Modeling IT Career Choice for the Differently Abled: Military Personnel and Veterans with Disabilities

Research-in-Progress

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Abstract
Increasing our understanding of barriers affecting IT career choice for persons who have acquired disabilities adds to the growing body of research on social inclusion in the IT field that is examining factors influencing the entrance into and persistence within programs of study for an information technology (IT) career by members of underrepresented groups. These groups include women, and African American, Latino, and Native American individuals. Prior research on IT career choice for these underrepresented people produced an IT career choice model that identified the following factors: gender roles, IT roles, role congruency, individual identity and self-efficacy (i.e. an individual’s self confidence that they can fulfill IT roles) (Joshi et al., 2013). In this research we add to this model a new category of underrepresented individuals: persons with disabilities.

Keywords
Disability, identity, IT career choice, military personnel, self-efficacy, veterans

Introduction
There is a compelling need to investigate factors affecting career choices of persons with disabilities because 12% of the US population has some kind of disability (NSF, 2011). Further, there is a compelling need to examine career choices of those individuals who acquire a disability after birth since only 15% of people are born with a disability (Siebers, 2008). The acquisition of a disability affects not only a person’s individual identity, but also one’s social identity as a minority. Hence, Lent et al. (1994) show that characteristics such as race, gender, and disability as well as the environment are influential factors in making an informed career choice.

One avenue to pursue in the examination of career choice and the relationship to issues affecting the differential learning, participation and graduation rates of postsecondary students with disabilities is in the information technology (IT) field. The literature suggests that in both education and the workplace, technology can be used to enhance the experience of individuals with disabilities. Students with
disabilities are just as likely to select science and engineering fields of study in post-secondary education, and scientists and engineers with disabilities are more likely to be employed or attend graduate school (NSF, 2011). Few engineers and scientists with disabilities are born with disabilities; approximately two-thirds acquire these disabilities around the age of 30 (NSF, 2011). Extant literature suggests that technology may be a means of accessing information and enhancing learning for individuals with disabilities both in school and at work. Graves et al. (2011) found that students with ADHD and learning disabilities who were enrolled in science classes benefitted from online, asynchronous access to the class content. Similarly, in terms of types of employment, Madaus’ (2006) study of adult participants with learning disabilities found that technology was the fourth most common field of employment (7.3% of participants).

Increasing our understanding of barriers affecting IT career choice for persons who have acquired disabilities adds to the growing body of research on social inclusion in the IT field that is examining factors influencing the entrance into and persistence within programs of study for an information technology (IT) career by members of underrepresented groups. These groups include women, and African American, Latino, and Native American individuals. Prior research on IT career choice for these underrepresented people produced an IT career choice model that identified the following factors: gender roles, IT roles, role congruency, individual identity and self-efficacy (i.e. an individual’s self-confidence about fulfilling IT roles) (Joshi et al., 2013). In this research we add to this model a new category of underrepresented individuals: persons with disabilities.

A particularly relevant population to study in the investigation of IT career choice for persons with disabilities is the military personnel and veterans community. There are now increased opportunities for higher education afforded to military personnel and veterans thanks to increased benefits. At the same time, the combined effects of more than a decade of war, improvements in combat medical care, and armor protection in combat zones have resulted in much higher survival rates of combat veterans with disabilities who are interested in pursuing higher education. Given the physical disabilities many military members sustain, courses of study and occupations with fewer physical demands can be an excellent prospect for these military service members and veterans. One promising prospect is a career in an information technology (IT) field.

While persons with disabilities experience unique challenges, barriers, and identities, military personnel and veterans (MPV) with disabilities are a subcategory with further nuanced experiences. Anderson and Mitchell (1992) suggest that individuals with military experience are more likely to develop mental health disabilities that affect workplace behavior. While this notion does match data supporting a claim that most disabilities are acquired (NSF, 2011; Siebers, 2008), veterans’ careers and education are impacted and complicated by their military experience. DiRaimo and Spires (2009) suggest that pursuing higher education can provide a positive focus during a veteran’s recovery and transition to civilian life. By adding military service members and veterans with disabilities in this model, we are expanding our validated model for understanding and predicting career choices of a group of individuals who are currently under-investigated in the literature and underrepresented in the IT community.

