Communications of the Association for Information Systems

Volume 52 Article 13

2023

What Motivates First-generation College Students to Consider an IT Career? An Integrative Perspective

Xuefei (Nancy) Deng
California State University, Dominguez Hills, ndeng@csudh.edu

Sam Zaza
Jones College of Business, Middle Tennessee State University

Deborah J. Armstrong
College of Business, Florida State University

Communications of the
Association for Information Systems

Accepted Manuscript

What Motivates First-generation College Students to Consider an IT Career? An Integrative Perspective

Xuefei "Nancy" Deng
College of Business Administration & Public Policy, California State University Dominguez Hills
ndeng@csudh.edu

Sam Zaza
Jones College of Business, Middle Tennessee State University

Deborah J. Armstrong
College of Business, Florida State University

Please cite this article as: Deng, Xuefei; Zaza, Sam; Armstrong, Deborah J. : What Motivates First-generation College Students to Consider an IT Career? An Integrative Perspective, *Communications of the Association for Information Systems* (forthcoming), In Press.

Communications of the Association for Information Systems

Education Paper ISSN: 1529-3181

What Motivates First-generation College Students to Consider an IT Career? An Integrative Perspective

Xuefei "Nancy" Deng
College of Business Administration & Public Policy, California State University Dominguez Hills
ndeng@csudh.edu

Sam Zaza
Jones College of Business, Middle Tennessee State University

Deborah J. Armstrong
College of Business, Florida State University

Abstract:

A career in information technology (IT) presents a viable source of economic advancement for college graduates, but ethnic minority students remain underrepresented in the IT workforce. Such underrepresentation is often exacerbated by their first-generation student (FGS) status. Yet, it remains unclear what leads to FGSs' IT career choice compared to their counterparts. To address this gap, this study aims to reveal the factors motivating FGSs to consider an IT career and examines the association of influencing factors with personal and demographic factors (gender, race, ethnicity). This qualitative research overlays capital theory and social cognitive career theory to develop an integrated sensitizing framework and draws on individual difference theory in interpreting the findings. Our analysis of the open-ended narrative responses of 193 surveys collected from a minority-serving university revealed 10 key factors influencing IT career choice. A theoretical model incorporating individual differences, generational status, and environmental influences is proposed to advance the discussion of influencing factors in IT career choice toward further theory building and empirical testing. The paper concludes with implications for motivating the IT career choice of the ethnic minority, first-generation student population.

Keywords: IT career choice, First-generation college students, Motivation, Ethnic minority, Gender, Capital theory, Individual differences, Social cognitive career theory, Diversity, Equity, Inclusion (DEI).

[Department statements, if appropriate, will be added by the editors. Teaching cases and panel reports will have a statement, which is also added by the editors.]

[Note: this page has no footnotes.]

This manuscript underwent [editorial/peer] review. It was received xx/xx/20xx and was with the authors for XX months for XX revisions. [firstname lastname] served as Associate Editor.] **or** The Associate Editor chose to remain anonymous.]

1 Introduction

Between 1990 and 2018, employment in the science, technology, engineering, and math (STEM) fields has grown 79%, and computing-related jobs have seen a 338% increase over the same period (Funk & Parker, 2018). In addition, over the next ten years, the Bureau of Labor Statistics estimates the U.S. labor market will add 316,000 software developer jobs alone, which represents a 22% growth rate in just that one job category (Breaux & Moritz, 2021). Not only does this explosion of jobs present employment opportunities for individuals, but a career in information technology (IT) presents a viable source of economic advancement, particularly for college graduates (Torpey, 2018).

Still, the diversity in the IT workforce is minimal. For example, Black or African American individuals comprise 11.9% of all workers, but only 7.9% of the technology workforce; and Hispanic or Latino individuals comprise 16.7% of all workers, but only 6.8% of the technology workforce (Muro, Berube, & Whiton, 2018). In addition, the representation of women has declined during the period 1990-2018 from 32% to 25% of the computing workforce (Funk & Parker, 2018). While research has explored the lack of diversity in the IT workforce (e.g., Riemenschneider, Armstrong, & Buche, 2019; Trauth, Cain, Joshi, Kvasny, & Booth, 2016), the underrepresentation of ethnic minority[1] students entering the IT workforce remains an issue.

Prior research has investigated the factors influencing college students' career choices in computing (Clarke-Midura, Poole, Pantic, Sun & Allan, 2018), minorities' career choices in computing (Charleston, 2012; Kvasny, Joshi, & Trauth, 2015), and women's career choices in computing (Adya & Kaiser, 2005). But the persistent underrepresentation[2] of ethnic minority students entering the IT workforce may be a function of a little studied phenomenon - first-generation student status. *First-generation college students* (FGSs) are those enrolled in post-secondary education and whose parents do not have such educational experience (Pascarella, Pierson, Wolniak, & Terenzini, 2004; Redford & Hoyer, 2017). Their counterparts, those with at least one parent with some post-secondary experience, are referred to as *continuing-generation college students* (CGSs) (Redford & Hoyer, 2017). The differences are striking between FGSs and CGSs on several dimensions, and research has identified inhibitors particularly associated with FGS persistence and success in higher education, including low household income, full-time work demands, and lack of social support (Engle & Tinto, 2008; Ishitani, 2003; Lohfink & Paulsen, 2005; Nunez & Cuccaro-Alamin, 1998). Yet, research on the factors that influence FGSs' IT career considerations remains limited. To address this gap, we conduct this qualitative research to explore factors motivating IT career choice of FGSs at a more granular level. Specifically, we seek to understand the association of influencing factors with student generational status (i.e., FGS vs. CGS) and individual characteristics (gender, race, ethnicity). Therefore, we explore the following three research questions (RQs):

RQ1: What factors motivate first-generation college students to consider an IT career?

RQ2: How do IT career motivations differ between first-generation college students and their continuing-generation counterparts?

RQ3: How do the interactions between student generational status and personal demographic factors influence IT career motivations?

To address these questions, we analyzed the narratives of 193 undergraduate students from a four-year postsecondary urban, minority-serving institution in the Western United States. As Latino or Hispanic and Black or African American students account for most first-generation college students (Redford & Hoyer, 2017) but less than 15% of the IT workforce, these questions are essential to the sustainability of the IT workforce, and the diversity of IT field. Answers to these questions 1) improve our understanding of the root causes of the underrepresentation of ethnic minorities in the IT workforce; 2) provide practical implications for educational institutions to promote IT career choice by ethnic minority students; and 3) may eventually contribute to a more inclusive professional IT workforce.

[1] An *ethnic minority* within the computing field is defined as a citizen of the United States who is Black or African American, Latino or Hispanic, or Native American.

[2] *Underrepresented* refers to a group whose percentage of the population in a given context (e.g., postsecondary students) is lower than their percentage of the larger population.

This study adopts *social cognitive career theory* by Lent, Brown, & Hackett (1994) and *capital theory* by Bourdieu (1986) as sensitizing frameworks for understanding ethnic minority students' career-related decision-making toward the IT field. This multi-theoretical lens is appropriate as it draws on well-established career theory, premises various forms of capital as enablers of career decisions (Bourdieu, 1986), and has been previously applied in the information systems (IS) literature (e.g., Joshi, Kvasny, Unnikrishnan, & Trauth, 2016). This qualitative positivist case study research develops an analytical generalization (Galli, 2011) regarding the IT career choices of ethnic minority college students. This approach is appropriate for identifying the applicability of key constructs for this population as we investigate their IT career choices.

This paper proceeds as follows: We describe the context of our investigation in Section 2 and review research on IT careers, social cognitive career theory, and capital theory, and their use in the IT context in Section 3. In Section 4, we present our research method and illustrate the data analysis procedures, and in Section 5, we detail the results regarding the motivating factors. In Section 6, we discuss the themes that emerge in ethnic minority college students' IT career choice motivations and propose a variance model based on prior research and our empirical findings. We discuss the study's contributions to theory and practice in Section 7, followed by the study's limitations and future research directions in Section 8. The paper concludes with Section 9.

2 Investigative Context: First-Generation College Students

One of the earliest descriptions of social mobility is a "movement, either upward or downward, between higher and lower social classes… with individuals (and their family units) moving from one role and social class position to another because of what they have done or what has happened to them in various kinds of social interaction" (Barber, 1957, p. 356). One's work can facilitate social mobility by providing access to opportunities to gain skills, experiences, and access to interpersonal networks (Mark, 2016). A career in a STEM field can be especially valuable for ethnic minority populations as these careers are of high quality, in demand, and can afford social mobility and economic stability (Arvizu, 2015).

Colleges and universities continue to play a role in social mobility processes (Beattie & Thiele, 2016; Jack, 2014), showing that "the chances of achieving economic success are independent of social background among those who attain a BA" (Torche, 2011, p. 798). Parents of FGSs are often not equipped to provide the information needed for college (Willett, 1989) and can struggle to understand the benefits of graduating from college (Hodges-Payne, 2006). Research has documented a gap in the level of college persistence between FGSs and CGSs, and this gap is consistent across post-secondary institutions (Ishitani, 2006; Redford & Hoyer, 2017; Witkow, Huynh, & Fuligni, 2015). Not only do FGSs discontinue their post-secondary education at a higher rate than CGSs, but they do so earlier in their post-secondary educational process.

One factor consistently identified in the literature as a cause of post-secondary education discontinuance for FGSs is the lower socioeconomic status (SES) of the majority of FGSs (e.g., Warburton, Bugarin, & Nuñez, 2001). The lower SES of FGSs contributes to a lack of awareness (tacit information to support the undergraduate experience) and lack of opportunity (e.g., financial stability; access to technology), which can negatively impact the post-secondary educational success of FGSs (Markowitz, 2017). Another factor identified in the literature as a cause of post-secondary education discontinuance for FGSs is the ethnic and racial minority background of most FGSs (Engle & Tinto, 2008; Lohfink & Paulsen, 2005). Within the STEM field, ethnic minority students comprise 54% of those who do not persist in post-secondary education, and differences in the educational experiences of these students explain much of the gap in persistence rates (Griffith, 2010). For example, FGSs are more likely to be non-traditional students (e.g., older than average) and have multiple obligations outside of college (e.g., employment, dependents), which may not allow students to participate in extracurricular activities or academic enrichment experiences (Engle & Tinto, 2008; Hodges-Payne, 2006; Nuniez & Cuccaro-Alamin, 1998).

Recently, scholars have paid attention to the increasing use and effect of social networking / social media technologies on engaging FGSs in the post-secondary educational environment (Fernández, Deng, & Zhao, 2018). Through social media use, FGSs have been able to build two types of social capital: bridging social capital that positively affected FGS academic experiences and bonding social capital that supported their academic experiences via emotional support from family and friends (Deng, Fernández, & Zhao, 2022), and bridging social capital is defined as the loose connections between individuals who may provide useful information or new perspectives to one another. In contrast, bonding social capital refers to

emotionally close relationships such as family and friends (Putnam, 2000). Thus, these two types of social capital present different benefits to members in a network of FGSs: bridging social capital is useful for sharing information about academic resources, while bonding social capital provides emotional support and enhances FGSs' sense of belonging.

Although insightful in terms of our investigative context, the literature outlined above focused on general demographic characteristics and social media use; the studies did not examine the career choice and success of FGSs, not to mention their underrepresentation in the IT workforce. As a nation's economic growth relies on the postsecondary education and training of a large population of working adults, it has become a priority for higher education institutions to increase the attendance and persistence of FGSs (Wiggins, 2011). As the IT field has witnessed rapid growth and generated a vast array of well-paying jobs (Breaux & Moritz, 2021), studying FGSs' career choices will provide institutions and policymakers with useful guidelines to promote FGS interest in IT careers and potentially enhance diversity, equity, and inclusion (DEI) in the STEM field. In this regard, our study answers the call by the IS community to enhance the DEI in relation to IS and IT development, use, and impact (Association for Information Systems, 2021; Burton-Jones & Sarker, 2021).

3 Literature Review and Theoretical Background

To achieve our research objectives, we first review the relevant research on IT as a career, followed by a review of social cognitive career theory and capital theory. While previous career research has primarily used social cognitive career theory or capital theory, we bring these theoretical foundations together to develop a more holistic framework for our research.

