literature review.

Table 3

Advisor Interview Items

Questions	Concepts
1. What do you do as a major advisor (What are your role and responsibilities)? 2. Who or what influenced what you do as a major advisor? (Did someone train you? Do you have a written guide? Did you 'figure it out' on your own?) 3. Are there things you would like to do as an advisor but don't have the opportunity to do so; if so, what are some of those things and what are some constraints? (e.g., resources, opportunities, training, administrative demands)	Advising organization; information seeking; experience and expectations

[10] Only three to four people could meet at one time, whereas a focus group is made up of six to 10 people (Powell & Single, 1996, p. 500).

4. How did you learn about dual advising (e.g., the role of [college advising], and referring students to [college advising])?[11] 5. How and when do you explain dual advising to students? (For example, how do you explain the differences between major and college advising?)	
6. How do you use [IDS] for your advising appointments (e.g., [APP] planning, degree audit, advisor notes)? 7. Has [APP], program sheets, or other online tools changed the way you advise[12]; if so, how?	Technology in advising; information seeking
8. What are some reasons that students might not meet with [college advising]? 9. What can [college advising] do to make it easier/better for major advisors to refer students?	Advising organization; technology in advising; information seeking; experience and expectations

Aligning with Allen and Smith's (2008b) suggestion to use "direct observations of faculty behavior during advising encounters" (p. 410) as an alternative measure, I also observed appointments with four major advisors in different majors from AS1 throughout March and April. Choy and Park (2016) noted ethnographic observation as a useful method in consumer research that "interprets subjects by the researcher observing their natural behavior in their daily life. If the concept of 'observation' is used in consumer research, the unconscious behavior of consumer can be captured, and researchers can also discover the other needs of consumers that are unexpressed or unacknowledged" (p. 7). Observation allows a researcher to further identify gaps that may not be predicted, and to watch new processes as they "unfold" which may include how students ask questions, what questions or prompts advisors use to obtain information from

[11] Questions (4) and (9) were not included in AS2 major advisor interviews due to different advising systems between AS1 and AS2.
[12] In some interviews, this was paraphrased "changed the nature of advising."

students, how advisors incorporate tools into the appointment, how advisors refer students to other resources, and reactions to unexpected information. Major advisor participants for observations were recruited from those who participated in interviews, except for one, to whom I was referred by an interviewee. I observed one appointment each with two advisors, three appointments with the third advisor, and 17 appointments with the fourth advisor. Because students ranged from prospective majors to graduating seniors, I could observe different types of relationships (e.g., advisor knowing student well compared to meeting for the first time) and information shared between students and advisors; when I was able to observe multiple appointments with the same advisor, I could also reflect on any potential changes or variances between how the advisor interacted with different students. Permission was collected prior to the appointments from both the advisors and students, who were provided with consent statements. Although my role as a college advisor was disclosed and I had informal discussions with major advisors during and after some appointments, the observations were considered nonparticipant observations with the intent to study natural behaviors that unfolded in the appointments, avoiding intervention (Given, 2008). Accordingly, I positioned myself to avoid being in the student's eye line (e.g., behind the student, or on the floor). During the observations, I took field notes about the interactions, following a set of possible points of interaction that might be observed in major advising appointments (see Table 4 for points of interaction and how they relate to concepts identified from the literature review).

Table 4

Points of Interaction (Major Advising Observations)

Interaction	Concepts
How the student presents their reason for the appointment (e.g., how they introduce themselves, their initial questions to the advisor)	Information seeking; experience and expectations
Giving student needed information beyond what the student has asked and how the advisor appears to "discover" these needs	Information seeking; experience and expectations
What tools the advisor incorporates into the appointment, including why and when the tools are used; How the advisor teaches the student about the tools and resources	Advising organization; technology in advising; information seeking
How the advisor conveys his/her role, such as the advising partnership	Advising organization; experience and expectations
How the advisor relates student needs to advising	Advising organization; information seeking; experience and expectations
How the advisor refers the student to other resources, including describing the other office, giving a name, sharing a personal experience about the office	Navigating resources; experience and expectations

3.3.4 Student surveys and interviews. Originally, online surveys were developed for nonusers who completed an advising appointment after the first email intervention. However, due to poor turnout after both email interventions, a survey for both users and nonusers, which could be administered to a larger group of students, was designed as an alternative. Surveys were given to undergraduate students majoring in AS1 and AS2 disciplines throughout April and May. Students who met with college advisors in AS1 and major advisors in AS2 (i.e., users) were instructed to complete a separate survey from students who had not met with college advisors in AS1 and major advisors in AS2 (i.e., nonusers) (see Appendix C for survey questions). This

purposive sample included students from upper division courses in seven departments; these courses were chosen because they were required for students majoring in the respective disciplines. Paper and online surveys were used. The surveys were collected two ways: 1) with instructor permission, the researcher visited classes, providing students with a research consent statement and asking for volunteers to complete the survey in person; 2) instructors contacted students, providing the consent statement and asking for volunteers to complete the survey. The survey method was used because of convenience, question diversity (e.g., mix of quantitative and qualitative), and timeliness; however, although online surveys offered flexibility and convenience, it also suffered from low response rate (Evans and Mathur, 2005). The total number of students who completed surveys was 135 (five of whom completed them online). However, six responses were excluded because students were not part of the eligible population (i.e., not an undergraduate advisee in AS1 nor AS2) or their status as user or nonuser could not be determined by reading their responses (i.e., they did not follow directions). Therefore, 129 responses were used for this analysis (see Table 5 for a summary of students surveyed).

Table 5

Summary of Students Surveyed

	Participants	Nonusers	Users
AS1	87	19 (22%)	68 (78%)
AS2	42	19 (45%)	23 (55%)
Total	129	38 (29%)	91 (71%)

Student interviews were an emergent element of the study (Creswell and Plano, 2011, pp. 54-55). Three undergraduate students were interviewed (two by email and one in person, which lasted approximately 20 minutes) using a convenience sample in July and August 2018. A snowball sample was intended, but because interviews were arranged during summer and

timeliness was vital, the interviewees' peers were unavailable or unresponsive. However, as Bengtsson (2016) stated, in qualitative studies, a small sample size is common and "the sample size should be determined on the basis of informational needs so that the research question can be answered with sufficient confidence" (p. 10). The main purpose of interviews was to gain student perspectives on concerns raised by some major advisors (i.e., about degree audit system); furthermore, because the surveys were anonymous and I was unable to follow up with subjects to elaborate on their responses, the students interviews allowed me the ability to probe (Evans & Mathur, 2005). Additionally, individual interviews might provide a more comfortable environment for subjects to volunteer "controversial information unknown to researchers" rather than a group dynamic (Kaplowitz & Hoehn, 2001, p. 245). Because I was interested in general student opinions and experiences, the sample was not limited to majors in AS1 and AS2. (See Appendix D for interview items; see Table 6 for a summary of sub-research questions and corresponding data collection.)

Table 6

Sub-RQ and Data Collection

Sub-RQ	Data Collection
(1) What impact do major advisors have on student use of college advising?	a. Major advisor interviews b. Observation of major advising appointments c. Student surveys
(2) What impact does the integration of technology into an advising system have on student use of college advising?	a. Major advisor interviews b. Observation of major advising appointments c. Student surveys d. Student interviews
(3) What impact does informing students about advising have on student use of college advising?	a. Major advisor interviews b. Student surveys c. Tracking nonusers

Participation was completely voluntary, and all research participants were not offered compensation for their participation. (See Appendix E for a timeline of activities.)

3.3.5 Documents/media. Documents and other media were also used for this study to contextualize information provided by participants and provide insight into the guiding principals of university practices. These included news articles, institutional reports, videos, and websites.

3.4 Data Analysis

Because an examination of the system of advising would result in emergent data and analysis, the grounded theory method was used. Grounded theory is defined as "a set of rigorous research procedures leading to the emergence of conceptual categories. These concepts/categories are related to each other as a theoretical explanation of the action(s) that continually resolves the main concern of the participants in a substantive area" (Grounded Theory Institute, 2014). Although previous literature provides a set of possible outcomes or predictions related to student behavior (e.g., reasons why students do not seek advising), grounded theory allows researchers to observe and identify information as it unfolds; such information may be new or excluded from previous studies; as Glaser (2014) stated, "The GT [Grounded Theory] methodology is based on coding what we do naturally, that is comparing incidents in our lives to see patterns in everyday life" (General Properties of Applying GT section, para. 5). Use of Grounded theory also aids in categorizing information that is specific to the target population; this characteristic of grounded theory further allows the researcher to discuss findings in relation to direct practices.

Real-time interviews were audio recorded and transcribed by me. To clarify key points, I followed up with some subjects via email, and I emailed interviewees with the opportunity to review the quotes used in this dissertation (adapted from Rowley, 2012). Using the Grounded Theory approach, I used the constant comparative method (Glaser, 1967/2008) to analyze interview transcripts, field notes, and qualitative survey responses. An initial open coding phase was completed after partial data collection (which led to follow up data collection). In this first phase, I used open coding to familiarize myself with the data and look for patterns to form "meaning units" (Strauss and Corbin, 1990; Bengtsson, 2016; McCabe, 2011) from major

advisor interviews and student surveys. Specifically, during this initial phase, the concept of reliance and trust in technology stood out, eventually suggesting the themes of automation bias, satisficing and framing in a later phase. However, because these concepts were discovered after having distributed student surveys, I was unable to directly ask students for their views or reactions to major advisor concerns. This led to collecting additional data through student interviews, with questions directly addressing these initial concepts.[13] After additional initial coding with all data collected, axial coding (Strauss and Corbin, 1990), was done through connecting and comparing categories that had emerged from the data. As an example, during this phase, categories were revised through clarifying, renaming, and combining concepts, including using interviewees' native language (Harrell and Bradley, 2009), to converge on common themes. These categories were also continuously connected and compared with the guiding research sub-questions, through the selective coding (Strauss and Corbin, 1990) process in which the categories were refined, including terms from literature. While the majority of coding was done by a single coder (myself), some student survey responses were ambiguous and required consulting a second coder. For example, in response to the question "What goals did you hope to accomplish in the advising appointment, and do you feel the appointment helped you to accomplish those goals?" a response such as "What classes I needed to take to graduate and transfer credits. Usually accomplished on [IDS]" was considered ambiguous regarding whether the goal was accomplished or not accomplished. For 25 such ambiguous responses, the second coder independently coded the responses (e.g., "accomplished," "not," "cannot determine") and coding was compared to the outcomes of the first coder. There was only one disagreement; for this discrepancy, we discussed our reasons for our choice and decided on a mutual outcome.

[13] The students interviewed were not survey respondents.

Prior (2014) noted that a perceived weakness of content analysis is that the extracted data might not be "'representative' of the material in the data set as a whole" (p. 364). Using their past research, in which they performed interviews and a network analysis to connect concepts, as an example of a possible approach to address the issue of representation, the author concluded, "the use of [content analysis] techniques allied with aspects of conceptualization and interpretation has enabled us to approach the interview data as a set and to consider the respondents as belonging to a community rather than regarding them merely as isolated and disconnected individuals, each with their own views" (p. 366). Although Prior's approach used interview data, it is also useful for research involving questionnaire and observation data, because it examines the relationships between responses to create a "bigger picture" that makes connections between individual responses. While individual responses might "stand out" and be presented as themes exemplified, a holistic approach, as suggested by Prior, has been utilized to examine the data for possible connections.

With a focus on a holistic approach, my goal was to also adapt a sociotechnical approach, as suggested by Alberdi et al. (2009), when examining issues related to advising technologies. As previous studies suggested, meaning is not inherent in the technology. Studying eHealth, van Gemert-Pijnen et al. (2011) found lack of "holism" in the field's literature and asserted: "The frameworks prescribe what should be done, but do not point to the instruments or tools to realize it. In fact, the greatest limitation of the frameworks is the lack of clear handles to support the development process" (p. 12). In response, the authors proposed holism. In their definition, "Holism maintains that properties of individual elements in a complex system are taken to be determined by the relations they bear to other elements" (p. 12). Every part of a system has an effect on, and is impacted by, other parts, and therefore, "Holistic means that we emphasize the

importance of the whole and the interdependence of its parts, and avoid separate analysis of its parts" (p. 3). This framework both parallels and illustrates the need to incorporate an ethnographic approach. Miller and Slater (2003), in their ethnographic work studying "the internet" in Trinidad, proposed to "start" with the assumption that "we need to treat Internet media as continuous with and embedded in other social spaces, that they happen within mundane social structures and relations that they may transform but that they cannot escape into a self-enclosed cyberian apartness" (p. 5). Further, the authors asserted, "For the purposes of any ethnographic study [...] technology always becomes material culture, observed in its context of employment as particular genres…" (p. 193). By considering the system, rather than specific parts or perspectives, holism addresses the emergent properties of an interaction, which are not solely reliant on the goals of the individual actors.

3.5 Role of the Researcher

Because I, the researcher, am an academic advisor, it was necessary to address the role of the researcher. Social desirability and researcher distortion were two potential biases associated with surveys and interviews (Trochim, 2006). Social desirability bias was identified as a potential problem in this study, because interviewees and survey respondents would be aware that I am an academic advisor and therefore give responses that they believes makes them "look good." Observation as another method and clarification that I am not the student's advisor during this research addressed this bias. Researcher distortion is also a potential problem due to my professional background and theoretical perceptions—this can lead to the issue, even subconsciously, to "make the judgement that they already know what the respondent would say to a question based on their prior responses" (Trochim, 2006, Bias Issues section, para. 3). This required continuous self-reflection of my "selves" (as indicated by Mosselson, 2010). Further, an exploratory approach that is attentive to emergence was used, to seek "new themes" that appear in responses rather than strictly confirming previous information and assumptions.

Highlighting ethnography as a qualitative method of advising research in their article, Hurt and McLaughlin (2012) stated, "While the participant approach is much more time intensive and arduous for the researcher, it often produces data obtainable in no other way. The researcher who lives through an experience can study and appreciate it deeply and uniquely" (p. 67). Further, as Bengtsson (2016) asserts, "Certain activities in the field remain hidden from the view of the researcher if he/she is a stranger to the context" (p. 13). Thus, my role as an academic advisor can be especially beneficial to provide a practical and direct perspective of an advisor's role in impacting and collaborating in an advising system.

Mosselson (2010) describes unbundling the role of the researcher as an important step in understanding framing of the research. The author stated, “Instead of trying to ignore, deny, or chop myself out of the research, I found that including my positionality, personal artifacts, emotional responses to the participants, and the data could enhance the research process” (p. 480). In describing their own research experience in which they interviewed participants, the author stated, “I couldn’t shed all the assumptions and perceptions they may have about me” and “the inherent power dynamic in our relationship would always play a role” (p. 482). In the author’s experience, the researcher has many “selves” that can both help the researcher to relate to the subject or have biases. By exploring these complex issues, the researcher is faced with questions about their own position in the research, including how subjects are categorized and chosen to be included, and how one experience the researcher has can impact the next step. Just as Mosselson suggested, there is a “paradox of *my* giving *them* voice” (p. 492).

3.7 Conclusion

The study methodology aligns with the main research question, *What factors impact student use or non-use of college advising?* A mixed methods design including qualitative interviews, surveys with qualitative and quantitative questions, field observations, and tracking of the nonuser student population were used to examine the themes of three sub-questions, major advisors, integration of technology, and informing students. Through analysis of the data, 11 categorical themes emerged, which will be discussed in the proceeding chapters.

To protect the privacy of individuals and avoid identifying features, direct quotes were edited with gender-neutral pronouns. The following codes are used:

MA = Major advisor interviewees; referred to as MA1, MA2, etc.

DR = Director of college advising

ST = Student interviewees; referred to as ST1, ST2, ST3

AS1 = Group that does not have mandatory college advising for all students

AS2 = Group that has mandatory college advising for all freshmen and sophomores

IDS = Institution's degree audit system

APP = Registration and planning application built into IDS

GE = General Education requirements; components of GE referred to as GE1, GE2, GE3, GE4[14]

For example, quotes were edited to use "IDS" when subjects mentioned the institution's degree audit system. Some responses were also edited for spelling and grammar.

[14] Aligning with "four components of the General Education requirements" published in the university's catalog.

CHAPTER 4

RESEARCH FINDINGS

In the dual advising system, advisors share students and advising responsibilities. Rather than focusing on roles separately (e.g., professional advisors and faculty), this study explored what happens when advisors with different roles and advising experience share advising responsibilities in a single, complex network. As a result, this study examined the relationship between major advisors and college advisors, and how this relationship can impact student use of college advising. It was found that some major advisors could not identify the value of college advising, in addition to the issues division of labor and differing advising systems. The gap between acknowledging value of meeting with a human advisor, yet not meeting with college advising, was also an unexpected finding. Further, by considering how informing students might impact use of college advising, two additional issues were raised: differentiating between students who need advising and do not seek it, and those who are able to triangulate a rich education from other resources; and students who, despite multiple interventions, remain unreachable.

Findings related to technology also provided a rich discourse in the psychological impacts—including those unintended—of automated systems and the benefits of electronic communication such as convenience. As some respondents described, IDS is a decision-making short cut that avails the tools to make situational assessments, which might be absent without the system. These included reducing barriers to access degree progress information and the ability for students to make registration decisions without human mediation. What makes the discourse

complex are the sociotechnical systems that also contribute impacting factors beyond the technology.

4.1 What Impact Do Major Advisors Have on Student Use of College Advising?

Out of 68 students in AS1 who self-identified as having met with a college advisor at least once, 23 students chose "My major advisor told me" as a response to the question "How did you learn about college advising?"[15] If students meet with their major advisor first, whether they are subsequently referred to college advising can impact student use of college advising. Major advisors and their ability or choice whether to refer students are impacted by factors such as limited knowledge of the value of college advising (e.g., beyond a limited number of tasks), difficulty in differentiating major advisor and college advisor roles, and unclear relationships and expectations between major advising and college advising.

4.1.1 Value of college advising. Although AS1 had been in a dual advising structure for several years prior, some major advisors stated they were not familiar with dual advising, or had not heard the term, until regular meetings with the director of college advising started (around the time of reorganization). Dual advising (i.e., reminding students about it) is discussed regularly in these meetings. The meetings were mentioned by most advisors in AS1 as an advising resource, with descriptions of meetings as a source of information such as curriculum changes and IDS updates. MA10 described how meetings with the director had an impact on their understanding of dual advising:

> I can't remember when DR started having meetings, that is the first point where I had started to, like, figure out how this all works and what's going on, and that took a while. But, before that, there was a long period where whatever the university was doing, I would basically find out whenever someone would arrive at the door and things like

[15] Students were asked to choose one option, but seven students completing paper surveys chose more than one response to this question, e.g., major advisor referral and email from college advising.

> mandatory advising, people would show up and say, 'I'm here for mandatory advising,' and I said, 'Who told you this?' We'd never, you know…and so the answer there is, thanks to the monthly meetings with DR, I do feel like I have a sense of how things work, but before that, I had no idea how anything worked.

Similarly, MA3 described, "DR's really informative and very helpful, and DR's pounded into my head 'dual advising' so, to DR's credit, that's what should happen, so people get a sense of that." However, while major advisors identified the value of consolidation and transparency of information provided by the director toward professional development, some major advisors found difficulty identifying the role and value of college advising, which are related to referring students to college advising. Some major advisors in AS1 indicated they did not know what college advisors do. For example, MA8 stated,

> …in instances where it's really technical […] I understand what you guys are going to offer, sort of confirmation and peace of mind. But like, what else are you going to offer the student that I can't offer? I may meet with them for longer, I know them, I have them in my classes, we talk informally, like what's the advising center going to do for the student? If I had a strong sense of that, I might be like, 'Gosh, guys, look you're missing out on this amazing resource.' But I don't know, necessarily, if I see [college advising] in that way.

As MA8 described, because they have strong ties with their students, the added value of college advising is not apparent. MA2, similarly, described one of the reasons their students may not see college advisors as, "because [the department major advisors] make a point of understanding the GenEd [GE], the Focus requirements [GE3], and we do try to talk to students about things like

gaining experience, they may feel like they got everything they needed in the mandatory major advising that we do."

MA7 further described a limitation, in seeing the value of college advising early in a student's career but not later:

> …they figure they've met with me, they know what they're going to register for, and why do they need to meet with [college advisors]. And, actually, I don't have a good answer for that; if someone says, "Well, I already know what I'm taking for next semester,' what are they doing at [college advising]? I don't know. No one's ever asked me that, but if they did, I wouldn't know what to tell them. I know what you're doing for your major, we've gone over classes that you're taking that fulfill your GenEd […] I don't know what the expectation is for their last couple of years if they've done all their GenEd why do they need to also meet up with [college advisors] once a year if they're just focusing on their major requirements? We [major advisors] should be pretty confident to see, 'Do they have enough upper division credits? And have they done their focus requirements?' We can see those, so, for confirmation it's good. That's about all I could say: 'Go over for confirmation.' Whenever there are articulation questions, [I refer to college advising], but sometimes I'm not so clear.

As described in this example, MA7 sees college advising as a resource to confirm certain requirements and for prescriptive advising that benefits students up to a certain point, but other functions can remain unclear.

MA5, who reflected on their own experience as an undergraduate student, stated,

> When I was a student I hardly saw the advisor, I just went right before I knew I was going to graduate, because it was pretty much laid out for me, it was self-explanatory: take these courses,

> go in, okay you see the advisor, okay you pretty much took all the classes, you can sign up for the [major audit graduation form], that was it. I didn't even see an advisor in [college advising], it was just my major advisor.

Although MA5 typically refers students to college advising to apply for graduation, MA5 stated there were never instances when they felt students had to be referred prior to that. MA5's understanding of the advising system, in this scenario, is based on their own experience in that system.

The belief that college advising offers no added value is also reflected in the following example from a student survey response, indicating they have not met with a college advisor because their major advisor meets their needs and expectations:

> My main concern is graduating and post-graduation plans that are specific to my major. My needs (I suspect) would be better met through meeting with the [major] advisor. I'm not sure if a general college advisor could meet any additional needs I have.

In student survey responses, 15 of 19 nonusers from AS1 indicated major advisors as a source of information and/or advice about classes, degree requirements, careers and future plans.[16] Three nonusers in AS1 specifically mentioned meeting with their major advisor as a reason that kept them from meeting with college advisors.

One major advisor also described a lack of clarity about college advising's functions due to its title. A reorganization of college advising split a larger unit, which served all Arts & Sciences colleges, into smaller college advising units serving specific populations of Arts & Sciences students. The college advising unit for AS1 changed its title at the same time its student

[16] Eleven students chose major advisor and another source (e.g., websites).

population was redefined. As MA6 described, this led to confusion about the role of the smaller unit:

> I knew it broke up and I knew where we were supposed to go, but I somehow didn't make the connection to what the students were doing. I just thought, they get their dual advising, I know that happens because your title is advising office, but it does not suggest to me a record keeping, processing…but that was confusing because of the title of the office. It's advising, so they get advising…

When MA6 was reminded that the previous larger unit had the term "student academic services" in its title, they responded, "That's when I understood it. But 'advising' does not say that to me. Now that makes sense—academic services—I'm like, 'Okay, go there.'" As MA6 expressed, the meaning of "advising" was different than their expectations. Further, MA6 noted that some of college advising's appointment materials are physical packets, rather than online; because students do not bring college advising materials to their major advising appointments, MA6 stated major advisors do not know what information students received. Even in cases when information is online, it is difficult to navigate for major advisors, just as MA6 stated, "I'm looking, trying to help them, and then I'm like this is totally inefficient, and then I'm like do I send them to [college advising]? And they're like, 'I just came from there,' so that's hard."

MA2 described how, in the past, when college advising hired a new advisor, that individual asked to observe MA2's appointments to learn about major advising. MA2 suggested that, likewise, being able to observe a college advisor, in order to learn what college advisors do, may be helpful:

> I've never sat in on what you guys do. Other than what I see on [IDS], or what we discuss in phone conversations about specific students, I have no idea what you do in an advising

> session. So, in some ways if we have a fuller idea about what typically goes on in some of [college] advising sessions, it would give us a better idea what we should be sending students to [college advising] for, besides the more obvious things like VA, anything university related, and [when students] ask me, 'Can I do this?'

4.1.2 Division of labor. To some major advisors, divisions between major and college advising are based on recognizing their limitations. MA1 described this delineation by joking, "GenEds are from another planet." In describing degree requirements, MA9 explained differences between the ability to "see" and "recommend and advise":

> I don't think that I have enough expertise for the [general education] requirements, and general electives and those kinds of things; I can't answer those kinds of questions with 100% certainty, so I actually will recommend, especially to those students who are like 'I think I'm done,' 'Well, have you checked in [with college advising] lately, or have you checked in recently?' I can see the advising notes and if I see they haven't been to advising for a long time, that's what I'll say: 'It's a good idea to check in just to get a sense of where you are,' because I can see, but I can't recommend and advise on those parts of their journey with confidence. So, again, it's good to know that the advising center is there for them.

Similarly, MA13, described their interaction as "collaborative" in helping students to identify resources and tools, yet they also emphasized, "...it is definitely about framing exactly what you intend and the information you can and can't give." MA13 described clarifying that while "I can see what you see," they are not confirming the information because this is not their area of expertise. Likewise, MA2 explained, "We know what they are, we know how many of each requirement they need to graduate, so that we can remind them of that, but we don't go into

details about which course to take for which requirement. So, there are limits to what we know about GenEds."

MA10 also described discussing courses that overlap between the major and GE, but ultimately stated that they are not an expert in GE:

> Like the Writing Intensive, Ethical, Oral Communication [GE3], I bring up the point that you can 'kill two birds with one stone' by doing them, and so I'll ask if they know about this, and usually have an idea of what that is. And there's that box on the left [in IDS] where I'll always tell them, 'I'm not the expert on this, so you should go see the advisors, but there are red things here, showing they're not complete, so as far as I know that means they're not complete.' Our two capstone courses are always Writing Intensives [GE3] so I'll bring that up to them, but I'll tell them, 'Usually you have more Writing Intensives [GE3] than you need in [this major] because there are so many of them.' Yeah, I do talk about it a little, but the basic message is, 'I can't guarantee anything, so go talk to the advisors over there [at college advising].'

In these situations, major advisors identified and articulated their limitations in expertise. For example, MA14 described it as a "stay in your own lane" philosophy, and stated that it is not about jurisdiction; rather,

> It's more about, I don't have the expertise that that other advisor has […] I think students will often, if you say something, kind of take it as rule, and then they'll just run with that. So, it's more like avoidance of that, where it's like there's an expert on this over here, and so it would be better for you to talk to that expert than for me to try to interpret it.

MA14 recognized the limitations of their own expertise and expressed those limitations in their interactions with students. As MA14 described, students may interpret information given to them

by advisors as authoritative; therefore, delineating "lanes" serves to avoid misinterpreting partial or incorrect information. Similarly, as one observed major advisor stated to a student when referring them to college advising, "The advisors over there know all this stuff. I don't."

MA15 also described a "sensible division of labor" in dual advising, stating,

> I think generally it's a good move. This way I don't have to learn all the GenEd requirements, all the ins and outs of that. You just leave that to people who actually understand all that, and have the knowledge of the undergraduate program. I just focus on my program; I understand that better than anybody else does. But they understand the GenEd requirements way better than I do, and it's kind of pointless for me to learn all of that. This split actually makes sense—it's working just fine.

In this example, MA15 described the existence of "ins and outs" of degree requirements outside their area of expertise; the major advisor is aware that there are complexities associated with these requirements, even if the major advisor does not know what those are. MA11 similarly stated that when students meet with major advisors, major advisors "go over just the major stuff" then send the students to college advising "to do the GenEds and everything else, and the planning and all that." In this system, the major advisors "do a really good job of referring students" to college advising and they "won't touch the GenEds or anything like that." MA11 described this division of labor as part of an advising culture:

> I'm not exactly sure how this all came about […]. It's probably from [college advising], just pushing major advisors to send students to [college advising] for the GenEds, and for [major advisors] to just do mentoring, and just do major requirements and stuff. I feel it is a cultural thing at this point…

In this example, MA11 described advocacy to divide labor between the roles of major advisors and college advisors and a shared understanding between college and major advisors of the division.

MA1 further expressed a sense of relief that they were not required to advise on requirements outside of the major. Describing their hectic first few days in their position, MA1 stated that "The line went around the corner and out the door daily. Students had to wait at times two and a half hours just to see me," in addition to the department's website getting hacked and an unprecedented number of students showing up for an exam that typically accommodated a third of that number. Being faced with multiple challenges, MA1 found relief in delineating major advising and college advising, thereby devoting time to improving departmental services including advising:

> …the guy who left helped me for one day. Everything I had to figure out on my own. When we [major advisors and college advisors] had a meeting and I asked, 'What's this side of the page?' and [the college advisors] said, 'That's the GenEd, and I asked, 'Do I have to know that too?' and [the college advisors] said, 'No, just send them to us,' and I was like, 'THANK YOU!' That was like a month [into the job]. In the back of my mind, I thought eventually I would have to learn it, until we had that meeting. And that was a big weight that was lifted.