This research project represents fundamental educational research about career choices for military personnel / veterans with disabilities. As such, it advances our understanding of factors that influence the entrance into and persistence within programs of study for an information technology (IT) career for military personnel and veterans with disabilities. Specifically, this research explores interest in pursuing a career in the IT field as a function of: perceptions about the skills and knowledge needed to be successful as an IT professional; stereotypes about IT skills and knowledge; perceptions about occupational roles of persons with disabilities; relative importance placed on various aspects of one’s own identity regarding gender, race, ethnicity, socio-economic class and disability; one's feeling of self-confidence regarding the ability to possess the skills and knowledge needed in the IT profession; and role congruity between perceived gender and occupational roles, and IT roles. This work provides theoretical evidence that will advance the knowledge base about underlying issues affecting the differential learning, participation and graduation rates of postsecondary students with disabilities in the IT field. A better understanding of barriers related to these factors will, in turn, inform subsequent interventions.
Literature Review

This research builds upon two theoretical pillars that were employed in prior research into factors related to gender and IT career choice. One pillar was constructed from a general body of role congruity theories that has been used to explain gender differences in participation in the IT field. The other pillar was constructed from a gender theory that explains within–gender group variation in factors influencing participation in the IT field (Quesenberry & Trauth, 2012; Trauth et al., 2009; Trauth 2002). Taken together, these theories produced a complementary theoretical approach to an understanding of the effect of role congruity, self-efficacy and specific aspects of one’s identity -- gender, race, ethnicity and socio-economic class -- on IT career choice. But whereas that research (Joshi et al., 2010, 2013; Trauth et al., 2012a, 2012b) applied role congruity theory to the context of gender socialization, which serves to enhance or inhibit males’ and females’ interest in the information technology field, and the intersectionality of gender with race, ethnicity and socio-economic class, the research presented here investigates IT role congruity as it relates to occupational roles for persons with disabilities. Below we discuss the literature on role congruity, identity, and IT self-efficacy as they relate to persons with disabilities.

Gender Roles for Military Personnel, Veterans and Persons with Disabilities

Research on gender in the context of military personnel and veterans and persons with disability shows gender effects which could further nuance their roles in this space. Women with and without disabilities are less likely to enroll in STEM majors than their male counterparts (Lee, 2011). However, women with disabilities are more likely to pursue graduate education (Martin et al, 2011; NSF 09-305). Women with disabilities are expected to adapt to having a disability more easily than men because they are considered to be more passive. They are also less frequently employed, affording them less access to benefits and making them more reliant on other support (Fiduccia & Wolfe, 1999). The gender pay gap still exists for those with disabilities, placing women with disabilities in a state of double jeopardy. This literature suggests that both the issues of gender differences in IT career choice for military personnel and veterans with disabilities, and gender stereotypes about IT career choice held by these individuals are underexplored.

Occupational Roles for Persons with Disabilities

A conclusion drawn by Lombardi et al. (2011) from a study of undergraduate students with disabilities is that self-advocacy is the most important factor in determining career pathways and success. Walker (2010) found that students without disabilities have higher levels of self-advocacy than students with disabilities. The research that focused only on students with disabilities indicated that students with high levels of self-advocacy had higher levels of “career maturity” than those with lower levels. Further, Conyers et al. (1998) suggest that students with disabilities believe that asking for special accommodations is a negative action that will put their academics at risk. The motivation could be to avoid the stereotypic roles ascribed to them as being less capable. Indeed, a survey taken by college professors indicates that there is wide variation in the types of accommodations faculty are willing to allow. The authors note that as the numbers dropped below 60% willingness per type of accommodation declined. The open-ended comments in the survey suggest that participants may not allow students with disabilities to have certain accommodations based on the belief that doing so would lessen academic standards and academic integrity (Rao & Gartin, 2003). These authors also found that faculty from law and engineering departments were less likely to provide accommodations than were faculty in other departments (Lee, 2011; Rao & Gartin, 2003).