3.1 Information Technology as a Career

To address the shortage of computing professionals needed to meet the continuing labor market demand, the IS research community has paid increasing attention to studying the factors influencing enrollments of IS/IT majors and sharing best practices (Choudhury, Lopes, & Arthur, 2010; Firth, Lawrence, & Looney, 2008; Granger, Dick, Luftman, Van Slyke, & Watson, 2007; Koch & Kayworth, 2009; Looney & Akbulut, 2007; Street, Wade, Bjørn-Andersen, Ives, Venable, & Zack, 2008) to increase participation in IT careers. In the studies that have been conducted using students' perceptions of IT careers, the findings indicate that three factors: (1) perceptions of, or accurate knowledge about IT careers such as occupational stereotypes (Johnson, Stone, & Phillips, 2008; Thomas & Allen, 2006), (2) external influences such as parents and friends (Meszaros, Creamer, & Lee, 2009), and (3) individual interests[3] regarding aspects such as technology, money, or business (Chen, Pratt, & Cole, 2016; Joshi, Kvasny, McPherson, Trauth, Kulturel-Konak, & Mahar, 2010) influenced students' selection of an IT career (Scott, Fuller, MacIndoe, & Joshi, 2009).

Research has found that IT career intentions are also influenced by gender, with male college students more likely to choose an IT career (Heinze & Hu, 2009). When we drill down into potential gender influences, we see that females' IT career choice is often influenced by their parents, particularly fathers (Adya & Kaiser, 2005), their culture's attitude toward women (Trauth, Quesenberry, & Huang, 2008), stereotypes of the IT profession, and interest (Stanko, Zhirosh, & Krasnikhin, 2014).

Consistent with the FGS research, a few scholars in the IS field have looked at factors that may influence IT career choices for ethnic minorities. In a qualitative study of Black male college students, four themes (community encouragement, exposure to computing, hustler's ambition, "New Black") emerged as motives of IT career choice for this population (Kvasny et al., 2015). Among the four themes, community encouragement focused on the support that Black males received for attending college from parents, family members, peers, and others in their community. Hustler's ambition referred to the emphasis on one's exceptional entrepreneurial skills to achieve wealth and prestige, much like the owners of technology giants Facebook and Twitter. Finally, "New Black" emphasized that racism continues to exist, but it can only deter you from your career goals if you let it hold you back and stifle your dreams. Another study of ethnically diverse college students found that African American men were reported most likely to pursue IT careers, and Anglo-American women were reported least likely to pursue IT careers (Johnson et al., 2008).

[3] Interests are patterns of likes and dislikes regarding career-related activities and occupations (Joshi & Kuhn, 2011).

While the existing research in this area informs our study, it has not explored factors that may motivate FGSs to consider an IT career (RQ1), how FGS motivations compare to CGS motivations (RQ2), or how FGS status may interact with individual factors to influence IT career motivation (RQ3). To address these research questions, we now elaborate on our theoretical foundations.

3.2 Social Cognitive Career Theory

Social cognitive career theory (SCCT) posits that one's environment, interests, self-efficacy, and outcome expectations influence occupational choices (Lent, Brown, Brenner, Chopra, Davis, & Talleyrand, 2001; Lent, Hill, & Hoffman, 2003). While SCCT has been used to study working professionals, the current study focuses on gathering insights about the influences on student intentions to choose a computing career (e.g., Akbulut & Looney, 2007).

Certain environmental influences have been studied when dealing with career choices, such as family (Berrios-Allison, 2005), social relationships (Higgins, 2001), and encouragement by others (Compeau & Higgins, 1995). Career choices are also affected by contextual influences, such as emotional and financial support and barriers to entry (Lent, Brown, & Hackett, 2002). With regard to interests, findings indicate that SCCT helps to account for the interests and choice goals of racially diverse students in computing disciplines (Lent, Lopez, Lopez, & Sheu, 2008; Lent, Lopez, Sheu, & Lopez, 2011) as SCCT theorizes that individuals form an enduring interest in an activity (i.e., IT career) when they view themselves as competent at performing it and when they expect the activity to produce valued outcomes.

One of the most influential of the SCCT independent variables consistently identified in the literature is self-efficacy, which is defined as "a set of self-beliefs that are specific to particular performance domains and that interact in a complex way with another person, behavior, and environmental factors" (Lent et al., 2002, p. 262). While various types of self-efficacy have been used in conjunction with SCCT (e.g., computer self-efficacy), and in this research, we define it as personal judgment regarding one's capability to attain a particular level of occupational performance or success (e.g., Tatum, Formica, & Brown, 2017). Finally, outcome expectations are defined as "personal beliefs about the consequences or outcomes of performing particular behaviors" (Lent et al., 2002, p. 262). In our study context, it is an individual's beliefs about the probable outcomes of career decisions (Bandura, 1989). Outcome expectations may be a more powerful predictor of occupational choice for marginalized/minority groups than self-efficacy beliefs (Morrow, Gore, & Campbell, 1996), and career prospects are one of the most consistent outcome expectations that positively influence student attitudes toward an IT career (Heinze & Hu, 2009). In the few studies looking at race and ethnicity differences in IT career decisions of college students using SCCT, findings indicate that self-efficacy, perceptions of IT professionals, community encouragement, early exposure to computing, and the pursuit of wealth and prestige influenced Black or African American males' IT career choices (Johnson et al., 2008; Kvasny et al., 2015)

While SCCT provides a base theoretical foundation for exploring career choice, some factors have emerged that are not captured with SCCT. Given that our focus is on FGSs and the factors that motivate these students to consider an IT career, we believe capital theory (Bourdieu, 1986) might be used to complement SCCT. The integration of these theories will allow us to explore the lack of diversity in the IT workforce early in the pipeline through the lens of FGS career choice.

3.3 Capital Theory

The premise of the capital theory is that the distribution of capital at a given moment represents the inherent structure of the social world (Bourdieu, 1986). Capital theory can explain power dynamics in society, especially how power is transferred, and social order is maintained within and across generations (Bourdieu, 2002). In this study, we engaged with capital theory by Bourdieu (1986) as a sensitizing framework for understanding the career-related decision-making of FGSs. In general, capital consists of assets that can enhance one's power to perform economically useful work, and capital is involved in the exchange of assets between individuals (Moore, 2012). While capital is primarily situated in the hands of the dominant class, capital is dynamic. The various forms of capital "can accumulate over time, and … has the potential to produce profits and reproduce itself in identical or expanded forms; conversely, it can also decline" (Glover, Champion, Daniels, & Boocock, 2016, p. 27).

Extending this idea, Bourdieu (1986; 2002) asserts that capital can present itself in five fundamental forms: economic, cultural, social, symbolic, and technical. *Economic capital* refers to monetary resources and can be expressed as money or property. *Cultural capital* includes shared cultural signals such as

attitudes, preferences, behaviors, and educational qualifications. “Educational credentials become a kind of surrogate measure of quality or ability” (Cai, 2013, p. 459) and can signal the ability to perform in the workplace, thus influencing labor market outcomes. *Social capital* is comprised of social obligations or connections and encompasses an individual’s socioeconomic status, social networks, and the social status/standing of their connections. *Symbolic capital* refers to an individual’s accumulated wealth in a symbolic form, such as authority, knowledge, prestige, and reputation. Finally, *technical capital* captures the technology-related skills that a person develops using computing equipment.

While capital theory has not been used extensively to explore career choice, a few studies need to be explicated. Social capital has been found to influence post-secondary education decisions of FGS and ethnic minority students (Carolan-Silva & Reyes, 2013; Cholewa, Burkhardt, & Hull, 2016), while cultural capital has been found to have a greater influence on ethnic minority college students' career choices than Anglo-American students (Cholewa et al., 2016; Daire, LaMothe, & Fuller, 2007). In one study focused on IT careers using capital theory, Black or African American men succeeded in an IT career by accumulating all five forms of capital in varying amounts, with social and cultural capital having the strongest influence (Joshi et al., 2016).

Figure 1 presents an integrated conceptual framework for this study. Building on the key concepts found within social cognitive career theory (self-efficacy, outcome expectations, and interests), we incorporate the forms of capital delineated by Joshi et al. (2016). As this research is exploratory in nature, we do not develop a priori hypotheses or speculate on the nature of the relationships.

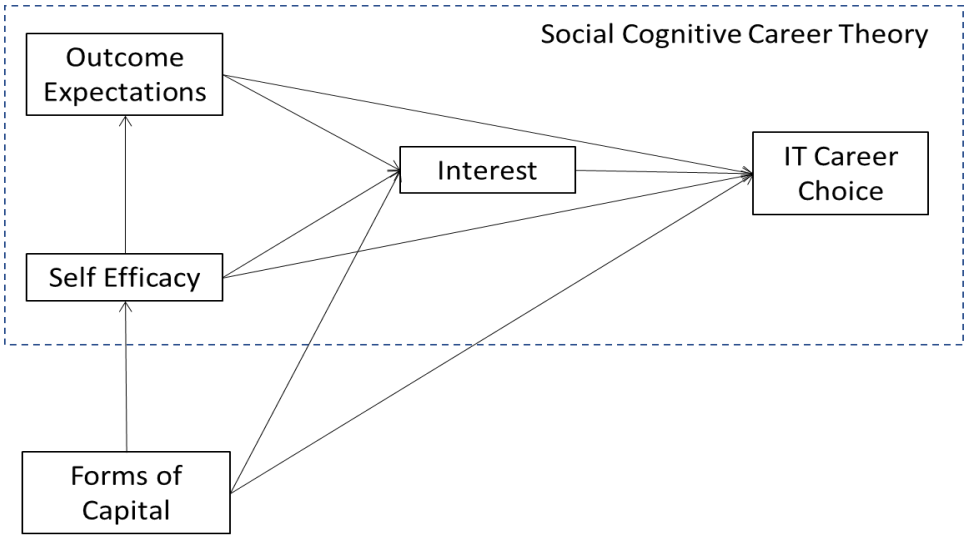

Figure 1. Conceptual Framework

When we synthesize the literature grounded in social cognitive career theory and capital theory and place this synthesis within the context of IT careers and the FGS population, we see that much work still needs to be done. We believe that the key factors that motivate FGSs to consider an IT career (RQ1), how their motivation may differ from that of CGSs (RQ2), and whether there are any interactions between FGS status and individual differences that may influence IT career motivation (RQ3) will be found within the combination of their interests, career [outcome] expectations, self-efficacy, and forms of capital. The following section details the process used to explore our research questions.

4 Research Method

We employed a positivist case research method to evoke key constructs and themes around college students’ IT career choices based on a qualitative data collection to address our research questions. According to Yin (2003, p. 13), “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.” We chose this research design because the phenomenon we are studying is broad, few studies have explored the topic of IT career choice, and “a holistic, in-depth investigation is needed, and it cannot

be studied outside the context in which it occurs" (Paré, 2004, p. 233-234). We followed an exploratory case study approach to capture new perspectives and provide empirical insights pertinent to the FGS experience to develop an analytical generalization regarding their IT career choices (Paré, 2004), where analytical generalization is the identification of the fundamental properties of a phenomenon (Lund, 2014). In designing this case study, we followed the steps recommended by Paré (2004). We started with research questions that are "clear, simple, intriguing, feasible within the time and resources available, socially important, timely, and scientifically relevant" (Paré, 2004, p. 238). Then, we elaborated on our guiding theories, SCCT, and capital theory, making sure not to be bound by them to reveal the development of new concepts. Next, we defined our unit of analysis as students in a public minority-serving university in the western United States (as we will detail in the following subsection).

4.1 Research Site and Data Collection

We followed the critical case sampling method since it "permits logical generalization and maximum application of information to other cases because if it's true of this one case, it's likely to be true of all other [similar] cases" (Patton 1990, p. 82). The research site was an urban, public minority-serving university in the western United States. At the time of the data collection, this university had a total enrollment of just under 15,000 students, with 37% male students and 63% female students, and more than 100,000 alumni worldwide. The university is a Hispanic or Latino serving institution with 60% of students being Hispanic or Latino, 15% Black or African American, 11% White, 11% Asian, and 3% others (as of Spring 2018). According to the latest data, 61% of the student population at this university identify themselves as FGSs, and 64% are Pell-eligible, i.e., qualified for U.S. Federal Pell Grants awarded to undergraduate students who display exceptional financial need. This university is one of the top 100 most ethnically and economically diverse universities in the western United States (*U.S. News and World Report* 2017). Given these considerations, this university was an ideal research site to conduct the qualitative study of the career choice behaviors of FGSs, consistent with the criteria proposed by Yin (2003).