In this scenario, with multiple obligations, in addition to time and cognitive constraints (as MA1 stated, currently it is the "same pace") the advisor delineated roles based on workload. Similarly, MA9 explained the benefit of a shared approach as experiencing increased support:

> …when I'm meeting with students I feel good talking with them about our major requirements, but at the same time, I feel like I have support from [college advising]. I

> feel like I have a lot of support, actually, in terms of working together to make sure the student gets through the program. So, from my perspective, that feels really good to have that support. I don't feel like it's just me trying to explain the major requirements and the rest of the requirements.

Delineation was also described as a result of experiencing a critical error. MA1, who also coordinated advising for faculty advisors, stated they provided faculty in their department with an advising curriculum, of which the top of the list is to refer students to college advising and to not advise on GE; this is a result of a past scenario in which a faculty member, with good intentions, attempted to advise a student on GE, without being aware of their own limitations:

> I repeat every semester to my faculty that they only focus on major requirements and if students have questions about their General Education requirements they need to see one of the college advisors. This is because of one incident where one of my faculty misadvised one of my majors about their GenEd requirements and the student had to stay one more semester. My faculty was actually relieved they didn't need to do GenEds.

When consequences are recognized by advisors, they can share such lessons with students: in an observed interaction, the major advisor explained the function and importance of college advising by saying, "Students who listened graduated, students who didn't listen get into trouble."

In contrast, for some advisors, complexity of roles resulted in unclear divisions between major advising and college advising knowledge and tasks. Examples of this complexity were found in observations with all four major advisors, who discussed overlapping requirements or services, such as major courses that also fulfill GE, assisting students with course plans, or linking liberal arts-related skills and careers. As MA2 recalled,

> DR does tell us what we should be talking about in major advising sessions, but does not insist, for instance, that we totally avoid mentioning university level things, even though that's what the [college advisors] have the authority for. DR says we can bring it up but send the students to [college advising] to get a more definitive answer. And it's hard, honestly, to talk about what a student's going to be registering for the next semester without looking at the GenEd [GE] and the Focus [GE3] requirements […] just as one example.

Further, as MA8 described, although their main concern is progress in the major, because they have "some experience working in the GE program, I can advise for the bigger college and university requirements with a fair degree of confidence." In this example, MA8 explained how they attained knowledge outside of the major domain. However, in another example, a different major advisor could only partially identify the extent of their knowledge; the major advisor was able to acknowledge they were not sure about one set of requirements (GE2), but did not recognize their limitation regarding another set of requirements (GE1).

Further, as MA6 described, despite understanding and advocating for the delineation, major advisors receive mixed messages:

> We were told previously, and there's been ongoing discussions about this for years, which is 'Don't do anything other than major advising, you're going to mess them up. Stick to that." And then sometimes there's been cause to expand that, but basically, 'You don't know all the things that go into advising, and you're not trained,' and we totally agree. So, stick to the major advising. And that happened […] a long time ago. That kind of explicit [division]…and so we've been doing that pretty much ever since. And now, there's this expansion in the past several years with the whole mandatory advising and

> when people declare and stuff; that has been defacto changing that notion, because, then, how do you do major advising when you have someone who hasn't even come to the university yet or it's their first semester and they're now a major, but the major can be accomplished in their last 2 years […] how do you integrate them, then, into the department.? […] It's so open for [our major] in what they might do and how they might approach it, and they don't even know what they want. And we want to encourage them to explore those areas, but then I don't know enough [about other majors] or whatever to help them, and yet, now we're forced.

In this example, MA6 described how some advising mandates are blurring lines that once seemed clear. Because of conflicts between how the advisor understood their role and messages from the college or university (direct or indirect), MA6 felt "forced" to overstep their boundaries, even though they recognized their limitations.

Additionally, all four major advisors who were observed described major-career connections that were specific and relevant to the individual student; discussions included discipline-specific job markets and application processes (e.g., one major advisor explained terms in a job description, why certain questions might be asked in an interview, and how to inquire about opportunities); describing how other students approached employment, including where former students were now employed and specific contacts in the field; and having the ability to refer students to specific people, including potential employers. Further, major advisors discussed specific courses; some topics included course content (e.g., "reading heavy" and "production heavy" courses), context (how the course prepares the student for their career or research), teaching styles (including how to approach the teacher or what types of questions to ask), and faculty expertise in sub-areas of the major in which the student expressed interest—all

four major advisors described at least one faculty member with whom the student would take a class or might want to take a class. Due to this discipline-specific knowledge, there is a division of labor between specialist and generalist information. For example, both college and major advisors can offer advising in degree-career connections; however, just as one major advisor, MA15, described, the college advisors "see our program things, but I'll do a better job advising about their major which ties into their career. The college level people can't really give career advice. It's associated with their major; they're just not able to do that very well at all, whereas I am able to say, 'If you do this, this is where you can go from there with that.'"

Further, MA7 described explaining the differences between major and college advising to students as a college advising function:

> I don't explain the different [between major and college advising]. I thought that's what the advising center does. I say you're supposed to go over there once a year, but honestly, I tell them they should not listen to some of the advice [from college advising] they get in their first semester because it doesn't work. They're often advised to take care of all these GE right off the bat, and they don't get involved in the major, and that's a mistake; or, they're told to take this course because it's a Focus [GE3] requirement and [college advising] doesn't know that we have all those Focus [GE3] requirements in the major. They don't come to see me, so they don't know, so they take classes that they didn't really need to take, […] which is why I like people to come and see me first or at least before they're registering, so they know. There were times people said, "they told me I should take this instead" and I reply, 'it's too bad you took an E [GE3] class because you're going to get one in a major course that you have to take' so it's not really…I don't know how to solve that. Because my understanding is in their [incoming student]

> advising that they're told they're supposed to come see the major advisors, but I guess students either listen or they don't, because they figure, 'I've already done it, why [do I have to see the major].' But if that's the window, the window needs to be really clear why you need to see your major advisor. Students don't see their majors advisors. They do general advising first…

As described in this example, there was specialized major-specific information about the student's curriculum that the college advisor did not know. Therefore, the college advisor gave information that contradicted the major advisor.

In contrast, MA1 described how they explain that advising works as a "trio advising" system – college advising, MA1, and a faculty advisor – in their first appointment with the student. In this explanation, the major advisor clarifies that they do not talk about GE, so the student needs to meet with college advising for GE questions. MA11 also described how one major department, with which students typically meet first, included the college advisor in email correspondence to facilitate follow up; and MA12 described framing meeting with college advising as part of one advising process, requiring the student to confirm with the major advisor after meeting with college advising. Identifying divisions of labor was not an issue for all major advisors. MA9 stated,

> I honestly feel comfortable recommending students to come to your office. I explain to them what it is, what you do […] I try to kind of create an understanding for them that we're working together for them for their individual journey through their coursework, etc. So, I don't really think there's really any way to improve upon the fact that I feel comfortable sending them to you if there's something I can't answer.

4.1.3 Differing advising systems. Although major and college advisors are part of one dual advising system, this system is made up of different smaller systems between departments, and within departments. Differences in systems include how students contact advisors, the structure of advising, and advising curricula. For example, many majors (including all 20 major advisors from AS1) list an individual's name as point of contact on their program sheets (worksheets listing degree and major information) accessible to students, with direct ways of contact such as email and/or phone number. Most of the interviewed major advisors in AS1 stated students made appointments directly through the individual advisor, either through email or an online sign up (such as a Google Doc), a physical sign up sheet, and in some cases, walk-in when the major advisors were available (i.e., without being required to check in at a reception desk or waiting area). In contrast, for college advising in AS1, communication was typically filtered through a reception service desk; unless students already met with a college advisor, or they looked up a specific college advisor by name in the university directory, students have been referred to the service desk in person or by phone, or a general office email address that is not associated with an individual advisor. The service desk then have filtered students to different levels of advising based on their type of appointment (e.g., express advisor, student advisor, professional advisor). Students are also unable to walk in without first checking in with the service desk.

MA5 described a difference in advising systems as a reason some students might not use CA: "I think it's the whole intimidation. Like, okay, I don't know how to ask these questions, I don't know how to approach them; so I think with that whole informal thing with me, it just comes natural to them and they open up, like, the questions just come out freely." Another advisor, MA6, described not having a point of contact in college advising, stating that "I'm

always going [online] to look up what's the number, who do we call; I don't know who the main person is for our area, I don't even know who that is…" and resorting to calling around to see who picks up. Similarly, MA2 stated, "If students can tell us which college advisor they are working with, and what they discussed with that advisor, then we'd be able to call [individual name] instead of just 'somebody.' So, there's a lot to be said for that, I think, as long as it's balanced." When introducing students to a partner department, a relationship with the office, and familiarity with individuals there, help to strengthen a referral; just as MA13 stated, when referring students to other advising offices,

> …it's always a better experience if I have a connection with that department so I can say, 'Listen, you're going to go over to this department, and meet this person, and they're great, and they're wonderful, and now you have your steps and understanding of the basic requirements that we're interpreting together, but you can go and get absolute, correct information and next steps from that department.'

Additionally, advising is not consistent between major departments. Some examples of major advising structures provided by interviewees were,

- One or two people advise all students in the major
- One main point of contact, but advising is assigned to faculty in the department
- One person handles advising (e.g., curriculum) but faculty in the department are "mentors" (e.g., other opportunities)

Major advisor positions included instructional faculty, administrative and professional staff who are not faculty (and hold responsibilities other than advising), and graduate students; some of whom are part-time employees. There were also differences in time spent on advising duties. Even within a single department, faculty can approach advising differently from one another,

regardless of notes or strategies distributed within the department aiming for consistency (e.g., MA1 stated, even with an advising curriculum for faculty, "some don't read instructions"; and MA6 stated that some students request to switch advisors stating, "I haven't been able to reach…"). When asked about their advisor training, major advisors provided a range of responses from close mentoring and guidance from their predecessor to having to figure out nearly everything on their own. Likewise, advisors' sources of information during training included mainly internal (i.e., faculty within their discipline), other departments (e.g., campus-wide teaching resources, general education office, advisors from other units), and one advisor mentioned NACADA as a source of professional development. With such differences in systems, this can also lead to competing messages about advising and what it means to advise. One advisor, MA6, pointed out the mixed messages between implementing an advising curriculum as facilitated by college advising, and the time and the rewards and recognition for it by the university:

> For me, my main concern is the amount of time. So, when I go to [the DR advising meetings] I feel like it's unrealistic to expect faculty to do the kinds of things and to hit all those [curriculum items…] I just feel like that's unrealistic. We want them to touch a faculty member and have a connection and I think we've been successful in making them feel welcome, that we want them, that we value them, I think all faculty do that. We share that kind of value, but I think there's lots of ways of achieving that. And I feel like it's a lengthy path that we've gotten from the advising office. And I feel like that's because that's where [college advisors] are trained. And that makes a lot of sense from [college advisors'] standpoint because that's what you're doing even with all the constraints you folks have. But I feel like faculty have other priorities and we certainly do not get praised,

> it is not valued at the university, for the amount of time that we spend on advising students. So, that cost-benefit thing is really at odds with the kinds of values that the university has.

Another advisor, MA15, similarly, stated there is a "complete disconnect" between institutional policy and evaluation of faculty work, stating that in the tenure and promotion process, "advising, it's not considered seriously at all."

Further, when asked if at any point there was someone who asked if this is realistic for them, MA6 responded, "No," and elaborated, "…this whole enforcement…I want to do well, I want to try to satisfy the advising but I don't think it's realistic from a faculty standpoint." Even within the dual advising system, as described by MA6, there are inconsistent values:

> Advising, then, we still have it as an important part, but it cannot be the main focus of it. And I feel that there's tension between what I'm being told from DR and the kinds of things they want done, and what I know realistically can happen, so I try to balance some of that. In spite of that, I think we do a good job in general.

As MA6 described, outcomes can be met in different ways. However, while some departments can dedicate more time to implement changes (e.g., as one advisor described, adopting an advising timeline) and increase time spent advising students (e.g., as another advisor described, increasing the length their appointments), time is a barrier for others. As MA2 described, "If I had 200 or 300 students to see…I mean, I look at [another major advisor], he's got like 300? He can't spend the time I can spend. There's just no way, there's not enough time in a day; even if you did forego doing everything else, there still isn't enough time in a day to deal with that many students." Subsequently, the question of whether a drive toward consistent approaches is possible in a dual advising structure was raised by MA6 when they stated, "If we

had advising outlets in our departments, then yeah, that kind of curriculum would be helpful. But that doesn't work when the other goal of it being decentralized in another department." Another advisor, MA4, also explained that the current advising structure came with tradeoffs:

> In an ideal set up, each department would have [a dedicated] advisor for one thing or another [...] but then there's a pro and con. Like, if we had somebody else [taking on that role], I wouldn't get access to these students, I wouldn't be able to talk to them, I wouldn't be able to recruit them to join [...]. So that's the thing. There are things that would make my job lighter, but that solution would take my access to the students away. So, you live with the added burden.

In this example, MA4 described the conflict between reducing burdens and taking away access to students that major advisors value.

Further, MA15 argued that there is a lack of support although "the college and the university talk about how important undergraduate education is." MA15 elaborated, "To properly administer a program and advise students takes some time" and "There's a need for recognition that it takes time to properly run the program." Despite the differences between time spent in advising meetings and coordinating advising, most major advisors mentioned time constraints as a barrier to expanding advising programs and other opportunities for students.

4.2 What Impact Does the Integration of Technology into an Advising System Have on Student Use of College Advising?

4.2.1 Automation bias. IDS is a homegrown automated system, advertised as the institution's "innovation made for students by students." IDS houses a variety of resources, including an automated degree audit/graduation checklist that shows students' complete, tentatively completely, and incomplete requirements; advisor notes; access to the student's transcripts; and an application (APP), that was made available to all students starting in fall 2017, which functions as a planner and registration tool. A prominent feature of APP is that, much like a GPS program, it automatically "recalculates" a student's courses toward graduation whenever changes occur en route. Some of the benefits of IDS noted by major advisors is that it helps an advisor look at a student's record in advance to see trends or patterns before talking to the student; it allows the advisor to see long-term plans (e.g., approximately when the student will be graduating, if they are on track with major courses); and information is transparent (e.g., notes can be shared between advisors). MA2, for example, had noticed that with APP, "I think as the students get used to [APP], a few more of them are using it to try to plan out more than one semester in advance" and "I know they like it much better than using [the previous registration system] to register. Just because everything is right there on the page." APP has been shown to potentially help students graduate more efficiently: "During the app's trial run, students lowered the average number of credits taken that didn't count toward their degrees from 22 percent, about the national average, to just 4 percent" (UH News, 2017, para. 5), and "This represents a remarkable savings to students and their families," (as cited by UH News, 2017, para. 6). Further, MA3 stated that with IDS, "I think, it's hard to overestimate how much better it is for

everybody. It can be tracked better, students can see everything right away, advisors can see everything right away."

Despite these advances, some major advisors described passive behavior in students that they perceived were related to IDS and/or APP. MA8 suggested that APP may have an impact on some students by appealing to their passive nature:

> …at the sort of basic level I think that our students are fairly passive, I think that they are deferential, that they sort of value authority and like to listen to it, and I think that a computer is something official, that it was developed by [the university], I think it does a lot of the advising in some ways, or at least it does it at crucial moments, like registration, so I think they take that seriously. And then, I'm concerned that there aren't sort of stronger forces within the student that counter-balance this, so I would love the student who sort of better understood what education was about. I realize that our curriculum is meant to reflect what education is about, but the students have the potential to customize that for themselves and pursue areas where they think they can really grow and express themselves or whatever, and I think somehow that gets quashed by [IDS] in some ways. […] when the computer is saying this is not a good route for you to go in your education, they say, 'Okay, that must be true,' or 'I don't have the right to defy the computer voice.'

In this example, MA8 described that because some students approach choosing their courses passively or view the "computer voice" as an authority that they can't defy, they take the message ("this is not a good route") at face value, rather than exploring other possibilities. MA7 posited a similar issue with APP, and their role in countering against passive behavior:

> There are courses in our department that are available to students that fulfill requirements that do not show up as requirements or as available to them in [APP]. Or it will show

> there is a restriction, because it only says what the system assumes you're allowed to take. But there are courses that we just generally have to give consent for or overrides for. But in the [APP] system, 'no you can't do this' so they don't pursue it. And it's not just for our department, they might have a class they're interested in but they don't have the pre-req according to the computer system, but yet, maybe [they might meet the requirement in some other way]. But there's no place there, unless they hear it from someone, saying you can contact the instructor, explain your experience, and you can ask for consent for an override to take this course if it's something you're interested in. Students are not encouraged to pursue their interests, so I actively encourage them to because I think they're being restricted way too early. And yes, I understand they need to make progress toward their degree, but when they're first coming in, anything they take is going to be progress toward their degree.

In this example, MA7 described that if students don't "hear it from someone" that they have control over some system restrictions, they will not actively respond to these restrictions. As one student, ST1, stated, "I don't think I would have been aware of using those 'not in plan' courses as electives unless I were to see an academic advisor. Before [being trained] unfortunately, I didn't know what electives were or how they fit into my collegiate pathway."

MA6, further, described that when they talk about APP in appointments, they must address "… do you really want to take that class? Especially for new students, they don't know to just close that out and look for whatever you think might be helpful." In this scenario, the advisor described that the APP plan might not match what the student "really wants." MA2 articulated the foundation of these concerns, stating,

> One of the things I am still concerned about is the idea of having the students think for themselves what they want their major to look like, want their degree to look like, as opposed to something that simply tells them, 'Here's what it should be.' I may be reading more into it than I should be. But I think a lot of times with technology, they're programming it to lead us to things. And if it's leading you, 'People who are doing this major and took the class you're taking also took these other classes,' it seems like it's easy for students to just follow it and say, 'Okay, I'll just do that' which, it seems to me, could make students more passive. At the same time, we're supposed to be teaching them critical thinking. And for the kinds of jobs we want our students to be qualified for, being passive is not the best.

In this example, MA2 described an underlying concern that passive use of IDS may affect students in other areas, including their abilities beyond school, and presented the subject of being led versus thinking critically. Further, while discussing student behaviors in advising, MA2 stated,

> …I think some of them, not everybody, some students try to suss out 'What does this advisor want to hear? That's what I'll tell them.' And I've seen the same student approach when I've advised students about their specific classes and they say something like, 'I wish the teacher would just tell me what they want, then I'd do it, but this teacher wants us to use our own imagination.'

In this example, MA2 described how some students are seeking clear paths to a perceived right answer. This concept was reflected in one student's response that IDS was equally reliable to a human advisor "because it tells me what to take."

In other examples, some participants described following automated recommendations without confirming the information given to them by the aids. Out of 19 students in AS1 who indicated they had not met with college advising, 18 students indicated they primarily used IDS to keep track of their progress to graduation, and 7 students indicated they did not use other resources (e.g., major advisor, program sheets, university catalog) to confirm the accuracy of their APP plan. Out of 19 students in AS2 who indicated they had not met with a major advisor, 18 students indicated they primarily used IDS to keep track of their progress to graduation and 8 students indicated they did not use other resources to confirm the accuracy of the APP plan.

Reliance on automation can lead to errors, as described by MA11. In this example, MA11 described cases where some students who were not required to complete mandatory advising relied on IDS:

> …those students tend to kind of strictly rely on what [IDS] is saying. So, if they haven't come into our office, we kind of see they're taking exactly what [IDS] says, and it may not be beneficial to them, or it may take them a few extra semesters because they didn't take the right pre-requisites or something like that. So, yeah, I can see if we weren't meeting with students, they'd kind of rely on it. For some students, they might work out perfectly fine, but for other students it gets complicated.

As described by MA11, relying on automation can lead the student to take fewer classes than actually needed because it appears they are fulfilling the needed amount of credits (potentially leading to an added semester) or take classes that are not needed because the student has already fulfilled the requirement with another course, resulting in less optimal situations.

Some major advisors also indicated they mostly trust IDS or find the system mostly reliable. In one example, MA7 stated, "I assume when something is classified up here [points to

the GE], that it's correct." In another example, when asked if they generally trust what they see on IDS, MA2 stated, "Yeah, I tend to trust it. Which is probably not great. Because I don't have anything else to refer to, I guess. Other than the files I have, that I keep track of the [major] courses they've taken. That's also based on [IDS], though…." MA2 also provided the example, "I've noticed, especially when students have transferred a lot, there tend to be more problems." In both cases, the major advisors were able to provide examples of discrepancies in IDS (for example, when something was not classified correctly in the major), but relied on the system.

Moreover, some advisors described how IDS enabled advising outside their knowledge domain. For example, MA8 explained,

> Very much so, in fact I don't think I would be able to do it now without [IDS]. It's doing the math for me, so to speak. I know things like you need a 120 credits… I'll demonstrate my ignorance: the number 45 is significant, but I can't remember if it's the required number of upper division credits, or if it's required credits at [the university], so it's like I have a vague sense, but [IDS] confirms it for me.

MA3, similarly, described that IDS shows major advisors information they might not otherwise know:

> …saying 'I see that you've got the O Focus [GE3] left,' or something like that, 'don't forget about that.' And because we don't have a lot of O Focus [GE3] in [the department], you're going to have to go outside of the department to do that; so that's the kind of more expanded thing that just a glance will show you right away, and I think you wouldn't know that if you didn't have [IDS]. You're helping the students keep a wider view of what they need to do to progress toward graduation […] that's the sort of thing we want our people to get better at doing, I would say.

While these examples indicated reliance on the system, in the following example, MA8 described a complex scenario, where a combination of a programming error and misunderstanding resulted confirmation bias. MA8 stated, "The problem with all computers is when an error is programmed into it" and "if something doesn't match the books in [IDS]" errors can result. Describing an incident in which IDS showed some major courses double-dipping with GE—an error—MA8 stated, "I was under the impression, based on what [IDS] was telling me" that the GE could be used toward the major; however,

> …in fact that was wrong. And I had no reason to think otherwise just 'cause, frankly, I hadn't read a [curricular exception] carefully enough. I think I read it the way I wanted to read it, not the way it actually was. So [IDS] was confirming my desires for me and it lead to trouble. Thankfully [college advising] helped me to sort that out, and […] they removed that problem from [IDS] and I'm able to think through the issue correctly now, but that was a problem. But that wasn't [IDS]'s fault, that was my fault/some programmer somewhere that I told to do that.

As described, what resulted in an error actually started as a logical projection of what was programmed, with the understanding that information in IDS has human sources (one of which was MA8). However, the resulting error was based on the belief that the source material was correct, and the perceived authority of the automation, for which the advisor felt they had "no reason" to question it:

> …the computer is telling me this is right; of course, it must be right. Looking back, I was the source of this error because I assumed I understood my program and I believe, I'm not 100% sure on this, I believe I told a [IDS] programmer, 'We made this change, please make it be reflected in [IDS] now,' and they said, 'Great, no problem.' So, it was an

> honest mistake though it had traumatic consequences, at least, for a short period of time. But it speaks to various human fallibilities, and also, frankly, the [IDS] person probably should not have accepted my authority even though I am the undergraduate advisor for [major] and I should probably understand my own program. But even then it doesn't work that way sometimes.

In this scenario, MA8 described that even with vigilance, they were influenced by what they saw on IDS. Until experiencing a crisis, MA8 did not recognize the error in IDS. Further, MA8 described a change in their awareness of the reliability of the automation, and the importance of programming process, stating,

> In light of this, when we updated our program sheets, they were meticulous. I don't know if there's a sort of legal aspect to program sheets but they were utterly meticulous about it. And I was grateful for that. Much more meticulous than the slap-dash 'Please make this change in [IDS],' 'Okay, we'll do it…done,' and that led to trouble.

However, this experience did not result in a change in their trust or reliance on the automation overall. As MA8 described, "I do rely on [IDS] to advise the GE, and do trust what I see on [IDS]. Is there reason to doubt?" MA8 described that they have not experienced IDS making mistakes except in the particular set of requirements, and although "a quasi-attempt has been made to correct it" they "do NOT rely on [IDS] and instead calculate which credits have been completed myself." Therefore, as MA8 described, they lost trust for a particular attribute (double counting a specific GE with specific major requirements) but not the system as a whole.

Conversely, MA5 described a scenario where they do not rely on IDS due to student testimony and personal experience with errors. MA5 stated, although IDS "makes life easier […] there's still that chance that students might complain that 'I'm not able to graduate because I didn't fulfill a course, but it

did say when I signed up that this course was a required course.'" MA5 elaborated that they were aware of these types of errors, because

> …I've heard stories from students who have other majors, like, say, in a biology course, where their [program year] kind of switched now, so [IDS] was not recognizing it. But I always was aware, like my own instincts, that things can shift online, like we have an issue with that when students sign up for the [major track], when paperwork goes through, [IDS] defaults it to [another major track], so our students always have to message the [IDS] people saying 'I actually signed up for [correct major]' because their requirements would be all the [other major track] requirements, not the [correct major track]. So they always have to double check…

Likewise, some advisors who described IDS as trustworthy or reliable also noted the importance of confirming information. MA3 described that while they "trust [IDS] about 95%" they refer students to college advising because, "here's what I say to them: 'Those are the people that certify you're ready to graduate, so you have to be sure you go talk to them, especially…you're going to do the [major audit graduation form], you're going to get ready, you've got to be sure you talk to them because they see something in there that nobody else does, that's their job.'"

Furthermore, one advisor, MA11, raised the question of whether errors in the IDS system could be fixed:

> I'd say it's getting there. It's close, it's still not quite 100 percent trustworthy yet. There's still a lot of edits that we have to manually input to make it work, but it's definitely a lot better than what it started off as. I can definitely see it getting better and being able to rely on it more, but just… I don't know how the coding for it works, but if they can figure out how to fix a lot of these problems, and some of it because they're pulling it from two different softwares—they're pulling it from Banner [by Ellucian] and putting it

onto IDS, and then IDS sometimes reads it different, I'm not sure that's something they can fix.

Because errors are present in the system, MA11 described how using paper plans is one approach they used to calibrate reliance on the APP plan:

> …we don't use the scheduling part of it, the four year plan thing, as much, because it seems to change and we don't know like, if the system is changing it, or the student is changing it or if it's something we did, so to be on the safe side, we're more on paper, and then we still don't trust the [APP] plan so much yet. Because it does have some things where it will tell your requirement that is taken in the fall, but that requirement is only offered in the spring, and that kind of confuses the student. So, we try not to trust it as much for now. […] There are some students that request that we transfer everything from their paper to the [APP], but we still give them the paper for their reference. We don't want them to rely on the [APP] just yet.

During this study, discussing potential errors in IDS directly with a major advisor had an impact on how the advisor referred students to college advising. While observing one major advisor, in an earlier appointment, the advisor pointed out remaining requirements listed on the IDS degree audit screen (in one instance, the advisor said a student was "on track to graduate"); however, after being made aware of potential IDS issues that were not visible, the major advisor started to add a disclaimer that while IDS tries to be accurate, it may not always be, so the college advisors would examine the student's record to confirm and check that there are no hidden surprises; and asked students if they had seen a college advisor.

4.2.2 Framing effect. In a video that promoted IDS, the following description was presented:

> Functionally, the key to staying on track is the ability to recalculate, so let's bring up the analogy of a GPS in your car. We all miss an exit or turn sometimes; however, the GPS just recalculates and finds the best path to the destination. What it does not do is tell you, 'You missed the exit, you're on your own now.' No, it recalculates your best route forward based on a set of defined parameters. Unfortunately, with our restricted institutional budgets and high student-to-advisor ratios, we're basically telling students, 'You're on your own,' instead of second saying, 'One second, please. Here if your new optimal graduation pathway. (STAR4Students)

Because all undergraduate students registered for courses using APP, all students were by default presented a course plan that automatically "recalculates" using set algorithms. MA2 described automatic recalculation, stating,

> I mean, I think it's nice in a way, but I've noticed some students get frustrated with it shifting. If there was a way to shut it off, so students could say, 'leave me alone and let me play,' then I think it would be all right. So for example, if they wanted to move these three and see how everything shifts, then the recalculation is great, but if they want to see what happens if they bring in a minor or a second major, then constant recalculating can get frustrating.

In MA2's description, the ability to turn off recalculation is not immediately visible. Until I gave the advisor instructions on how to turn off the recalculation (which required clicking on a dropdown menu labeled with a symbol resembling "…" at a corner of the screen) they were not aware that it was an option.