A project that addresses barriers specific to military personnel and veterans with disabilities is AccessComputing (2009). It argues that post-high school support systems and resources are diminished for this population and that these individuals often suffer from a lack of access to technology as well as role models and mentors. They also suffer from scarce accommodations and low expectations, compounded by negative attitudes held by others about them. This program suggests that the answers lie in interventions, particularly providing hands-on access and activities related to technology and STEM projects. The program identifies a need to build skills and prepare potential students for post-secondary
education as well as careers, thereby providing work-based experiences and mentor / peer leadership. Finally, it emphasizes the importance of training educators to be able to instruct individuals with disabilities without perpetuating normative stereotypic roles. DiRamio and Spires (2009) also identify logistical and other veteran-specific barriers to post-secondary education. These include: frequent medical appointments and procedures, scheduling rehabilitation, confusion and memory loss, and military medical review board disputes. Veterans with disabilities also lack self-advocacy skills (AccessComputing, 2009).

**Disability and Identity**

In much of the disability literature there exists a disambiguation between the traditional medical model and the social model, while few pieces attempt to navigate between this binary (Shakespeare, 1996). The social model of disability pulls from critical disability theory to argue that labeling people as disabled represents a failure of society and one’s environment to accommodate ones’ needs, thereby revealing a preference for able-bodies (Rule, 2012). Siebers (2008) argues that bodies are socially constructed much as reality is. He explains that society ascribes tasks and values to bodies that determine what is “normal” (i.e. able-bodied) and what is a minority or “abnormal” body (i.e. disabled). Rather than viewing bodies as disabled via a medical model, where the focus is on disability as an illness and the prescription is treatment, he suggests that the remedy should be social justice for those who are a socially constructed minority. In developing this argument Siebers borrows from queer theory and gender theory to make comparisons between socially constructed disability and other social constructs, such as gender and sexuality. He furthers his analogy by stating that persons whose disabilities are not visually evident have a similar “closet” from which to “come out” because “passing” as a person without disability may allow one to be “visible” as a member of the able-bodied majority, but without getting the resources one needs (Siebers, 2008). Within the UK, there has been much debate over disability labels as a result of a national movement towards social inclusion, particularly in education. Jodrell’s (2010) exploratory study demonstrated that out of thirty undergraduates (half of whom had dyslexia and half did not), the self-efficacy of those who have dyslexia was based on their social identity as dyslexic after completing an experimental assignment. In a study measuring perceptions of college students with disabilities Harvey and Pellock (2003) found that career and technical education instructors anticipated poorer performance from students with disabilities, confirming that disability labels can, in fact, be detrimental.

**Self-Efficacy for Persons with Disabilities**

Bandura’s Social Learning Theory (1977) emphasizes the importance of a student’s confidence in his or her abilities and skills in choosing a career. But extant literature also shows that factors such as gender, race and disability influence an individual’s self-efficacy (Lent et al., 1994). Conyers et al. (1998) suggest that self-efficacy is critical for students with disabilities enrolled in post-secondary education. Jenson et al. (2011) also identified self-efficacy as an essential characteristic to study in students with disabilities, suggesting that it may be a way of reducing the barriers they face in post-secondary education. Their study yielded a positive relationship between self-efficacy during college and success in their STEM courses. Similarly, while students identified having academic disabilities offices and the opportunity to apply their learning as important, most participants identified believing in themselves to be the most important element in achieving academic success. The four students with military experience stood out, indicating that teamwork helped them build self-confidence and that they felt they had outgrown stress or that similar emotions could be used to fuel positive results. Self-efficacy decreased, however, when students felt judged by others, particularly in lab work. They identified theoretical and abstract courses as the most difficult, because there were fewer opportunities for application. The literature on self-efficacy as it relates to persons with disabilities is considerable. What is lacking is sufficient research on the population being studied in this project: military personnel and veterans with disability in the context of STEM / IT career choice.