We collected data, during two periods, via an online survey containing both open-ended questions and structured questions. In period one, we collected 118 undergraduate student responses across five classes in May 2019. The five classes included two general education classes open to the entire campus, two computer information systems (CIS) major classes from the School of Business, and one computer science class from the College of Engineering. In period two, we collected 111 undergraduate student responses from four classes at the School of Business, including one CIS major class and three business statistics classes (required course for all business students) in March 2021. In the survey, we asked the students to identify themselves as "first-generation students" if applicable, and asked them to describe who and/or what motivated them to pursue a post-secondary education and why they have (or have not) thought about pursuing a career in IT.

The data collected via an online survey was cleaned by removing incomplete responses and graduate students' responses to focus on the undergraduate population. Of the 229 total responses, 193 were valid. Within the valid responses, 60 (31%) identified themselves in an IT-related major (33 (56%) Computer Information Systems (CIS), 10 (17%) Business Analytics, 8 (13%) Information Systems Security, 7 (11%) Computer Science, and 2 (3%) Other). One hundred thirty-three (69%) respondents identified themselves as non-IT majors (41 (31%) Business Administration, 20 (15%) Global Logistics and Supply Chain Management, 19 (14%) Marketing, 15 (11%) Accounting, and 38 (29%) Other (e.g., Finance, Criminal Justice, Entrepreneurship, Psychology, Digital Media Arts)). In terms of the academic standing of the participants, most of the respondents were more advanced undergraduates, including 45% seniors, 41% juniors; 6% freshmen; 3% sophomores; and 5% missing data. Table 1 shows the sample demographics.

Table 1. Sample Demographics (n=193)

Demographics	Non-IT Majors (n=133)	% (69%)	IT Majors (n=60)	% (31%)	Grand Total (n=193)
First Generation Status					
CGS	32	24%	17	28%	49
FGS	101	76%	43	72%	144
Gender					

Female	69	52%	16	27%	85
Male	63	48%	44	73%	107
Missing	1	0%	0	0%	1
Employment Status					
Employed full-time	35	26%	16	27%	51
Employed part-time	46	35%	23	39%	69
Not employed (Student Only)	49	37%	20	33%	69
Missing	3	0%	1	0%	4
Race/Ethnicity					
Asian or Pacific Islander	5	3%	13	22%	18
Black or African American	14	10%	9	15%	23
Hispanic or Latino	79	60%	24	40%	103
White / Caucasian	13	10%	3	5%	16
Other	7	6%	7	12%	14
Prefer not to answer	15	11%	4	6%	19

Note: The % reported in the columns is the percentage based on the column total n (133 and 60 respectively).

To triangulate the data and add richness to the study, we conducted one-on-one interviews with undergraduate students majoring in CIS, Accounting, Marketing, and Business Administration that were not part of the survey sample. Interview requests were sent to 39 students who participated in a university-sponsored digital skills training workshop. Of the invited students, nine were available for the interviews. Each interview was conducted via Zoom and lasted from 30-45 minutes. The interviews were transcribed verbatim for data analysis. The transcripts ranged from three to seven pages in length, excluding interviewer introduction and questions. The interview protocol included ten open-ended questions such as, “What is your major?” and “Have you thought about pursuing a career in computers and/or IT? Follow up: Why or why not?”

4.2 Data Coding and Analysis

In keeping with the qualitative positivist case study design, we follow Paré (2004) who divides the data analysis into three distinct stages: early steps, within-case analysis, and cross-case analysis. For the early steps in the data analysis, we developed our coding scheme that “represents a key data management tool for researchers; it is used to organize segments of similar or related text for ease in interpretation and to search for confirming/disconfirming evidence of these interpretations” (Paré, 2004, p. 250). In addition, we imported the responses collected from our survey and developed an Excel worksheet to capture the coding. For the within-case analysis, we followed the method articulated by Miles and Huberman (1994), including open coding, analytical categories informed by prior research, and data display matrices. As patterns emerged in the coding, we focused more on our key phenomenon (IT career motivations of FGSs) (Glaser, 2016). For the cross-case analysis, we extracted the meaning of the individual responses by looking at generational status, gender, and students' ethnic background. We aggregated the unique instances to distill the ideas and concepts and apply those concepts for others within that group (i.e., generalize). We followed a process of evoking themes from the participants, abstracting these themes into constructs, and generalizing the constructs to our context via SCCT and capital theory.

Three IS researchers with qualitative data analysis experience were involved in the data coding process. Following Miles and Huberman’s (1994) coding strategy, we performed the data coding in multiple steps. First, we developed the coding scheme of influencing factors based on SCCT concepts and the five forms of capital. For example, social capital is defined as access to relationships with others knowledgeable about the field of study (i.e., IT, Accounting). Using this initial coding scheme, we independently performed coding on 20 randomly sampled responses. Once independent initial coding was complete, the researchers discussed the coding results and refined the coding scheme. Two new factors—stereotype and perceived job opportunity – emerged from the data. Using the revised coding scheme, the

researchers independently coded the remaining responses, discussed the coding, and resolved any disagreements to reach 100% agreement.

Our data analysis revealed ten influencing factors contributing to students' decision to pursue an IT career. Table 2 provides the coding scheme of influencing factors, the definition of each factor, and sample quotes. Of the factors, technical, social, and economic capital as well as interest are consistent with those revealed in prior studies (e.g., Joshi et al., 2016; Scott et al., 2009). However, our study also finds an inhibiting effect of lack of interest, lack of technical capital, lack of perceived job opportunity, and lack of social capital on college students' choice of an IT career.

Table 2. Coding Scheme and Sample Quotes

Influencing Factor (# of mentions / # of participants)	Definition	Participant Quotes
Interest (22.3%)	Patterns of likes and dislikes regarding career-related activities and occupations such as IT (Joshi & Kuhn, 2011). The respondents talked about childhood experiences with computers or movies related to computers. Those lived experiences sparked their interest in the computing aspect of an IT career.	"*Obviously I loved being on computer since I was little… Everything has been on computers now, [so] pursuing computers as my career is definitely a way to go." (Asian or Pacific Islander FGS, Male)* *"Yes, I have considered a career in IT because of my strong interest and [because of] the movies Wargames, and Hackers. These movies really piqued my interest in computers." (White or Caucasian CGS, Male)*
Lack of Interest (19.2%)	Patterns of apathy or dislike regarding career-related activities and occupations such as IT. The respondents talked about experiences with computers and/or technology that contributed to individual choice of a college major other than IT/IS. *(Derived from the study*)	*"I am not a big fan of working with technology. As a consumer, I do enjoy the technology, but I would not enjoy my job if it consisted of computers and IT." (Hispanic or Latino FGS, Male)*
Perceived Job Opportunity (7.8%)	The availability of job opportunities, professional growth, and job security expected from the chosen field (e.g., IT). The respondents noted the increasing importance of IT in a digitized workplace. (*Derived from the study*)	*"I chose IS major because I want to land a job that will provide me with the security and stability that I want." (Asian or Pacific Islander CGS, Male)* *"The growing demand of programmers helped lead the way. I also like solving problems. Yes, it [IT career] is the future. More and more stuff is getting automated and there is a need for people to program the technology." (White or Caucasian FGS, Male)*
Lack of Perceived Job Opportunity (1.6%)	Negative perceptions of job opportunities, professional growth and lack of job security expected from the chosen field (e.g., IT) compared to another career field. *(Derived from the study*)	*"I started in that IT area but the growth and advancement in global supply chain moved me towards another field." (White or Caucasian CGS, Male)*
Stereotype (12.4%)	The collection of negatively perceived characteristics of professionals in an IT career or negatively perceived aspects of the occupational environment. (Adapted from Cheryan, Siy, Vichayapai, Drury, & Kim, 2011; Garriott, Hultgren, & Frazier, 2017)	*"I am not that tech savvy. Computers confuse me." (Hispanic or Latino FGS, Female)* *"I don't think I have those types of skills. I would picture someone really smart pursuing those types of careers... Marketing allows me to be creative in some sort of way." (Hispanic or Latino CGS, Female)* *"I would rather spend my time interacting with people in my career than spending my time on a computer." (Hispanic or Latino FGS, Male)*

Technical Capital (7.8%)	Exposure, previous experience, or familiarity with computing and technology-related credentials. The respondents noted this form of capital was often accumulated from prior employment. (Adapted from Bourdieu, 1986; 2002)	*"I took a computer class in community college and decided to major in computer information systems." (White or Caucasian CGS, Female)* *"I thought about pursuing a career in computers and IT. I used to work at XXXX and I really enjoyed working with the tech department and virtual reality." (Hispanic or Latino FGS, Female)* *"I've personally built a computer and it's very rewarding. I love learning about how CRMs [customer relationship management systems] work." (Hispanic or Latino FGS, Male)*
Lack of Technical Capital (3.1%)	A dearth of computing or technology-related exposure, familiarity, knowledge, relevant skills, credentials, or technology-related experience. *(Derived from the study*)	*"I haven't really considered it because I took a coding class and didn't really like it." (Hispanic or Latino FGS, Female)* *"At some point I had but I took a few courses and realized it's not for me." (Hispanic or Latino FGS, Female)* *"After taking some computer classes I realize that I am not passionate about it especially when it comes to computer programming." (Hispanic or Latino CGS, Female)*
Social Capital (1.0%)	Having access to relationships with others knowledgeable about computing and/or IT (e.g., IT professionals, role models, alumni, professors, career counselors, etc.). The respondents often explained how family members influenced their career choice. (Adapted from Bourdieu, 1986; 2002)	*"My mother always taught us to be independent education-wise and have a career and seeing my elder sister achieve IT career, that made me want to achieve it too." (Asian or Pacific Islander CGS, Female)* *"I have chosen IT career, as everyone older than me (adults, parents, family members) keep telling me computers are the future." (White or Caucasian CGS, Male)*
Lack of Social Capital (1.6%)	Lack of access to and interactions with knowledgeable others (e.g., IT professionals, role models, alumni, professors, career counselors, etc.). *(Derived from the study*)	*"I have found that the professors who have been teaching it at xxx are not very engaging with students. I feel like I just have to teach myself, so it doesn't make me feel like I want to continue or be excited about it." (Hispanic or Latino CGS, Female)* *"It is hard for students who are in big classes that need attention. Some instructors do not treat all students equally. Some only help certain students." (Black or African American FGS, Male)*
Lack of Economic Capital (0.5%)	The absence of monetary resources expressed as money or property. (Bourdieu, 1986; 2002)	*"I would love to continue some type of computer career, but do not have the money to pay for it." (Hispanic or Latino FGS, Female)*
Economic Capital	Monetary resources that can be expressed as money or property. (Bourdieu, 1986; 2002)	*Did not emerge from the data*
Cultural Capital	Shared cultural signals such as attitudes, preferences, and behaviors. (Bourdieu, 1986; 2002)	*Did not emerge from the data*
Symbolic Capital	Accumulated wealth in a symbolic form, such as authority, knowledge, prestige, and reputation. (Bourdieu, 1986; 2002)	*Did not emerge from the data*

It is interesting to note that three forms of capital (economic, cultural, and symbolic) did not emerge from this data collection. Given that many of the participants were FGSs, their lack of reference to cultural capital (i.e., knowledge to help navigate the college culture) and symbolic capital (i.e., authority, prestige, and reputation) may not be too surprising. Concerning economic capital, our respondents did reference this factor, but from a scarcity of resource perspective (i.e., lack of resources).

5 Results

Our data analysis found differences in the motivating factors between students' generational status (FGS vs. CGS). It produced some interesting findings when we drill down into individual demographics (i.e., gender, ethnicity) within the generational status groups. Recall that our research questions focused on the factors that motivate FGSs to consider an IT career (RQ1), how those factors might differ from their CGS counterparts (RQ2) and whether there are any interactions between FGS status and individual differences that may influence IT career motivation (RQ3). Table 3 presents the key factors that motivated each generational cohort's IT career decision making. Detailed findings are discussed in sub-sections 5.1 through 5.3.

