Chapter 15

The Innovation and Promise of STEM-Oriented Cybersecurity Charter Schools in Urban Minority Communities in the United States as a Tool to Create a Critical Business Workforce

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ABSTRACT

This text is an on-going study to provide current information regarding developing underrepresented student populations through STEM specific Charter schools to fulfill pipeline shortages. Current findings show that African Americans are underrepresented in high paying Science, Technology, Engineering, and Mathematics (STEM) fields, especially in cybersecurity. The U.S. pipeline of minority students studying STEM falls short in producing the next generation of cybersecurity professionals; thus, a salient need exists to design, pilot, and test a program to grow the minority student pipeline in the cybersecurity field. The charter school movement is one of the fastest growing education reforms with the ability to make a dramatic impact in the U.S. and internationally. Because charter schools often organize around a mission, theme, or curricular and enjoy freedoms, in organizational structure, mission, and academic program, with all held to high standards, this text proposes cybersecurity charter schools to fill technology voids. This organizational structure, mission, and academic programming, will enable students to become immersed in hands-on, real world applications allowing for experiential learning, which can develop students with cybersecurity expertise, technical knowledge, and skills, and competencies needed to take and pass cybersecurity and information security related certification assessments.

DOI: 10.4018/978-1-4666-8345-7.ch015
INTRODUCTION

African Americans unemployment rate is consistently twice that of Caucasians (Desilver 2013). One of the challenges is the need to develop specialized job expertise in career areas that are in demand and high paying in urban African-American communities. Knowledge, critical thinking skills, and leadership in science, technology, engineering and mathematics (STEM) fields are in high demand, especially in the cybersecurity profession (See Figure 1).

African Americans remain one of the most underrepresented minority groups in computer science and computer engineering-related fields (Washington, 2011). The percentage of African-Americans earning STEM degrees has fallen during the last decade. African-Americans are 12 percent of the U.S. population and 11 percent of all students beyond high school. In 2009, they received just 7 percent of all STEM bachelor’s degrees, 4 percent of master’s degrees, and 2 percent of PhDs, according to the National Center for Education Statistics (Washington, 2011). From community college through PhD level, the percentage of STEM degrees received by African-Americans in 2009 was 7.5 percent, down from 8.1 percent in 2001(Washington, 2011). The numbers are striking in certain fields. In 2009, African-Americans received 1 percent of degrees in science technologies (Washington, 2011). The underrepresentation of African Americans in STEM college degree programs and STEM jobs begins at the K-12 educational level, as successful graduates with the expertise in the areas of computer science, information security, and computer engineering are the necessary building blocks for successful careers.

Demand for trained cybersecurity and computer science professionals who work to protect organizations from cybercrime is high nationwide, but the shortage is particularly severe in the federal government, which does not offer salaries as high as the private sector (Halzack, 2014). The nationwide shortage of cybersecurity professionals particularly for positions within the federal government creates risks for national and homeland security, according to a new study from the RAND Corporation (Halzack, 2014). The Washington metropolitan area had more than 23,000 total job postings for cybersecurity positions in 2013, a figure that far surpassed the number of cyber postings in any other region. New York, which

Figure 1. Unemployment rates by race: Seasonally adjusted

![Unemployment rates by race: Seasonally adjusted](image)

Source: Bureau of Labor Statistics


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