A Critical Analysis on the Effects of Negative IS Stereotypes on Underserved Populations

Emergent Research Forum (ERF)

Mina Tari
The Information School
University of Washington
minatari@uw.edu

Hala Annabi
The Information School
University of Washington
hpannabi@uw.edu

Yvette Iribe Ramirez
The Information School
University of Washington
yirie@uw.edu

Erin Beneteau
The Information School
University of Washington
benet@uw.edu

Stephanie Ballard
The Information School
University of Washington
ballard4@uw.edu

Abstract

Low student enrollment in information systems (IS) programs across the U.S. persists, despite an increase in job opportunities for IS graduates. One approach to meet this increased demand for IS employees is the recruitment and retention of underserved populations. Beyond meeting demand for employees, creating more equitable environments is an issue of social justice essential to the vitality of the IS field. Negative stereotypes about IS are one of the major factors contributing to lack of student interest. In this paper, we synthesize relevant literature on gender and racial stereotypes and existing stereotypes about IS, describe the theoretical foundation of our proposed work, and outline our research approach. In this emergent research, we aim to contribute a theoretical understanding of underserved groups in relation to IS stereotypes. Findings from this work will contribute to the design and deployment of curriculum, pedagogy, and recruitment strategies that enhance equitable IS programs.

Keywords
underserved populations, stereotypes, IS education, critical theory

Introduction

Despite increased job opportunities for information systems (IS) graduates, low student enrollment persists in IS programs across the U.S. (Annabi & McGann 2019). The field is slowly recovering from a period of sharp decline in enrollment, from around 18,000 students in 2002 to under 8,000 students in 2017 (Bureau of Labor Statistics 2018). The gradual rate of projected growth in student enrollment is not nearly enough to fill the estimated 22% increase in IS jobs by 2020 (Annabi & McGann 2019). One approach to meet this increased demand for IS employees is the recruitment and retention of underserved populations (e.g., women and racial minorities). Underserved groups are underrepresented in IS fields and all of information technology (IT) degrees: women make up only 26% of IT fields compared to 51% of other professional fields (Ashcraft, McLain, & Eger 2016). Furthermore, improving representation of underserved populations in IS improves innovation and team performance, leading to higher profit for IT organizations (Annabi & Lebovitz 2018). However, prior literature makes clear the necessity to go beyond recruitment and retention to create more equitable environments in IS, hence our use of the term “underserved” rather than “underrepresented” (Kvansy 2006). Beyond meeting demand for skilled employees and subsequent organizational benefits, creating more equitable environments is an issue of social justice essential to the vitality of the IS field. Because IS work is fundamental across all facets of society, the lack of underserved populations means they are literally being left out of shaping the future (A. Joshi et al. 2015; Wajcman
Critical Analysis of Negative IS Stereotypes

Therefore, it is imperative that we address structural barriers at the individual and organizational levels to make IS more inclusive (Annabi & Lebovitz 2018; Trauth 2013).

Negative stereotypes about IT-related fields, such as IS, are one of the major factors contributing to lack of student interest (Akbulut-Bailey 2009; Akbulut & Motwani 2013; Annabi & McGann 2019). In the U.S., the portrayal of IT-related fields as primarily the domain of white men is perpetuated by the majority of IT leadership, faculty, and students as well as media representations (Akbulut-Bailey 2009; Akbulut & Motwani 2013; Berki, Payton, & Pinto 2015; Trauth, Cain, Joshi, Kvasny, & Booth 2016). For example, in a recent top 30 list of most influential computer scientists, 29 were men and only two were non-white (Berki et al. 2015). It is not difficult to understand why underserved groups perceive the field as exclusive. Underserved students also are more influenced by negative stereotypes of a field, so it is essential to break down these portrayals in order to make IS more inclusive (Oelhborn 2018). Previous work in IS fields shows that negative stereotypes can be reduced when providing positive media representation and role models (Berki et al. 2015). While there is prior work in IS investigating stereotypes of students (e.g., Annabi & McGann 2019), African American men (Cain & Trauth 2015), and veterans (Graham, Joshi, Nithithanatchinnapat, & Trauth 2015), little research focuses on the intersectionality of identity factors for underserved individuals and how that may affect students’ perception of IS stereotypes (Joshi et al. 2015).

To address this gap in the literature, our study aims to explain why underserved students’ perception of IS negative stereotypes persist. In this study we will also investigate how IS negative stereotypes differ from other IT-related fields. We do so with a critical, theoretical foundation focused on individual differences of race, gender, and nationality. Our work aims to contribute a theoretical understanding of how IS stereotypes affect underserved groups in relation to their career choices. Findings from this work will contribute to the design and deployment of curricula, pedagogy, and recruitment strategies that enhance equitable IS programs. This paper reports on the conceptual underpinning of our study and approach.