Further, in an IDS "vision" document, an example of a student who is academically successful, yet taking too few credits to graduate in a timely manner, was presented. The document diagnosed this issue as follows:

> Findings, like what happened to [the student] are not uncommon (although her example is very clear) and can even be seen as systemic at the highest of levels, due in part to the construct of a "Liberal arts education" in the United States. In Higher education, just like a democracy in the US, there is passion and choice. When you have entities built around passion and choice there is a need for a 'system' of checks and balances to avoid systemic failures.
>
> An example of this systemic failure can be seen in the typical process of designing a new degree program. The degree is made of many different disciplines and each discipline has significant passion about the importance of their discipline to the degree program as a whole. The result more often than not, is a "grand compromise" between all the disciplines that leads overly complex degree requirements and choices, just to ensure all disciplines and individuals within the units [sic] interests are represented in the newly created degree program. (STAR, Overview section, para. 6-7)

In this statement, IDS was described as a system to provide more "checks and balances" within a system that includes "overly complex degree requirements and choices." However, as some major advisors asserted, the system, instead, created a different kind of imbalance. As MA6 described, IDS/APP ignored the flexible nature of certain disciplines:

> …they want them to graduate, so what's the most efficient way for them to do that? And it works very well for professional programs that have step by step [curricula]. But if you want to encourage them to explore, and discover, then [APP] doesn't help them to do that, because it's looking for the [most efficient way].

MA8 further described APP as "efficiency-oriented," stating that there had been "tremendous dip" in enrollment for some of their department's courses when APP was rolled out, and "courses that don't maximize the number of requirements it will fulfill seem not as visible." As an example, MA8 stated that one course dropped from an enrollment of over 100 students to around 40 people, and an impacting factor seemed to be the course fulfilled "just one requirement that can be fulfilled by several other courses." MA8 expressed, on one hand, "I get it" – IDS was designed to save students money and time, and help students be well-advised; conversely, "… right now the students do not get a lot of messaging about what their education is about, what they're supposed to be transformed into on the other side of these four, five, or six years." When asked if there was a way to teach students to counterbalance this messaging, MA8 responded, "Yeah, but I wonder if there's any will on campus to do it, to be perfectly frank," elaborating that although "I try to do that in a limited way in my individual advising sessions, I'll talk to students about their goals, what excites them, but what am I working with? […] that's a sort of drop in the pond," and there is "a lack of a sense of purpose, among other things."

MA7, further, described APP as "very restrictive" and "right off the bat, I find it will be telling people 'this is not in your plan.' Whose plan? It's my education. I'm just starting off my education. Why are you determining my plan? So, I tell students to be persistent, to put in their personal choice. If they have questions, to see me or go to the advising office and they can help you get registered in something …." In contrast, ST3 stated, "I think personally, if I were to get a message that says, 'this isn't in your optimal plan,' and it didn't let me register for the class, I'd be mad. Because even if it's not in my plan, I still have an interest in it," and "My first time in [college advising] was because I had an override that wasn't going through. I was like 'I need it.'"

When presented with a suggestion that rather than giving students a negative message like “not in plan” students be given more choices based on other criteria, such as recommending other types of courses that meet students' personal goals and interests (examples including "students who took X course also took Y course" or asking students to choose from a list of goals and creating a plan that matches the goals), ST1 responded, “I think it’s an effective way of giving students alternatives when choosing courses. This type of suggestion allows students to make their course picks based on their interests and goals while allowing students to have a realistic outlook on their post-graduation journey,” while ST2 stated, “Yes, I agree, it’s a good idea because students will often just default to whatever IDS says, so when they see ‘not in plan’ it deters them from registering for a class they’re interested in.” However, as ST3 pointed out, alternative prompts must be further contextualized and refined to avoid negative impacts: “I think that ‘students took X class also took Y class’ is a good idea, but I also see where that gets really annoying, because if you’re taking, like Japanese 101, of course it’s going to say ‘students who took Japanese 101 also took Japanese 102.’ And that's not going to be helpful. But, I think for, like, elective courses, it could be.”

Some students also perceived APP to be a replacement for college advising. Four nonusers from AS1 specifically mentioned IDS as a reason for non-use of college advising:

- “The utility of [APP], I feel, makes it almost unneeded [to meet with college advising].”
- “The [IDS] program on the [university’s] website seemed to be sufficient…”
- “I don't meet with a college advisor mostly because I keep track of my requirements on the [IDS] website, which I find quick and easy.”
- “All of the information I need in terms of what classes to take in order graduate are on [IDS].”

Although these examples described IDS/APP as giving students "all of the information" they perceive they need, just as MA11 pointed out, "there are some cases, like, where it doesn't differentiate the types of courses you're taking, like you're taking four sciences this semester, you can spread that out and make your schedule a little bit easier, you can put in some of the other GenEd requirements…it doesn't really factor in the difficulty of some of the classes."

Further, as ST3 described, they personally encountered students "who are like, 'Oh, I don't need to see an advisor because [IDS] has this plan, and I just need to follow that' and I'm like, 'Well, it's not always right.'" ST3 further stated, "I think the majority perception is that it's accurate," and without additional training, "I would think it was accurate as well." Related to student perceptions of IDS's accuracy, MA14 described:

> One thing that I have noticed, though, as a negative aspect of it, is that students just assume that whatever [IDS] is telling is correct. So, they'll get really tripped up by [APP] registration, how it will automatically input classes for, like, four semesters out […] or it puts the plan in there, almost, and sometimes that's not accurate to what they actually need. Like, maybe, [IDS] might not be counting a class that we know in our department counts toward this thing, or, small nuances that it doesn't capture. So, students come in freaking out, like, 'I have a whole semester left?! I thought I could finish this semester!' It's like, 'No, no, no, go based off of our advising appointment, not [IDS]. We already planned this out.' But that's the only time I can see it getting in the way or creating an issue. But it's easily resolved when students come and talk to us. We don't know about the number of times that kind of stuff happens when students aren't coming in, but at least for the ones who come in, it's pretty easily resolved.

In this scenario, as MA14 pointed out, the issue was "pretty easily resolved" when students met with an advisor. However, issues can remain unresolved when students do not meet with advisors, just as MA11 described that in some cases, because students "fill in whatever [APP] says to fill in" and did not meet with an advisor prior to registration, they were not aware "it's not necessarily the best option for them, or they'll miss something." One consequence was having to "take an extra semester to finish."

4.2.3 Satisficing. Some major advisors described a link between alphabetical lists in IDS and student registration patterns. In one example, MA7 expressed concern that students were picking courses from the top section of alphabetical lists, rather than scrolling through all options. MA7, whose department's courses appear lower in the alphabet, explained,

> Enrollments in our classes dove. That's the [APP] system. It's anecdotal information but, what else makes a class that's had a [high enrollment] suddenly drop, with the [APP] system, that's the only factor that's changed. For many, many years this has been a high enrollment class, and suddenly it's not. There's totally a connection there, and administration's like 'we don't see any connection.'

Further, as MA6 described, scrolling for classes created a barrier for students to discover classes: "… if your college or department title is lower in the alphabet, then you don't see it as a possible option because you'd have to scroll through tons of names before you would get to something on the end…". As described in these examples, although courses at the bottom of the alphabet were available as options, they were negated if students did not scroll to the bottom of the list. Visibility also impacted how one major department approached classification of their courses; as MA8 described, the department cross-listed courses with a higher alpha to increase visibility.

Conversely, MA10 asserted this type of behavior was present prior to the introduction of APP, stating when courses were arranged on a webpage listing classes that were available (rather than a drop down menu requiring additional scrolling), courses in their department tended to fill up from top to bottom of the list: "They get to the first one, 'Oh that has an opening.' Boom, it's that. So, even before [APP], there was already a tendency to kind of start at the top and fill in as you go down the pages. I mean, yes, it probably makes it worse, maybe, but it [didn't cause the problem]." Similarly, on one hand, MA7 suggested, "The list of possible courses to take could be randomized so it's not alphabetical. We've brought this up at several meetings. There are algorithms. There's no reason they can't be randomized." On the other hand, as MA10 responded, "That could mess things up even more, if someone goes, 'Wait, anthropology, why isn't it after something?' And if they have to scroll for it, forget it, I think."

In discussing how students learned to navigate IDS, all three student interviewees indicated that they either figured out how to use IDS on their own or sought the advice of peers who had used the system, prior to institutional training (i.e., from an advisor). For example, one student mentioned they were out of state when registration began. Further, even with more available resources to educate students about IDS, such as video tutorials, students do not always utilize these. As ST2 stated, to figure out how IDS worked, "I just played around with it on my own," while ST3, when asked if they were aware of the tutorials, responded, "Yeah, they pop up, but I'm like, I don't want to watch a three-minute video, so then you just kind of go."

Further, MA9 described that many students seek out courses that will "fit into their schedule that will fulfill the requirement. Sometimes it's just, 'This is a W [GE3] class and it's at this time, I have kind of interest in this.'" However, MA9 also stated, "we encourage students to take courses outside of the department, so it's never really that difficult in terms of finding classes that students might be

interested in." In addition to presenting students with options, students "seem to find them on their own, too" and "They generally are thinking critically and I'm happy with that." Similarly, ST1 described how students prioritize their schedules over course content, with examples such as other obligations (e.g., work schedules that can't be adjusted) or conflicting course schedules; however, ST1 stated, "I do believe that students will make it work" when students can adjust classes or other obligations.

MA3 also described how students have asked the same types of questions in advising appointments, stating, "I think it's still a matter of what do I need to take, what do I need to fill out, what requirement will it take care of," but they are triangulating information online (e.g., IDS, websites, worksheets), which helped students to plan ahead and "I think in general, overall, they're more prepared." As described in this example, requirements were the main concern of students, but they have been combining efficiency with informed decisions to be "more prepared." Student responses also indicated they pursued advice outside IDS to make informed decisions. For example, in response to the question "In your opinion, is [IDS] more reliable than a human advisor to keep track of your progress to graduation?" students stated,

- "[IDS] is less reliable because it does not really include other options (like alternate classes, or if you have more than one major, the layout is confusing)."
- "I prefer a human advisor (to supplement [IDS]) so I can ask specific questions. I rely more on my human advisor than [IDS]."
- "I'd say it equally reliable in different ways. [IDS] solely keeps track of your progress, and is always available. However, an advisor can give more guidance about specific requirements and needs you may have."
- "No, it's more like a guideline, human advisors are more helpful to specific needs and wants."

- “No because a human advisor is more helpful when I have questions. They have their own opinions.”

These quotes described specific questions, needs, options, and opinions that are benefits beyond what is offered by lists. Student interviewees suggested that while it is possible some students may be choosing courses that are shown first, they had not seen or experienced the behavior. For example, ST2 assessed their peers’ behavior, stating, “Some students are fine with just letting [IDS] decide what classes to take and just choosing whatever options pop up first, whereas there are students who still try to look at all the options available and decide.” Further, ST3 stated, “I’ve never had that issue, because the first one on there is accounting, right? And I've never wanted to take an accounting course. I mean, most of my classes are in the L’s and the S’s, so I'm always down [the list].” Although ST3 stated that they could see the possibility of students choosing from the top of the list, “personally I don't think it’s an issue.” Furthermore, ST1 perceived more “attentive” behaviors, stating,

> I hadn’t had an experience where a student would choose a course based on the results shown [at the top of the list]. Therefore, I do believe that with the help of [APP], students are becoming more proactive in searching for their courses. They become more interested in utilizing [IDS] which results in students becoming more attentive when picking courses.

Similarly, rather than avoiding scrolling through lists, ST3 described situations where students purposefully scrolled through course lists rather than using filters:

> Personally, I filter. So, I know I want to take classes in this subject, or I want to fill this GenEd requirement, or this focus requirement, and I filter based on that. I know other students do that as well. But I've also seen some of my friends just scroll through all of the classes, because they need one more class, but they really have no idea what they want to take.

When asked whether those friends were unaware that filters were available, ST3 responded they were aware, but, “They just want to see what's available,” and that they perceived scrolling through the list as a way to see the full range of what was available.

Moreover, MA10 described other possible factors that might explain a drop in enrollment. In one example, MA10 suggested enrollment in introductory courses for GE1 had gone down, because one discipline “used to have a monopoly on the global requirement [GE1], then they opened it up and everyone could then have a global course [GE1], and I think all these other departments thought they could benefit. But, it spread it out so thinly across the university that no one has really benefitted from that.” This example highlighted curricular changes and course offerings as factors. In another example, MA10 stated, “I’ve checked recently, and I think 70% of our majors are transfer students so they’ve taken their introductory courses somewhere else; we have no influence over that.”

Additionally, when discussing student enrollment, MA9, whose department is higher in the alphabet list, stated, “Our registration rates for [introductory classes] are pretty much the same,” and although the alphabetical position “might make a difference, but we can’t tell for sure,” because “we haven’t seen a major influx of students.” Finally, recruitment for the liberal arts was mentioned by some major advisors in AS1 as a potential reason for changes in enrollment for related disciplines. As MA8 described, so much is in flux, and the status of humanities is very unclear.

4.2.4 Convenience. Some students provided reasons such as scheduling conflicts, time constraints, and narrow advisor availability as reasons they had not yet met with college advising (AS1) or major advisors (AS2). Examples included, “Scheduling conflicts,” “Busy schedule. Don't have time,”

"School schedule is tight with work schedule" and "Their [advisors'] availability is very narrow." Major advisors also identified heavy course loads and advanced planning as factors. MA2 reflected,

> …I do think some students, especially those trying to go to work and go to school, or the students who feel pressured to finish as quickly as possible and are taking 19 credits a semester, are feeling so stretched, and probably sleepy. And so they'll always, even though there may be a lot to talk about, they'll sign up for the minimum appointment time—a half hour instead of two half hour sessions—and then they'll want to rush through everything without really giving thought to what we are discussing.

MA8 also observed that students are open to having deeper conversations, but they might also avoid interactions that require planning:

> I think they have an impression that their lives are incredibly busy and that if they can avoid doing anything, especially something that requires advanced planning, like making an appointment for something, I think most students here will avoid that. There are other schools or maybe other types of students who are culturally habituated to planning. So, they like doing things like seeing advisors but I don't think here that's the case. Here, students operate on a day by day plan, moment to moment.

Further, IDS has been impactful because students can save time and complete certain tasks without any advisor mediation; as one student described, "Aside from school/classes and work I have no time and there is [IDS] degree to help me." However, MA10 stated this is not unique to IDS; students also have access to other online resources, such as program sheets and department websites, which make information just as transparent and easily accessible. In contrast, one student from AS2 described how added difficulties in finding advisor information can deter students from accessing advising: "I have been busy and booking an

appointment/knowing who my advisor is, is just really confusing, so I don't have time to deal with figuring out how to make an appointment & find my advisor."

Of 19 nonusers in AS1, nine students indicated using websites as a source of information and/or advice about classes, degree requirements, careers and future plans; of 19 nonusers in AS2, nine students indicated using websites as a source of information and/or advice. Two nonusers in AS1 and three nonusers in AS2 only indicated electronic resources (e.g., websites, IDS) as sources of information. Further, five nonusers from AS1 and three nonusers from AS2 specifically mentioned using email as part of their information seeking process.

Regardless of electronic or in-person interaction, as MA1 described, "Students just want instant answers. They get it on their phones so they want the same thing if they have to walk to [college advising] and make an appointment. It has to be straight to the point." Further, MA11 stated, "A lot of students are working full time; just to clear out the physical time on campus, they're mixing their online with their in-person classes. Or they're trying to look for online courses that's offered in day school, I've been seeing a lot more of that lately" and, "…for some students they'll just do a phone appointment because it's easier to get a hold of us that way." These examples described how students are seeking ways to decrease time required to complete their task. In another example, MA15 stated that though they hold open office hours, "if people can't make that and there's something that needs to be done right away, or they need to chat about something, we can do email, Skype, or I just make a separate appointment. That seems to work pretty well." In this example, online platforms are used for immediacy if students cannot meet in person. Similarly, MA1 discussed that, although students were required to meet with faculty advisors (not MA1) at least once a semester, throughout the semester students continued to email MA1 with questions. MA1 described how communication afforded better integration

into student workflows, stating, "I just started answering student questions via email and that tremendously reduced the number of students who needed to walk to [the physical office]. They get their answer within 24 hours and straight to the point with what they wanted to know." Further, MA1 stated that email was not preferred for any reason other than convenience (e.g., students did not express they were intimidated to meet in person). MA1's examples described convenience related to location, less time required to obtain needed information, and brief/relevant information. However, MA1 also noted students continued to seek a face-to-face relationship with the advisor:

> They'll come in anyway, to hang out […] they already have all the answers because I already gave all the answers, but what they're looking for really is connection. So, the connection is when they come and they just hang out and study, they whatever. Sometimes, I'll have like five students and we're just cracking jokes or talking story, or whatever. I ask them what they're going to do after they graduate, and most say, 'I don't know' so I say, 'I can help you with that.'

In this example, although email was primarily used to deal with the issue of inconvenience (i.e., waiting in line, walking to the physical office), as MA1 described, students also continued to visit the advisor informally, although they completed mandatory advising with faculty advisors. In this scenario, the major advisor unbundled accessibility (getting answers) from face-to-face interaction to correspond with student workflows. In addition, MA1 described using Facebook to post information regarding internships and upcoming courses. This further differentiated information sharing from responding to student inquiries, because Facebook was used primarily to push a specific set of information rather than for two-way communication.

MA4 also described using email, videoconferencing, and text to be more accessible to students:

> …the ideal is they come to me during my consultation hours, but during that time they might have class, and I had a change in circumstances so I'm no longer here on campus as often as I would like, so thank God for technology. If could answer their question through email I do, but that's usually very quick for me. If they email and it's just one question, boom, them I can answer. But sometimes it's oh I'm confused about the requirements, oh I have to submit the [major audit graduation form], those things would require a lot of time and attention, because I know if I do it incorrectly there would be all sorts of problems. So usually email first, then we Facetime or Skype, or meet at the office. But I know it's not conventional, but I treat them as my children, so they can come to me, I would like to develop that sort of relationship that they can come to me with any issue or problem. That's why if they text me or call me, I always pick up, because you never know if sometimes they're in a panic.

Much like described by MA1 and MA15, MA4 used technology to balance their limited in-person availability, while also addressing the need for immediacy in some situations ("sometimes they're in a panic"). Although email was used when questions could be answered without requiring "a lot of time and attention," the advisor availed themselves through videoconferencing, text, and phone calls to address complex issues and further develop a relationship with the student, aligning with their advising philosophy of being open to "any issue or problem."

However, offering a more diverse range of communication platforms does not improve student use of advising. For this study, nonuser students were offered videoconferencing as an

option, in addition to in-person and phone appointments; yet, no students requested videoconferencing appointments. The majority of students, instead, met with a college advisor in-person (only seven of 66 students completed a phone appointment).

Finally, most major advisors in AS1 allowed students to make appointments electronically, either by email or an online sign up (e.g., Google Doc), whereas college advising did not have an online appointment system.[17]

4.2.5 Performance and capabilities. In student surveys, respondents identified differences in performance and capabilities between human advisors and IDS. For example, one student described, "[IDS] gives facts, not advice," and another student stated, "A human advisor is more helpful when I have questions. They have their own opinions." However, some students also described IDS as more reliable than a human advisor. In one example, a student stated they found IDS more reliable because, "I've seen advisors before at [community college] and they [were] unreliable for me." While perceiving human advisors as unreliable resulted in this student's perception that IDS was more reliable, an error in IDS does not necessarily result in seeing human advisors as more reliable, as another student described: "I did have one issue with [IDS], but I trust it most still."

Additionally, students who responded that IDS was equally or more reliable than a human advisor tended to refer to IDS's features ("keeps track of progress," "allows me to visualize…"), appearance ("organized," "everything is clearly laid out,"), ease of use ("quick and easy," "fairly easy to navigate"), and accessibility ("always available," "Lets me see immediately…").

[17] At the time of this study.

4.3 What Impact Does Informing Students About Advising Have on Student Use of College Advising?

Sixteen nonusers from AS1 and 14 nonusers in AS2 indicated they currently get information/advice from non-automated resources (e.g., other advisor, friend/family, co-workers, teachers). Further, most nonusers indicated human advisors were equally or more reliable than IDS, citing reasons such as "I prefer a human advisor (to supplement [IDS]) so I can ask specific questions. I rely more on my human advisor than [IDS]," and "[IDS] lets me see immediately what I have completed and should be seeking to complete. However, it is unable to give me feedback on how I should proceed in my progress. I find that when attempting to plan out my classes, a human advisor is better suited to the task." Although these students indicated using other human resources, a disconnect persists where they are not meeting with college advisors. Informing students means providing students with information about college advising; however, surface-level information—simply knowing about college advising—does not predict use of college advising.

4.3.1 Method of communication. This study examined different methods of communication for informing students about advising. Although flyers were posted, no users surveyed in AS1 indicated they had heard about college advising from flyers, or other paper materials. Instead, of non-electronic promotion, word of mouth was most common. Of 68 students surveyed in AS1 who self-identified as having met with college advising, 28 indicated they heard about college advising from another person such as a major advisor, friends/family, professor and community college system (seven of the 28 students indicated a person and an electronic source); of 23 students surveyed in AS2 who self-identified as having met with their major advisors, 10 indicated they heard about major advisors from another person (two of the 10

students indicated a person and an electronic source). For electronic communication, email was most frequently chosen, with 40 out of 68 students in AS1 indicating they learned about college advising by an email from college advising (nine of the 40 students indicated email and another source, e.g., major advisor) and only three by a phone call from college advising (two of those three students indicated both email and phone). Similarly, in AS2, 12 out of 23 students indicated they learned about major advising by an email from major advising (two out of the 12 students indicated email and another source)[18]. Of nonusers surveyed, most students indicated they had heard about the respective advising services; out of 19 students in AS1 who indicated they had not met with college advising, 18 indicated they had heard of college advising, while out of 19 students in AS2 who indicated they had not met with major advisors, 15 indicated they had heard of major advisors.

For the present study, proactive advising interventions were designed based on pilot study results. First, an email was sent in February 2018, to 194 students identified as college advising nonusers in AS1. Around that time, a flyer advertising college advising was posted. Next, to students who had not yet met with college advising, a follow up email was sent in March which contained a 5-question "IDS quiz" that students could complete online. The online quiz that was sent as part of this email was only completed 18 times (the actual number of students may be less, because there was no limit to how many times one could take the quiz). Finally, college advising called remaining students who had not met with an advisor from April through the second week of May (end of spring semester), with a standard message inviting them to meet with college advising. By July 11, of 194 students, 66 students (approximately 34%) had

[18] Three responses from AS1 and two from AS2 could not be determined. For example, "I just knew it was there" and "Self-sought."

met with a college advisor for regular appointments; 16 students filed for graduation without meeting with an advisor in a regular appointment (5 of those students met with an advisor for an express appointment only); 110 did not meet with college advising for regular appointments (four students met with an advisor for an express appointment only); and two were excluded due to exiting the college. It is important to note that during this time, the office was conducting three programs that were not associated with the current study but may have impacted student response. First, mandatory advising was piloted for a select population of students (students in the population were notified by email, and some additionally by phone, that if they did not come in, they would get a hold; holds were placed starting in February through March). Of the 66 students who met with college advising in a regular appointment, 16 were from that special population; these students were required to meet with college advising in-person (however, one person did a phone appointment). Second, students who were identified as close to graduation were also contacted by email, and some additionally by phone, about applying for graduation. Third, students who were newly declaring a major or second major were strongly suggested to make an appointment when they turned in their forms in person at the college advising office.

By the end of March, only five nonusers from the non-mandatory group had completed an appointment. Of the 50 total students who met with an advisor from the non-mandatory group, 43 students met with college advising after the office started to call them.[19]

[19] It should be noted that nonusers who were not in the mandatory group may have been motivated to meet with a college advisor for reasons other than the intervention. Thirty students were specifically identified by a college advisor as having made an appointment related to the codeword intervention (29 of whom met with the advisor after the phone intervention started); for the remaining students, this means they could have either been motivated by other reasons, or not tracked consistently.

In discussing interventions use by major advisors, MA6 suggested that the content of the message can impact student response:

> I reach out and I try different persuasive messages along the way. […] I checked with our students to ask which word would be more 'scary,' and they said 'overdue' would be more scary. So, then, I put in my subject heading 'overdue,' and then 'Oh no! You missed it, but we can still…'. And now, all the 15 people who were the ones who hadn't done it are now getting pretty much all of them done. So last year, by the time registration started, I only had like three or four that actually hadn't out of the 100 majors. So, I was able to get people in to advising with our department, with just some repetition and changes in the message along the way. I'd make the message more scary as it goes along, without it being harsh or anything, to try to get mostly everybody…

In this example, MA6 described how repetition and persuasive (e.g., "scary") tone led to successful outreach. However, although email is an official communication channel of the university, some advisors described how students are not reading emails. MA6 suggested students may be deleting emails without reading them. Further, MA7 stated,

> Once they've talked to me, I'll tell them, 'I don't send out very many emails, three or four a semester about advising, about events, and about scholarships, so if you get something from me, please look at it because it's important to you. I don't just pass on a bunch of things.' Once I meet them, it's not a problem. Getting people initially is always [an issue]. I still have [some people] who have not responded. I put at the bottom, 'If you're not a [major], please let me know and I'll stop bothering you.' No one tells me that they're not.

As MA7 described, without an initial meeting with a student, the effectiveness of email communication is reduced. MA10 described similar issues, stating,

> Another thing I always wonder about is, too, are people even checking [university] email accounts, and how do we know this? Because I have teenage kids, and I'll ask something about email, and they'll be like, 'Oh yeah, I never check email.' It's like [laughs] okay, well…and I think that's got to be the same. Because, sometimes, I'll even send stuff that's really helpful, like, "Hey, if you do this, you'll save time," and there's no response, nothing. But what else can you use? I mean, I haven't really thought about it, but…it would show up if they log in to [the university's online learning and collaboration system], right? Well, but you'd have to notice it. And they'd have to log in to this, or connect it to some existing thing, and I think most people wouldn't even…and I think that's another problem, people just don't check.

In this example, MA10 also described the issue of having to log into different platforms to access advising communication. Similarly, they also described a change in email communication: "I mean that whole system started when, for a lot of people that was like their first email account, getting a university account or a school account, and where now it's just one more annoyance on top of so many others, I think, for people."

Furthermore, in describing use of videoconferencing software, MA11, who offered appointments via Zoom, also found that students who received distance advising preferred to use phone rather than the online program; however, videoconferencing was not widely advertised. MA11 stated, "…we're kind of working on how we want to do that. Because I can see it's benefits, but I think it's getting it all set up for the students, and all the technical difficulties that we have to deal with, figuring that part out before we fully offer it."

Finally, MA10 described the changing "nature of the university" as one possible reason students do not respond to proactive advising outreach:

> …the one big change that the university has gone through in the past 20 years is that we've gone from a commuter school to what I call a transfer school, so I think we have people transferring in who don't declare because they're busy and they have it figured out, and they'll only be here a couple of years, and it isn't a big issue. I think, some other people like the freshmen and sophomores […] are planning to go somewhere else, so they don't bother to respond because anyway they're planning to leave. So, I'm assuming that's a number of people who don't respond, just because the nature of the university right now.

4.3.2 Credibility and accountability. One survey respondent from AS1 who met with college advisors described a loss of credibility contextualized by a "skewed" institutional system:

> I've met with two advisors [in college advising] and one advisor did not lead me in the correct direction (ended up taking useless classes). […] I think some advisors really want to help students graduate ASAP and others advise another route that benefits the university—education system skewed—waste of time/$.

In this example, the student described the advisor that "led" them in a direction that corresponds with the student's personal interests as helpful, while the other advisor who "did not lead" the student "in the correct direction" is described as a "benefit" to the institution. This student further stated, "I learned to really question my advisors." In another example, a nonuser from AS2 stated, "I feel I get wrong information from advisors, like they make me take more classes than I need to, so I rather figure it out on my own."

Students have influence on each other's information seeking behaviors; in some cases, the credibility of peers trumps other third-party credibility as described by ST3. In this example, when asked if they felt they get more relevant information from peers rather than just searching

online (e.g., professor "ratings"), ST3 responded, "I think so, because it's more first-hand experience, like face-to-face, instead of...I don't know, you can't always trust what's on the internet, and you don't know the background of the person who typed it, so you can't really trust them." Peer credibility also seemed to be a tool for major advisors; all four observed major advisors mentioned other students' experiences as examples during their appointments (e.g., "I heard from other students…"; relating advisee's interest to other students' contexts). In one major advisor's instance, the advisor, who was familiar with the student's friends, referred the student to a specific peer for more information; the advisor also asked a student to help dispel rumors that had been circulating among students in the program and to share correct information.

Additionally, conflicting information can lead students to question the credibility of information and seek assurance in uncertain circumstances. In one example, MA14 described a case of conflicting information between IDS and the student's major advisor, which prompted the student to return to major advising:

> We just recently had a student come in with that kind of issue. Like, 'No, we just talked about this at the end of the semester. You're good, you're good.' I think that it makes sense, I mean, students are working so hard for their degree, and they don't want something to prevent them from graduating last-minute. I don't know if it's distrust with the system as a whole, or the university, or if it's feeling like it's not all in their hands. Like there's this ultimate gate keeper at the end, who might be like, 'No, you can't graduate.' But, in my mind, it's just all students' anxiety.