Table 3. Summary of Motivating Factors

Generational Status	Individual Difference	Key Motivating Factors
FGS		Interest; Lack of Interest; Perceived Job Opportunities Stereotype; Technical Capital
CGS		Interest; Lack of Interest; Perceived Job Opportunities
Generational Status & Gender		
FGS	Male	Interest; Lack of Interest; Stereotype; Perceived Job Opportunities
	Female	Interest; Lack of Interest; Stereotype; Technical Capital
CGS	Male	Interest; Lack of Interest; Perceived Job Opportunities
	Female	Interest; Lack of Interest
Generational Status & Ethnicity		
FGS	Black or African American	Lack of Interest; Stereotype
	Asian or Pacific Islander	Interest; Perceived Job Opportunity; Technical Capital
	Hispanic or Latino	Interest; Lack of Interest; Stereotype; Technical Capital
	White or Caucasian	Interest; Lack of Interest; Perceived Job Opportunities; Technical Capital
CGS	Black or African American	Interest; Stereotype; Technical Capital
	Hispanic or Latino	Interest; Lack of Interest; Perceived Job Opportunities Stereotype
	Asian or Pacific Islander	Interest; Lack of Interest
	White or Caucasian	Lack of Interest; Perceived Job Opportunities

5.1 First-Generation Students vs. Continuing-Generation Students

To address research questions 1 and 2, we look at the motivation factors for the generational cohorts. The findings for the FGSs follow a pattern similar to that of the overall sample in that Interest, Lack of Interest, Stereotype, Technical Capital, and Perceived Job Opportunity emerged as the top five factors that influence IT career choice. For example, an FGS explained how the perceived job opportunities at her prior employer motivated her to pursue the IT career:

> *My dream is to become a system analyst. In my previous work experiences, my job requires performing space utilization studies. My goal was to help the company save money by ensuring we are using our workspace effectively. I worked closely with many executives by trying to find the right solution for each scenario. In the end, I got a promotion, and it made me realize that my strength is problem-solving, curious and always thinking outside the box. For that reason, I decided to pick this career because I feel like I can be successful. (Asian or Pacific Islander FGS, Female)*

In looking at FGSs and CGSs, we found differences in three primary areas. First, the ***stereotype*** factor emerged as a negative influence for more FGSs than CGSs. Second, the ***technical capital*** factor emerged as a positive influence for FGSs more than CGSs. Finally, and counter to the other two findings, the ***interest*** factor emerged as a positive influence for CGSs more than for FGSs, and ***lack of interest*** is

higher for FGS than CGS. Table A1 (Appendix A) details the distributions of the motivating factors and the frequency distribution of the motivating factors for the two cohorts (e.g., 15.3% of all FGSs stated stereotype was a motivating factor, while 4.1% of all CGSs mentioned this factor). Each of these findings is detailed next.

The stereotype of IT professionals as "technology savvy," "detail-oriented," and "extremely intelligent" negatively affected FGSs' intention to pursue an IT career. One female Hispanic or Latino FGS explained, "No, I have not thought about pursuing an IT career. I find technology very challenging and tedious. I know technology is our future, but I am more of learning the basics". Another FGS shared her perception that an IT professional has to "learn multiple programs," "have hands-on experience," "work on a series of projects," and "is very organized." In a follow-up one-on-one interview, one Hispanic or Latino FGS confirmed that, "Pursuing an IT degree is for super smart people, but not me. If I read 'IT' on a brochure, it's intimidating." This "but not me" was a consistent theme that emerged within the stereotype concept. Some FGSs had an image about what an IT professional "looks like." As one Black or African American FGS stated, "That's not me. That's not how I perceive myself." The constant comparison between the stereotypical image and self-evaluation of their knowledge of technology-related topics and tools pushed them toward the idea that IT, after all, is "not for them." For example, another Hispanic or Latino FGS shared, "I didn't think that it was something that I would ever pursue, or I would ever take an interest in, like it was always something I like. Like that's, that's pretty interesting, but it's not for me."

The second difference that emerged was that FGSs were more likely to cite technical capital as the factor that positively influenced their IT career decision process than the CGS cohort. While high school IT courses and prior exposure to technology were common sources of technical capital for CGSs, employment emerged as the primary channel for FGSs to build technical capital. In addition, job advancement opportunities in the IT field at their current employer provided further motivation for FGSs to pursue an IT career. For example, one FGS shared,

> *I was put in a position at my previous job where I would assist our IT guru and I enjoyed exploring the tasks he gave me … my goal is to eventually move into the [IT] help desk with my organization to eventually become an analyst. (Hispanic or Latino FGS, Female)*

The third difference that emerged in the data was that interest played a stronger role in the IT career decision-making of CGSs than FGSs. For example, one Asian or Pacific Islander CGS shared, "I have an interest in consumer behavior and data analytics. We live in a world now run by computers and technology. I want to be knowledgeable in that world." In contrast, lack of interest played a stronger role in the IT career decision making of FGS than CGS. When asked whether he/she considers an IT career, a Black or African American FGS replied, "No, I don't care to further my career in computers because I don't want to learn more software."

5.2 Generational Status and Individual Differences in Gender

We now turn to our third research question that explores how individual demographic backgrounds within each generational status group may influence IT career choice.

While interest was a prominent motivating factor for both cohorts, if we look at the distribution of the factor within each cohort by gender, we note some differences. Table A2 (Appendix A) details the distributions of the motivating factors by generational cohort (FGS vs. CGS) and gender. The first notable difference is that more female FGSs considered *stereotype* in their IT career choice compared to female CGSs (18.2% vs 5.3%). A stereotype about the IT domain identified by female FGSs is that it is "too difficult" and "complex" for them to learn. For example, one female Hispanic or Latino FGS elaborated, "I don't think I have those type of [IT] skills. I would picture someone really smart pursuing those type of careers."

Another notable difference is in the *technical capital* factor (12.1% FGS, 0% CGS). Female FGSs that addressed technical capital as a positive influence on IT career choice indicated taking IT-related courses at a community college or university as well as exposure to IT in their employment as valuable channels to build technical capital. Interestingly, no female CGSs mentioned technical capital (or lack of technical capital) as an influence on their IT career choice.

The final notable difference between female FGSs and CGSs is the influence of *interest* and *lack of interest*. More female CGSs credited interest as the factor motivating them to choose an IT career, compared to female FGSs (36.8% CGS vs. 16.7% FGS) and more FGS credited to lack of interest compared to CGS (19.7% FGS vs. 15.8% CGS). We speculate these differences may stem from outside

influences. For example, when parents have experienced a postsecondary environment, they have first-hand (experiential) information regarding potential careers and educational opportunities. In addition, the higher socio-economic status of many CGS families may indicate that at least one parent has exposure to a white-collar work environment and thus exposure to IT departments.

When we look at the male participants in our study, regardless of their generational status, they cited *interest* and *lack of interest* as major factors motivating their IT career choice (see Table A2 in Appendix A for distribution details), with lack of interest cited more as a motivating factor for FGS than CGS. The major difference between male FGSs and male CGSs was that more male FGSs were influenced by stereotypes than male CGSs (13.0% FGS vs. 3.3% CGS).

These findings suggest that the relationship between gender and IT career choice is not generalizable across the two generational cohorts (FGS vs. CGS). Our data analysis shows that generational cohorts and gender affect an individual's consideration of an IT career. Consistent with Trauth (2002), our participants indicated that individual characteristics and socio-cultural factors work together to influence IT career choice.

5.3 Generational Status and Individual Differences in Ethnicity

Continuing our exploration of research question three and the interaction of generational cohort and demographics, we now turn to ethnic background. The dominant motivating factors varied between the FGS and CGS student cohorts of different ethnic backgrounds. The distribution of the motivating factors by ethnicity and generational status is summarized in Tables A3 (FGS) and A4 (CGS) (see Appendix A), but we provide a few percentages here for comparison purposes.

Within the FGS cohort, Black or African American students in our sample are primarily and negatively influenced by lack of interest (31%) and stereotype (15%), while Asian or Pacific Islander students are primarily and positively motivated by interest (50%) and perceived job opportunity (30%) (See Appendix A, Table A3). For example, a Black or African American FGS explained his lack of interest in, and negative stereotype toward an IT career as, "I don't want to learn more software. I'm seeking a position at my current workplace, and in order to qualify, I need a degree in Business Administration." In contrast, an Asian or Pacific Islander FGS expressed that his interest in an IT career was because "it's fun and challenging." Thus, in our sample, it seems that Black or African American FGSs may be pushed away (negatively motivated) from IT careers, and Asian or Pacific Islander FGSs may be pulled (positively motivated) into IT careers.

The majority of Hispanic or Latino students in our study are FGSs (87%), and Hispanic or Latino FGSs reported motivating factors including lack of interest (21%), interest (19%), stereotype (13%), and technical capital (12%). Hispanic or Latino FGSs often mentioned that they were not technologically savvy (which is a stereotype expectation in an IT career) and did not believe that they could succeed in an IT career. As one Hispanic or Latino FGS participant explained, he did not consider IT career because "I don't feel that I would do great in that career due to my lack of knowledge in some areas of technology." In contrast, technical capital positively motivated Hispanic or Latino FGSs to pursue an IT career. As expressed by a female Hispanic or Latino FGS, the source of technical capital initially came from experiences at her workplace and then through computing courses.

> *I used to work at XXXX and I really enjoyed working with the tech department and virtual reality. I was undecided in my area of concentration. After taking an intro CIS [computer information system] course ... I have thought about pursuing a career in computers and IT. (Hispanic or Latino FGS, Female)*

Thus, those FGS participants may experience both a push away from an IT career via lack of interest, stereotype and a pull into an IT career via interest, and technical capital. Within the CGS cohort, the first interesting difference is the influence of *stereotype* on the IT career decisions of CGSs of different ethnic backgrounds. Stereotype negatively influenced the IT career decisions of Black or African American and Hispanic or Latino CGSs but provided no (0%) influence on the IT career decisions of Asian or Pacific Islander and White or Caucasian CGSs (See Appendix A, Table A4). Another difference was that *lack of technical capital* was cited by White or Caucasian and Hispanic or Latino CGSs as a factor in their decision to not choose an IT career, was not mentioned by Black or African American and Asian or Pacific Islander CGSs (0%). Finally, *interest* was a motivating factor in the IT career choice of Asian or Pacific Islander and Black and African CGS, and lack of interest was a motivating factor for Hispanic or Latino, and White or Caucasian CGS. When the Asian or Pacific Islander CGSs in our sample expressed interest

in pursuing a career in IT, the responses often demonstrated the appeal of developing computing technology (i.e., hardware or software) or designing a specific computing product (i.e., video game).

In summary, our data indicate that the key motivators for FGS to choose or not choose an IT career are: interest, lack of interest, stereotype, perceived job opportunities, and technical capital, compared to CGS who are mainly driven by their interest, lack of interest, and perceived job opportunities. Moreover, our data further indicate differences in the motivating factors for different generational cohorts and subgroups. First, we found that generational status has a more profound effect on females. FGS females cited interest, lack of interest, stereotype, and technical capital, while CGS females primarily cited lack of interest as their motivation. Meanwhile, FGS male and CGS male cited similar factors, including interest, lack of interest, and perceived job opportunities. The key difference was that more FGS males cited stereotype as a motivating factor.

Second, generational status demonstrated different effects on students with different ethnic backgrounds. Interest (and lack of interest) was a consistent motivator across cohort groups, but the effect of stereotype and technical capital differed. Both FGS and CGS students from Asian or Pacific Islander backgrounds did not list stereotype as a [negative] motivating factor. In contrast, stereotype was a [negative] motivating factor for students from both Black or African American and Hispanic or Latino ethnic backgrounds, even more so for FGS. Technical capital was a motivator for all FGS except those from Black or African American ethnic backgrounds, and only Black or African American CGSs mentioned technical capital as a motivating factor. Finally, while Hispanic or Latino CGSs highlighted just interest and lack of interest, Hispanic or Latino FGSs cited multiple factors (interest, lack of interest, stereotype, and technical capital) that motivated their pursuit of an IT career. These findings suggest that further decomposition of the FGS cohort into more granular subgroups is worthwhile to pinpoint the specific influential factors for each of those subgroups.