Exploration of the Literature

We synthesize relevant IS-related literature on gender and racial stereotypes in the field to identify existing stereotype’s effects on underserved populations’ choice to pursue IS-related careers. The literature review is meant to be illustrative and not exhaustive as is typical for emergent research papers.

Effect of Stereotypes on Underserved Populations

Stereotypes are cognitive schema formed to improve how we process, store, and recall information about others. Stereotypes form spontaneously through the process of repeatedly passing social information between people (Martin et al. 2014). Through each transmission, information about a particular group becomes simpler and easier to remember, eventually converging around a categorical structure. In their work, Martin and colleagues show that once the categorical structure stabilizes, it can be used to generalize to unfamiliar members of the social category (i.e., it becomes a stereotype of that category). Stereotypes can lead to harmful and inaccurate assumptions about an individual’s abilities in IS (Annabi & Lebovitz 2018; Oelhborn 2018). These schemas may reinforce the power dynamics between underserved individuals and dominant groups and further marginalize the underserved.

Negative Stereotypes of IS and IT Fields

Negative stereotypes persist about the nature of the IS field and professions which leads to lack of interest and even turnover within the workforce (Ahuja 2007; Annabi & McGann 2019; Armstrong, Riemenschneider, Allen, & Reid 2007). In particular, perceptions of IS being a difficult major (e.g., requiring a prohibitive amount of prior knowledge), and the IS workforce demanding longer hours, frequent travel, and social isolation (e.g., spending most of one’s working time with computers) have led to limited interest in IS careers (Ahuja 2007; Annabi & McGann 2019; Armstrong et al. 2007). Furthermore, since IT has been dominated by white men since the late 1980s, the belief in their inherent skill with technology has been widespread across popular culture and academia (Trauth, Joshi, Kvasny, & Chong 2010; Trauth et al. 2016). These stereotypes have led to the belief that underserved groups are not as capable, leading to their further exclusion from the field and often their opting out of the IS or IT workforce entirely (Ahuja 2007; Armstrong et al. 2007; Joshi, et al., 2013; Joshi & Schmidt 2006; Trauth et al. 2010).
Gender stereotyping impacts women's participation and success in the IS field (Joshi et al. 2013). For example, stereotypes of women's roles in family and lack of interest in technology and travel leads to fewer opportunities within the field (Ahuja et al. 2007; Annabi & Lebovitz 2018). Women report several negative stereotypes related to the IS field as a whole (e.g., IS jobs are too technical, the field is dominated by men, there is too much isolating work) and related to individuals within the field (e.g., nerdy/geeky introverts, extremely passionate about computers) (Armstrong et al. 2007; Joshi & Schmidt 2006; Oehlhorn 2018). Stereotypes around difficult, isolating, and technical work also negatively affect underserved groups more likely to prefer collaborative working environments. Prior literature suggests that individuals of color prefer more community-based, collaborative engagement in careers (Espinosa 2011; Tari & Annabi 2018). Perceptions of isolated work may further turn them away from the field. Furthermore, individuals with lower socioeconomic status often have less exposure to technical skills in K-12 curricula; the perception of needing a high level of technical skill and prior knowledge of the subject matter may prevent them from even considering the field as a possibility (Ahuja 2007; Espinosa 2011; Margolis & Fisher 2008).

Prior work has mixed views that IT stereotypes may be decreasing or changing in the U.S. due to the growing ubiquity of technology. Joshi & Kuhn (2007) found some shift in gender stereotypes of IT-related fields, while technical skills were still seen as strongly stereotyped toward men; other skills traditionally viewed as masculine (e.g., leadership, problem solving) were seen as more gender neutral by millennials (Joshi & Kuhn 2007; Trauth et al. 2010). From these results, there is the potential that as IT becomes more widespread across identities, the affiliation with masculinity is decreasing (Trauth et al. 2010). However, this may instead imply that masculinity is beginning to encompass more skills (Trauth et al. 2010).

**The Role of Introductory IS Courses in Demystifying Stereotypes**

Underserved students have been particularly affected by negative stereotypes in their early exposure to IT-related fields. In post-secondary education (PSE), students often identify with a discipline if they have more favorable views toward it (Akbulut & Motwani 2013). Unfortunately, studies suggest that upon enrollment in PSE, students have narrow and inaccurate views of IS (Akbulut-Bailey 2009; Annabi & McGann 2019). Initially, students perceive IS to be similar to CS. Akbulut and Motwani (2013) found that women believed IS was dominated by men and was more technical. Annabi & McGann (2019) found that students similarly perceived IS to be technical and require prior technical knowledge. However, enrolling in an introductory IS course that focuses on reducing stereotype threat can drastically change students' perception of the field (Akbulut & Motwani 2013). Akbulut & Motwani (2013) studied an introductory IS course in a large public university in the U.S. that emphasized the use of IS to meet organizational objectives, rather than solely technical tasks. The results indicated that there was a shift in both women and men’s perceptions of IS, toward a more gender neutral perception of the field. As introductory courses are often the first concrete experience students have with a field, it is necessary to create environments that eradicate negative stereotypes to increase interest (Annabi & McGann 2019; Akbulut-Bailey 2009).