When discussing such issues, MA14 stated, "We don't know about the number of times that kind of stuff happens when students aren't coming in, but at least for the ones who come in, it's pretty

easily resolved." In this scenario, the advisor, who took responsibility for information given to the student, provided accountability. As MA14 stated,

> …you can trust us, we have your back, if there's a mistake that we make, we'll own up to that. If it's going to prevent you from graduating. And there's been times, like last semester, that happened, where—not often that it happens—but there's like, a student who, maybe they were advised incorrectly in the past, or something happened, we'll do our best as a department to support that. It's not the student's fault.

Likewise, the following examples described scenarios where an advisor provided answers that were uncertain, which impacted the student's perception of advising. One student stated their appointment was not useful because "I went in with one real question regarding my language credit requirement and [they] didn't know a definitive answer. [They] asked a counselor and [the counselor] hesitated, too." Similarly, another student described a situation in which they wanted to learn how to earn a degree in an area that the university does not offer, but "I did not receive a clear answer. I offered what I thought I could do and was given a, 'I suppose you could do it that way.'"

In some examples, major advisors described ways IDS advisor notes helped them with accountability. MA9 described using notes to follow up for continuity, stating,

> …I feel actually very confident when I log on to [IDS] to get a good sense of where the student's at. I really look at it before they come in, so I can also point out things or questions I have based on previous advising notes, and things like that, to follow up. Because sometimes I see my own notes, and [know], 'I should follow up on what I asked last time.'

MA3 also described using advisor notes for information sharing between college and major advisors:

> I've really come to appreciate to be able to see what you folks have been talking about on your side and try to make sure that we have something there so that you can see it. I will say this is a little bit of a footnote, in this department, we are still getting used to as a group using that feature in [IDS]. Not everyone had access to [IDS], we just did that this last semester, we tried to do that so everybody could in fact have those notes. That was a big reason to do it as much as anything else.

Regarding faculty potentially seeing IDS as added workload, MA3 responded, "If people thought, this means I'm doing more work, the other way you can think of it is the work you have to do is…easier to do it, and you can be more competent at it because of this tool." However, some major advisors described reasons for not using advisor notes in IDS. MA6 stated,

> One of the changes was that DR told us we should try to do more notes in the [IDS] advisor notes. Some people have been better at it; other people have not been better at it. The new people have been better at it in our department, because they don't know, so they just listen to what I've asked them to do versus the other people.

MA6 also described that this responsibility resulted in opposition from some faculty advisors because they felt that entering advisor notes was beyond their role (i.e., their job title is not "advisor") and due to the added responsibility and risk of what the note contained, because others would have access to it (i.e., "I'm not an expert"). MA4 described a similar resistance due to risk, stating,

> I don't know why I don't write on that. I think it was, like, because there were different security [levels], so I was afraid of if I make a mistake, everybody can see what I wrote. So, I was afraid of the FERPA [Federal Education Rights and Privacy Act] violations because I'm not very tech…I don't understand, sometimes, buttons and all that. So, I can navigate through it, but what if I wrote something that was meant to be confidential or just my notes, and then I mistakenly or

> inadvertently shared it with everybody? That was my fear. So, then, rather than make this mistake, I just didn't use it.

MA4 stated that even with training (e.g., guidelines) and knowledge, their lack of confidence and consequent personal fear remained an obstacle:

> I know those already. I mean I know what you can do, and there are notes you can write for yourself to remember, and notes to the student and to all advisors. I just have to overcome my fear of the technology, I think. Although, for someone new who didn't go to that orientation [meeting with DR], I think that would help. […] But, for me, I already know that. I'm just, 'Oh my God, don't mess this up.'

4.3.3 Motivation and information needs. Student motivation was described in terms of consequences and benefits. As MA1 described,

> It's another appointment. If they don't get anything out of it, they will think, 'then why should I go?' But if there is a consequence they will, or benefit. They don't know the benefit is to stay on track and get help with GenEds.

This concept was also echoed in student responses regarding "need"; just as one student from AS2 stated, they did not meet with major advisors due to "Lack of time/need," and another student from AS1 stated they did not return to college advising because "I did not see the need to visit."

One method reflecting consequences and benefits is mandatory advising (i.e., student required to complete advising in order to register). If advising is not mandatory, some students would not seek advising regardless of whether they are informed of services, as MA2 described:

> ...if we didn't have it mandatory and place holds on students, some of them wouldn't come to us at all. And it's often not the students who are capable of mapping out their

> long-term plans [on their own] who don't sign up for advising. But I do think that it helps that ours is mandatory advising, so they have to come in or they'll get a hold. In short, I wonder if [college advising] doesn't place a hold, some students will never come.

MA10, who does not put holds on students, also described,

> I think I've seen advisor comments [in IDS] from you like, 'contacted the student, no response.' Some of these exact people I'm talking about, we've had the same thing. And so, [contacting students] works to a degree for some people who are responding, but then there are some who just will not respond to anyone.

In another example, MA11 described how mandatory advising primed students to regularly visit advisors. With this priming, students continued to visit advising after mandatory advising was completed in their sophomore year: "Once they're done with that then it's not mandatory, but at that point they're already close to graduation so they will come in anyway. So it's worked out pretty well. We see a majority of our students every semester."

In these cases, meeting with advisors for mandatory advising were embedded in an advising system that students were introduced to early (e.g., from their first semester). However, as ST3 described, if students were accustomed to one system, they may find a transition to a new system more difficult than those who were already acculturated. In this example, ST3 explained a similar situation in which students who were previously enrolled at the university, under a different registration system, had difficulty adjusting to the new APP registration process, whereas newer students "think [APP] was easy to figure out"; and if the current system was changed to a new system, "I would probably be mad."

While mandatory advising were seen as beneficial for some advisors, others described potential disadvantages with this type of system. For example, as one advisor, MA13, described,

> ...as they transition into college, it's nice for them to understand the value of taking responsibility on themselves a lot. And I think that that's like a discourse that we've had in our office. Where do we find the balance of encouraging them and making sure they're meeting all their requirements, but also helping them understand it is definitely a responsibility? And, as they move further out into their careers, they need to understand navigation of ambiguous situations. And, I've said this a lot, but navigation of certain institutions. So, I think there's a value of, like, weaning them off toward that end.

As described by MA13, systematic mandatory advising was not equated with taking responsibility. Likewise, one student respondent from AS2 stated, "I am forced to meet with the advisor. If not I can't get classes," and "I learned that is not necessary that the school force me to get advice from a person." In this case mandatory advising did not result in engagement. Further, MA13 suggested, "I would say that I haven't seen students coming in that are, like, totally lost in the dark, and if mandatory advising had been implemented through us, that that would have made a difference." MA14 elaborated,

> There's always going to be students falling through the cracks. I mean, last summer, I remember a couple students coming in who were really floundering, and so I could see there's probably a couple students every year that may have benefited from having that structure placed on them. But, I think, it's the cost-benefit of that; for the vast majority of students, it's not an issue at all.

Even when students were mandated to meet with an advisor using a registration hold, there were cases where students "circumvented" the system. MA7, provided an example, stating, "If they don't contact

me, I block their registration. They're supposed to contact me, but there are some people who circumvent that." Some groups of students see allied advisors and work around the system through them, which delays their meeting with their college and/or major advisors. However, as MA7 stated, the allied office "doesn't know about our program necessarily," and receiving advice elsewhere without a referral to major advising "keeps them from coming to see me for a couple of semesters." Although MA7 stated, "It's not a big problem. I understand that's privileged information," they also suggested, "it would be nice if there was a way to communicate that person has registered through them; that's more work on their part, though, to have to let all of the different departments know; or, if they could just encourage people to see their major advisor." MA15 also described another student group, stating that because another advising outlet "takes our major out of our program and sends them somewhere else," MA15 will "never see anyone" so the major advisor did not know what these students were being told. As described in these examples, student non-use of advising is not limited to college advising. Three nonusers in AS1 and one nonuser in AS2 indicated meeting with an allied advisor as a reason for non-use of college advising or major advising.

Although nonusers did not indicate mandatory advising as a reason for non-use, three students in AS1 indicated it as a reason they did not return to college advising in the current school year:

- I know my requirements needed to graduate, it was not mandatory, I have [IDS] that keeps me updated and on track.
- I did not have any questions to ask advisors and I was finished with mandatory advising.
- I was only required to go once (in my freshmen year) and I know what classes I need to take now, so I didn't think that I needed to go again.

As described in these examples, one reason students did not return to college advising was because they perceived they already completed a mandatory portion of their advising with college advising or because using college advising was not mandatory at all. However, mandatory advising was also indicated with other factors such as already knowing requirements, having IDS as a sufficient resource, and not having questions.

Additionally, students perceive they can find sufficient information from other sources. MA11 described receiving resistance from some members of a student group that also met with allied advisors. In this context, MA11 clarified their role, tailored the appointment to the student, and differentiated the information they can give compared to the students' other advisor:

> I just let them know that this is something we have to do, and I'm going to go over the requirements. I know you've heard it before, but we're going to go over it, so you can't say you didn't know the policy or you didn't know this or that. So, we still go through it, probably a little less in depth than the others just to speed it up a little bit, then we let them go on their way.

While MA11 stated that students need documentation in their progress to maintain their scholarships and for other reasons, it "is a completely different thing from trying to get them to graduate, too. So, we try to give them so that at least they're progressing toward it, and if they do have to go back to their [allied advisor], then at least they can kind of work something with them too…maybe alter their schedule a little bit so they can be eligible and still graduate on time." MA6 described a similar situation with the same group of students, and the need to provide these students with a different perspective to make more informed choices:

> …throughout the years that's what I've heard, they're like, 'My advisor signed me up for this' or they're not quite sure […]. So, when they come to see me, I'm like, 'You're at the

> university, there are opportunities here,' and they're like, 'Well this one is going to get me done,' that kind of thing. And I'm like, 'But you came here, so why are you in [this course]? Because you're interested in [another course]? Why are you…?'

MA6 also described asking the students to consider what they would do if their current plan "doesn't work out" and, while understanding, "There's lots of pressure on you, I get it," and their priority may be their schedule to attend certain obligations "because their classes are at a certain time, or it'll help their GPA so it looks good, but it's not necessarily about that student's academic life…." MA11 and MA6 presented alternative viewpoints compared to those of students' allied advisors. In MA11's case, students had mandatory advising with multiple advisors, which resulted in some resistance. However, MA11 explained that the advising session was for the student's benefit because even in cases of overlap, reiteration could also help students to make sure they were not missing information.

Similarly, MA2 stated that having a second opinion on a subject could help students be more informed in their choices:

> I think it's important for the students to get other perspectives than just the [major] perspective. I mean, I think we know a lot about what the situation's like [for positions related to this major], but I also think there could be a lot of other things that a student could look into as a career that we haven't thought of. They might talk to [college advising] about that. You might say 'Have you thought about this?' 'Oh, that sounds really cool. Sounds better than…'. […] So, I think, hopefully, [college advising] can give additional ideas about the skillset that they get with their degree, even if it doesn't directly relate to [their major]. That's fantastic, that as a team, our dual advising can help.

MA2 and MA10 also explained that there may be situations in which students do not want to discuss something with their major advisor. For example, MA10 described a situation where a student might be embarrassed to speak about struggling academically to a major advisor who is also their teacher.

In response to the question why students did not meet with college advising (AS1), some examples included,

- I have typically directed any questions to my Major advisor.
- I have my own athletics advisor I use instead.
- I have alternative mentors.
- All of the information I need in terms of what classes to take in order graduate are on [IDS].

Similarly, for students who had not met with major advisors (AS2), some reasons included,

- I honestly forgot about it ‘cause there are many types of advising.
- I went to [college advising] but not the [major] dept for advising. I forget that I can go to [major] advisors too.
- I have a clear idea of the courses I need to take to be a [major]. I recently declared being a [major], I do plan to meet w/ my advisor eventually.

As these examples described, students searched for information independently, at least up to a certain point (plan to meet “eventually”); were getting advice elsewhere, including other advisors, websites, friends/family, professors (who are not formal advisors), and “forgot” about advising.

Students also described seeking information to meet needs. Student survey responses of college advising users from AS1 reflected accomplishing goals when their needs were met:

- I had questions about transferable credits. The appointment with the advisor helped answer my questions and helped me make further decisions for choosing courses in the upcoming semester.
- To talk about graduation and if I am on the right track. I was given a clear outline on what classes I need to graduate Fall 2018.
- I wanted to take classes that would maximize my GPA. We met and calculated the required classes, credits. It helped me make an informative decision on selecting my courses for the following semester.
- I wanted to see if there was anything that I missed in terms of classes I need, what to do for graduation, etc. Yes, they were accomplished because I asked, 'what do I need to do to graduate?' and [they] told me everything.

In these instances, students met with college advising with a specific goal to accomplish, wherein goals were equated with needs. Conversely, in some instances, student responses showed that whether students had goals did not correlate with whether the student found the appointment to be useful; in AS1, nine students indicated they did not have goals or questions when they met with college advising, but five students found their appointment useful. Likewise, in AS2, three students indicated they did not have a goal or question when they met with major advisors, of which two felt the appointment was useful. Some examples of why students found the appointment useful were,

- They gave me a lot of advice that I needed.
- It was useful because it is my first year at college, so I really didn't know all the tools I can use, and it was helpful.
- Was useful to gain general info about managing upper division classes.

Some examples of why students found the appointment not useful were,

- …it was pretty much repetition of what a past advisor told me.
- …I felt like the advisor made me feel stupid because they continuously insisted that I not take more than 15 credits but I always take more than 15 credits and still do well.
- …I already knew what I wanted to major and the requirements & classes needed to graduate.

In these examples, the appointments that were deemed useful involved offering students information they felt they needed. The appointments that were perceived as not useful were information the student already had ("repetition"; "I already knew…"), and student ability ("made me feel stupid").

Further, of 36 users in AS1 and eight in AS2 who articulated a goal(s) for their advising appointment and indicated their goal(s) were met[20], all students indicated they found the appointment "useful," but only 19 students in AS1 and five students in AS2 indicated that they had "learned something new" (14 in AS1 and one in AS2 indicated they had not learned anything new; two in AS1 and two in AS2 left the answer blank; and one response "N/A" in AS1 could not be determined). As an example, one student described their goals as "to know if my classes that I am taking or to see if the classes I will apply for in upcoming semesters are relevant. It definitely did. They were able to guide me by having a reference list." Additionally, in terms of usefulness of the appointment, the student responded, "Yes, it was useful to me. Had I not met with an advisor, I would have been lost and gone off track to graduate." However, in response to

[20] Fifteen in AS1 and 11 in AS2 could not be determined because students did not articulate whether or not their goal(s) was met; eight in AS1 and one in AS2 articulated their goals were not met.

the question of whether something new was learned, the student responded, "No. Everything they told me, I was aware of." In this example, the student describes utility (e.g., whether the student got what they wanted/needed) as independent of the learning processes (i.e., learning something new). Likewise, MA10 asserted students who seek advising are not more developed than nonusers: "I don't detect that anyone is ahead of anyone else in that level. They're all…I mean, for seven years I've been asking people, 'So what are you going to be doing now?' and no one has any idea, basically. I mean, there's been a few who come through who want to go to law school and are really on the ball with that, but most don't really have an idea, it seems."

MA10 also suggested that because some degree requirements are straightforward, with basic information students can fulfill minimum requirements without any significant issues:

> Our degree is pretty straight forward, you basically don't have to do anything for the first two years, get your GenEd done and then focus on [the major]. You know, I never get students coming in going, 'Oh my God, I'm so confused, I didn't know….' Now, I think [college advising] sort of forces people to declare and get on track early, whereas before that happened, let's say five years ago, I'd get people coming in like a month away from graduation, or even days away from graduation, or even with graduation the coming weekend, and be like, 'I want to declare the [major], I've done all the courses.' And yeah, they had everything and it was fine…they never came in, they never saw anyone, they just saw what the requirements are and they fulfilled them all.

Similarly, MA14 suggested that there are self-directed students who turn to alternative resources (other than their assigned advisors) to supplement information available online. Reflecting on their own experience as an undergraduate student, MA14 stated,

> As an undergrad, I never went to any kind of advising service throughout my entire career in undergrad, probably. And I would go to professors, so the professors who had classes that really inspired me, or who I had connections with, I would ask them. Or like, my friends in the department. And then figured it out online, like, here are the requirements, that's what I need, and I just pieced it together. And so, I wonder how many students are out there who just do that, they'll take it on, like they'll come in here with their spreadsheet or whatever and have really been able to manage it themselves. So, I'm wondering what percentage of students are like that, and who could just navigate this without seeking advising services, versus those who should but aren't.

As described in this example, MA14 used multiple resources to triangulate information and customize their education, including online resources for prescriptive information and speaking with mentors for developmental advice.

While it is possible that students who do not use advising are self-directed and may not need advice from college advising as some examples described, some major advisors also stated students who need advising avoid seeking help. MA10 stated, "Basically, what I feel when it comes to, like, getting people to come in, I feel like the ones who need the least sort of advice or assistance are the ones who jump at the opportunity to come in, and then the ones are just kind of adrift they never respond or come in." In this scenario, students who need advising do not seek it. MA6 suggested that some students do not recognize a need for the resource:

> ...they don't know it's value, they don't realize it until after they see you. So, by anticipating that it's not going to be helpful, they don't do it; for example, it has happened way too many times to [other major advisors] and myself, and now I've been hearing it from other people. When students come in they say, 'Oh, that was actually

> helpful. Oh, I didn't know…'. […] I never asked directly [why students don't seek advising]. I think that students often don't realize that it could be actually helpful to talk to somebody, that they don't have everything under control, or that not everything is available online, or even if it is, it's still helpful to talk it through to somebody. And I don't think that's necessarily captured in their assessment of this resource. They think of it as 'a resource that I can tap into if I need it, and if I don't think I need it, if I don't think it's going to be helpful, then I'm going to spend my energy elsewhere.'

In another example, MA9 suggested that students who recognize their need may be avoiding help: "my suspicion would be if a student is struggling a little bit, that they might feel that going in to advising to have them see their transcript and how much they're struggling, there might be a little bit of difficulty there. It's just to engage with that, to confront the fact that they might be struggling."

Finally, two respondents (one each from AS1 and AS2) checked "do not get information/advice" regarding classes, degree requirements, careers and future plans from any resource (although both described IDS in other responses).

4.4 Conclusion

In the current research, value of college advising was one area in which major advisors could impact use of college advising. Some major advisors found it difficult to identify the value of college advising, for example, because some major advisors saw the primary function of college advising as confirmation and prescriptive advising, while there were functions that were not associated with the term advising. Further, some major advisors and students perceived major advisors already offered students needed information.

In the area of division of labor, advisors who recognized differences articulated them as the ability to "see" in contrast to being able to "recommend and advise"; and the "ins and outs" of college advising. In contrast, some major advisors described overlap between major and college advising, expressed confidence advising in areas outside their major domain, and described advising mandates from the university that were blurring lines.

The third area of impact, differing advising systems, included factors such as how students make appointments, different types of advisors across departments, differences in training, differences in time spent on advising duties, and a "disconnect" between work and evaluation of faculty advisors.

Exploring these issues raised the following questions, which will be further discussed:

- How can the value of college advising be clarified for major advisors? How can college advising make it a more inclusive process toward shared understanding of college advising value?
- How can the information seeking processes of major advisors be further supported? How can relationships be strengthened between major advisors and college advisors?
- How do advisors define their domains of expertise? How can the different approaches in defining advising be supported?

- What types of college and campus-wide support can be offered to major advisors?

Moreover, this study also found that integration of technology into an advising system impacted student use of college advising by affecting how users think and approach information seeking processes. Some major advisors described passive behavior in students that resulted in their following IDS cues. Some students did not confirm the accuracy of their APP plan, while some major advisors also indicated they mostly trusted or found IDS reliable.

Some major advisors also described the "messages" from IDS and university that prioritized efficiency, making some messages stronger over others. Some students also perceived IDS as a replacement for advising. Further, some major advisors described issues based on scrolling through alphabetical lists in IDS that changed student registration patterns, although other major advisors presented alternative explanations, such as changing class availability and an increase in transfer students. Further, student survey responses described benefits beyond lists that reflect critical thinking processes; and student interview responses described attributes such as "attentive" behaviors and purposeful scrolling.

In other areas, some nonusers did not use college advising because of time limitations and multiple priorities. Use of electronic resources as alternatives was discussed, although one major advisor noted this was not unique to IDS. Further, students perceived differences between human advisors and IDS, with some students indicating IDS was more reliable.

Considering these concerns, the following questions were raised and will be further discussed:

- How can IDS be changed to reduce issues such as automation bias and passive satisficing behavior? What social/human factors are related to these issues?
- How can unintended impacts and consequences of IDS be addressed? What are the implications of the "paradigm shift" created by IDS/APP?

- How can advisors and the institution support further education on IDS?
- How can college advisors further support student workflows?
- How can advisors support transparency of information to increase reliability and accountability?

Addressing the final sub-question, findings showed email was chosen more than any other electronic resource as the way students learned about college (AS1) and major (AS2) advising. However, more students in the AS1 nonuser group completed regular appointments with college advising after the start of phone interventions. Further, factors such as perception of benefits, seeking assurance, and peers were found to impact how students approach advising; consequences and benefits, the perceived usefulness and need for information were also described as motivators, although some major advisors felt students who needed help avoided advising.

Accordingly, the following questions were raised:

- How can information be made more accessible for advisors and students to support accountability?
- What are systematic problems with multiple advising roles (including dual advising, within college advising, and beyond major advising/college advising)? How can these be addressed?
- How does college advising define its "product"?
- How can students be reached? (Or, can students be reached?)

These questions are further explored in chapter 5.

CHAPTER 5

DISCUSSION

In addressing the research question, *What factors impact student use or non-use of college advising?*, themes of social and technical functions were identified by major advisors and students. Although the role of IDS, an automated system which includes degree check, planning, and registration functions, emerged as an important theme, a wider outlook on systematic issues, including conflicting goals and beliefs, was developed. Therefore, the current analysis offers views of social and technical aspects. Students, advisors, and programmers participate in the system; the properties of how these work—or do not work—together illustrate a dynamic structure that influences advising in a complex, multi-faceted system. Factors that might impact student perceptions of college advising were explored, including information that is shared by and between major and college advisors, how students learn about college advising and for what reasons they use advising services, and how informing students of college advising can impact variables such as credibility and expectations of college advising.

Additionally, in this study, technology was described in two ways: first, in terms of automation, focusing on the degree audit system IDS; and second, as a communication channel including email correspondence. Although the technology sub-question assumed that technological innovations had some type of impact on student use of advising, including trust and reliance in technology, themes such as reduced vigilance and passive behavior were unexpected. Even with the IDS system's flaws, students are at an advantage because it alerts them when they might be "off track." Although this suggests a reduction of cognitive burdens to further aid in making decisions efficiently, it is also important to consider other costs and

benefits. Theoretical frameworks that emerged from findings include automation bias, competency and knowledge domain, framing, and satisficing.

5.1 What Impact Do Major Advisors Have on Student Use of College Advising?

5.1.1 Value of college advising. In AS1, meetings with the director of college advising served as a modified training session for major advisors, with an emphasis on dual advising. However, this study also found that despite regular meetings, some major advisors in AS1 remained unclear about the value of college advising. In other words, although cued to remind students about dual advising, major advisors may not know why they should refer students. Lack of knowledge about the advisement process, which is a barrier for some students (Walker et al., 2017), can result from this barrier for major advisors—it impacts when, how, and if major advisors refer students to college advising. Referrals are a form of major advisors' buy-in to a dual advising system; consequently, major advisors must be well-informed of the system (that is, what they are buying into). Grites (as cited in Academic Impressions, 2012) stated that faculty may see advising as "course scheduling and course selection" and asserted, "If the degree audit is the *only* purpose of academic advising, then let the machine do it" (Faculty Development section, para. 2). While Grites discussed this in the context of how faculty see their own advising roles, this philosophy may also be reflected in how faculty see college advising roles. This suggests that further clarification of the value of college advising is needed. Cues from college advising may remain implicit and, consequently, not be received by all major advisors as intended. For example, advisors may not share a common understanding of advising (Myers & Dyer, 2003; Allen & Smith, 2008a). Therefore, while college advisors share information about dual advising, the value of college advising remains unclear to some major advisors because what constitutes advising is ambiguous. Revisiting the issues of the college advising office title, posed by MA6: to college advisors, functions including "record keeping" and "processing" (as described by MA6) are clearly part of college advising, but to those who are not college advisors, this

connection may be unclear. Major advisors may not be able to explain all relevant functions of college advising to their students because these functions are unclear to major advisors. While college advisors know that advising encompasses a wider range of functions, as MA6 illustrated, this may remain implicit and elusive for non-college advisors (i.e., major advisors) until clarified. Further, as this study showed, the information presented by major advisors also may have appeared comprehensive to students and major advisors, which led to the question of why another appointment with a separate advisor was necessary. Therefore, the ability to delineate and communicate differences between functions and roles to both students and advisors is needed (Allen & Smith, 2008a). If major advisors can invest in, identify, and articulate the added value of college advising to students, which requires an understanding of what college advisors do, this can help to improve referrals to college advising. Aligning with the Grounded Theory method, during the course of this study I partnered with a college advisor to create sample training videos, to learn if these videos might help major advisors. The videos were intended to illustrate what can happen in a college advising appointment and describe the value of college advising. Through this experience, I learned that when producing training materials, it is imperative to involve major advisors in the process of design, rather than simply providing the finished product. This is a step toward ensuring the materials align with major advisors' needs and avoiding one-way communication or miscommunication. When materials are produced for major advisors, the appropriate foundation or starting point is major advisors rather than college advising.

Additionally, some major advisors in AS1 indicated that they were unable to attend all meetings with the director of college advising. Therefore, a more consistent way to share information needs to also be considered. MA4 asserted the need for major advisors to be "on the

same page" as college advising and provided an example where if the major advisor is not aware of information from college advising, "I'm glad it hasn't happened, but what if they [at college advising] go, 'What is this? You made a mistake.' You never know if it's not DR there and you get someone who is not nice, someone who will get mad at the advisor […] you never know." Further, MA4 stated, "the most embarrassing thing is that if we find out from the student. Like, the student comes and says, 'Now it's a new form,' I'm like 'What? I'm the one who's supposed to know everything here.'" This suggests that pushing information to all major advisors, in addition to offering regular meetings, is an inclusive approach to educate major advisors about college advising. Although sharing videos with major advisors is one option, MA4's example involved quick updates (e.g., forms) rather than training. For this type of information sharing, a quicker and more simplified approach, such as a listserv, may be more appropriate; as MA4 asserted, this issue involves not only timeliness but also major advisors' reputation—both factors that can impact relationships and trust between major advisors and college advising.

Advisors are both designers and users. Since major advisors educate students about information seeking, it is also important to know how major advisors seek information. Some examples include what resources major advisors use, how they use them, how major advisors convey use of resources to students (e.g., how they show/teach students to navigate), and how to make resources more user friendly. Input from major advisors can improve the usability of resources for students through identifying navigations patterns that make sense to major advisors. As MA6 described, information is currently inefficient online, and offline information from college advising is not accessible to major advisors. This suggests a need to increase ease of access to information for major advisors, both at the college and university levels. While the theme of knowing what college advisors do was explored, as I learned from this study, it is

equally imperative for college advisors to know what major advisors do, for example, to learn how faculty construct their advising process (Allen & Smith, 2008b). College advisors can attain valuable information from major advisors. For example, major advisors also give materials and information to students, some of which may not be available to college advisors. In the observed appointments, all four major advisors used a mix of media; resources ranged from printed worksheets and informational packets designed by the department (in one instance, the major advisor gave students a newly approved program sheet that was not yet available online), to external career websites (one major advisor also gave a student a USB flash drive containing major information). Further, college advising can learn about themes or questions that students repeatedly ask major advisors. As MA1 described, they learned about processes through helping students figure out the answers: "anything I keep hearing over and over again is what I let the students know, because to me, I want to listen to the student…."

5.1.2 Division of labor. Defining college advising values is also related to defining divisions of labor—recognizing limitations of one's own knowledge can lead to recognizing the needed expertise of others. However, as described by some major advisors, some areas overlap, such as requirements (e.g., a major requirement can also fulfill a GE) and services (e.g., creating a long-term plan, degree-career connections). In the example of MA2, who discussed shared requirements in their advising appointments, the major advisor navigated a soft boundary rather than a hard line. In these types of situations, contextualizing the information within the advisement process is especially important. When can the advisor confirm information rather than giving an opinion or educated guess? How far can the advisor's accountability extend? These types of questions are raised when navigating soft or blurred boundaries.