There is considerable literature about factors contributing to employment opportunities for individuals with disabilities, the transition from secondary and post-secondary education to the workforce, and the types of barriers they face with respect to both finding jobs and advancing within their careers. Similarly, there is much discussion about the lack of recruitment of individuals into STEM fields. However, there is
much less research into the motivations behind career choice and decision factors employed. This is the gap in the research literature that our research endeavors to fill.

**Research Design**

The objective of this study is to explore the influence of role congruency, individual identity, and IT self-efficacy of persons with disabilities on IT career choices (career intentions and interests) using a sample of military personnel and veterans with disabilities. The overarching research question examined in this study is the following:

*How does the degree of congruiy between perceived IT role, perceived gender roles, and occupational roles combined with individual identity and self-efficacy affect IT career choices for military personnel and veterans with disabilities?*

![Figure 1. Conceptual Model of IT Career Choice for Military Personnel and Veterans with Disabilities](image)

**Instrument Design**

A comprehensive survey instrument designed and developed by our research team that has been rigorously tested for its validity and reliability (Joshi et al., 2010) was adapted to collect data for this study. The validity of the new disability related constructs (Occupational Role and Disability Identity) included in this was validated during the pilot study. The scales for IT Roles, IT-related Gender Roles, and IT-related Self-efficacy were developed by the first and second authors. Our measures of Sex Identity were adopted from the existing literature.

**Sample**

Our sample is comprised of military personnel and veterans who have a disability. An incentive to those who complete the survey is a $10 Amazon gift card. For the pilot study used to validate our new constructs, we conservatively estimated a minimum sample size of 250. Based on the power analysis, we conservatively estimate that we will need a minimum sample size of 560 to conduct the main study. We are recruiting participants from, at minimum, five universities that have agreed to help us distribute our
survey at their institutions. All of these institutions have a significant military service member and veteran presence.

**Current Status of the Research**

In the first year (2012-2013) of this three-year (2012-2015) study our previous survey of IT career choice was adapted to add new elements based on the expanded research model shown in Figure 1. The goal of the second year (2013-2014) is to conduct the pilot study at the two institutions where the first and second authors work. A link to SurveyMonkey was sent to the veterans offices of these two institutions who then forwarded the link to relevant constituencies. The link and a recruitment email were distributed on December 2, 2013. By February 3, 2014 the link was closed when the number of pilot survey responses reached 290. The pilot survey responses are currently being analyzed.

Following analysis of the pilot data, changes to the survey are being made. In the final year of the project (2014-2015) the full survey will be administered to individuals at all five institutions through the veteran’s affairs units of these schools. Once again, a $10 Amazon gift card will be sent to all participants who complete the survey. In addition, participating institutions will also receive access to detailed, prepublication results of the survey. Such knowledge will enhance counselors’ ability to support service members who have an interest in the information technology field.

**Conclusion**

The results of this research will have implications for both theory and practice. First, the findings will add to the overall body of knowledge about barriers to participation in the IT field by members of an underrepresented group that is generally absent in the IT career choice literature: individuals with disabilities. Second, the findings will contribute to a better understanding about IT career choice for persons with disabilities, thereby informing interventions to increase participation rates. Finally, these findings will facilitate a better understanding of the needs of and particular factors influencing participation in the IT field by a growing population of persons with disabilities: military personnel and veterans.

**Acknowledgements**

This research is being funded by a grant from the National Science Foundation # 1245124.

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