6 Discussion

The main objective of the study was to identify the factors underlying FGSs attraction to, and choice of, an IT career (or not) in a more nuanced manner. We found that the students' lived experiences of these motives varied by their generational status (FGS vs. CGS), gender, and ethnic background cohort. We found that career choice motives are not 'one size fits all' but are a function of factors guided by individual identity, individual influences, and environmental influences, consistent with individual differences theory of gender and IT (Trauth, 2002).

6.1 Emerging Themes in IT Career Motivations of FGS

Our findings suggest that students from the two generational cohorts (FGS vs. CGS) share three motivating factors: interest, lack of interest, and perceived job opportunities (See Table A1 in Appendix A). However, FGSs and CGSs also demonstrated differences in their motivation for pursuing an IT career. Compared to CGSs, FGSs were more likely to cite stereotype (negative) and technical capital (positive) as factors motivating their IT career choice. While the stereotype of the IT person (i.e., "smart" and "tech savvy") and the IT subject ("confuse me" and "intimidating") discouraged FGSs from pursuing an IT career, their technical capital (knowledge about IT topics) emerged as a positive motive for their choice of an IT career. The IT stereotype perceived by FGSs centers on their understanding of the IT discipline and technical competence self-perceptions. With increasing knowledge about the IT subject area, i.e., technical capital, FGCs may better tackle the issue of the IT career stereotype.

However, the IT stereotype perceptions of FGSs and their lack of technical capital may be rooted in family, ethnic, and/or cultural background elements. Compared to their peers, FGSs predominately come from ethnic and racial minority backgrounds (96.5% of FGSs in our sample), are slightly older (average age for FGS = 26.7, CGS = 25.4 in our sample), and often have multiple obligations (e.g., employment, childcare, family care) in addition to their academic pursuits (Engle & Tinto, 2008). Most FGSs are characterized as having a lower-than-average socioeconomic status (SES) than their CGS counterparts (e.g., Warburton et al., 2001), which can widen the educational gap (Markowitz, 2017). For example, individuals from higher SES neighborhoods are often exposed to school computers, whereas individuals from lower SES neighborhoods are more exposed to mobile phones, and non-academic computer activities in the home (Harris, Straker, & Pollock, 2017).

The experiences of FGSs in our study offer several useful channels for increasing participation of FGSs in IT careers by providing early exposure to computers and building technical skills. Several FGSs who

majored in computer information systems (CIS) call for more information on IT careers during high school, as a female Black or African American FGS noted “Safest bet for students is to understand what comes with the major your picking before graduating high school.” Another male Hispanic or Latino FGS further elaborated that high school should provide concrete examples of the possible career paths within an IT career, “I had a real lack of information in high school. I couldn't imagine what a ‘day in the life of a computer programmer’ looked like ...Talk openly about having to take math and science as core requirements of a lucrative and secure career... I really knew almost nothing about these basics back then.” As FGSs are more likely to be employed while in school than their CGS counterparts, the FGSs in our study also reported their workplace and work experience as an important source of IT knowledge and skills. Developing programs and increasing awareness of internship course credit may allow FGS to further leverage their work experience.

As discussed above, the two generational cohorts (FGS and CGS) shared some perceptions and differed when considering IT careers. We noted some individual differences located at the intersection of generational cohort, gender, and ethnic background. These results suggest that examining IT career choice motivations only at the generational cohort level might not provide the most appropriate level of granularity. More nuanced individual difference variables should be considered when investigating student motivations for considering an IT career.

6.2 Individual Differences and IT Career Motivations

Our study noted differences in career motives located at the intersection of the generational cohort and gender. For example, female FGSs stated that technical capital was an important factor contributing to their IT career choice, whereas no female CGSs mentioned this factor, and female FGSs were more likely to be affected by their perceptions of the stereotype of individuals pursuing an IT career in their decision process, than female CGSs. In terms of the male cohort, both male FGSs and male CGSs cited interest and perceived job opportunities as factors positively motivating their IT career choice and lack of interest negatively motivating it. However, in addition to these factors, male FGSs were more likely to be negatively influenced by stereotypes in their IT career choice.

The influence of gender has been examined in prior research, and factors motivating female college students’ choice of an IT career include computer self-efficacy and attitudes towards IT careers (Heinze & Hu, 2009), the influence of parents, particularly fathers (Adya & Kaiser, 2005), and cultural attitudes (Trauth et al., 2008). Meanwhile, factors motivating a young woman’s decision to not choose a career in IT include a lack of aptitude to succeed in IT, unwillingness to deal with numbers, insufficient knowledge, parental influence, and interest (Stanko et al., 2014). Our study brings together and extends these lines of research by using capital theory (Bourdieu, 1986) and individual differences theory (Trauth, 2002) to consider the influence of individual and environmental variables on IT career choice for students, with an emphasis on FGSs.

Our study examined another important individual variable in motivating IT career decisions – ethnic background. Among FGSs, the Black or African American FGSs in our sample were more likely to be influenced by lack of interest and stereotype, while Asian or Pacific Islander FGSs were motivated by interest and perceived job opportunity. Hispanic or Latino FGSs reported the most diver motives with lack of interest and stereotype, interest, and technical capital in their IT career decision process. Previous research has looked at the IT career motivations of Black or African American students in terms of IT self-efficacy, impressions of IT professionals (Johnson et al., 2008), and prior exposure/experience with computers and the IT field (Joshi et al., 2016). Consistent with prior research, our study shows the effect of ethnic background on FGSs’ IT career choice. Moreover, our study reveals the motivating factors for each FGS subgroups from different ethnic backgrounds, where Black or African American FGS seem to be motivated such that they are pushed away from IT, and Asian or Pacific Islander FGS seem to be motivated such that they are pulled toward IT, and for FGS of Hispanic or Latino and White or Caucasian ethnic backgrounds, it’s a mix of push and pull motivations.

Our participants articulated the critical and positive impact of seeing successful people of their own ethnic background and gender in an IT career. As stereotype was a key negative factor for FGS (but not CGS), breaking the perceptions of “that’s not me” can be key. For example, research has found that Black or African American males who majored in IT expressed their desire to see a young Black or African American male achieve success in creating a technology giant (Kvasny et al., 2015). In our study, FGSs of different subgroups expressed similar desires for diverse role models reflecting their race or ethnic background and gender. The desire for such a role model was echoed by one of the interviewed female

Latino FGS, "Have somebody like [me] come to talk to me and show me if she can do it, then I can do it." The presence of role models may help mitigate the negative influence of stereotype as a barrier to FGS pursuit of IT careers.

6.3 Capital Theory and IT Career Motivations

Our study incorporated the general framework of capital theory (Bourdieu, 1986) to examine the influence of several forms of capital in one's IT career choice decisions. For our participants, technical capital was the most salient form of capital in motivating individual IT career choice. While one or two participants mentioned a few other forms of capital, they did not reach the threshold of practical importance. Prior research has studied students from Historically Black Universities and Colleges and identified cultural capital (i.e., community role models and culture) as a significant influence in Black or African American men's IT career choice (Joshi et al., 2016). In contrast, we consider individuals from different genders, diverse racial and ethnic backgrounds, and different generational status (FGS vs. CGS). We found that to motivate FGSs (both male and female) to pursue an IT career, focusing on increasing technical capital and perceived job opportunities is key. We suggest that building students' technical capital is a useful strategy for overcoming negative environmental influences (e.g., societal and cultural barriers) and developing students' technical competence and self-efficacy.

6.4 Bringing it Together

Our study expands the IT career research by revealing the motives that influence the consideration of an IT career among one FGS population. Grounded in social cognitive career theory (Lent et al., 2001), and capital theory (Bourdieu, 1986), we put forward an initial conceptual model (Figure 2) that may help explain and predict the effects of the factors that emerged from this study on college students' choice of an IT career, and more specifically the choice of an IT career by FGSs.

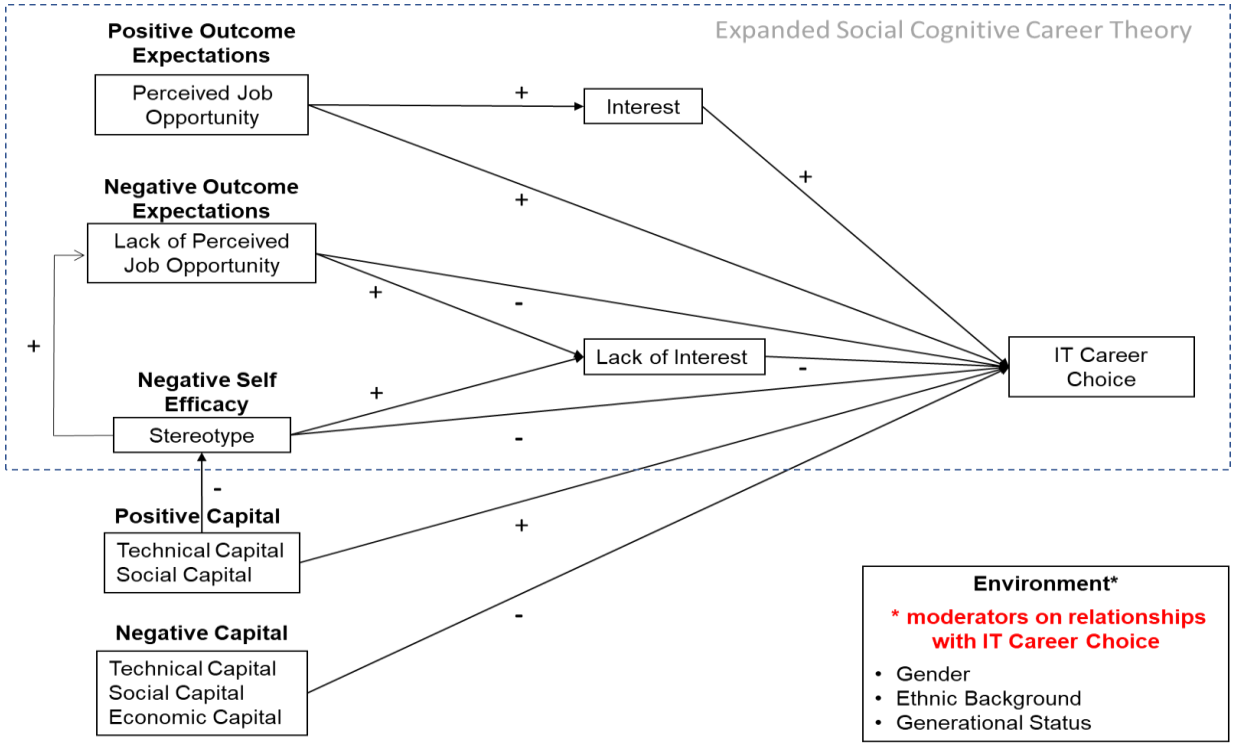

Figure 2. An Integrative Theoretical Model of IT Career Choice[4]

Our proposed model suggests that from social cognitive career theory, outcome expectations, interest, and self-efficacy influence career choice (environment is discussed later). We posit that within our context,

[4] As this study is exploratory in nature, we retain the lesser mentioned forms of capital in our model and encourage future research to confirm or refute.

perceived job opportunities function as a positive outcome expectation for choosing an IT career, a lack of perceived job opportunities functions as a negative outcome expectation. Recall that self-efficacy is a set of self-beliefs specific to a particular performance domain (Lent et al., 2002). Within our context, the performance domain is IT and the self-beliefs are captured in the students' perceived gap regarding IT personnel and themselves. Thus, stereotype functions as a negative perception of self-efficacy. Interest (and lack of interest) directly influences IT career choice and mediates other concepts. Triangulating the emergent findings with capital theory we see that technical capital and social capital emerged as positive and direct influences on individual decisions regarding an IT career. We also posit that technical and social capital might decrease negative stereotype perceptions (i.e., self-efficacy beliefs) as individuals build IT-related skills and social connections. Finally, a lack of technical, social, and economic capital may negatively influence IT career choice decisions for FGS.

Individual differences theory was developed by Trauth (2002) to explore gender in the IT field. According to the theory, the interaction of individual characteristics and environmental attributes influences individuals' intention to remain (or leave) the IT field. Specifically, socio-cultural influences (e.g., education, professional development, family) and individual characteristics (e.g., technical competence, intellectual capacity, self-confidence, age) interact such that all women do not respond similarly to the challenges faced in pursuing a career in the IT field. The female IT professionals in the study represented considerable variation – as they "do not all experience the same influences, nor do they all respond in the same ways" (Trauth, 2002, p. 114).