In this study, divisions of labor were contextualized as knowledge domains, aligning with competency theory (Dunning, 2011; Gross, 2005; Kruger and Dunning, 1999). While there are areas between major advising and college advising that might overlap, there are also areas that require relevant expertise to systematically advise. This expertise was described by major advisors as "ins and outs" and the "lanes" of advising. Issues were seen to arise when advisors misconceived their ability to "see" for their ability to advise students. Therefore, differentiating areas requiring specific expertise is needed. To borrow a concept from Huvila (2013), in order to teach students about how they seek information, advisors first need to be aware of their own information seeking and "informedness." One potential approach is to simplify explanations of divisions in terms of what each role can and cannot do. For example, when asked if sharing college advising information (e.g., what goes on in an advising session) would help major advisors, MA6 responded, "Maybe, but I don't know if that would solve the issue […] non-professional advisor people would not care necessarily. They want to know, 'What do I cover or not cover?' But, it has to be simple…." This approach assumes that there are delineated boundaries—what one can "cover or not cover." This concept is similar to findings by Huvila (2013), who studied the information seeking processes of librarians:

> …the professional practices and their articulations as dos and do nots play a significant role in defining the norms and boundaries of the 'library system'. […] At the same time, the descriptions of the informants contain numerous examples of how the articulation of boundaries was related to the emergence of established library practices as boundary objects that helped librarians to communicate with library users and other professional groups. (p. 728)

The “principal context” of the library functions as a “yardstick for the availability and quality of information and information seeking strategies and defines boundaries of informedness in that particular context” (p. 727). Much like Huvila’s study, this study also implicates that although boundaries are negotiated, the ability to share and articulate “outer limits and internal norms” (p. 728) is a necessary foundation to define the system’s structure, which influences users’ behavior—this is what MA11 described as advising culture. Further, as this study showed, extra caution can result from knowledge of possible errors, especially from those who possess high internal accountability. Because meetings with the director of college advising were identified as a source of cues for major advisors, such meetings present an opportunity to negotiate and establish boundaries, and share stories of personal crises.

In contrast, those who do not recognize the limitations of their expertise will not distinguish these boundaries and, as a result, may not perceive delineations as relevant to their practice (Dunning, 2011; Gross, 2005). For such advisors, presenting them with hypothetical scenarios, examples from other units, or generally educating them on advising errors may not have an influence because they might approach such issues with a “that’s not me” perspective due to the inability to use social comparison to learn about their lack of skill (Gross, 2005). What this also suggests is that even if attributing an error directly to an advisor rather than presenting it anecdotally, some advisors may not feel directly accountable for errors (i.e., lower internal accountability) and, instead, believe that the error occurred due to other information, cues, or tools outside of their control (Dunning, 1999). Consequently, this competency framework (as defined by the Dunning-Kruger Effect), suggests that building competence is a more appropriate solution. For example, major advisors expressed they did not know what college advising did beyond “confirmation,” which raised the question of whether major advisors recognized the

complexity of confirmation. Rather than instructing major advisors not to advise on certain requirements outside their domain, building competence involves teaching major advisors the process of confirmation. In the context of this research, building competence would involve teaching advisors the process of checking for accuracy to confirm information, including potential outcomes and errors. To go back to the description of "seeing" in contrast to "advising and confirming" as described by MA9, building competence involves teaching advisors how to do the latter. Because the two types of preferences were suggested, both approaches—simplification and building confidence—should be taken into consideration when designing interventions.

However, it must be pointed out that while ignorance and confidence are factors cited in discussions of the competency framework, what makes it especially complex for advisors is that domains are very close, and may have overlapping components, Therefore, when an advisor feels competent in one domain, they may mistake this confidence for competence in a close domain. For example, if an advisor states they can advise on GE based on the knowledge of what those requirements are and the ability to identify them, that is a different domain than knowing the application of those requirements to the individual student's record—this includes curricular expertise that results in knowing how to look for and identify exceptions, having historical knowledge of curricular changes, identifying misclassified courses and ensuing errors, which can impact advising on such requirements. On the surface level, a non-expert can read whether or not a requirement is complete or missing; however, an expert in the domain can, for example, identify whether what looks like a missing requirement might in fact be completed through an exception or application of the student's previous program requirements—in other words, what is not apparent to those without the domain knowledge. To further complicate the issue, advisors

can be exposed to some knowledge in one domain through resources like working on committees, access to degree audits in student information systems, publicly available worksheets, or simply talking about requirements with other advisors. Consequently, this can also contribute to a false sense of expertise in a related domain. In such cases, clarifying boundaries of knowledge domains can potentially help advisors understand the limitations of their knowledge.

Notably, MA7 suggested that students see college advising first, although students can choose to see major advisors first. MA7's example of not explaining the difference between major and college advising aligns with issues described by Allard and Parashar (2013)—unclear communication channels between faculty and professional advisors—and Allen and Smith (2008b)—that helping students navigate the institutional landscape was identified as important, but a function that faculty felt least responsible. However, this scenario proves complex, as indicated by MA7, major advisors might assume students choose to see college advising first. It is not clear that students may, instead, choose to see major advisors first. Therefore, major advisors might assume students already receive the relevant information elsewhere and not refer students to college advising. This information problem is reflected in one student survey response from AS1 that stated although they had heard of college advising, the reason that kept them from meeting with college advising was, "I met with an advisor in the [major] department, didn't know if I should meet with one at the center [college advising]?" Clarification of roles is part of "How Things Work" (Allen and Smith, 2008b), which should be a continuous process that is shared by all advisors, especially to contextualize the information given at different times and places. If major advisors do not see this as part of their role (parallel to Myers & Dyer, 2003) and consequently roles are not clarified and reiterated, the advising process can become a

roadblock (Walker et al., 2017) and mistrust or misaligned expectations can occur. For example, without clarification of roles between major and college advisors (e.g., Advisor x is an expert in X and Advisor y is an expert in Y), students who encounter advisors giving incomplete information outside the advisor's area of expertise may read this as a cue to mistrust the advisor. As Vianden (2016) found, uninformed or incorrect advice was a factor of students not seeking further help from their advisor. This further raised the question of perceived messages; for instance, if major advisors tell students not to listen to some of the advice from college advising, can students interpret this as not to listen to all advice from college advising, or not to seek advice from college advising? Taken together, these implicate the ability to refer students is an important skill in advising (Roundy, 1992/2017). To revisit Vianden's (2016) assertion, advisors who are "not responsible for providing the information or not knowledgeable" need to know "who can answer a student's question" (p. 26). When college advisors meet with students first, they can give students the "first referral" to major advisors, and vice versa, to set expectations. As MA9 explained, because the ability to "create an understanding" is a foundation of referring students to college advising, this indicated that emphasizing and explaining dual advising is a shared responsibility.

Further, despite findings by Lynch (2004) that professional advisors from advising centers were "rated significantly higher than both departmental and faculty advisors by all classifications of students" on the item of long-term academic and career plans (p. 67), major advisors and students may perceive major advisors can offer the same information, and possibly more, in comparison to what is offered by college advisors due to greater perceived social capital which gives major advisors the added "credential" (Bourdieu, 1986). Major advisors offer discipline-specific expertise that college advisors, as generalists, cannot always offer, and as

MA15 suggested, major advisors can do a "better job" in those areas. Cheung et al. (2017) found that one of students' highest areas of need was "career aspects of their program of study" (p. 26). Accordingly, when considering the example presented by MA15, if both college advisors and major advisors offer some type of career-related advice, students may opt to see major advisors instead of college advisors because of the specialized information major advisors can offer (e.g., the perceived greater economic, cultural, or symbolic capital possessed by the major advisors, as described by Granovetter, 1983). As a result, the generalized information from college advisors (assuming the college advisor does not have a career or research background in the discipline) may not be considered of equal value due to the differences in levels of knowledge. However, as MA2 and MA11 suggested, a second opinion is an important aspect of students' information seeking processes. When advisors encourage students to seek other perspectives, this is part of "alerting students to their responsibilities"—a function Dillon and Fisher (2000) found to be perceived by faculty as a low priority. Notably, as MA11 indicated, students can take the information provided by one advisor and share it with another advisor, in a collaborative approach; this can result in changing previously-made decisions in ways that are best for the student. Therefore, the student mediates information between the two advising units to contextualize the information given by one to inform information from the other. Similarly, MA6 discussed the ability of an advisor to challenge students, explore motives, and impact student decisions. In these scenarios, a second advising meeting was used to emphasize important information and motivate students to pursue additional perspectives.

Offering and seeking a second opinion further aligns with a philosophy of information literacy, wherein students consult more than one resource before making a decision. The recognition of value in obtaining more than one perspective is transferable to other advisors in a

student's advising network (e.g., allied advisors). For example, 11 out of 110 remaining nonusers in AS1 had multiple majors, and their primary major was outside AS1. Two of 19 survey respondents also indicated seeing their primary college advisor as a reason they did not use college advising in AS1. In the current advising system, these students are not expected to meet with their AS1 college advisors, instead meeting with their primary college advising office. This raises the question of whether there is an information gap, especially if the student's primary college differs in curricula and/or philosophy from AS1 (e.g., a professional program in contrast to a liberal arts college).

5.1.3 Differing advising systems. Different advising systems can impact student use of college advising because students' previous advising experiences can shape their expectations for future advising; this includes their preference for type of advising (Mottarella et al., 2004). As described, students more commonly approached major advisors individually, in contrast to a service desk with college advising. The college advising triage system was developed to balance the allocation of resources, especially considering that the office serves the entire college. It is recognized that this system is efficient and flexible (as MA1 mentioned, they wish they had a similar system so they could have help with part of the workload), but it may also be perceived as a barrier for students who, from experience with major advisors, expect to be able to directly contact a named individual rather than a more general "advising center." This may reduce the approachability of college advising, especially when students are able to have informal advising environments with major advisors as described by MA1, MA4 and MA5—in other words, these are obstacles to relationships and advisors knowing their advisees (Walker et al., 2017). Similarly, low expectations of engaging in a strong student-advisor relationship can deter students from meeting with advisors (Cheung et al., 2017).

The differences between advising systems is a difficult issue to reconcile because factors such as the number of advisors available, the time given to faculty and staff for advising, and the number of students in the department are subject to departmental criteria and resources. On one hand, dual advising is designed for college advisors and major advisors to share workload while facilitating collaboration between full time advisors and teaching faculty or other major advising staff. On the other, the separation of advising roles also creates distance and further inconsistency between individuals and information (i.e., information may not be shared with everyone). However, some potential areas with which major advisors can be further supported are implicated. Cuseo (n.d.) described advisors as an important channel to connect students to a network of resources; however, advisors are also part of the network to which students are connected. Although all major advisors in AS1 were able to name the director of college advising as an individual contact, most major advisors did not mention other individuals in college advising. Unclear communication channels between faculty and professional advisors (Allard & Parashar, 2013) can be a result of lacking contact between individual advisors. Aligning with this concept, one potential program to support advisors' relationships is a "liaison" system with each department, where one college advisor is assigned as a liaison to specific major departments. The college advising liaison would serve as a point of contact for major advisors, to provide a "name and face" representing college advising, answer any questions, and strengthen relationships with departments by regularly communicating with major advisors. This also ensures information from major advisors are shared among all college advisors rather than assigning the responsibility to one person (e.g., a director). As suggested by MA13, the information seeking process of the major advisor can have an impact on college advising, because major advisors who have strong relationships with college advisors can facilitate a

connection between college advising and students. This implicates that features such as being familiar with individuals in the office and having a consistent person to refer to or identify as a source of information is important to major advisors to facilitate that connection. Because knowledge of "who can answer a student's question" is an essential advising skill (Roundy, 1992/2017; Vianden, 2016), the extended knowledge of an individual in the office can, in turn, help major advisors accentuate the approachability of college advising. Further, the liaison system differs from a case load system because students can choose to see any college advisor, and, similarly, major advisors are free to contact any college advisor. This is beneficial for times when specific advisors are unavailable (e.g., out of office for the day). It should be noted that college advising at the study site, prior to reorganization, had started to implement a liaison system; however, due to limited resources and changes in staff, the system was not manageable and had to be discontinued. A change in advising populations, a smaller group of departments and potentially greater stability in staff would present an opportunity to reexplore this option. However, to build and strengthen a relationship between college advising and major advisors, buy-in must be shared by both sides; just as MA12 stated, "I have worked to cultivate and maintain a professional and respectful relationship with [college advising] and all their advisors." The strength of the relationships between major advisors and college advising can help to facilitate and mediate relationships and expectations between college advising and students. Upon examining the dual advising structure, how major advisors feel about this facilitation, or how that relationship between major advisors and college advisors is perceived, can differ depending between departments, and even individual advisors within one department. Allen and Smith (2008b) suggested that dual advising offers a solution to offering students holistic advising while addressing the difficulty of having faculty cover all aspects of advising. However, as this

study suggests, shared responsibility also introduces issues such as differences in definitions of advising and whether outcomes are being fulfilled, especially when only some advisors (e.g., major) can provide regular support for all students. Miller (2012) suggested using four questions to steer discussions of advising structures: "Who is advised?," "Who advises?," "Where is advising done?," and "How are advising responsibilities divided?" (Advising Structure Questions section). The lack of clarity in answering some or all of these questions can impact student use of college advising.

From the institutional level, interview responses from major advisors who are faculty indicated a need for greater emphasis to be placed on rewarding faculty for advising—for example, by recognizing "advising as teaching" for tenure and promotion. However, as MA15 asserted, in addition to recognition, time is requisite, reflecting Habley's (1997) finding, "even when an individual is identified to integrate advising activities, the responsibility does not merit a significant time commitment" (p. 43). Proponents of increasing training for faculty advisors (e.g., Grites, as cited in Academic Impressions, 2012) assert that stronger faculty advising involves a mutual definition of advising, involvement and buy-in by faculty, and accountability. However, as this study indicated, there are conflicting issues that keep faculty from pursuing this type of training. Grites (as cited in Academic Impressions, 2012) asserted, "Some degree of faculty development *has* to come into play, because most faculty have not been trained or exposed to what undergraduate advising is about. You need to raise awareness and equip them with information, examples, and practice." Wallace (2011) also asserted, "To embrace the value of advising and advisor development, faculty members must believe that development is a good investment of their time and processional energy (Recognition and Reward section, para. 1)." However, what happens when there "isn't enough time in a day" as described by some major

advisors? This impacts student use of college advising because, if faculty are not given the time for professional development in advising, they will lack knowledge of "what undergraduate advising is about," and in turn, will lack the ability to convey this concept to students. This also implicated other questions, including, if major advisors do not have time to be trained and are not held accountable, are they advising? Allen and Smith (2008a) asserted that having an "advisor" title for both professional advisors and faculty may be problematic; this highlights the question of whether those who do not fulfill advising responsibilities nor are held to agreed-upon standards should be distinguished by titles or descriptions other than advisor. These issues and questions, taken together, implicate an area for future research; while faculty professional development in advising is described as critical, and potential areas of development are suggested (Academic Impressions, 2012), recognition and time remain barriers. In addition to questions such as "Will there be a stipend? Will there be release time?" (proposed by Academic Impressions, 2012), questions such as how expectations for faculty to advise with little or no training in advising are constructed, how institutions define improvement of faculty advising, and who is responsible for training faculty, remain. To borrow the question put forth by Allen and Smith (2008b), what can changing the advising model rather than "bolstering faculty abilities" offer?

Finally, an important consideration is that a feeling of exclusion can develop based on group criteria and expectations. MA6 expressed that they felt the majority of advisors attending the director's meetings had official titles of "advisor" and what they described doing in their departments "does not happen in our department." Faculty advisors may feel like they are underrepresented, regardless of the actual representation of faculty advisors in the college or campus. If faculty feel like outliers, they may hesitate to voice any concerns. This is reflected in

Bennett's (1993) observation of being an outsider when describing the division between professional advisors and faculty at a national advising conference. The author stated, "I've been in sessions where real advisors vented about us amateurs. I've heard the resentment of professional academic advisors as they talked about faculty members who had the audacity to bitch about an advising load of as few as 15 students, when their load was 400 or more…" (p. 4). As a result, Bennett did not self-identify as faculty in these meetings. Although this example is one end of a spectrum, faculty advisors may perceive that they are not recognized as "real advisors" instead of "amateurs" through exclusion, albeit unintended. Academic Impressions (2012) stated, "While there are many resources available for training and developing professional advising staff, faculty advisors often receive little or no training—yet they provide most of the advising services at college and universities in the US" (para. 3). However, training faculty advisors requires allies, including professional advisors, to recognize them as advisors. As an example, the site of study has a campus-wide advising group, but communication and membership remain focused on professional advisors. Definitions of advising and advisors put forth may not account for faculty advisors whose title is not "academic advisor" but who consider themselves as academic advisors. Likewise, the existence of the advising group as a resource may be less visible to faculty. Lack of faculty advisor participation and input can result in gaps that impact advising for students.

5.2 What Impact Does the Integration of Technology into an Advising System Have on Student Use of College Advising?

5.2.1 Automation bias. In the current study, the theoretical framework of automation bias could be applied to use of the automated degree audit system, IDS. For example, if a major advisor used IDS to check if students are "on track for graduation" in all degree areas, assumed IDS classified courses correctly, and relied on the information in IDS without checking for accuracy using another resource, this would be a case of automation bias (see Skitka, Mosier, & Burdick, 1999). If students view IDS as an ultimate authority, believe it is accurate, and are not aware of the value of college advising beyond IDS, this can impact whether the student chooses to meet with college advising. Similarly, if major advisors believe IDS is accurate and rely on IDS to advise students on college requirements (e.g., GE), they may fail to refer students to college advising.

As a relatively new innovation on campus, an undeniable strength of this system is transparency of information, where students can access their degree requirements, progress to graduation, and course plan which doubles as a registration system, and advisors can share "notes" and make appropriate changes associated with the curriculum (e.g., program year, exceptions) that can be viewed by the student and other advisors with access to the student record. However, advisors and students may become more reliant on automation, and more susceptible to related biases. On one hand, automation can be especially helpful for those who are unfamiliar with processes that the automation is supposed to aid. If students' IDS degree audit and APP are 100% accurate, and the advisor is unable to confirm the information using their own knowledge or other (non-automated) aids, this can lead to increased accuracy (Skitka et al., 1999). On the other, if the system is not accurate, lack of knowledge also can result in

errors associated with automation bias. This was illustrated in the quotes by MA3 and MA8 that indicated IDS enabled GE advising, whereas without IDS, they would not have the same access and ability. Further, as MA2 described, even though they were aware of issues with the system, they relied on IDS because they "don't have anything else to refer to." This aligns with Lee and See's (2004) differentiation of trust and reliance; in this example, MA2 relied on IDS although they did not necessary trust is completely. Consequently, if IDS does not cue advisors who rely on the system of potential "misses," untrained advisors will remain unaware of potential errors, leading to a possible increase in errors (Skitka et al., 1999). Because advisors may be looking to IDS to confirm information, for those who are unable to confirm the information without the automation aid, and therefore unable to identify potential issues that automation does not cue (Merritt et al., 2014), this can lead to automation bias errors such as omission errors (e.g., not recognizing credit count is off because student is repeating course).

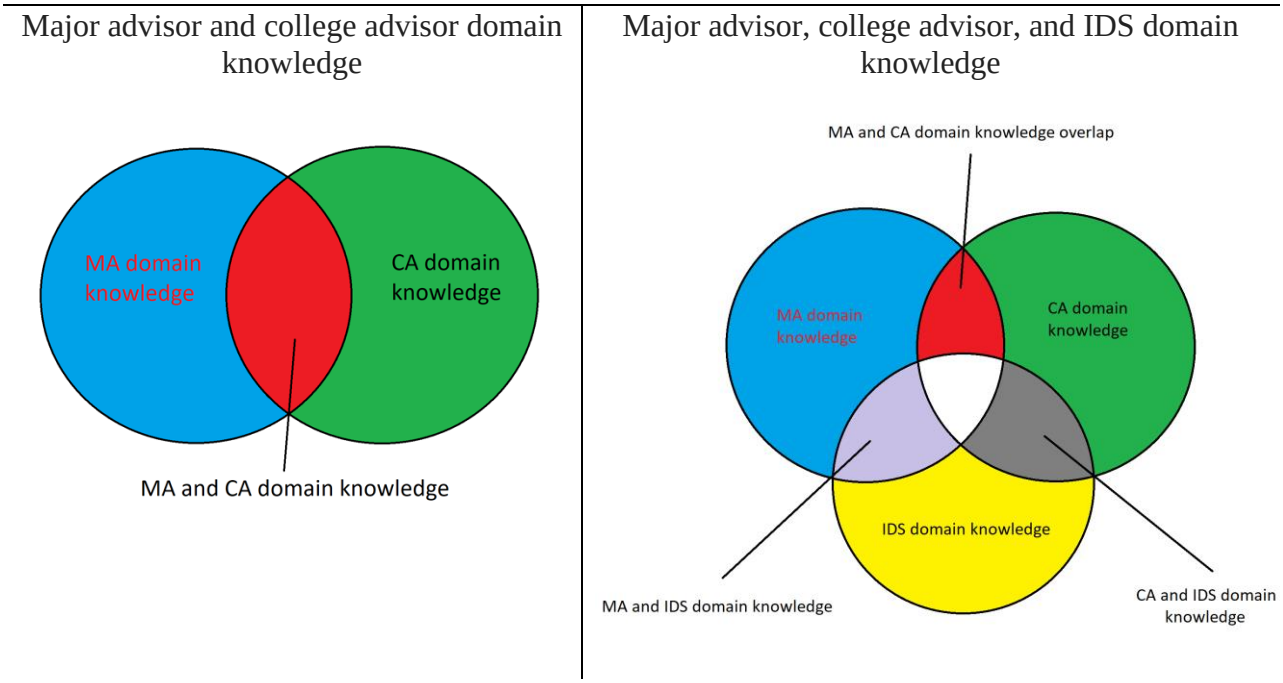
This type of scenario can also stem from being unaware of potential errors in certain areas of IDS. Because major advisors may not recognize value in college advising, in combination with misunderstanding of domain expertise, they may feel they can rely on the information on IDS to discuss GE. For advisors to use IDS to advise students, this requires confidence in the system. How people arrive at this confidence, or trust, can differ. As Skitka et al. (1999) described, "Given that computers and automated decision aids are introduced into many work environments with the articulated goal of reducing human error, they may well be interpreted to be smarter and more authoritative than their users" (p. 993). This suggests that users may interpret the presence of a "computer voice" to subordinate the decisions of human operators, as described by MA8. Additionally, because the automation is introduced and

endorsed by the institution, it is perceived to be accurate, reflecting the authority of the institution (McKnight, 2005).

As previously discussed, domain knowledge can be unclear when domains are close together; when advisors perceive expertise in one area, they may mistakenly assume expertise in another area. This issue is further complicated when adding technology, such as IDS, to the equation, because there are additional areas that overlap, and consequently appear ambiguous. Figure 1 illustrates the difference between domain knowledge for major advisors and college advisors prior to IDS (left), and after IDS is introduced (right). When more systems are introduced, an individual advisor's expertise in all domains is further reduced; as illustrated in Figure 1, when IDS is added, it also requires additional domain knowledge.

Figure 1

Domain Knowledge



However, while actual expertise in overlapping areas decreases, IDS can give the opposite impression: that domain knowledge is increased. Prior to IDS, advisors may have had a better

idea of the extent of their domain knowledge, because they were unable to advise on particular areas without the help of technology. However, because IDS made information transparent, advisors may find it more difficult to identify limitations, as they have more access to information in IDS. Further, those who perceive they have expertise in the overlapping domain knowledge of major advisors and college advisors (red area in Figure 2) misunderstand this as the overlapping area of college advisors and IDS domain knowledge (gray area in Figure 2) or area where all three domains overlap (white area in Figure 2) that require additional expertise to identify errors in IDS. The context of domain knowledge may explain why some advisors choose to be more hands-off (as illustrated in the "stay in your own lane" example) and others choose to venture into GE advising. Although "confirmation" may seem trivial, domain knowledge indicates that confirmation is actually a complex and significant task requiring in depth knowledge of the curriculum. In this context, the miscalibration of trust and/or reliance in IDS may be explained by the difference between defining easy and difficult tasks dependent on the person's domain knowledge. For users who do not have expertise in a curriculum, the task of navigating the curriculum without automated aids may seem difficult, whereas an advisor who has domain expertise is able to complete the task without reliance on automation. With the transparency of information on IDS, those who lack domain knowledge view a once-difficult task as an easy task (Madhavan et al., 2003). Therefore, users with domain knowledge may be better equipped to calibrate trust with system performance.

In contrast, reduced assessment despite vigilance (Skitka et al., 2000) was described by MA8. Automation bias can occur even with the understanding of sociotechnical aspects involved in the process of programming. The mere presence of automated aids can lead to the reduction of information assessment and vigilance associated with automation bias (Skitka et al., 1999). The

case described by MA8 illustrated that even with the knowledge that humans program the computer—in this case, the major advisor was one of those humans—the perception of technological superiority (as described by "the computer is telling me this is right; of course, it must be right") in addition to "human fallibility" (illustrated as confirmation bias) monopolized how MA8 assessed the information presented in IDS. This might be formulated as automated cue + confirmation bias = automation bias. This illustrates that automation bias can be more complex than passively accepting what the system tells the user, instead involving multifaceted thought processes and beliefs that result in errors. As MA8 described, because they had certain expectations about the system (e.g., it would be accurate; information would be regulated; the major advisor's own confidence being the initial source of information), those expectations were "confirmed" (e.g., through what the major advisor perceived as the computer "telling" them the correct information, which was also misinterpreted by the major advisor). As such, IDS users may follow automated advice, perceiving the advice to reflect their expectations, and fail to seek outside advice until a moment of crisis. Much like Mosier et al. (1998) described experienced pilots recalling "phantom cues," those with experience are still susceptible to automation bias and may see cues that confirm their expectations. Therefore, they are unable to effectively identify or recall errors. It must be noted that the information-seeking environments for both students and advisors consist of multiple cues, both automated and non-automated; they choose to follow some cues over others. The case presented by MA8 further aligns with findings from findings of Pop et al. (2015). Much like the high automation expectancy operators described in their study, MA8 became "more sensitive to change in reliability of automation" but the advisor's trust in other parts of the system remained. MA8's example suggests that the authority of a "computer voice" impacts a user's perception that the system is basically correct;

however, the theoretical framework of automation bias indicates that regardless of a person's belief in the authority of IDS—that is, even if the user perceives the system to be erroneous—the act of using the automated system reduces one's ability to assess information (Dzindolet, Peterson et al., 2003; Mosier et al., 1998). Therefore, even the most experienced and knowledgeable advisors are not immune to automation bias, and users who experience automation bias can range from those following prompts without question to those who are actively assessing the system's output.

Findings by Li et al. (2008) describing social influence on trusting beliefs also need to be considered. For some advisors, as MA8 described, the belief "Is there reason to doubt?" may remain for the automated system until a personal crisis occurs, or until the advisor is made aware of all errors. Because of this, advisors who explicitly or implicitly convey that they trust a system can have an impact on student trust of the system. In relation to automation bias, if advisors do not double-check or use secondary sources to check the information on IDS, students may mimic this behavior by not confirming whether the information they see in IDS is correct. Because of the confidence perceived, students may also not seek assistance, or not be told that they need assistance, from college advising until a moment of crisis.

Although automation is not the sole cause of errors, automation presents new, stronger cues in the advising environment that can lead to automation bias. As long as errors are present in automation, reduced vigilance increases risk of errors (Dzindolet, Peterson et al., 2003; Mosier et al., 1998). This is especially relevant when considering the limitations of how "fixable" issues in IDS are, as MA11 described. IDS information is typically retrieved/input from three sources: Banner (by Ellucian); "rules" based on standardized worksheets (program sheets and four-year plans that are developed by departments/colleges); and user changes on the IDS web interface.

While IDS appears to have more dynamic functions, information that is translated between different systems exposes limitations. As an example, if someone does not manually delete a course that is taken out of sequence in Banner software, IDS will use the erroneous record, which will result in one or more errors in the IDS degree audit (e.g., credits). This illustrates a complex sociotechnical system that involves several roles and functions, and different points where information is input in the system (e.g., records office versus admissions office versus IDS). Because of this, it is possible that IDS may never be 100% accurate, and therefore the concerns expressed in this study regarding automation bias and errors will remain a potential issue with this system.

Errors associated with automation bias, consequently, cannot be fixed short of non-use of automation. However, education might combat passive behavior associated with automation bias. Educating users (which includes both students and advisors) that IDS is not always accurate may calibrate their trust in the system with its actual performance. (See Appendix F for examples of potential IDS errors.) One approach is to make this information widely available, such as in a video tutorial; yet, as discussed previously, this requires consideration of the audience. For example, although this type of content can be helpful, new concepts and jargon can also be introduced in the video, which will require additional education for clarification.