**Gaps in the Literature**

The current IS literature has explored stereotypes of the IS field and careers and their effect on potential students (e.g., Annabi & McGann 2019) and also explored the participation of underserved groups in the field. However, it does not address how IS stereotypes affect underserved groups and their career choices. Prior work often focuses on gender as a binary variable or essentializes differences to inherent, gendered traits (Howcroft & Trauth 2008; Trauth 2013). While there is literature examining gender or racial stereotypes, there is little work exploring the intersectional effects that identity characteristics might have on the perception of IS stereotypes (Joshi et al. 2013). Therefore, we focus on the experiences of underserved students in IS as they encounter stereotypes at the intersection of gender, race, and nationality.

**Theoretical Foundation**

To understand the perception of stereotypes across and within identity characteristics, we incorporate a critical feminist lens throughout the research process. Prior IS research has been poorly theorized regarding identity characteristics; often, gender or race are singularly examined which is insufficient to explain intersectional identities of underserved groups (Howcroft & Trauth 2008; Kvasny 2006; Lerman, Oldenziel, & Mohun 2005; Quesenberry & Trauth 2012; Trauth 2013). Theories used in IS have often been essentialist or deterministic, ignoring the social and structural processes that shape stereotypes (Ahuja...
Critical Analysis of Negative IS Stereotypes

2007; Howcroft & Trauth 2008; Martin 2014; Trauth 2013). Furthermore, theorization in IT-related fields is often biased from the perspective of dominant groups; Kvasny (2006) explains how IT-related research frequently takes a “deficiency-assimilation” model, where underserved groups are measured in relation to the “success” of dominant groups and are expected to conform to dominant values and beliefs rather than expanding the norms of the IS field to be more inclusive (Kvasny 2006). As dominant groups, often unknowingly, shape the measures of organizational success in reflection of their skills and values, it is essential to reveal these biases in order to reduce stereotyping and increase inclusivity (Kvasny 2006; Wajcman 2004). Critical feminist work also utilizes socially situated knowledge, questioning the legitimacy of the dominant perspective, and revealing inherent biases (Haraway 1988; Howcroft & Trauth 2008; Kvasny 2006).

In our critical analysis, we will use the Individual Differences Theory of Gender and IT (IDTGIT) which identifies factors related to individual identity, individual influence, and environmental influence to explore their effect on how one experiences IS and related stereotypes (Quesenberry & Trauth 2012). IDTGIT has been utilized to explore experiences of gender-ethnic minorities not only limited to women in order to understand the combination of socio-cultural and individual influences (Cain & Trauth 2015; Trauth et al. 2016). To move toward equity in IS, it is necessary to understand and address the relationships that exist between power and intersecting identity characteristics (Kvasny 2006).

Proposed Research Approach

To explore the perceptions and impact of negative IS stereotypes on underserved groups we will conduct an exploratory study in three business schools across dispersed, representative regions of the US (northwest, southeast, and northeast). Our study will include underserved business students enrolled in the IS major and underserved non-IS majors; IS majors will be recruited prior to taking introductory IS courses and non-IS majors will be recruited through university offices of minority affairs. Our study will utilize 25-30 hour long semi-structured, qualitative interviews with underserved students guided by an individual differences lens to identify the range of stereotypes about IS held by underserved students. In these interviews, we aim to understand the effect these stereotypes have on students’ career choices in relation to IS. Our analysis will also explore the interplay between individual identity, individual influences, and environmental influences to reveal how each of these constructs affects the individual’s perceptions of IS stereotypes and their responses. Interviews will be transcribed analyzed utilizing Miles and Huberman’s (1994) interactive model of content analysis using inductive and deductive coding techniques with assessing inter-coder reliability on a subset of interviews, as per Baker-Brown et al. (1990).

Our proposed study methodology is based in understanding the experiences of underserved groups directly from their perspectives. This approach locates the power in the hands of underserved individuals and their knowledge, rather than an “emancipatory” role of the researcher (Howcroft & Trauth 2008). To address negative stereotypes, we will utilize a critical feminist lens with the aim of advancing social change by taking an analytical lens to historical, political, and economic contexts (Howcroft & Trauth 2008; Wajcman 2004). Not only does a critical lens reveal influencing factors, but also ideologies at the root of inequitable structures (Howcroft & Trauth 2008). By utilizing these lenses, we hope to follow the critical feminist model for making research exist for underserved populations rather than about them (Howcroft & Trauth 2008).

Acknowledgements

This work was partially funded by the University of Washington Graduate Opportunity & Minority Achievement Program (GO-MAP).

REFERENCES


U.S. Department of Education National Center for Education Statistics 2018. Bachelor’s, master’s, and doctor’s degrees conferred by postsecondary institutions, by sex of student and discipline division.