Drawing on the individual differences perspective and consistent with SCCT, we theorize that individuals will look for a career that has positive prospects and is interesting, while evaluating the barriers of pursuing such a career. We further posit that within our context, the individual characteristics (i.e., gender, race, or ethnic background) and generational status cohort (FGS vs. CGS) function as the environment (from SCCT). Specifically, the effects of outcome expectations, forms of capital, and interests on IT career choice are moderated by individual variables (gender, race, or ethnic background) and student generational status (FGS vs. CGS). In this regard, our study provides a foundation for future research to explore the intersectional influences of the environment, outcome expectations, forms of capital, and interest on individual IT career choice decisions. We encourage researchers to continue to build theory and test the validity of this model.

7 Contributions to Theory and Practice

7.1 Contributions to Theory

Our study makes three main theoretical contributions. First, the study expands social cognitive career theory by considering positive and negative outcome expectations, as well as interest and lack of interest as separate factors motivating IT career choice (See Figure 2). Moreover, our study drew on capital theory to examine the various investments made by students toward an IT career. We found that of the forms of capital, technical capital is perceived to be "the coin of the realm." Future studies of career choice within the IT context need to look at the influence of the various sources of technical capital available.

Second, this study identifies boundary conditions for IT career choice by highlighting the important role of individual factors (i.e., generational status and gender) and demographic background (i.e., race or ethnicity). This study uses the lens of the individual differences theory of gender in IT (Trauth, 2002) within the context of IT career choice in postsecondary education. In addition, this study examined the intersections between individual and environmental influences and IT career choice motivation by their postsecondary generational status (FGS vs. CGS). Future research on IT career choice and key IT workforce constructs (e.g., turnover intention) can benefit from theorizing using this more granular perspective.

Third, our study expands the IT career research by revealing the motives that influence the consideration of an IT career among an FGS population and its different cohorts. Prior research calls for "empirical studies of underrepresented groups in the IS profession" (Trauth, 2017, p. 13). We second this call. Based on the themes that emerged from our data analysis, we put forward an initial conceptual model (Figure 2) that may provide the impetus for further empirical studies of the effects of these factors on college students' choice of an IT career. We encourage further qualitative and quantitative studies to tease out the unique contribution of the various motivating factors that emerged from this study, explore the nature of the interest/lack of interest mediation (e.g., full, partial, or zero), and clarify the influence of single verses

multiple moderators on IT career choice. Future research may build on the more granular, individualistic perspective put forth here to understand the unique characteristics of the FGS population and further develop IT-specific career choice theory.

7.2 Contributions to Practice

Our findings also offer important practical implications. The differences in motivating factors between the subgroups of FGS and CGS highlighted in Table 3 suggest that different strategies should be considered when higher education institutions and policymakers attempt to promote IT careers. Student motivation to consider an IT career is multifaceted, differing along several dimensions, including students' generational status (FGS vs. CGS), individual identity (gender, race, ethnicity), individual influences (abilities, social support), and environmental influences (cultural values). Consistent with Trauth & Quesenberry (2006), our study suggests that flexible interventions by educational institutions that consider students' diversity and account for individual differences in their motivations for choosing IT career are key to increasing participation in IT. While Table 3 summarizes the major motivating factors for different subgroups that emerged from this study, Table 4 builds on the findings to list potential recommendations to promote students' pursuit of IT career.

To promote FGSs' pursuit of an IT career, our findings suggest four potential strategies, including:

1. **FGS Recommendation on Interest**: To develop and sustain ***interest*** in IT careers by designing and implementing programs at high school and college to promote, nurture, and reinforce positive interest and develop social support from family and friends.
2. **FGS Recommendation on Stereotype**: To reduce the negative effect of ***stereotype*** by providing early and more exposure to IT careers, such as engaging IT professionals as speakers, IT job site visits, job shadowing with individuals from diverse ethnic backgrounds and gender groups. Bring in successful FGS graduates and mentors.
3. **FGS Recommendation on Technical Capital**: To highlight existing ***technical capital*** students already possess through mentoring sessions with faculty. To increase ***technical capital*** by providing access to technology resources and skills training prior to or early in the post-secondary education, such as a summer bridge program before college, IT courses at community colleges, or college freshman year. Provide peer mentoring/tutoring from diverse student populations and FGS.
4. **FGS Recommendation on IT Job Opportunities**: To showcase ***IT job opportunities*** by designing and implementing programs, such as IT career panels and career expositions with individuals from diverse ethnic backgrounds and gender groups to learn about IT job market demand and hiring trends.

To promote CGSs' pursuit of an IT career, our findings suggest two potential strategies, including:

1. **CGS Recommendation on Interest**: To develop and sustain ***interest*** in IT careers by designing and implementing programs at high school and college to nurture and reinforce positive interest.
2. **CGS Recommendation on IT Job Opportunities**: To showcase ***IT job opportunities*** by designing and implementing programs, such as IT career panels and career expositions, to learn about IT job market demand and hiring trends.

Table 4. Targeted Recommendations for Motivating IT Career Choice

Generational Status	Individual Background	Potential Strategies
Generational Status & Gender		
FGS	Female	Same as "FGS Recommendation on Interest", "FGS Recommendation on Stereotype", and "FGS Recommendation on Technical Capital"
	Male	Same as "FGS Recommendation on Interest", "FGS Recommendation on Stereotype", "FGS Recommendation on IT Job Opportunities"
CGS	Female	Same as "CGS Recommendation on Interest"
	Male	Same recommendations as all CGS
Generational Status & Ethnicity		
FGS	Asian or Pacific Islander	Same as "FGS Recommendation on Interest", "FGS

		Recommendation on IT Job Opportunities", "FGS Recommendation on Technical Capital"
	Black or African American	Same as "FGS Recommendation on Interest", "FGS Recommendation on Stereotype"
	Hispanic or Latino	Same recommendations as CGS females
	White or Caucasian	Same recommendations as FGS Asian or Pacific Islander
CGS	Asian or Pacific Islanders	Same as "CGS Recommendation on Interest"; develop social support from family and friends in the Asian or Pacific Islander communities
	Black or African American	Same as "CGS Recommendation on Interest", "FGS Recommendation on Stereotype", "FGS Recommendation on Technical Capital"; develop social support from family and friends in the Black or African American communities
	Hispanic or Latino	Same as "CGS Recommendation on Interest", "FGS Recommendation on Stereotype", "CGS Recommendation on IT Job Opportunities"; develop social support from family and friends in the Hispanic or Latino communities
	White or Caucasian	Same as "CGS Recommendation on Interest", "CGS Recommendation on IT Job Opportunities"; develop social support from family and friends

Given our finding regarding FGS perceptions of IT stereotypes and "that's not me," we believe it would be particularly useful at both the high school and postsecondary levels to have career panels, seminars, and workshops with diverse speakers, such as individuals that are underrepresented in the IT field (e.g., FGS, women, Hispanic or Latino, Black or African American). It is important to have role models that individuals can identify with, that have shared backgrounds and experiences to counter the stereotypical image of what an IT professional "looks like." Although providing individuals with information on the variety of opportunities available may produce opportunities to grow their technical and social capital within the IT field, our study revealed the negative influence of stereotypes on FGS IT career choice, particularly for Black or African American and Hispanic or Latino FGSs. As such, we believe bringing more experientially, and demographically diverse role models (i.e., FGSs with different gender and ethnic backgrounds) into the picture may encourage FGSs to explore and broaden their career options rather than perpetuate the perception that IT is "not for me."

In summary, to attract more underrepresented students (women, first-generation college students, Black or African American, Hispanic or Latino) to join the IT workforce, higher education institutions and policymakers must understand their individual experience with computing and their attitude toward IT. Consistent with previous findings (Zaza, Harris, Arik, & Geho, 2019) of the insights of business management personnel, we believe that a supportive ecosystem of family, school, community, and government, is crucial to the success of our FGS students. By highlighting the influence of the intersectionality of generational status (FGS and CGS) and gender for multiple racial and ethnic groups, we have provided initial guidance for schools, colleges, and universities on how they might encourage all students to consider an IT career.

8 Limitations and Future Research

Our study has limitations that need to be acknowledged. First, we limited our participants to a single minority-serving urban university located in a metropolitan area in the Western United States. While this choice allowed us to address our research questions, it does limit the generalizability of our findings. Insights were found within the subgroup analysis but caution also must be taken when generalizing the findings. Future research in different contexts such as private universities, large public universities, and universities in other geographic locations could provide additional insights into students' motivation for their IT career choice (or lack of IT career choice) and further develop the nuanced influences of individual differences. A second limitation of the study is that it lacks statistical measurements of the weights of each motivating factor, as this study adopts an inductive approach and qualitative analysis method. The findings from this study should be empirically validated and statistically significant differences in factor weights identified. Future studies can build on our initial findings and proposed research model (Figure 2) to further investigate individual differences and IT career choice.

Promising future research includes a deeper analysis of the interactions between the motivating factors, such as the possibility that perceived job opportunities and technical capital interact to influence interest, and the role of other demographic factors (such as age and employment status) in FGS IT career

decision. In addition, our data revealed social capital as one influencing factor. Further research to differentiate the influences of the types of social capital – bridging capital and bonding capital – on the IT career choice of FGSs could provide additional insights into promoting IT career among FGSs.

For future research, it is also important to conduct longitudinal studies to examine to what extent each motivating factor sustains individual IT career passion. In other words, which factors will motivate students to continue in an IT career? Complementing academic training with internships and mentorships equips IT graduates with the professional skills required to thrive in early careers (Setor and Joseph, 2021). Our study reveals the set of motivational factors for FGS initial career choice, but it would be interesting to examine if and how the motivators to choose an IT career will sustain students through their early career and beyond.

Similarly, it would be interesting to address the question: Does individual motivation in IT career choice affect job mobility in an IT career. The IT field faces the challenges of turnover and attrition. The IT mobility literature identifies career burnout, stress, and relative pay gap as enablers of exit behaviors (Armstrong, Brooks, & Riemenschneider, 2015; Joseph, Ang, & Slaughter, 2015). Our study reveals a set of motivators that may influence the initial choice of an IT career and the differential effects of the factors on different subgroups of FGSs. Such motivators may influence IT professionals (especially those in our identified sub-groups) to remain in the IT profession.

9 Conclusion

To the best of our knowledge, our study is the first to explore the influence of individual identity variables such as gender and ethnic background on the IT career choice decisions of students from generational cohorts (FGS vs. CGS). Postsecondary generational status is important to consider because FGSs experience unique stressors that negatively affect their college persistence and success that CGSs may not (Schwartz, Kanchewa, Rhodes, Gowdy, Stark, Horn, Parnes, & Spencer, 2018; Stebleton, Soria, & Huesman, 2014), and this population is still underrepresented in the IT workforce (e.g., Muro, Berube, & Whiton, 2018). An IT career offers not only employment opportunities (Breaux & Moritz, 2021) but also a potential source for economic advancement (Torpey, 2018), and there is no doubt that the IT industry needs a more diverse and inclusive workforce. Encouraging more FGSs to pursue IT careers may increase their representation in this profession and perhaps ignite a more diverse and inclusive professional culture.

By acknowledging that *one size does not fit all* and tailoring programs that address the needs of the individuals that educational institutions serve, first-generation college students may have more career options and the opportunity to choose an IT career. Left unaddressed, we will continue to see low rates of first-generation students choosing an IT career. As IS academicians, we are responsible for developing knowledge to benefit business *and* society (Davison & Bjørn-Andersen, 2019). Our research is one of many efforts to address the imbalance in the IT employment pipeline by exploring IT career choice from a more nuanced perspective. We hope this research and initial theoretical model contribute to the ongoing conversation on diversity, equity, and inclusion within the IT field.

Acknowledgements

This research is partially funded by a grant awarded by The Mervyn M. Dymally African American Political & Economic Institute at California State University, Dominguez Hills. We appreciate the constructive comments provided by the anonymous editor and three reviewers during the review process.

References

Adya, M., & Kaiser, K. M. (2005). Early determinants of women in the IT workforce: A model of girls' career choices. *Information Technology & People*, *18*(3), 230-259.