Because some major advisors and students expressed students might be accepting messages in IDS at value, and do not seek options that are hidden from view in APP nor actively respond to restrictions, information should address objective and subjective errors. However, findings by Dzindolet, Peterson et al. (2003) suggested that educating users about the potential errors of the system was not sufficient to reduce behaviors associated with automation bias. Further, although cues may be available in the environment outside IDS, such as video tutorials,

documents, and even advising, these cues may be subordinated by compliance with the automated system (as described by Sutherland et al., 2016). In addition, just as ST3 indicated, even students who are aware of tutorials chose to navigate IDS without assistance (even if it might save them time). Therefore, a second approach involves incorporating cues directly into the IDS system, namely, the degree audit and registration functions of APP. One example is to create "flags" that are intrusive, to signal potential errors to users. In this scenario, because omission errors are associated with certain scenarios such as students who repeat courses, have transfer credits, have stopped out for a year or more, or are pursuing multiple majors or minors/certificates, users who are viewing these students' information in IDS would receive a pop-up message indicating their status and potential errors (e.g., "This student is repeating a course(s). Credits may be incorrect."). This type of intrusion would alert the user that there might be an issue that is not immediately visible on IDS degree audit and APP. For advisors, this would serve as a "nudge" to investigate other parts of the student's record, such as their transcripts, which are less visible. This type of cue would alert advisors without having to spend much time or effort to receive it (as suggested by Sutherland et al., 2016). Because IDS by default is automated, checking for issues in IDS requires constant vigilance and resistance to following information that is immediately visible, increasing the cognitive load of users. Cues can relieve this cognitive load by interrupting the automation and replacing this "cost" by creating a lesser cost—that is, less time and effort to identify the issue—and serving as a reminder to check for issues, potentially reducing errors.

The most direct approach to eliminate automation bias errors is to eliminate system errors. However, perhaps ironically, this is likely also the most difficult approach to achieve. Just as Alberdi et al. (2009) asserted that systems need to be assessed as whole, socio-technical

systems, IDS, likewise, is part of a system that involves several sources of information input, assessment, and management. In one example, as MA11 pointed out, IDS pulls information from other software that has programming limitations. While one argument is to program IDS so it is independent from the old system, to change from one system to another would not only require a technical change but also a larger and exceedingly complex change in the work culture and processes of the institution. In another example, course exception issues were perceived as an IDS problem because exceptions are not recognized by IDS: exceptions cannot be programmed because they are not standardized, and therefore present added barriers (e.g., the course is not part of the optimal plan) for students which deter them from registering. However, this actually posed both a technical (limited by rules) and human (creating/allowing exceptions) problem. Even if human advisors manually review each student's record, issues remain; for example, records are individually reviewed by college advising for graduation, so errors in IDS are hypothetically caught for all students, eventually. Yet, even in these instances, students who have not met with college advising earlier have been impacted—in the best case, adding an unplanned class at the last minute; in the worst case, having to delay graduation. Again, both human and automated factors can be identified: in addition to programming the system to give stronger indications that IDS is not always correct, students need to be taught how to check different resources and be more aware of their requirements for stronger self-efficacy. Because of the complexity of sociotechnical systems, as Alberdi et al. (2009) suggested, solutions are not simple or straightforward. Advisor input into the programming of IDS is imperative for its functions to work toward reducing errors because of advisors' extensive knowledge of how curricula tie into student records; at the same time, advisors must be willing to work with IDS and consider potential costs. For example, on one hand, IDS can build in stronger cues such as removing the

practice of "hiding" courses and including a visible note (e.g., in a pop up) that encourages students to consult their advisor regarding curricular design such as course exceptions; on the other hand, because these are subjective errors, major departments might consider reducing the need for exceptions by adding courses into the standard curriculum, especially if the trend is to give exceptions to several students, so that students do not need to encounter extra barriers when choosing courses. Similarly, MA4 described a curriculum change in which an optional course was changed to a required course to improve consistency and advising in their major. In this scenario, despite initial hesitation by faculty, the curriculum change was formalized because "if you say it's needed by the student, then really we should be fixing our course offerings." MA4, further, stated that the standardization of program sheets and four-year plans campus-wide to match the university catalog "was a big help" and although initially, "people were like, 'No, we have our own advising sheet, we don't want the program sheet'," the benefits outweighed the cost: "There's always a lot of resistance, but in the end you know that it helps." The importance of consistency, clarity, and the ability to navigate curricula is highlighted. This involves considering why changes are made, and the costs and benefits of making changes in comparison to keeping practices. However, MA15 expressed frustration that IDS "actually never could handle our old program" prior to a curricular change, and "No one has ever talked to me about what works in [IDS] and what doesn't work in [IDS], and how can we make it better and how can we help." Much like relationships between major advisors and college advisors can improve student connections with their advisors, increased advisor input into IDS can improve its functions. Because of this, it is recommended that IDS consult advisors who are directly impacted by prospective changes (e.g., respective majors) during design and before changes are implemented. These examples, further, indicated that balance is needed between making

compromises to fit system limitations (changing what is programmed) and expanding system capabilities (changing the ability to program). Just as Skitka et al. (2000) suggested, a "need for a clearer understanding of the psychological impact of automation on human operators, and for the development of decision-making contexts that take into account the strengths and weaknesses of both the human and the automation to better optimize performance" (p. 716).

5.2.2 Framing effect. In the current study, framing effect theory could be applied to descriptions of IDS use. The analogy of a GPS system is helpful to understand how frames can present different perceptions of a narrative. As communicated by the IDS promotional video, IDS tells students what is their "optimal graduation pathway," in contrast to leaving students "on your own." However, to present a contrasting narrative, Sutherland et al. (2016) began their article with a case involving GPS, where "a driver reportedly followed the directions provided by his GPS navigation, leading him to drive his car off a demolished bridge." The authors point out that while there were outside cues such as signs and barriers, "This example illustrates compliance with automation despite the information in the environment being more predictive of correct actions to be taken" (p. 2). This scenario indicated that even when perceiving several cues, the driver chose to ignore important warning signs and instead follow the GPS directions, leading to fatal consequences. Although the IDS video highlighted an important need for students—not to be left on their own—the second example exposed a gap, and potential risk, in the narrative: the question of whether an automated system like GPS reduces the ability for one to critically assess competing cues and make decisions independently if necessary. Although both examples use the analogy of GPS, the respective frames present very different perspectives.

The way information is presented, including how affective the message is and perceived risks, can influence people to choose one decision over another (Kahneman, 2003). Sutherland et

al. (2016) found, “If a user knows that there is a consequence for an incorrect decision, then he or she should be motivated to reduce errors” (p. 31). In their study, consequences were contextualized as “timeouts” during a game, which interrupted the tasks of participants. When applying this framework to APP, consequences are contextualized as not following an optimal plan, implying that an ultimate consequence is graduation can be delayed; pop up notifications stating a course is not part of the optimal plan interrupt the student’s task of choosing courses. These perceived consequences may further motivate students to follow these prompts. However, as MA7 phrased the consequent question, “whose plan?” On one hand, IDS frames consequences in terms of diverging from the path to efficient graduation, while on the other, advisors frame consequences as lacking encouragement to further explore options. For example, a course may not be tagged by IDS as a major course, but the department recognizes the course as fulfilling a requirement by exception; however, if the student is notified that the course is not part of their optimal plan, the student may choose to replace it with another course rather than pursuing alternative information. This is especially relevant for students who are new or otherwise lack the knowledge that exceptions are available. Just as Goddard, Roudsari, and Wyatt (2014) found in their study, which looked at how automation impacted users’ decisions, when users highly trusted the automation but had low confidence in their own decisions, they were more likely to change their decisions to match the automated aid; in contrast, users who had high confidence but low trust were less likely to change their decisions (p. 372). Further, Dijkstra, Liebrand, and Timminga (1998), in their study, asserted, “The fact that people are told that information comes from an expert system is enough to influence their evaluation of the information” (pp. 161). Taken together, this suggest that if IDS is framed as a high-trust system, and students are not confident with their decisions, students may be deterred from choosing courses that best fit their

personal interests due to a system regulations. Further, advisors also indicated that even if a course fulfills credit requirements as an elective, but does not fulfill a specific designated requirement, or multiple designated requirements, students may decide not to take the course because it is seen as not efficient. While MA7 stated that "when they're first coming in, anything they take is going to be progress toward their degree," the frame of efficiency, which is introduced early in the student's career by IDS, can contrast that message. For example, students are exposed to APP prior to meeting with an advisor. If APP is positively framed as reliable, this early exposure to IDS and APP can contextualize how students proceed with their choices.

Additionally, because all undergraduate students register for courses using APP, all students are by default presented a course plan that automatically "recalculates." If students do not actively seek to change their plans or turn off recalculation, they are "accepting the formulation given" (Kahneman, 2003). Because automatic recalculation is presented as the default option, it has the larger advantage of student use. This relates to findings by Sutherland et al. (2016), who, in their study of automated advice in video games, suggested, "With less reliable [automated] advisors, users may learn to more effectively decide when they are willing to rely on the environment and/or the advisor" (p. 30). This implicates that if users knew that APP was not always accurate, they may be less likely to rely on the system, minimizing overutilization. Yet, the authors stated, "However, this is most relevant for tasks where the advice must be requested. If the advice is provided regardless of whether the users have decided that it is necessary, then they may give some weight to the advice and be unwilling to completely discount received information" (p. 30). In the context of framing, because an automatically recalculated plan is the default option of APP, this default carries weight that students may be unwilling to discount – in other words, it is impossible for students to "unsee" the plan once they are exposed to it. Further,

because there is an added hassle to turn off these features, students may be more willing to accept them. Although default options create a primary frame, as described by Kahneman (2003), the costs of interventions need to be carefully considered. When creating additional cues in the system, designers need to ensure that it will not distract the user from their tasks (Sutherland et al., 2016). For example, because the default option in APP is recalculating, one suggestion is to change the setting so students must manually request recalculation (e.g., by pressing a button). This example is applicable to IDS, where if students are constantly interrupted in their tasks, this could cause distractions that lead to errors. Therefore, when considering solutions, there needs to be an assessment of what cues are most effective, at which points, and with what frequency.

Further, Tversky and Kahneman (1981) stated, "We suspect that many concurrent decisions in the real world are framed independently, and that the preference order would often be reversed if the decisions were combined" (p. 455). An effect of framing is the appearance of having to choose between two options (Kahneman, 2003). With IDS, the system defines what an optimal plan looks like. This gives the impression that the choice is binary—either you follow the plan (optimal) or you don't (not optimal). Moreover, as marketed in the IDS video, one choice is "You're on your own," while another choice is the "Optimal graduation pathway." This frames APP positively in comparison to advising, which is assigned a role of lacking or absent support. As implied by advisor responses, without alternative framing, students are missing key pieces of information to truly customize their education. However, it could also be argued (as the IDS vision appears to be doing) that ignoring efficiency for exploration, another binary choice, also leads to serious consequences for students. If considering both are true, is it possible to find a compromise between choice and restriction? One nonuser response suggested an alternative

perspective, where students may already see this compromise built into IDS: "[IDS] is more reliable than a human advisor, because it organizes my academic plan in a very clear and precise way. It allows me to visualize what I am missing/what I need. It shows how different options will affect my grad pathway." This example illustrated that the student was presented with more than one option (exploration) while they also adhered to a plan. With an emphasis on being "clear and precise," defining what the student is in "need" of, and a "grad pathway" as an end goal, this suggests that rather than simple efficiency, the frame of certainty surrounding IDS, or certainty effect (Tversky and Kahneman, 1981), is what attracts students to IDS. In this case, with the emphasis on APP guiding students toward graduation in a timely manner, and the emphasis on graduating on time in the most efficient way possible, APP is framed in certain, quantifiable terms (e.g., four-year plan). This frame capitalizes on the idea that the outcome of education can be calculated, and uses other quantifiable terms such as money (savings). It also implies that following IDS's recommendations reduces risk. If the frame of certainty is greater with IDS, in comparison to college advising, students may be motivated by what they perceive to be the safe choice.

IDS was designed to provide students with a safety net, when other resources, such as advisors, are not available. In the institution's narrative, APP's main function is to help students "recalculate"—a prescriptive function that is based on algorithms. In this context, IDS is undeniably doing its job. As MA13 reflected, "I think that the benefits definitely outweigh the negative outcomes." This parallels Dzindolet, Pierce, and Beck's (2003) findings that perceived outcome value of automation outweighs cost. The penalties of IDS use are not perceived to be high—especially not higher in "cost" than reverting to human "manual operation." However, the question of how technology impacts student use of college advising, and the sociotechnical

complexity behind systems like IDS, requires examining both benefits and costs of outcomes. One important implication is that regardless of intent in design, perceptions and use of the system may diverge from those of designers. As Mosier et al. (1998) suggested, regardless of the intentions in the design of an automated system, the mere existence and use of the automated system introduces new and potentially stronger cues that override previous cues. Thus, while the system is marketed as a tool and not as a replacement for advising, students may inadvertently "replace" advising with this technology. As indicated in the pilot study, some students who were not meeting with their college advisors were using this system for "advice." Although APP is not explicitly marketed in terms of replacing advisors, the positive framing of APP as recalculating the student's "route," in contrast to the negative message of "we're basically telling students 'You're on your own'" can imply that the APP system is a replacement for absent advisors. Further the word "Advising" is prominently featured on the log in screen; the distinction between advising tool and advising is not immediately clear. If students do not meet with college advising, APP may be perceived as an electronic advisor that students reference, instead, and their ability to remain "on track" for graduation is significantly high even without further information seeking. This implicates a further need to clarify the role of the degree audit system in the advising network. Further, Parasuraman and Manzey (2010) suggested that automation can change human activity. This study provides examples of this framework, such as IDS may be perceived a replacement for college advising (e.g., as ST3 stated, students believed they did not need to see college advising because of the APP plan); and, trust in the system can be miscalibrated with system performance, as illustrated in both student and advisor scenarios. The examples presented in findings raise the following questions: If there is an extent to which APP can guide students in their education, what is that extent? Is APP, and IDS on a larger scale,

clearly and realistically presenting its limitations? Can it be assumed that students will not passively accept what the system "tells" them and inherently understand the system's limited role in their educational planning (that education goes beyond counting credits)? Because IDS is a developing system, raising these issues represents an opportunity for stakeholders to understand other potential impacts and unintended consequences this system will have on those using it. In a promotional APP video, it is stated, "We believe the technology construct behind [APP] will cause a paradigm shift that will probably forever change what it means to be on track in higher ed" (STAR4Students). This study indicated that a paradigm shift is currently developing, but potentially one that supersedes values identified by advisors. A focus on recalculation, taken together with the concepts of "optimal plan," "staying on track" and "higher education" have prompted concern that the deeper meaning of what it means to experience higher education is getting lost. Further, by framing APP in contrast to advising (as illustrated in the video), this can give the impression that the system offers more than simply recalculating. To revisit the example of GPS, as Ferreira (2017) wrote, "Today, solid blue lines on digital maps beckon all who seek the best of all possible routes, and train our focus on the moving dot or arrow that represents ourselves." In this context, the questions raised by major advisors suggest that when we see everything as "solid blue lines" and "the moving dot or arrow," we may forget the real individuals and landscapes they represent. Therefore, the effects of framing present issues beyond errors, with a need to consider philosophical questions of the paradigm shift. Wilcox (2016) wrote,

> On my own campus, technological developments have shifted advising functions and roles as many of the classic information-giving responsibilities of advising are now automated[…]. Professional preparation and training of advisors has become formalized

> and more rigorous […] and continuous learning is now widely recognized as necessary to maintaining the quality of campus-wide advising programs. (New Directions section, para. 2)

Considering these technological developments, the author suggested an opportunity to "end to checklist thinking" with learning-centered advising. However, contrary to creating more opportunities for learning-centered advising to take place, the current study raised the question of whether IDS may be reverting students to "checklist thinking." While IDS certainly has had positive impacts on both students and advisors, such as the transparency and accessibility of information, and the ability to view different "routes" to graduation, this study implicates there are also psychological impacts of how students define education that need to be considered. As described by some major advisors, efficiency is the guiding principal of IDS (inclusive of APP). Although the "checks and balances" that APP offers is imperative to improving the college experience, the perceived dominant frame of efficiency—for example, as the "optimal plan"—positions meaningful education as submissive. To return to the framework of sociotechnical systems, MA8's example of lack of messaging on campus indicated issues that were associated not only with technology but also institutional values and messages, which led to inconsistencies in defining higher education (White, 2015). Wilcox (2016) suggested that automated tasks open the opportunity for advisors to focus on learning-centered approaches by relieving advisors of "checklist" tasks. This is what MA8 referred to as instilling "a sense of what this education is about." However, as MA8 implicated, rather than a primary focus, such approaches have become a response, to counterbalance messages of efficiency; while incorporating developmental approaches in their advising, it is minimized ("drop in the pond")—the consistent and promoted support for efficiency, in contrast to exploration, dominates the frame ("I wonder if there's any

will on campus…"). This further raised the issue of whether IDS changed the structure of advising and advising roles: whereas dual advising suggests two advising roles (e.g., major and college), how does IDS factor into this structure? Is it a secondary tool, as its designers claim, or has its role grown to become a "third advisor"? To borrow a concept from Parasuraman and Riley (1997), it must be considered whether human advisor roles are being defined "in terms of the automation." By reducing workload (e.g., redirecting prescriptive tasks that were once done by users), IDS has also added increased responsibility for responding to errors and passive behaviors encouraged by the system. The current study, therefore, presented two contrasting impacts on use of college advising: on one hand, students may perceive IDS as a replacement for college advising; one the other hand, the deficiencies of IDS also adds value to college advising, since college advising is a source of IDS education (i.e., making users aware of biases and errors, and balancing efficiency and exploration). In this context, the risk that college advising will primarily be perceived as monitors of automation, defining the role of human advisors as submissive to technology, must be considered. In this context, two student survey responses stood out: when asked whether IDS was more reliable than a human advisor, they stated, "I prefer a human advisor (to supplement [IDS]) so I can ask specific questions" and "The ideal way is an advisor and I double check the process by using [IDS]." In the first example, the human advisor supplemented IDS, indicating IDS as the primary resource; in the second example, IDS was used to confirm what was said by the human advisor, symbolizing IDS as the authority. What this study implicated is that while users have an increased responsibility to be vigilant when using the system, influential stakeholders, including system designers, have an equal responsibility to account for potential psychological impacts as described in this study.

To further balance perceptions of efficiency and exploration, different frames need to be incorporated into the institutional narrative, which are further represented by IDS. As an example, to reduce framing effects, indirect priming can be built into the system (to adapt findings by Thomas & Millar, 2012). Using this framework, direct priming is represented in advising sessions by having students articulate their interests and what they want to learn, using reflection and critical thinking to direct their choices. In turn, indirect priming can also be built into IDS as cues; for example, a list of keywords describing student interests can be generated to tag courses with matching content, so searches and subsequent results are arranged by keyword relevance rather than limited to surface-level criteria (e.g., times/days, designations). Furthermore, student input can be used to generate keywords to represent what is important to them or what they are seeking to learn. This type of indirect priming encourages growth and development of values that will impact future experiences, aligning with what MA8 suggested is "what their education is about, what they're supposed to be transformed into." Additionally, current cues that are perceived as negative messages can be changed; for example, instead of wording suggesting a course is not in the optimal plan, students can be presented with a message like, "This course is not currently in your plan, but it may fulfill requirements; visit your college advisor to discuss how this course will impact your plan and explore your options." This type of message encourages students to pursue alternative routes outside IDS. Further, as students indicated, alternative messages such as X took Y course or aligning the plan with goals can be helpful. However, the paradoxical nature of recommendations was raised in this study; on one hand, as MA2 described, this could be leading students toward choices rather than encouraging critical thinking, yet, on the other, it could also help students find different classes based on alternative criteria (as ST3 suggested, not for obvious reasons such as sequenced courses, but to

discover choices such as electives). To revisit the concept of recommendation systems (Wharton School of the University of Pennsylvania, 2015), do recommendations really help users to discover something new? While recommendations can provide an alternative frame encouraging students to explore different choices rather than focusing on limitations, this must be combined with "other sources of discovery" such as advising—this needs to be a more apparent message. As MA9 stated, students "seem to be unaware of a lot of the resources that the university provides for them." Finally, although IDS was intended to provide a more accessible "checklist" for students and not a replacement for advising, as ST3 asserted, student perceptions that IDS and the plan provided by APP are accurate are cited as reasons for non-use of college advising. The inclination to double check information from a trusted source appears to be low (as suggested by Tseng & Fogg, 1999). Although unintentional, the positive frame of APP can encourage this perception. While cues may currently be present in the system, they are not strong enough to capture students' attention; factors such as position and wording should be considered. To help students calibrate their trust and reliance, a visible message that conveys IDS may not be 100% accurate can be included in IDS as a form of priming. While the framework of automation bias suggests that errors of omission are related to diminished vigilance, framing suggests that presenting the system positively, whether implicitly or explicitly, as a reliable resource can result in users choosing not to pursue outside resources that cue them toward potential issues in a timely manner, just as MA11 described. Perhaps this can be explained as a discrepancy between a trustworthy system and a trustable system. Lee and See (2004) differentiate between trustworthy automation and trustable automation, stating,

> Trustworthy automation is automation that performs efficiently and reliably. Achieving this performance sometimes requires very complex algorithms that can be extremely hard

> to understand. To the extent that system performance depends on appropriate trust, there may be some circumstances in which making automation simpler but less capable outweighs the benefits of making it more complex and trustworthy but less trustable. (pp. 74-75)

Although IDS is marketed as a trustable system that aids students with important planning and decision-making processes, it may be erroneously perceived as a trustworthy system because the difference is not clearly distinguished. Further, even if prescriptive information is correct, other decisions might not be appropriate for the individual student, including certain combinations of courses, as described by MA11, which can involve how they are doing and any difficulties they face (that might not be apparent on paper), as described by MA2. This is especially problematic when considering some students prefer being told what to do to reach a perceived correct answer, as described by MA2, because one path for one student may not be "right" for another student. While MA14 stated that issues can be "pretty easily resolved" when students meet with an advisor, this assumes that the student is aware that something is wrong with their record (e.g., what they expected doesn't match what they see). However, the question remains, what happens when students are not aware of these issues?

The framework of sociotechnical systems also raises the larger question of framing issues that predate IDS, such as the impact of the institution's curriculum. For example, it could be argued that "checklist thinking" is not only philosophical, but results from a curriculum that resembles a checklist. In this context, if students are choosing courses based on efficiency—how many requirements they can "knock out"—this indicates a potential systematic issue with the way requirements are designated. Consequently, rather than focusing solely on IDS and advising interventions, one potential question is, how can requirements be redefined to focus on the

content of the course rather than how many abbreviations it fulfills? This is one instance of looking at the "whole system" and exploring alternative narratives that future research can explore. Taken together, the effects attributed to APP and IDS may also be explained by other, non-automated factors.

5.2.3 Satisficing. The framework of satisficing was applicable to sociotechnical aspects of student and advisor responses. While on one hand, the affordances of IDS are used to positively frame the system, which can influence student perceptions of its reliability, on the other, student needs and expectations also influenced the design and use of the system.

Satisficing is related to the existing boundaries of one's knowledge. In a satisficing scenario, students do not choose the best option after considering all possible options; instead, they choose a good enough option after seeking a minimum amount of possible options to make their decision. This minimum amount is subjective to the student. As an example, if a student perceives choosing courses that follow APP's optimal plan as their goal and believes that choosing the first course from a list that fits the plan as a good enough option, pursuing further options—and, consequently, using college advising—will be considered unnecessary. In this study, satisficing was explored in two contexts: passive behavior, which some major advisors described as choosing the first option that fits minimum criteria from the top of the list rather than scrolling down; and strategic satisficing (Warwick et al., 2009), in which students seek shortcuts to save time, while also making informed choices. While student interview responses did not indicate passive satisficing, this was a small sample and does not discount the concerns expressed by major advisors. Further, although it was indicated that satisficing is encouraged by IDS, as found in a study by Hadar (2011), passive satisficing beliefs were present with high school students, indicating the issue predates interaction with IDS. While MA7 suggested

teaching students about an alternative resource where availability of classes are listed on a webpage rather than a drop down menu that requires scrolling, as MA10 responded, satisficing behavior (choosing from the top of the list) was also present when students used this webpage, which had been available prior to APP. In the same vein, students may enter the university with the conception that the minimum requisite—checking off requirements—defines what it means to have a good plan. As implicated by Hadar's study, students perceive following instructions given by an authority figure (i.e., teacher) as a major conception of learning; this is translatable to following what APP, a symbol of authority, presents to the student. These examples, again, suggest sociotechnical issues which require consideration of automated (alphabetical lists) and social (cognitive limits, need to teach students) factors.

MA12 suggested that it is "the advisor's responsibility to make sure that students understand all the nuances of APP and become active participants in their own registration process." This approach included working "with the student to make sure that they know how and the reasons why to use [IDS]. Normally this occurs at the first or second appointment." In this scenario, the learning (through advising) takes place outside of the IDS system; this positions the role of IDS as secondary to advising and aligns with the perspective that the IDS system was built to supplement advising. It also assumes that advisors would be available to sufficiently educate students on the use of IDS; this setup requires all students to meet with advisors who can provide this education. However, this exposes a gap in design: as previously examined, a motivation for APP's design was "restricted institutional budgets and high student-to-advisor ratios." Advising in AS1 presents an example of this constraint: students are required to meet with their major advisors, but not college advising, since there are not enough college advisors to meet with all students every semester. Yet, major advisors are not always equipped to

educate students on the nuances of IDS (e.g., as some major advisors described, they only use IDS in the context of their major, do not know what the student interface looks like, or do not use IDS). Despite this gap, because students are entering the university with preconceived beliefs and behaviors, early education is imperative (e.g., advising incoming students[21] within the first few weeks of school, or, if possible, before and during registration periods before students enter campus). As the context of strategic satisficing suggests, student use of "shortcuts" can be turned into a benefit when combined with education on information seeking and assessment (Warwick et al., 2009). Satisficing can also have a positive influence on students' decision-making processes when students have the skills to make the best decision under pressure (e.g., limited time, multitasking, risks) (Parker et al., 2007). Educating students to use IDS involves helping students to develop strategies to make decisions efficiently, yet to be aware of resources with which they can pursue more than one possible answer, and compare options. To avoid a technology-centered approach, education on strategic satisficing should not be equated to a "how to use IDS" lesson. Rather, one framework to consider is information literacy (IL), which is defined as "a set of abilities requiring individuals to 'recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information'" (American Library Association, 2000). As this study implicates, passive satisficing can result from a gap in IL. Because college advisors are knowledgeable about IDS and regularly interact with features in IDS that students use, college advisors are positioned to provide IL education for IDS. As Tukey (1996) asserted, "Students are not passive recipients of information and influence. Students need

[21] Incoming students is used here to indicate all students entering the university, including transfer students. These sessions are relevant to students with previous higher education because they would be encountering a system, whether at a micro or macro level, that is different from their previous institution.

to be empowered to seek out and sift through information pertinent to their needs" (p. 9). Although resources are limited—as indicated by the design of APP—IL education if foundational and must be offered to students in a timely manner. As MA13 described, students can remain unfamiliar with helpful features in IDS, such as filters in APP, until someone explains and demonstrates the features to students. Likewise, lack of competence with the IDS system is one possible reason for passive satisficing (e.g., using an alpha list rather than filters, which increases time to find information and make decisions). If individual sessions are not feasible, other options such as group sessions or incorporating lessons into classes can be explored. Although webinars or web tutorials are also an option, as Latham and Gross (2013) found in their study of IL instructional preferences of first-year college students, students "preferred small face-to-face classes" rather than online instruction (p. 440). Hands-on learning was also mentioned as a favored approach (pp. 439-440). However, the authors also asserted, "One of the biggest challenges is how to motivate students so that they are receptive to learning new skills. In the case of the standalone workshop, students often fail to see the relevance of the instruction to their academic work or their personal lives, and the resulting lack of interest and low motivation create obstacles to learning" (p. 430). Findings from their study can inform the development of future college advising sessions. For example, students "mentioned incentives as a very important issue […]. Students said they would be likely to attend such a session if it were required, or if it offered course credit, extra credit, an opportunity to improve their grades, or food" (Latham and Gross, 2013, p. 440). Further, "Students said they would not be likely to attend an information literacy instructional session if they felt they already had the skills and/or they felt the class had no personal relevance to them" (p. 441). These findings align with MA1's suggestion that students need to see a "benefit" or "consequence" and MA10's suggestion that

students who need help ("kind of adrift") do not seek advising. Similarly, MA3 described their experience with the challenge of attracting students to events: "I think what tends to be frustrating is that you think about advising or mentoring just in general […] you have this information, you have your services, and you want to be sure that everyone knows about them and takes advantage of them. So you plan things to be available, then nobody comes." Taken together, these findings suggest that (1) the session must be contextualized, (2) the session must be incentivized, and (3) students may not seek help on their own. Making the session mandatory addresses the latter issues: it is required (incentive) and is a proactive approach (not waiting for the student). Making the session mandatory—whether through a registration hold, or incorporated into another mandatory task (e.g., a workshop in a required course)—does not rely on the student's ability to assess their needs. However, it is also important to consider that unskilled students, even when required to attend IL education, may not engage with the lesson (Gross and Latham, 2007), which is implicated by findings in this study. Therefore, the session needs to be contextualized so it is relevant to the student's personal wants and needs.

Although educating students through advising can have an impact on their use of IDS, advising is considered an external cue. As the GPS example from Sutherland et al. (2016) illustrated, external cues, regardless of their importance, can be ignored in favor of cues within the automated system. Therefore, technical considerations internal to IDS are also necessary. This is especially relevant when considering students encounter IDS before being in contact with an advisor. As student interviewees indicated, students learn to use IDS from peers or try to navigate without any mediation. They may not have access to an advisor prior to using IDS, which implicates that the necessary education beyond IDS is not available to all students in a timely manner. Although acknowledging IDS may not cause satisficing, because it may be the

first system that students encounter, the cues within IDS that are incorporated into the system's workflow can have an impact on whether students continue to pursue satisficing. In this study, reordering items in APP was suggested as a potential option; however, it presented other issues that need to be considered as MA10 implicated. Alternatively, different criteria can be used to present results to students. For example, if students were required to rank their top 3 keywords, the list could be defaulted to order by relevance. Giving the student control over reordering the list would also empower them to choose how they view the information (e.g., choice between "order by relevance," "Alpha A-Z," "Alpha Z-A" and the like). Another option is incorporating short lists into APP. Short lists, as described by Schnabel, Bennett, Dumais, and Joachims (2016) in their study of a movie recommendation short list, are "a temporary list of candidates that the user is currently considering" that "remove cognitive constraints that hinder effective decision making" (pp. 987-988). The authors described short lists as different from favorites lists because short lists are a "temporary way of keeping track of items that a user found interesting in the current session," and "visible all the time, making explicit consideration of and comparison with all previously viewed items much easier." Further, shortlists in their study were "manually curated and only contained items that users expressed explicit interest in" (pp. 988-999). Shortlists would provide an additional cue to look at different options and compare them (i.e., rather than just choosing the first option they see), while also allowing students to choose items based on their explicit interests. Assuming that satisficing is a strategy to reduce cognitive load, shorts lists can add to this strategy by relieving the need to memorize choices, while also encouraging students to explore options. Because a shortlist is based on short-term decisions, the ability to compare sessions-based interests can help the student flexibly. In Schnabel et al.'s study, users were more satisfied with their choices using a shortlist than no shortlist.

This study implicates that satisficing is a result of both social and technical factors, some of which predate students' entry into the university. Although, as MA7 suggested, these issues appear anecdotal, the presence of satisficing beliefs and behavior in students, as illustrated in Hadar (2011), indicated the need for further examination. Satisficing is present in student conceptions of learning in high school (Hadar, 2011) and such beliefs and behaviors influence how students approach conceptions of learning in college. However, while satisficing can impact how students approach use of APP, and IDS enables satisficing, the system can also assist students with being proactive and exploring a range of options. Future research can track the issues and variables implicated in this study, for systematic analysis, as the IDS system matures.

5.2.4 Convenience. Although "human interaction" may be preferred by students (Yanosky, 2014), actual information seeking behaviors may contrast preferences. If students can find information elsewhere, and do not perceive a need to use advising, they will choose a more convenient route. The convenience of technology, ranging from email correspondence to the automated degree audit system, can have an impact on student use of college advising. Although past literature has shown that students prefer face-to-face contact for reasons other than making an appointment or simple questions over email (Noonan & Stapley, 2015) and over technology-based advising tools (Kalamkarian & Karp, 2017), the current research found that student behaviors may not match these preferences due to inconvenience, which involves time and effort (Fast & Campbell, 2005). From the theme of convenience emerged the context of workflow (Connaway et al., 2011). As MA1 illustrated, students primarily emailed MA1 with formal advising questions and continued to make an effort to meet with MA1 informally. This allowed students to obtain timely responses to priority issues without added barriers, while giving choice to pursue further in-person interaction. Additionally, by being more available to students using multiple technologies, MA4's increased accessibility provided greater opportunity to develop a close relationship

with their students; this implicates a contrast to the belief that technology poses a gap in advisor-student relationships (Golubski, 2009; Joslin, 2009). Convenience is relevant to how advising interactions are defined. As an example, at the beginning of this study, in collaboration with college advising in AS1, the population "nonusers" was defined to include students who had completed "express" appointments (10 minutes or less) because such short appointments were not considered as substantial as a full appointment (i.e., students were not getting the value of a full appointment). However, when considering that formal advising can take place over email in other units, and the building of relationships occur beyond formal advising, this can reframe definitions of users and nonusers. Subsequently, interactions that occur outside a shared physical space do not indicate reduced effort to form a relationship between advisor and advisee. Allowing students to interact with advisors in spaces where they already work—including an asynchronous workspace like email—may attract students by providing more access to college advising. At the time of this study, use of email and phone was restricted by AS1 college advising: for example, in some situations, students had been told their questions could not be answered over email because the answer was complex, or phone appointment was not available because materials were unavailable in electronic format. While this may have been acceptable in the past, to borrow concepts from Connaway et al. (2011), continuing with these restrictions expects the user to build workflows around college advising systems and services. Due to the changing nature of being a college student—which includes an increasing number of obligations on and off campus—college advising must consider how it can build its services around user workflows.

Although advisors and students recognize the value of interpersonal relationships, due to the diversity in students' schedules, it is suggested that college advising not restrict access to advising by phone and email. This will require college advising to not only make materials and information accessible in electronic formats but to rethink curricula to fit these communication

methods. Without further consideration for convenience, college advising may continue to see a pattern of non-use, especially in cases where students feel they can get the answers quicker and with less effort somewhere else, as reflected in Allard and Parashar (2013). Just as Latham and Gross (2013) stated, students "prefer the Internet and people as resources, but they place little emphasis on information quality" (p. 431). This indicated that even in cases where information quality is questionable, students might opt for convenience.

The theme of convenience also implicates IDS as a powerful tool that can be harnessed as an additional "space" for college advising to build services. A significant benefit of IDS is that the system is designed around students' workflows. As MA13 stated, "it definitely translates to how students are navigating the world now, through technology, and the platform is fairly, I think, easy to use." It is where students register, keep track of requirements and view their transcripts, and the system is accessible anywhere. With the availability of technology that builds systems and services around the student's workflows so well, this might raise questions about why better integration with student workflows are not readily offered by college advising. Lack of incorporation into workflows can therefore lead to perceptions of unnecessary obstacles. For example, rather than requiring students to access another platform (e.g., log into email), or search for advisor contact information, a chat function can be built into IDS, with which students connect to advisors in real time, and allows students to leave messages when advisors are offline. The system can further cue students to seek additional advice or information during tasks in APP; for example, if a student seems to hesitate in making a decision (e.g., due to a pause in activity), the system can automatically offer the option to chat with an advisor as a pop up. However, in addition to requiring the ability and interest of IDS programmers to incorporate these features into the system, advisors must also be willing to meet students in this space. As

indicated in earlier literature (e.g., Golubski, 2009; Joslin, 2009), advisors may be wary that by making access to advisors more convenient, a result is sacrificing opportunities to build meaningful relationships with students. This may also raise concerns about moving toward a "customer service" approach rather than teaching moments valued by advisors. However, as suggested by MA1, convenience and advising values are not mutually exclusive, and as illustrated by MA4, technologies can be used to further develop open relationships with students. Students can seek close relationships with their advisors but perceive advisors to be "too busy" and inaccessible (Allard & Parashar, 2013), resulting in non-use of advising. As the examples in this study implicate, sacrificing relationships for convenience is not determined by the technology; instead, how the technology is used is key to finding a balance.

Another issue that was raised is the limitation in how students can schedule appointments with college advising. At the time of this study, college advising in AS1 did not accept appointment requests through email and there was no online appointment system, which may have decreased the approachability of college advising especially for students who are able to make appointments electronically with their major advisors.[22] As announced by IDS developers in summer 2018, a new scheduling feature was built in IDS and available for use effective Fall 2018 (Nishida, 2018). If advisors choose to use this feature, it will give students greater access to advisors' availability and further clarify who students can contact for help. Just as one AS2 nonuser suggested, the problem of how to "find my advisor" indicated that the system may be (inadvertently) "hiding" information about advising. On one hand, this scheduling feature can offer transparency of information. As described, the introduction of the scheduling feature can

[22] Not affiliated with this study, college advising plans to implement an online appointment system.

help advisors identify inefficiencies and align with best practices by increasing availability to students. On the other, questions such as whether the feature provides a strong enough cue for students to interact with advisors, and how to avoid automation abuse (Parasuraman & Riley, 1997), need to be considered. Questions such as these can lead to further development of the system—for example, combining the new feature with the concept of adding stronger cues to create a pop up "Make an appointment with your advisor" message that links them to the scheduler in weeks leading up to registration.

One issue that remains is that regardless of increased accessibility and immediacy of interaction with college advisors, college advising will need to compete with information that does not require human mediation. Convenience considers both time and ease of access; therefore, even with increased availability of college advisors, studies suggest students will opt to use non-mediated resources, such as those found through Web searches, over advising if they perceive it to be time-saving (Fast & Campbell, 2005; Connaway et al., 2008). Even virtual access to experts is perceived to be less convenient than searching on the Internet, with tasks such as typing into a chat box seen as more time-consuming than Web search (Connaway et al., 2011; Connaway et al., 2008). Although the transparency of information and increase in available resources has positive effects, to borrow MA8's inquiry, "What else can college advising offer?" The examples given by major advisors implicates students contacted the advisors because the advisor's attention on the matter was needed to offer assistance, and this need could not be met elsewhere. Although students seek human interaction (Noonan & Stapley, 2015; Yanosky, 2014), they may feel they can find this interaction elsewhere, as described by MA14; therefore, emphasis on caring and personal college advisors in proactive advising outreach may be overlooked in favor of convenience.

5.2.5 Performance and trust. As described, some students perceive IDS to be more reliable than human advisors. This perception was based on past experiences of the respondents, in addition to the features and affordances of the IDS system. In one case, the student described a negative experience with a human advisor that influenced the student to view IDS as more reliable. This connects to Lee and See's (2004) assertion that trust and reliance, while related, are not equivalent; the student did not state that they found IDS reliable because they trust it; rather, it was based on decreased trust of human advisors. Students may also view the automated system as more "objective" than human advisors (Dijkstra et al., 1998). However, errors are also possible in IDS. This raises the question, if the same perceived errors attributed to advisors had been experienced when following an APP plan instead, would the student have perceived the program to be biased? The student response regarding experiencing an issue but continuing to find IDS more reliable hints that this is not the case, but factors including the "severity" of the issue might impact this perception. Likewise, would experiencing errors in APP and no errors in human advising have an impact? These are issues that remain open.

Further, it was notable that students who responded that IDS was equally or more reliable than a human advisor described "reliable" features and affordances that were not necessarily capabilities that increase accuracy; instead, they largely reflected personal preferences. Likewise, it can be argued that human advisors also possess some or all of these capabilities. While this may relate to preferences for resources over information quality (Latham & Gross, 2013), or the expectation that automation outperforms humans (Dzindolet et al., 2002), the question of why these features and affordances were seen as "reliable" in IDS (but, for example, not in humans) remains.

Another potential factor of perceiving higher reliability of IDS is that it is an extension of the institution (Lee & See, 2004; Li et al., 2012; McKnight et al., 2011). Institutional trust is based on the perceived guarantee offered by the institution (McKnight, 2005); as discussed, accountability can impact trust. In this scenario, students may see the individual advisor and institution as separate actors, with the institution offering higher accountability. However, due to the complex sociotechnical system involved, the question of who is accountable for IDS errors remains. Because IDS is a homegrown system, the institution that designs the program is one possible answer; however, a university is made up of several divisions—for example, IDS developers are in a different unit (both organizationally and physically) than several advising units that use the system (dividing programmers and those with curricular expertise), and others who input information into Banner, from which IDS pulls information, are also housed in different units. Notably, when MA15 was asked "Who do you think [IDS] programmers talk to?" they responded, "I don't know. Their software people in the mainland or wherever they get the things from." This indicated that some IDS users, including key stakeholders, are unaware that IDS is a homegrown system, that resources are directly accessible on campus, and the extent to which the institution is responsible for developing the system.

While the sociotechnical system of IDS would suggest that several units share accountability for the system, because advisors are on the "front line," have curricular expertise (they are also closely involved in the production of materials such as program worksheets and four year plans that are used to program IDS), and, in extenuating situations, have the authority to make curricular exceptions, major advisors and college advisors are positioned as monitors who are accountable for identifying and reporting errors. In some cases, advisors are tasked with resolving errors through manual input when they cannot be fixed otherwise. Further, the speed of

programming and the ability to fix errors does not always match with the identification, and in some cases complexity, of the errors—for example, not all systematic issues that are reported by college advising to the IDS staff are fixed immediately (or fixable). In one example, MA4 stated that IDS "hasn't changed fast enough to accommodate [the department's] need." Philosophically, it could also be argued that students are accountable for confirming the information. However, in both scenarios—placing accountability on advisors and students to identify issues—the frameworks of automation bias, framing effects, and domain knowledge show the added complexity of diminished vigilance, lack of knowledge and skill to identify issues, and the perceived reduced risk afforded by IDS. Additionally, to revisit the concept of automation abuse, (Parasuraman & Riley, 1997), this defines the human operator's role in terms of the automation. MA4 described,

> DR was telling us obviously as an advisor you can move things around, but I don't touch the student's record because I know that if I make a mistake it will mess up the student's record. So, I know it's extra work for [college advising] but I just note it down on the [graduation form] so then the substitutions are just noted there, I don't change the student's record.

Who is accountable for this information in IDS? As illustrated by this example, there is no simple answer. The question of accountability for this system remains an area requiring further exploration.

5.3 What Impact Does Informing Students About Advising Have on Student Use of College Advising?

5.3.1 Method of communication. While Schwebel et al. (2012) suggested that phone and email contact increased student contact with advisors, this study implicates that email may not have a strong impact compared to phone interventions. While conclusions about the strength of phone outreach cannot be made, as MA10 described, the questions of whether students check their email, and how impactful email is, were raised. Considering email is commonly used to communicate with students (Pasquini, 2011; Pasquini & Steele, 2016) and previous literature found a preference for "using email as the vehicle of engagement with academic advising and information dissemination" (Gaines, 2014, p. 47), these are important questions to consider. Because email was selected more than other sources from where students learned about their advisors, this implicates that email has a wider reach to students than other sources of information. However, it must be noted that the motivation for students to visit advisors may differ from when they learned about advising. For example, hypothetically, they may have learned about college advising in an email, but a referral from a major advisor may have motivated the student to actually visit college advising. This was also implicated in student survey responses indicating they had not met with their college advisors (AS1) or major advisors (AS2) despite knowing about these services. To revisit the assertion of Junco et al. (2016), how advisors relate to students "matter more than the modality used." Relating to students is inclusive of not only content but "tone" of an email. One thing to consider is the two messages emailed to student were neutral in tone (i.e., they were informational and did not require the student to take action). As seen in the example provided by MA6, the major advisor's email indicated a consequence, what was referred to as "scary." Although the marketing communication designed

for this study did not explicitly state that the appointments were optional, students who received phone calls may have perceived the appointment to be mandatory or needed due to the potential tone of importance or urgency conveyed through the medium. Additionally, the current study incorporated an online quiz as an activity to "nudge" students; however, because most students did not complete the online quiz linked to the second email, information would likely be best contained in the body of the email rather than linked to a secondary source such as an activity.

Although Skype was offered, no students used Skype. Of types of appointments, in-person was chosen by most students. This mirrors findings by Gaines (2014) that students preferred in-person appointments, and least preferred Skype. One possible reason for avoiding videoconferencing is that if students are not already regular users of Skype, the platform is not familiar to them and would require them to download additional software, in addition to a learning curve. A related issue may be anticipation of technical problems associated with videoconferencing. Further, considering students indicated do not have time to meet with advisors, both phone and videoconferencing options do not offer significantly convenient solutions. Despite email as a preferred interaction type of students next to in-person (Gaines, 2014), asynchronous communication, such as email, was not considered as regular advising for this study, based on the parameters determined by college advising. If other forms of communication, such as email, chat, or text messaging are utilized in regular advising (i.e., significant communication with the student for formal advising), this may yield different results.

Multiple messages and communication channels can also overburden students, resulting in avoidance behavior. This can result in important emails being "buried." During one observation, when the student presented their reason for the appointment, the student mentioned they had scrambled to make an appointment with the major advisor because they had only

received an email from college advising reminding them of the graduation application deadline a week before; however, declared students are supposed to receive timely email reminders prior to the deadline. While the exact reason for the delay is unknown, it is possible that the student received an earlier email but did not see it due to receiving multiple announcements at the same time. Nonetheless, unless receiving proactive advising outreach, students may not take initiative to seek advising; for example, one AS2 respondent stated "lost the document saying who my major advisor is" as a reason for non-use, which raised the question of why the student did not obtain another copy of the document.

Although MA1 described using Facebook as a method to push information to students, it must be noted that this platform attracted an already existing market of users who had an established relationship with major advising. Whether social media such as Facebook would impact nonusers remains an open question; notably, previous studies found social media can negatively predict advising experiences (Junco et al., 2016, p. 60) and students have perceived university-affiliated social media as "a spy tool" (Connell, 2009, p. 33).

A question that remains is whether the frequency of communication had an impact; on one hand, some students could have received as little as two emails and one phone call, while on the other, students could have received four emails, a phone call and an in-person reminder (e.g., if they had declared a multiple major, were close to graduation and also part of the mandatory advising population). For some students, frequent communication may have had an impact, while for others, the final method of a phone call might have had an impact, regardless of the number of other interventions.

Finally, because 110 students (who did not apply for graduation or exit the college) did not meet with college advising, it must be considered that some students may never respond, regardless of the

type of intervention, as suggested by Tennant (2013). MA10's example indicated that some students were nonusers because they did not intend to stay at the school (e.g., may be seeking advice from their future institution, instead), or did not invest time in navigating the system because of their short tenure at the university and having the information they feel they need. Further, in findings by Latham and Gross (2013), one student stated they could not be reached except by word of mouth (p. 441). MA7 and MA10 indicated that even with mandatory advising initiatives, some students do not seek major advising. Further, even when students are referred to other advisors, some students do not follow through. The question of how these students can be reached—or if they can be reached—remains.

5.3.2 Credibility and accountability. In discussing the technology sub-question, trust in technology as an extension of the institution was considered. Conversely, in the example of the student who perceived differences between two advisors, the advisor who "did not lead" the student "in the correct direction" was described as benefiting the university. The advisor was also seen as an extension of the institution; in this case, the institution was perceived as a source of distrust, in opposition to the student's interests. The student's personal experience, or knowledge-based trust (McKnight et al., 2011), was based on the student's assessment of the larger education system as "skewed." Based on the student's first-hand experience, the student judged the advisor to be intentionally misleading. The student defined time and money as costs. Although the student did not elaborate on their reason, it was notable that the student judged the advisor's actions as based on an intentional bias rather than a mistake or other circumstance. Although it is possible that the advisor disregarded the student's needs, the student did not articulate other possible reasons the advisor may have advised the student about the course (e.g., although in hindsight the student "didn't need the course," the advisor may not have foreseen some other circumstance at the time of the appointment; at the time it appeared the student

needed the class for elective credits; or miscommunication may have occurred), nor are alternative perspectives implicated (e.g., that graduation rates are a benefit to the institution). Tseng and Fogg (1999) described different ways people judge a person or thing to be credible. Reputed credibility "describes how much the perceiver believes someone or something because of what third parties have reported" while presumed credibility "describes how much the perceiver believes someone or something because of general assumptions in the perceiver's mind" and experienced credibility "refers to how much a person believes someone or something based on first-hand experience" (pp. 41-42). In the given example, loss of college advising's credibility related to both presumed credibility (student's perception of institutional bias) and experienced credibility (meeting with two college advisors). The lost credibility may have also impacted how the student perceived future interactions with advisors—whether college advising or with other advisors such as in the major—as indicated by their response, "I learned to really question my advisors." Further, as this study found, students valued information from their peers and reputed credibility (e.g., hearing stories of other students) could impact student perceptions (Vianden, 2016). If the student in this example decided to share their experiences with other students, this could lead to reputed credibility that influences how others perceive college advising. MA14 also described how students perceived an "ultimate gate keeper" that would prevent them from graduation; this represented presumed credibility, which stemmed from existing anxiety or mistrust with the institution.

This study implicates that greater accountability could lead to greater credibility for advising, as described by MA14. If accountability taken by the human advisor is perceived to be greater than the accountability that can be provided by the automated system, students may be more apt to using college advising. Although high internal accountability can be more impactful than social accountability alone

(Skitka et al., 2000), feeling internal accountability can lead to further buy-in for external accountability; MA4 described this in terms of "I know that if I assign it, but if this advisor doesn't do it correctly, it will come back to me as coordinator, so I'd rather do it myself if I'm not sure. If it's me, at least I can own up to my mistake, and I can track and do the history and why the students took these courses because I advised them." Although advisors may claim to take responsibility for their errors and to hold students harmless, this requires advisors to recognize their errors. Further, accountability is often contextualized as "directability"—"the degree to which the trustor can rapidly assert control or influence when something goes wrong" (Hoffman et al., 2013, p. 84)—which highlights the ability for an advisor to identify a problem and offer a solution with immediacy. Conversely, mistakes can occur days or months before it is "caught." Some advisors may not remember giving advice (or may no longer be at the institution), and, consequently, cannot recognize or take responsibility for their error. Although Grites (as cited in Academic Impressions, 2012) asserts that in the framework of advising as teaching, "You can advise a student in a five-minute encounter when you run into them at a local retail store or at a cafeteria, if you understand advising as a teaching role" (Faculty Development section, para. 4), how can advisors take accountability for what they tell students during these interactions? This poses a potential gap in accountability; when advisors are limited in directability, but possess internal accountability (i.e., wanting to take personal responsibility) and/or social accountability (i.e., department assigns responsibility), how can these be reconciled? Reflecting on the issue of roles, advisors must not only delineate roles between advisors, but also differentiate between "official" advising and other interactions. One representation of official advising is documentation. For example, during and/or after each advising meeting, advisors should be required to take notes to document the information that was shared with the student, so advisors can later reference those notes. Further, while some advisors keep internal notes (e.g., on paper), because advising takes place in a system where students can obtain

information from multiple sources, transparency is a related issue. With internal notes, students and other advisors do not have access to the information from the appointment unless the information is requested directly from the advisor (e.g., by phone or email). In these situations, students often mediate information between advisors ("My advisor told me…"). This indicated "unclear communication channels" and separation of offices "with little interaction" (Allard & Parashar, 2013). The capability of IDS to write advisors notes in a shared space presents a potential solution. To make the information more transparent, advisors can include relevant information in IDS advisor notes, where notes can be accessed by students, advisors, and other campus stakeholders who have security permissions. This would help other advisors to also identify who the student is working with; as discussed by MA2, it is helpful to know which advisor the student worked with, rather than "somebody." The mapping of the student's education through advisor notes, including where they visited, who they talked to, and when they used the resource, can further serve as a bridge between the different advising systems that were described in 4.1. Additionally, the ability to share notes can help advisors to create a stronger sense of continuity; continuity is key in building relationships between students and advisors, as seen in three of the observed major advisors: when meeting with students they had met with before, they knew what was going on with the student individually, which helped the major advisors to follow up on what was discussed previously, ask student-specific questions, and anticipate potential questions or issues that were implicit. Yet, this presents a third issue, which is the added responsibility of posting transparent information. For example, because advisor notes can be seen by anyone who has access to them, the advisor must be vigilant about what is written for current readers and consider potential future readers who may gain access (e.g., government employers' requests for security clearance, legal circumstances). Thus, posting advisor notes, which appears as a simple task on the surface, has significant conditions and implications, and responsibility falls on the advisor to learn the system, including related rules and

regulations (e.g., what not to write in students' records). Major advisors may hesitate to use IDS because they perceive the costs (e.g., learning curve, security tests required to gain access, having to enter advisor notes online) to be greater than benefits. This can lead to hesitation to use the system, as described by MA4 and MA6. While much of the discussion of automation illustrated overreliance in automation, the perceived risk involved with use of IDS for advisors can result in automation underuse. As Parasuraman and Riley (1997) discussed, "Few technologies gain instant acceptance when introduced into the workplace. Human operators may at first dislike and even mistrust a new automated system. As experience is gained with the new system, automation that is reliable and accurate will tend to earn the trust of operators. This has not always been the case with new technology" (p. 244). In some situations, the ability to assess when and how a user should trust an automated system can be an overwhelming task, especially when the user does not have expertise or experience with that system or automation in general. This can lead to situations such as underreliance, even in circumstances where the automation can improve the user's performance (Hoffman et al., 2013, p. 85). The initial experience or perception of the system, including workload (and potentially other upfront costs such as gaining access and learning how to use the system) and perceived risk, whether experienced or shared by a third party, of the system can deter use, regardless of the benefits. As two advisors stated, even when they learned about features in IDS that they wanted to try, access was blocked. While overreliance on automation can result in serious consequences, such as second-guessing and substituting correct answers for erroneous responses (Alberdi et al., 2009), the outcome of underuse is to overlook benefits such as reducing cognitive load by storing information (e.g., reducing need for memorization), the ability to quickly execute simple functions (e.g., calculating a grade point average) to aid in efficiency for multitasking, and providing a "second opinion" to identify potential human errors (e.g., if IDS is showing a different solution, the advisor will double-check the answers). A balance between

overreliance and underuse requires further consideration. Just as overreliance impacts use of college advising, underuse can impact advising in two ways. First, with underuse in the context of lacking competence with using the system, it reduces the advisor's capability to relate to the student's experience of planning their education. Therefore, while advisors do not have to use the system in their appointments, because all students are required to use IDS (at minimum to register for courses), the ability to address the tools and issues in IDS that are relevant to each advising unit should be as ubiquitous as its use. Just as one observed advisor demonstrated, while they did not regularly use APP, they were able to show their student how to use a search function in APP to filter course options. Second, shared information provides a holistic view of the student's record by creating a map of the student's interactions: who they consulted, what was discussed (including any changes in their record), and any follow up action that the student must take; underuse, consequently, potentially leaves a gap in the student's record. Contextualizing accountability as an advantage for students rather than a consequence for advisors can reframe it from a risk to a reward. Although advisors must undoubtedly practice vigilance when posting advisor notes in a shared space like IDS, how advisor notes can ultimately improve communication and transparency within a student's advising network must be emphasized. As MA3 suggested, with IDS, "like any tool, sometimes you discover that it can do more things than you thought. So, again, my view is that it's a cultural thing: you're getting used to it and this is what we do. And, if you become used to it, then not only will it not be complicated, it'll be something that smooths the way for the sort of thing you have to do. That's the optimistic view."

Notably, MA4 suggested that although training for an experienced advisor may not be effective in building confidence and self-efficacy, training for a novice ("someone new") may help to alleviate some technology-based fears. Similarly, MA6 suggested that newer faculty in the department were more willing to write advisor notes because it was perceived as part of their

duties: for new advisors who “don’t know” otherwise, advisor notes may be perceived as a natural part of their workflow and advising culture. This might be explained by default trust and deliberate trust, as described by Hoffman et al. (2013). Default trust occurs when an individual trusts technology without requiring much consideration; trusting that an external drive will automatically back up information is one example; conversely, with deliberate trust, an individual thinks deliberately about the technology before deciding whether to trust it (p. 85). In this context, the novice advisor who sees entering IDS advisor notes as part of their advising culture may have automatic trust in the process of writing the note. However, in the scenario presented by MA4, deliberate trust is, instead, based on considering the consequences of posting potentially sensitive information in the note and the availability of the note to a wider audience, with the option of not entering notes. Although the perception of risk is extremely relevant and not unfounded, the lack of transparency can leave a gap in the student’s record that impacts college advising’ ability to look at the student holistically. Standard information such as student transcripts do not always reflect the student’s situation. Shared information, such as found in advisor notes, can provide an additional cue, as described by MA9. In this context, if a major advisor notes that the student needs to follow up with college advising for a specific question, the advising center can be ready to this address this question; similarly, if the student does not follow up, either major advisors or college advisors can practice further proactive advising with the student.