Akbulut, A.Y., & Looney, C.A. (2007). Their aspirations are our possibilities: inspiring students to pursue computing degrees. *Communications of the ACM, 50*(10), 67–71.

Armstrong, D. J., Brooks, N. G., & Riemenschneider, C. K. (2015). Exhaustion from information system career experience: Implications for turn-away intention. *MIS Quarterly*, 39(3), 713-727.

Arvizu, D. E. (2015). *Revisiting the STEM Workforce*, NSB-2015-10. National Science Foundation. https://nsf.gov/pubs/2015/nsb201510/nsb201510.pdf

Association for Information Systems. (2021). AIS diversity and inclusion statement. https://aisnet.org/page/DiversityInclusion

Bandura, A. (1989). Social cognitive theory. In R. Vasta (Ed.), *Annals of Child Development*, 6 (pp. 1–60). Greenwich, CT: Jai Press LTD.

Barber, B. (1957). *Social stratification.* New York: Harcourt Brace.

Beattie, I., & Thiele, M. (2016). Connecting in class? College class size and inequality in academic social capital. *The Journal of Higher Education*, *87*(3), 332-362.

Berrios-Allison, A. C. (2005). Family influences on college students' occupational identity. *Journal of Career Assessment, 13*(2), 233–247.

Bourdieu, P. 1986. The forms of capital. In J. Richardson (Ed.) *Handbook of theory and research for the sociology of education* (pp. 241-258). New York, NY: Greenwood.

Bourdieu, P. 2002. *The social structure of the economy.* New York, NY: Polity.

Breaux, T., & Moritz, J. (2021). The 2021 software developer shortage is coming. *Communications of the ACM, 64*(7), 39-41.

Burton-Jones, A., & Sarker, S. (2021). Creating our editorial board position statement on diversity, equity, and inclusion (DEI). *MIS Quarterly*, 45(4), iii-xii.

Cai, Y. (2013). Graduate employability: A conceptual framework for understanding employers' perceptions. *Higher Education*, *65*(4), 457-469.

Carolan-Silva, A., & Reyes, J. R. (2013). Navigating the path to college: Latino students' social networks and access to college. *Educational Studies*, *49*(4), 334–359.

Charleston, L. (2012). A qualitative investigation of African Americans' decision to pursue computing science degrees: Implications for cultivating career choice and aspiration. *Journal of Diversity in Higher Education*, *5*, 222-243.

Chen, L., Pratt, J. A., & Cole, C. B. (2016). Factors influencing students' major and career selection in systems development: An empirical study. *Journal of Computer Information Systems*, *56*(4), 313-320.

Cheryan, S., Siy, J. O., Vichayapai, M., Drury, B. J., & Kim, S. (2011). Do female and male role models who embody STEM stereotypes hinder women's anticipated success in STEM? *Social Psychological and Personality Science*, 2, 656–664.

Cholewa, B., Burkhardt, C. K., & Hull, M. F. (2016). Are school counselors impacting underrepresented students' thinking about postsecondary education? A nationally representative study. *Professional School Counseling, 19*(1), 144-154.

Choudhury, V., Lopes, A. B., & Arthur, D. (2010). IT careers camp: An early intervention strategy to increase IS enrollments. *Information Systems Research*, 21(1), 1-14.

Clarke-Midura, J., Poole, F. J., Pantic, K., Sun, C., & Allan, V. (2018). How mother and father support affect youths' interest in computer science. In *Proceedings of the 2018 ACM Conference on International Computing Education Research ICER 2018*, (pp. 215–222). New York, NY: Association for Computing Machinery.

Compeau, D., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly, 19*(2), 189–211.

Daire, A. P., LaMothe, S., & Fuller, D. P. (2007). Differences between Black/African American and White college students regarding influences on high school completion, college attendance, and career choice. *The Career Development Quarterly*, *55*(3), 275-279.

Davison, R., & Bjørn-Andersen, N. (2019). Do we care about the societal impact of our research? The tyranny of the H-index and new value-oriented research directions. *Information Systems Journal, 29*, 989-993.

Deng, X., Fernández, Y., & Zhao, M. (2022). Social media use by first-generation college students and two forms of social capital: a revealed causal mapping approach. *Information Technology & People, 35*(1), 344-366.

Engle, J., & Tinto, V. (2008). *Beyond access: College success for low-income, first-generation students*. Washington, DC: Pell Institute for the Study of Opportunity in Higher Education.

Fernández, Y., Deng, X., & Zhao, M. (2018). Social networking technology and the social justice implications of equitable outcomes for first-generation college students. In A. H. Normore and A. I. Lahera (Eds.), *Crossing the bridge of the digital divide: A walk with global leaders* (pp. 145-162). Charlotte, NC: Information Age Publishing.

Firth, D., Lawrence, C., & Looney, C. A. (2008). Addressing the IS enrollment crisis: A 12-step program to bring about change through the introductory IS course. *Communications of the Association for Information Systems, 23*(1), 2.

Funk, C., & Parker, K. (2018). Women and Men in STEM often at odds over workplace equity. *Pew Research Center*. Retrieved on 07/12/2020 from https://www.pewsocialtrends.org/2018/01/09/diversity-in-the-stem-workforce-varies-widely-across-jobs/

Galli, E. B. (2011). *Building social capital in a multibusiness firm: Lessons from a case study*. Heidelberg, Germany: Gabler Verag.

Garriott, P. O., Hultgren, K. M., & Frazier, J. (2017). STEM stereotypes and high school students' math/science career goals. *Journal of Career Assessment*, *25*(4), 585-600.

Glaser, B. G. (2016). Open coding descriptions. *Grounded theory review*, *15*(2), 108-110.

Glover, J., Champion, D., Daniels, K., & Boocock, G. (2016). Using capital theory to explore problem solving and innovation in small firms. *Journal of Small Business and Enterprise Development, 23*(1), 25-43.

Granger, M. J., Dick, G., Luftman, J., Van Slyke, C., & Watson, R. T. (2007). Information systems enrollments: Can they be increased? *Communications of the Association for Information Systems*, *20*(1), 41.

Griffith, A. L. (2010). Persistence of women and minorities in STEM field majors: Is it the school that matters? *Economics of Education Review*, *29*(6), 911-922.

Harris, C., Straker, L., & Pollock, C. (2017). A socioeconomic related 'digital divide' exists in how, not if, young people use computers. *PloS one*, *12*(3), e0175011. https://doi.org/10.1371/journal.pone.0175011

Heinze, N., & Hu, Q. (2009). Why college undergraduates choose IT: A multi-theoretical perspective. *European Journal of Information Systems*, *18*(5), 462-475.

Higgins, M. C. (2001). Changing careers: The effects of social context. *Journal of Organizational Behavior 22*(6), 595–618.

Hodges-Payne, T. (2006). *Perceptions of first-generation college students: Factors that influence graduate school enrollment and perceived barriers to attendance* [Doctoral dissertation]. ProQuest Dissertations and Theses Database (UMI No. 3223320).

Ishitani, T. T. (2003). A longitudinal approach to assessing attrition behavior among first generation students: Time-varying effects of pre-college characteristics. *Research in Higher Education*, *44*(4), 433-449.

Ishitani, T. T. (2006). Studying attrition and degree completion behavior among first-generation college students in the United States. *The Journal of Higher Education*, 77(5), 861-885.

Jack, A. A. (2014). Culture shock revisited: The social and cultural contingencies to class marginality. *Sociological Forum, 29*(2), 453-75.

Johnson, R. D., Stone, D. L, & Phillips, T. N. (2008). Relations among ethnicity, gender, beliefs, attitudes, and intention to pursue a career in information technology. *Journal of Applied Social Psychology, 38*(4), 999-1022.

Joseph, D., Ang, S., & Slaughter, S. A. (2015). Turnover or turnaway? Competing risks analysis of male and female IT professionals' job mobility and relative pay gap. *Information Systems Research*, 26(1), 145-164.

Joshi, K. D., & Kuhn, K. (2011). What determines interest in an IS career? An application of the theory of reasoned action. *Communications of the Association for Information Systems*, *29*(1), 8.

Joshi, K. D., Kvasny, L., McPherson, S., Trauth, E., Kulturel-Konak, S., & Mahar, J. (2010). Choosing IT as a career: exploring the role of self-efficacy and perceived importance of IT skills. In R. Sabherwal & M. Sumner (Eds.), *Proceedings of the 31st International Conference on Information Systems* (pp. 154). New York, NY: AIS.

Joshi, K. D., Kvasny, L., Unnikrishnan, P., & Trauth, E. (2016). How do black men succeed in IT careers? The effects of capital. In *Proceedings of the 49th Hawaii International Conference on System Sciences (HICSS)* (pp. 4729-4738). Washington, DC: IEEE Computer Society.

Kvasny, L., Joshi, K. D., & Trauth, E. (2015). Understanding black males' IT career choices. In *Proceedings of the 2015 iConference.* http://hdl.handle.net/2142/88872.

Koch, H., & Kayworth, T. (2009). Partnering with the majors: A process approach to increasing IS enrollment. *Journal of Information Systems Education*, *20*(4), 439-450.

Lent, R. W., Brown, S. D., Brenner, B., Chopra, S. B., Davis, T., & Talleyrand, R. (2001). The role of contextual supports and barriers in the choice of math/science educational options: A test of social cognitive hypotheses. *Journal of Counseling Psychology, 48*, 474–483.

Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior*, *45*(1), 79–122.

Lent, R. W., Brown, S. D., & Hackett, G. (2002). Social cognitive career theory. In Brown D. (Ed.), *Career choice and developmen*t, 4th edition (pp. 255–311). San Francisco, CA: Jossey-Bass.

Lent, R. W., Hill, C. E., & Hoffman, M. A. (2003). Development and validation of the counselor activity self-efficacy scales. *Journal of Counseling Psychology, 50*(1), 97–108.

Lent, R. W., Lopez, A. M., Lopez, F. G., & Sheu, H. (2008). Social cognitive career theory and the prediction of interests and choice goals in the computing disciplines. *Journal of Vocational Behavior*, *73*, 52–62.

Lent, R. W., Lopez, F. G., Sheu, H., & Lopez, A. M. (2011). Social cognitive predictors of the interests and choices of computing majors: Applicability to underrepresented students. *Journal of Vocational Behavior*, *78*, 184–192.

Lohfink, M. M., & Paulsen, M. B. (2005). Comparing the determinants of persistence for first-generation and continuing-generation students. *Journal of College Student Development*, *46*(4), 409-428.

Looney, C. A., & Akbulut, A. Y. (2007). Combating the IS enrollment crisis: The role of effective teachers in introductory IS courses. *Communications of the Association for Information systems*, *19*(1), 38.

Lund, C. (2014). Of what is this a case? Analytical movements in qualitative social science research. *Human Organization*, 73(3), 224-234.

Mark, S. L. (2016). Psychology of working narratives of STEM career exploration for non-dominant youth. *Journal of Science Education and Technology*, 25(6), 976-993.

Markowitz, T. (2017). The barriers to success: upward mobility for first generation students and how to fix the problem. *Forbes*, August 8, 2017. (Accessed 25th June of 2019. URL: https://www.forbes.com/sites/troymarkowitz/2017/08/08/the-barriers-to-success-and-upward-mobility-for-first-generation-students-and-how-to-fix-the-problem/?sh=11a6b1381cb3)

Meszaros, P. S., Creamer, E., & Lee, S. (2009). Understanding the role of parental support for IT career decision making using the theory of self-authorship. *International Journal of Consumer Studies*, *33*(4), 392-395.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook.* Thousand Oaks, CA: Sage Publications.

Moore, R. (2012). *Capital*. In M. Grenfell (Ed.), *Key concepts: Pierre Bourdieu. 2nd edition* (pp. 98–113). Bristol, CT: Acumen.

Morrow, S., Gore, P., & Campbell, B. (1996). The application of a sociocognitive framework to the career development of lesbian women and gay men. *Journal of Vocational Behavior, 48*(2), 136-148.