Another suggested change in practice is to remind major advisors that incoming students do not always meet with college advising first. Some major advisors, such as faculty advisors, may not realize they are responsible for helping students navigate the institutional landscape (Allen & Smith, 2008b). Therefore, to create mutual responsibility for ensuring students are

educated on dual advising, college advising can request that all major advisors ask students if they have already met with college advising, and if not, explain how college advising is different from major advising, and to refer students to college advising; likewise, college advising can reciprocate by emphasizing the importance of visiting major advisors and continuing to systematically refer students to major advisors. Further, because directability involves the ability to recognize what the advisor can "assert control or influence" over (Hoffman et al., 2013), role clarification is needed to educate students on the advisor's limitations. Role clarification involves informing students about what college advising can and cannot do, which is part of understanding how systems work at the university. For example, just as Walker et al. (2017) found that some students find it difficult to differentiate between a high school counselor who "helped me with everything" and an academic advisor (pp. 45-46), students may feel like college advising is a place where they should be able to get all answers in one place. Because student expectations may be formed by high school or other previous experiences, it cannot be assumed that students inherently have this knowledge. If student expectations are based on their prior experience, they may perceive the inability of an advisor to provide all answers to their questions as a failure or source of frustration (Allard and Parashar, 2013; RNL, 2017). To align expectations, this involves informing students about how college advising functions in the larger network, elaborating on why an advisor can't answer a question, and explaining the value in referring students to the appropriate resource. In findings, although the student who described the hesitation of advisors to answer their question did not elaborate on the situation, it was implied that the advisor (peer and professional advisor) could not provide an answer because it was not within the college advisor's domain of expertise. If the student was not correctly referred to an expert outside of the department (i.e., language department), or was not given an explanation

about why there was no “definitive answer” and there was “hesitation” to answer the question, it is not particularly surprising if the student perceived college advising with low credibility. The example of the “I suppose” response also indicated a need for role clarification. In this example, it would be clear to a college advisor that a degree which was not offered at the university was outside the realm of expertise for college advising (unless the college advisor has a degree in that field or has personal experience beyond the institution). However, because the student may have expected the advisor to know information beyond what the institution offers (e.g., like a high school counselor, as illustrated in Walker et al., 2017), or if the advisor's response was ambiguous, the student may not have understood why college advising could not provide expert information. Without direction, the student can feel disregarded (Vianden, 2016). In this type of scenario, the advisor could clarify that their domain of knowledge does not extend outside the institutional offerings, but also guide the student to other resources that the student can pursue for more information.

While role clarification involves differentiating roles in college advising and roles in other departments, there can be different roles within a single advising office. For example, in offices that have different types of advisors (e.g., professional advisors, peer advisors, walk-in advisors), student expectations may not match the type of advisor role they encounter. If a student plans to meet with a professional advisor who is able to confirm information, but instead meets with a peer advisor who is not trained beyond reading automated information, the student may perceive advising to be unreliable. For students to trust college advising, college advising must also be aware and willing to be accountable for its limitations in different roles. Therefore, information is heavily tied in to accountability, where a student’s perception of college advising’s reliability can depend on whether the student perceives the information to be

trustworthy. This can be contextualized by what Hoffman et al. (2013) call "swift trust" which "can occur because of a confession, which is an assertion that is immediately credible (perhaps on the basis of authority); that leaves the trustee vulnerable by admission of some mistake, weakness, or misjudgment; and that conveys a shared intent with regard to the topics of trust" (p. 85). Much like calibrating trust in automation, swift trust may allow students to better calibrate their trust in advisors and, more generally, human fallibility. When advisors are up front about their limitations (the possibility of mistakes, weaknesses, or misjudgment), students may understand that while the intent is benevolent, there are different levels of reliability with different roles.

However, whether or not these factors would impact the student's perspective is unclear if there is general distrust toward the institution, as illustrated in the AS2 example that the student perceived they "get wrong information from advisors" despite not having met with a major advisor. This student indicated that they "do my own research" and had not heard of major advising, which implied the student was not familiar with the advising system. Further, the student stated that IDS was "sometimes more reliable" than a human advisor, implicating that the student also does not completely trust IDS. This scenario raised the question of what factors impacted the student's assessment that advisors give wrong information if it is not based on first-hand experience or other sources of advice.

5.3.3 Motivation and workflow. Findings implicate students see advising as a product from which they expect to "get" something "out of it"; this parallels findings by Gross and Latham (2009) that students saw information literacy as a "product or outcome […] rather than the knowledge base and skills that lie behind the ability to achieve this result" (p. 345-346). This idea was also reflected in context of major recruitment and retention, when MA3 described,

> Maybe this is something to think about, where recruitment, advising, retention, are all gears that all turn each other. You turn one, you turn them all. So, if you have good recruitment and, to put it in market terms, you know what your product is, and how you're going to pitch it to people, the next step up is, now you're advising people about how to go through this process. And if both of things are done well then presumably you're getting more majors and you're keeping them.

As MA3 explained, good recruitment requires knowing "what your product is." Notably, this can also impact use of college advising; for example, as major advisors illustrated, the ability to articulate the "product" of college advising in terms of value was challenging. Huvila (2013), in their study, identified three dimensions in the "expertise related to the familiarity of resources" of librarians as, (1) knowledge of sources; (2) knowledge of the system ("including how to access the library catalogue (and how not to access it)"); and (3) "the expertise build on the librarians' explicit and implicit understanding on how a library user perceives the library (as an information system) and on the reciprocal understanding by users of what a library is supposed to be" (p. 728). The current research indicated that advising can be held to similar dimensions; aligning with the first two dimensions, advisor expertise is based on knowledge of degree curricula, policies and procedures, and the ability to identify and assess resources. However, the third dimension—the shared understanding of what college advising is supposed to be—is identified as a problematic area, which is further impacted by the complexity of a dual, or multi-advisor system. Namely, even if advisors perceive college advising as an essential resource, students may not share this perception. This may result from a variety of factors, including convenience (e.g., instructional faculty relating the fluidity of advising with their interactions in and for classes) and the belief that students are receiving all essential information from other

resources such as their major advisors, other advisors/mentors, or IDS. As this study implicates, there are two basic reasons students use college advising: (1) for specific questions or to accomplish goals (i.e., some kind of personal value or "benefit" to the student); and (2) obligation (e.g., a "consequence" such as receiving a mandatory advising hold; required to fulfill a task, such as applying for graduation). This implicates that without incorporating these reasons, no matter how much college advising pushes information to students, non-use of college advising will continue.

In relation to the first reason, benefit, Fullick et al. (2013) found that advisees with high expectations of support reported receiving more support; similarly, in the current study, when student goals were met, they found the appointment useful. However, as this study also found, some students were able to articulate that the appointment was useful even when they did not have a goal. Notably, even though students did not enter the appointment with a specific goal, they appeared to have expectations that were met or not met (e.g., expecting that the appointment would teach them something new; advisor would be more agreeable). This aligns with concepts from Teasley and Buchanan (2013), who stated, "Regardless of an advisor's good intentions, students may be dissatisfied with the advising services received. This dissatisfaction may reflect a disconnect between an advisor's and student's expectations and values of advising"; and Merritt et al. (2013), who stated, "People are more likely to remember and use information that confirms their expectations, and they are also likely to interpret ambiguous information as expectancy consistent" (p. 523). Students may not see factors impacting advising in the same way as advisors do.

In addition, students who articulated goals and found their appointment useful did not necessarily perceive they learned something new. From an advisor's perspective, if students had

specific goals or questions, that implicates they had a gap in their knowledge that they sought to fill with college advising; and by having met those goals and finding the appointment useful, that gap would have been filled (at least partially); this would naturally lead to the assumption that they learned something new to fill that gap. However, because some students indicated that their goal was met but did not learn anything new, this indicated an alternative perspective. In this framework, students may prioritize getting their questions answered (the "product") rather than the learning process, as implicated by Gross and Latham (2009). However, this also raised the question of whether the student learned something new but did not recognize it. As asserted by the Dunning-Kruger Effect, students who lack domain expertise mismatch their assessment of confidence and real competence (Kruger & Dunning, 1999; Gross, 2005). In this context, although students did learn something new, they were unable to recognize it.

In relation to the second reason, obligation, mandatory advising was discussed as a type of obligation. However, in some cases, even with a mandatory advising hold, students did not complete advising as described by MA7. In these scenarios, some students were "unreachable" without holds, and even with holds, if students could circumvent the system through other means, they might continue to do so until prompted to visit their major advisors or college advising (e.g., referral from their other advisor; required task that other unit cannot offer; problem that cannot be solved elsewhere). As MA7's example implicated, this returns to an issue with transparency of information; without the availability of information regarding where the student went, what they were told, and when they were advised, this left a gap for the other advisors in the student's network. However, as MA8 stated, "…people always talk about the 'siloization' of [the campus] so there are offices that I think can work more closely together." On one hand, as MA8 suggested, college advisors

> …are sort of the distribution center for that. If students need those services, you would be the ones to send them there, probably more than me in some ways. And so, I wonder if there could be a way of kind of like, demonstrating the connections to students more closely. You might do that already, like during your advising sessions, like I don't want to tell you what you're doing, but those are valuable resources that I think are being underused in some ways, so I feel like that would add value to the good things you're already doing for the students if stronger connections there were made.

On the other hand, as one student survey respondent from AS2 stated, "I do not like that we cannot get help from just one place." This parallels findings by RNL (2017) that having to "run around" was an area of student dissatisfaction; Walker et al. (2017) that students were dissatisfied "that they must do more work because the communication between academic departments and academic advising centers fell below their expectations" (p. 48); and Allard and Parashar (2013), that "When students did manage to meet their advisors, several were predictably frustrated by the generalist-specialist division that was over-exaggerated by a cumbersome bureaucracy separating assigned tasks across various offices with little interaction and adjustment in roles "(Results section, para 6). As Gross and Latham (2007) described, education needs to be contextualized for the student, or they may not engage with the lesson. As both MA5 and MA9 described, they integrated advising into their class workflows; MA5 incorporated advising into "talk story" sessions that are required for their class "so they kind of kill two birds with one stone" and MA9 described how in-person interactions with their students are primarily part of the courses they teach, one of which is required for all students in the major, while they also answer advising questions over email. Because major advisors in these instances can seamlessly incorporate advising with the student's workflow, college advising can be

perceived as separate from the student's workflow. The concept of "siloization" raised the following questions: with advisors for multiple special programs, in addition to the dual advising structure at the college level, is this fracturing the student's education into parts instead of bringing them together to create connections? In dual advising, are the benefits (e.g., shared workload) of splitting advising responsibilities greater than the costs (e.g., creating more bureaucracy "red tape")? These require further examination of systematic issues in advising both at the college level and campus-wide.

Further, this study implicates informing students of advising is not affective without an intrinsic understanding that they are responsible for, and must be involved in their education, as described by MA12 and MA13. Information becomes contextualized in relation to how a student is expected to navigate a system. Not all students enter the university equipped with this understanding (e.g., as described by Stephan, 2003). In this context, as MA12 suggested, meeting with major advisors and college advising needs to be framed as part of students' advisee responsibilities. As a result, one suggestion is to establish an advising culture, which sets expectations of advisee responsibilities, early in the student's time at the university. Advising culture informs the role of advising in their education. If expectations are clearly set from the start, students will perceive meeting with both advisors as a regular process in their workflow rather than an added barrier. As found in this study, for some, advising with major advisors and college advising are part of one continuous process (MA12); for others, advising with two units helps students explore different perspectives (MA6; MA11). Establishing an advising culture can be part of the student's early education, as discussed in 5.2.3, related to information literacy. Mandatory advising in itself is not a solution, and there are arguments against mandatory advising, including that the "costs" of implementing this type of system—including significant

planning, advisor availability, and assessment strategies; in addition to student agency—may not result in the benefits being sought for all students (Creveling & Edelman, 2009; The Mentor, 2012; Winston & Sandor, 1984). Also, because mandatory advising forces students to meet with an advisor rather than encouraging them to independently and responsibly navigate situations by choice, advising itself is framed as a cost rather than a benefit. However, despite these reasons, because some students may not attend without being required, making this early advising session mandatory appears a necessary advising tool. For example, while MA13 suggested that not having mandatory advising aligns with a discourse for students to take "responsibility on themselves," their office required students to attend an introductory advising meeting with major advising prior to being approved as a major; although a hold was not used, the major had selective admissions requirements which was used to enforce the mandatory session. Likewise, students who need advising may practice avoidance behavior (Henning, 2009; Kirk-Kuwaye & Nishida, 2001). Although MA10 and MA14 described cases where students may be triangulating information using other resources, students may not be getting information or advice from any resource as indicated in this study. This raised the question of whether students do not use advising even in situations where they do not feel they are getting sufficient advice or information from other sources due to inconvenience or difficulty of finding advising information; it is also questionable whether these students felt that they were making progress in their education without seeking information/advice from others. Although there is a chance that students will not engage with a mandatory lesson (Gross and Latham, 2007), if students do not attend, there is no chance for engagement.

Additionally, while convenience was discussed as greater access to online resources, some ways to better work into student workflows offline were also indicated. For example, MA8

described the convenience of college advising's triage model stating, "…the sort of innovations that DR did, like the triaged model, where you can speak to people at the front desk, you can see student advisors, you can make appointments to see [professional advisors], I think that was really ingenious, in the sense that it's kind of like urgent care clinics, for doctors, where you can see people quickly, you don't have to do a lot of advanced planning." MA13 also described how their unit moved from an appointment system to walk-in, stating, "Now, we've found that because students are coming in at their own pace, and for whatever they need at any given time, we host walk in hours throughout the week." Further, "They don't have to feel constrained by, 'Okay, I have anxiety for this appointment coming up.' They can just come in and have it handled whenever best suits them. And it's a lot more organic between classes and between a student's schedule, so it's not so rigid. That's been my experience, at least this past year." However, MA13 also pointed out, "The only time I would say the benefit of an appointment, that I've seen, is if a student has a complicated issue. If I were able to prepare for that. But most walk-in hours are accompanied by an email letting us know that they're coming in, which allows us to prepare, if there is a complicated issue…". In this example, walk-in advising fit into the student's workflow as part of an "organic" process, in addition to reducing anxiety; however, the trade-off of convenience for the student in contrast to more preparation for advisors must be considered.

5.4 Conclusion

Overall, the findings in this study suggest that both social and technical factors need to be considered. Even with the proposed efficiency introduced by IDS, advisors are tasked with other responsibilities to work with the system. As an example, part of proposing educating students about IDS is proposing availability of advisors who are knowledgeable about IDS and can teach these lessons. As implicated by major advisors' responses, to add this type of responsibility for faculty or staff is unrealistic. Multitasking can further diminish vigilance; as MA8 illustrated, a recent error in email communication from college advising "may be an indication that college advising is trying to do too much." Further, to avail more contact with advisors on IDS as proposed, or other online communication methods, advisors available to monitor these platforms and for timely response to student inquiries are needed. At the same time, there is also a need for adequate advisors who are available for in-person interaction. Finally, one potential issue that is especially relevant to the dual advising system is, lack of college advising availability may force major advisors to leave their "lane" of domain knowledge. Currently, AS1 does not have the resources to make college advising mandatory every semester, which indicated college advising cannot meet with all students regularly; consequently, mandatory advising is done by major advisors. Because students are not able to access college advising in a timely manner, major advisors may feel obligated to interpret information outside their area of expertise, even if they recognize their limitations, in order to alleviate any feelings of abandoning the student. One student survey respondent described an issue with timeliness, stating, "When I went to the advising appointment, I already finished talking to my major adviser, so I did not have things I needed to ask. I wish I could have made an appointment earlier. (I tried making an appointment, but always full. I waited for a month.)" This parallels findings by Lynch (2004) that the reason

"inability to make contact" explaining non-use was cited significantly more by advising center than faculty-advised students (p. 66). Although IDS was built to fill this type of gap, as this study indicated, it was not designed to replace advisors and did not negate the need for more advisors to adequately meet with students. Perhaps ironically, while IDS was intended to ease advisor workload and help a resource problem, it also added to a different type of workload for advisors (as this study indicated, advisors identify errors to improve system reliability, and are tasked with educating students on responsible use of the system, e.g., to avoid passive behavior). The added responsibility for advisors can, on one hand, be perceived as a burden. However, on the other hand, advisors can use it as a teaching moment, as suggested by MA12 and MA13.

Because of the widespread use of IDS, advisors can benefit students most when they are able to use the system and educate students on its relevant features. This will require changes in approaches to advising as the system becomes further developed, just as MA2 described:

> I'll ask them something and they'll say 'Well, if you look at my [APP] plan…' and I think, 'Oh, I should have looked at their [APP] plan before we met.' So, that's shifting how I'm thinking. I think for the rest of my appointments this semester, I want to try to not just look at the main [IDS] academic advising sheet to see where they are but also to look at the [APP] to see what they're thinking is in terms of planning, or if they're doing it at all.

Likewise, this study indicated that for college advising to distinguish itself from IDS and major advising, college advising must consider how to articulate its "product" to students and advisors alike. An example of this is "branding." Taken together, these issues can be framed as the following questions: What are the implications of advisors as system mediators? In the

hypothetical scenario that IDS becomes 100% accurate, what then? How would this further impact the role of college advising?

As described, advisor input is needed because advisors who use these systems in their introductory phases can help to shape the IDS system. This is significant when considering that the programmers developing the system cannot always understand the context of use. As this study indicated, potential solutions were attributed to sociotechnical factors rather than strictly human or technological problems. Users can lend their expertise to identify these social and systematic issues by answering questions such as what students bring, what advisors bring, and how past experience can shape future use, which can result in scalable ideas. Future design will need to be integrative rather than reactive; for this to take place, multiple stakeholders will need to be involved and open to making changes, such as reconsidering system policies. Just as MA8 stated, IDS "has the potential to be amazing, but there are too few people working on it." IDS is undoubtedly an innovative tool, and has resulted in great strides to support students on their path to graduation. It is exciting to consider how the system can continue to grow and improve.

CHAPTER 6

CONCLUSION

This study explored the research question *What factors impact student use or non-use of college advising?* and three sub-questions in the areas of major advisors, integration of technology, and informing students about advising. This study focused on the context of college advising in dual advising. The purpose of this study was to examine why students use or do not use advising, which required examining how the advising system is constructed, who and what is involved in the advising system, and how they are connected. For this study, proactive advising interventions were developed based on responses to a pilot study survey; major advisors were interviewed and observed in advising interactions; and students were surveyed and interviewed.

Factors impacting student use of college advising were found in in 11 categories. In the area of major advisors, value of college advising, division of labor, and different advising systems were examined. In the area of incorporating technology, themes aligning with the frameworks of automation bias, framing effect, satisficing, convenience, and performance and capabilities were found. In the area of informing students about advising, method of communication, credibility and accountability, and motivation and information needs were explored.

This research is based on the opinions and perspectives of respondents. While factors impacting use and non-use of college advising were identified in this study, further research is needed to examine how concepts translate to use/practice. For example, some areas for future research should include testing the impacts of training practices (e.g., shared advising definition; increasing competence) through assessment; conducting user studies of how students interact with IDS, to test for behaviors and issues raised related to automation bias and satisficing; and,

parallel to information literacy studies (e.g., related to the Dunning-Kruger Effect), testing students' real knowledge and skills versus their perceptions of their knowledge and skills. Further, student survey respondents self-identified as users or non-users, which may have been based on different perceptions of use and non-use compared to those of college advising. While this research explored the question of how advisors construct the advising process, future research can explore how students construct definitions of use or non-use of college advising.

This study contributes to the field of advising by examining dual advising and non-use. Building on research related to advisor perceptions of roles (e.g, Allen and Smith, 2008b) and disconnect between advisors in a system (e.g, Allard & Parashar, 2013), the current research explored and identified areas of divergence between major and college advisors in a dual advising system and how these might occur (e.g., not only related to training, but also difficulty reconciliating different systems; "what else are you going to offer…?"). Notably, in this shared advising system, while major advisors saw college advising as source of advising-related information (similar to findings by Waters, 2002), they might also perceive college advising as another source of "tension" in addition to administration. This study also brought into question implications from previous literature. For example, in contrast to comparisons of faculty and professional advisors (e.g., Cheung et al, 2017; Lynch 2004), major advising (e.g., by faculty) might be seen as having higher value than college advising based on factors such as distinguishing generalist and specialist information, and approachability. In another instance, although advisors and students might prefer a "human touch" (e.g., Joslin, 2009; Noonan & Stapley, 2015; Yanosky, 2014) students may prefer to use technology instead of meeting with advisors based on factors such as convenience.

Moreover, observations as another measure (as suggested by Allen & Smith, 2008b) proved helpful for me to see some of the concepts related to how advising is constructed by major advisors; these included overlaps between roles, how major advisor talked about college advising, their in-depth knowledge and articulation of their major-career connections, how they used other students' experiences as examples (also demonstrating knowledge of their students), and the resources to which the advisors referred. In the case of one advisor, I was able to observe a change between appointments after the advisor gained new knowledge.

Notably, this study found wider implications of technology use in advising that can impact advising at all levels regardless of structure. The issue of automation bias, which was previously studied in other areas (e.g., Mosier et al., 1998), can also be found in the context of incorporating technology in advising. This study illustrated that the potential psychological impacts, such as those associated with automation bias and framing, need to be considered. This study can therefore serve as a starting point to investigate these still-emerging areas.

APPENDIX A

Email Excerpt

Why meet with the Advising Center? Our professional advisors are trained experts in degree requirements and policies, and specialize in helping you on your path to finishing your degree and planning for beyond. Our advisors will provide you with accurate information that is recorded in your student file. The Advising Center is your official college advising office: i.e., we're the ones who verify your degree requirements and approve your graduation.

What the Advising Center can do for you. Our advisors will work with you to explore your educational options, including assistance with course selection for the semester, long term academic planning (for example, four-year plans and timely graduation), finding extracurricular activities, career, future, and life planning (for example, connecting courses with career skills), and more.

What is the Advising Center? We are your college advisors. While your major advisor is located in the major department and advises you on major-related subjects, the Advising Center advisors are located in and look at your broader education, including General Education and degree-career connections.

Don't have specific questions? That's okay! Meeting with us is a great way to be proactive, make sure you're on track, and find out things you might not be aware of. Think of it as your annual check-up.

How to make an appointment. Our friendly welcome desk staff is ready to assist you. You can visit us in the for student services, room , or call . To make the advising process easier, we are offering you an advanced appointment (up to a week in advance). *When making your appointment, please mention the word "Mango."* Appointments are available between 10:00 AM and 3:30 PM; mornings tend to be less busy. Not a morning person? Can't make it in person? No problem! We also offer phone and Skype* advising. Simply request phone or Skype advising when you make your appointment.

APPENDIX B

Email Quiz

How well do you know your degree requirements?

Answer the following questions then click "submit" to view your score.

You can graduate after you finish your major requirements.

- ◯ True
- ◯ False

What are the minimum credit requirements for a bachelor's degree?

- ◯ 120 Total Credits plus GenEd and Major, no other credit requirement
- ◯ 120 Total Credits and 45 Upper Division Credits
- ◯ 120 Total Credits, no minimum Upper Division Credits

All students are required to complete Focus courses.

- ◯ True
- ◯ False

All courses that are NOT designated “repeatable” can be taken for credit only once.

- ◯ True
- ◯ False

*** is always accurate, so I can rely on what it shows.

- ◯ True
- ◯ False

APPENDIX C

Student Survey Questions

Note: For surveys in AS2, “advising center” and “college advisor” were replaced with “major advising” and “major advisor.”

Have you met with a college advisor (in the Advising Center, [location])?
If your answer is YES → Please answer the questions on page 1 only.
If your answer is NO → Please answer the questions on page 2 only.

1) How did you learn about college advising? Please check one.
   - ❒ Email from the Advising Center
   - ❒ Phone call from the Advising Center
   - ❒ My major advisor told me
   - ❒ Other advisor told me (for example: ***)
   - ❒ Friend and/or family told me
   - ❒ Other: please specify

   _____

2) Did you meet with a college advisor in the current school year (Fall 2017-Spring 2018)?
   - ❒ Yes
   - ❒ No

   2a) If you did not meet with a college advisor in the current school year, please describe the reason(s) that kept you from returning to the Advising Center.

Please answer the following based on your most recent appointment with a college advisor:

3) Did you meet with a professional advisor or a peer advisor?
   - ❒ Professional advisor
   - ❒ Peer advisor
   - ❒ Not sure/Prefer not to answer

4) What goals did you hope to accomplish in the advising appointment, and do you feel the appointment helped you to accomplish those goals? How were your goals accomplished or not accomplished? (If you did not have a goal, please indicate no goal.)

5) Was this appointment useful to you? How was it useful or not useful?

6) Is there anything new you learned from this appointment? If so, please describe what you learned. (For example, did you find out something you were not aware of?)

Do not fill out this page if you have met with a college advisor.

1) Have you heard of the Advising Center and/or college advising before today?
   - ❒ Yes
   - ❒ No

   1a) If your answer is yes, please describe the reason(s) that kept you from meeting with a college advisor.

2) Where/from whom do you currently get your information and/or advice about classes, degree requirements, careers and future plans? Please check all that apply.
   - ❒ Major advisor
   - ❒ Other advisor(s) (for example: […])
   - ❒ Websites
   - ❒ Friends and/or family
   - ❒ Other: please specify

     _____

   - ❒ Do not get information/advice

3) Please describe how you seek information/advice from these sources (examples: what kinds of questions you ask; how often you interact with these resources; how you compare information from two resources).

4) Do you primarily use [IDS] to keep track of your progress to graduation?
   - ❒ Yes
   - ❒ No

5) In your opinion, is [IDS] more reliable than a human advisor to keep track of your progress to graduation? Please describe how [IDS] is less, more, or equally reliable compared to a human advisor.

6) [APP] is the registration platform for all undergraduate students. Do you use other resources (e.g., major advisor, program sheets, university catalog) to confirm the accuracy of the [APP] plan, and if so, how?

APPENDIX D

Student Interview Items

1) How do you choose which courses to register for? For example, in [APP], do you tend to pick from recommended courses or do you do your own research?
2) If you want to find out more about a class, who do you ask first, or if not a person, what resource do you primarily use? What kinds of questions do you ask/steps do you take?
3) How did you learn to navigate [APP]? Was there a particular person who taught you or sat with you the first time you accessed [IDS]? (examples: high school counselors, teachers, parents, friends, college advisor)
4) Please consider this scenario: You want to register for a course that looks really interesting to you, but [APP] gives you a message that the course is "not in plan." Do you think you would register for the course anyway, or would you follow the [APP] recommendation instead?
5) One suggestion is that rather than giving students a negative message like "not in plan" students be given more choices based on other criteria. For example, recommending other types of courses that meet students' personal goals and interests. One suggestion might be "students who took X course also took Y course" or asking you to choose from a list of goals and creating a plan that matches the goals. What are your thoughts on this—do you think it's a good or bad idea? Why?
6) Some people argue that [APP] enables students to be more passive in choosing their courses (for example, choosing courses that are at the top of the list, instead of scrolling down), while others don't think this is a [APP] problem. What are your thoughts on this?

APPENDIX E

Timeline of Activities

February	March	April	May	June	July	August
Email 1/Flyer	Email 2	Phone calls				
	Major advisor observations					
	Major advisor interviews					
		Student surveys				
					Student interviews	

APPENDIX F

Examples of Potential IDS Errors

Examples of false positives that have appeared in IDS include double counting repeat credits (credits are not deleted until the end of the semester), repeat credits that require manually deletion (e.g., courses that have overlapping material, but are assigned different course numbers), double dipping of major courses across multiple majors, double dipping of minor or certificate courses with GE (IDS did not recognize minors and certificates), and excess transfer credits (a limited number of credits from non-university-system community colleges can be applied toward the degree). Instances of false negatives that have appeared in IDS include mislabeled transfer courses (e.g., transfer report does not include GE designations), exceptions listed in the catalog (e.g., courses not designated as GE but can be used toward GE based on course title), and incorrect program years (e.g., if a student's true program year is 2011 and IDS assigns 2017, requirements might show incomplete because degree requirements have changed). Identifying these errors requires not only the ability to "read" a degree audit, but knowledge of curricular design. Therefore, if a student's record is not checked for these potential issues, a student's degree audit and APP plan can be incorrect.

Both omission and commission errors (as defined by Mosier et al., 1998) can occur. An example of an omission error is when an advisor concludes that a student is on track to graduate in their final semester, failing to notice that the student is repeating a course and will in fact be 3 credits short; there is no cue telling the advisor that the student is repeating a course, and the advisor does not know to check the student's transcript. An example of a commission error is when a student is told that the information shown on their IDS record may be incorrect, yet the student does not confirm their record with an advisor because they choose to rely on the

automated information, which results in delayed graduation. For example, MA11 described omission errors that they have seen in student cases, when students do not meet with advisors before registering:

> … when reading [IDS degree audit], for example, when repeating a course, that has been an issue, because it appears that you're having the extra credit added on there, but they're deleted once the grades come in. Then, sometimes, even the transcripts don't come onto [IDS] academic essentials properly. So, if that's not caught, then they'll take a class that they didn't need to take, or they'll take an extra Writing Intensive [GE3] even though they took it at one of the community colleges, because it didn't transfer properly.

As described, relying on automation can lead the student to take fewer classes than actually needed because it appears they are fulfilling the needed amount of credits (potentially leading to an added semester), or take classes that are not needed because the student has already fulfilled the requirement with another course.

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