Muro, M., Berube, A., & Whiton, J. (2018). Black and Hispanic underrepresentation in tech: It's time to change the equation. *Brookings Report*, March 28, 2018. Retrieved on 10/13/2020 from https://www.brookings.edu/research/black-and-hispanic-underrepresentation-in-tech-its-time-to-change-the-equation/

Nunez, A. M., & Cuccaro-Alamin, S. (1998). First-generation students: Undergraduates whose parents never enrolled in postsecondary education (NCES No. 98-082). *Statistical Analysis Report, Postsecondary Education Descriptive Analysis Reports*. Washington, DC: U.S. Department of Education

Paré, G. (2004). Investigating information systems with positivist case research. *Communications of the Association for Information Systems*, *13*(1), 18.

Pascarella, E. T., Pierson, C. T., Wolniak, G. C., & Terenzini, P. T. (2004). First-generation college students: Additional evidence on college experiences and outcomes. *The Journal of Higher Education, 75*(3), 249-284.

Patton, M. Q. (1990). *Qualitative evaluation and research methods,* 2nd edition. Newbury Park, CA: Sage Publications.

Putnam, R. D. (2000). Bowling alone: America's declining social capital. In L. Crothers (Ed.), *Culture and politics* (pp. 223-234). New York, NY: Palgrave Macmillan.

Redford, J., & Hoyer, K. (2017). First generation and continuing-generation college students: A comparison of high school and postsecondary experiences (*NCES 2018-009),* U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved on 10/13/2020 from https://vtechworks.lib.vt.edu/bitstream/handle/10919/83686/FirstGenerationPostsecondaryExperience.pdf?sequence=1&isAllowed=y

Riemenschneider, C. K., Armstrong, D. J., & Buche, M. (2019). He said, she said: Communication theory of identity and the challenges men face in the information systems workplace. *The DATABASE for Advances in Information Systems, 50*(3), 85-115.

Schwartz, S. E., Kanchewa, S. S., Rhodes, J. E., Gowdy, G., Stark, A. M., Horn, J. P., Parnes, M. & Spencer, R. (2018). 'I'm having a little struggle with this, can you help me out?': Examining impacts and processes of a social capital intervention for first-generation college students. *American Journal of Community Psychology*, 61(1-2), 166-178.

Scott, C., Fuller, M. A., MacIndoe, K. M., & Joshi, K. D. (2009). More than a bumper sticker: The factors influencing information systems career choices. *Communications of the Association for Information Systems*, *24*(1), 2.

Setor, T. K., & Joseph, D. (2021). College-based career interventions: Raising IT employability and persistence in early careers of IT professionals. *Journal of Information Systems Education*, 32(4), 262-273.

Stanko, T., Zhirosh, O., & Krasnikhin, D. (2014). Why girls with an interest in IT in high school do not choose an IT career. In *Proceedings of the International Conference on Interactive Collaborative Learning (ICL)* (pp. 131-137). Washington, DC: IEEE Computer Society.

Stebleton, M. J., Soria, K. M., & Huesman Jr, R. L. (2014). First-generation students' sense of belonging, mental health, and use of counseling services at public research universities. *Journal of College Counseling, 17*(1), 6-20.

Street, C., Wade, M., Bjørn-Andersen, N., Ives, B., Venable, J., & Zack, M. (2008). Reversing the downward trend: Innovative approaches to IS/IT course development and delivery. *Communications of the Association for Information Systems, 22*(1), 28.

Tatum, A. K., Formica, L. J., & Brown, S. D. (2017). Testing a social cognitive model of workplace sexual identity management. *Journal of Career Assessment, 25*(1), 107–120.

Thomas, T., & Allen, A. (2006). Gender differences in students' perceptions of information technology as a career. *Journal of Information Technology Education*, *5*(1), 165-178.

Torche, F. (2011). Is a college degree still the great equalizer? Intergenerational mobility across levels of schooling in the United States. *American Journal of Sociology, 117*(3), 763–807.

Torpey, E. (2018). Measuring the value of education. *U.S. Bureau of Labor Statistics*. Retrieved on 07/14/2020 from https://www.bls.gov/careeroutlook/2018/data-on-display/education-pays.htm#:~:text=Median%20weekly%20earnings%20in%202017,weekly%20earnings%20for%20all%20workers.

Trauth, E. M. (2002). Odd girl out: An individual differences perspective on women in the IT profession. *Information Technology & People, 15*(2), 98-118.

Trauth, E. M. (2017). A research agenda for social inclusion in information systems. *The DATABASE for Advances in Information Systems, 48*(2)*,* 9-20.

Trauth, E. M., Cain, C. C., Joshi, K. D., Kvasny, L., & Booth, K. M. (2016). The influence of gender-ethnic intersectionality on gender stereotypes about IT skills and knowledge. *The DATABASE for Advances in Information Systems*, *47*(3), 9-39.

Trauth, E. M., & Quesenberry, J. L. (2006). Are women an underserved community in the information technology profession? In *Proceedings of the 2006 International Conference on Information Systems*, (pp. 1757-1770). New York, NY: AIS.

Trauth, E. M., Quesenberry, J. L., & Huang, H. (2008). A multicultural analysis of factors influencing career choice for women in the information technology workforce. *Journal of Global Information Management, 16*, 1-23.

Warburton, E., Bugarin, R., & Nuñez, A. (2001). Bridging the gap: Academic preparation and postsecondary success of first-generation students. *NCES 2001–153*. Project Officer: C. Dennis Carroll. U.S. Department of Education. National Center for Education Statistics. Washington, DC.

Wiggins, J. (2011). Faculty and first generation college students: Bridging the classroom gap together. *New Directions for Teaching & Learning*, 127, 1-4.

Willelt, L. H. (1989). Are two-year college students first-generation college students? *Community College Review*, 17(2), 48-52.

Witkow, M. R., Huynh, V., & Fuligni, A. J. (2015). Understanding differences in college persistence: A longitudinal examination of financial circumstances, family obligations, and discrimination in an ethnically diverse sample. *Applied Developmental Science, 19*(1), 4–18.

Yin, R. K. (2003) *Case study research, design and methods* (3rd edition), Beverly Hills, CA: Sage Publications.

Zaza, S., Harris, A., Arik, M., & Geho, P. (2019). The roles parents, educators, industry, community, and government play in growing and sustaining the STEM Workforce. *Journal of Higher Education Theory and Practice*, *19*(8), 114-130.

Appendix A: Motivating Factors to Pursue an IT Career

Table A1. Motivating Factors by FGS vs. CGS

Factors that contribute to the decision whether to pursue an IT career	FGS (n=144)	CGS (n=49)	Full sample (n=193)
Economic Capital (negative)	0.7%	0.0%	0.5%
Interest	20.8%	26.5%	22.3%
Interest (negative)	20.1%	16.3%	19.2%
Perceived Job Opportunity	7.6%	8.2%	7.8%
Perceived Job Opportunity (negative)	1.4%	2.0%	1.6%
Social Capital	0.7%	2.0%	1.0%
Social Capital (negative)	0.7%	4.1%	1.6%
Stereotype	15.3%	4.1%	12.4%
Technical Capital	9.7%	2.0%	7.8%
Technical Capital (negative)	2.8%	4.1%	3.1%
Note: The % reported in the columns is the percentage based on the column total n (144, 49, and 193 respectively).			

Table A2. Motivating Factors by FGS/CGS and Gender

	FGS (n=144)		CGS (n=49)	
Factors that contribute to their decision whether to pursue an IT career	**Female (n=66)**	**Male (n=77)**	**Female (n=19)**	**Male (n=30)**
Economic Capital (negative)	1.5%	0.0%	0.0%	0.0%
Interest	16.7%	24.7%	36.8%	20.0%
Interest (negative)	19.7%	20.8%	15.8%	16.7%
Perceived Job Opportunity	4.5%	9.1%	5.3%	10.0%
Perceived Job Opportunity (negative)	0.0%	2.6%	0.0%	3.3%
Social Capital	0.0%	1.3%	0.0%	3.3%
Social Capital (negative)	1.5%	0.0%	0.0%	6.7%
Stereotype	18.2%	13.0%	5.3%	3.3%
Technical Capital	12.1%	7.8%	0.0%	3.3%
Technical Capital (negative)	4.5%	1.3%	0.0%	6.7%
Note: The % reported in the columns is the percentage based on the column total n (66, 77, 19, and 30, respectively).				

Table A3. Motivating Factors by Ethnic Background and FGS

Factor	FGS			
	Asian or Pacific Islander (n=10)	Black or African American (n=13)	Hispanic or Latino (n=90)	White or Caucasian (n=5)
Economic Capital (negative)	0.0%	0.0%	1.1%	0.0%
Interest	50.0%	7.7%	19.0%	20.0%
Interest (negative)	0.0%	31.0%	21.0%	40.0%
Perceived Job Opportunity	30.0%	7.7%	5.6%	0.0%
Perceived Job Opportunity (negative)	0.0%	0.0%	1.1%	20.0%
Social Capital	0.0%	0.0%	1.1%	0.0%
Social Capital (negative)	0.0%	0.0%	1.1%	0.0%
Stereotype	0.0%	15.0%	13.0%	0.0%
Technical Capital	10.0%	0.0%	12.0%	20.0%
Technical Capital (negative)	0.0%	0.0%	4.4%	0.0%

Notes:
"Other" n = 11
The % reported in the columns is the percentage based on the column total n (10, 13, 90, and 5, respectively).

Table A4. Motivating Factors by Ethnic Background and CGS

Factor	CGS			
	Asian or Pacific Islander (n=8)	Black or African American (n=10)	Hispanic or Latino (n=13)	White or Caucasian (n=11)
Economic Capital (negative)	0.0%	0.0%	0.0%	0.0%
Interest	50.0%	40.0%	23.0%	9.1%
Interest (negative)	13.0%	0.0%	31.0%	18.0%
Perceived Job Opportunity	0.0%	0.0%	7.7%	18.0%
Perceived Job Opportunity (negative)	0.0%	0.0%	0.0%	9.1%
Social Capital	0.0%	0.0%	0.0%	0.0%
Social Capital (negative)	0.0%	0.0%	0.0%	9.1%
Stereotype	0.0%	10.0%	7.7%	0.0%
Technical Capital	0.0%	10.0%	0.0%	0.0%
Technical Capital (negative)	0.0%	0.0%	4.4%	9.1%

Notes:
"Other" n = 3
The % reported in the columns is the percentage based on the column total n (8, 10, 13, and 11, respectively).

About the Authors

Xuefei "Nancy" Deng is a Professor of Information Systems at California State University, Dominguez Hills. Nancy received her Ph.D. in Information Systems from Carnegie Mellon University. Her research interests include crowdsourcing, digital and social media, IS workforce, first-generation college students, and inclusion. Her research has been published in *MIS Quarterly, Journal of Management Information Systems, Journal of the Association for Information Systems, Decision Support Systems, Information Systems Journal, IT & People,* and *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, among others. Nancy has served as guest editor for *ACM Transaction on Social Computing* HICSS special issue for three years (2018-2020), and serves as associate editor for three peer-reviewed journals, including *Information and Organization*. Starting fall 2022, Nancy will serve as the co-editor in chief for *The Data Base for Advances in Information Systems* journal.

Sam Zaza is an Assistant Professor of Information Systems and Analytics in the Jones College of Business at Middle Tennessee State University. She earned her Ph.D. in Management Information Systems from Florida State University. Her primary research interest areas include IT professionals, inclusion, IT careers, IT artifact and methodological approaches. Her research has appeared at *Communications of the Association for Information Systems, Information and Organization, IT & People, The Data Base for Advances in Information Systems, AIS Transactions on Replication Research*, among others. Sam is currently the president of the Association for AIS SIG Social Inclusion, cochair-elect of AIS Women Network College, and serves as a senior editor at *The Data Base for Advances in Information Systems*.

Deborah J. Armstrong. Deborah J. "Deb" Armstrong is a Professor of Management Information Systems at Florida State University. Deb's research interests cover issues at the intersection of IS personnel and cognition, involving the human aspects of technology, change, and learning. Many of the research problems that Deb finds interesting involve IS workforce issues. Deb has published articles in *Management Information Systems Quarterly,* the *Journal of Management Information Systems,* the *Journal of the Association for Information Systems,* and the *European Journal of Information Systems,* among others. Deb has served as the co-editor in chief for *The Data Base for Advances in Information Systems* journal, the AIS Women's Network co-chair, and now sits on their Advisory Board. To God be the glory.