Chapter 14
Techniques for Retaining Computer Science Students at Historical Black Colleges and Universities

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ABSTRACT

Computing jobs are among the fastest growing areas of employment in the United States. However, there is a critical shortage of students majoring in computing. Institutions of higher education are not producing enough computing graduates to keep up with the growing demand. A contributing factor to the shortage of graduates in computing is the lack of African Americans completing computer science degrees. To change this trend, it is imperative to increase the number of African American receiving computer science degrees and who are well prepared for careers in computing. This chapter discusses effective techniques for retaining African American computer science majors at Historically Black Colleges and Universities.

IMPACT ON STUDENT RETENTION

This chapter recognizes the shortage of African Americans in the computing field as a contributing factor to the shortage of well-trained individuals to meet the growing need for computing professionals in the United States. Data show that there is a national trend of decreasing numbers of African Americans completing degrees in computer science.

A strategy to stop this trend is to increase the number of African Americans who are retained and complete computer science degrees at Historical Black Colleges and Universities (HBCUs). Students who achieve academic success and who are actively engaged in activities related to their major are more likely retained.

This chapter discusses techniques and activities to assist with achieving academic success in an effort to increase retention of African American students majoring in computer science at HBCUs.

INTRODUCTION

Computing jobs are among the fastest growing areas of employment in the United States. The United States Department of Labor predicts that the employment of computer scientists will grow by 24% from 2008 to 2018 (Lacey, 2013). However, there is a critical shortage of students majoring in computing at the local, state, and national levels. Institutions of higher education are not producing enough computing graduates to keep up with the growing demand. According to the Department of Labor, the projected average annual number of computing job openings is 144,500 during 2008-2018; however, the projected number of annual degrees earned in Computer and Information Sciences is only 88,161 during 2008-2018 (Exploring Computer Science, 2015). According to the Education Policy Committee of Association for Computing Machinery (ACM), the need for a solid education in computer science is a national imperative because: (1) most new jobs in Science, Technology, Engineering and Mathematics (STEM) based careers will either be in computing fields or require a deep understanding of computer science (CS); (2) rigorous CS education provides students with problem solving and analytical skills; (3) CS education serves as the entry for pathways to successful computing careers; and (4) excellence in CS is a strong foundation of the nation's future innovations and economic prosperity (Kaczmarczyk, 2014).

The underrepresentation of minorities in computing has been a longstanding challenge. According to American Community Survey Reports (Landvivar, 2013), African Americans held 7.3% of computer jobs in 2011. The labor force statistics from the current population survey (United States Department of Labor, 2015) shows 8.3% of computer and mathematician occupations were held by African Americans in 2014. According to CRA Taulbee survey reports (Zweben, 2012, 2013, 2014), the fractions of CS bachelor's degrees awarded to African Americans were 4.5% in 2011-2012, 3.8% in 2012-2013, and 3.2% in 2013-2014. These data show underrepresentation of African Americans receiving computer science degrees and holding computer jobs.

According to the National Association of Colleges and Employers Salary Survey, for the Class of 2013, students with bachelor's degrees in engineering and computer science had the highest starting salaries of all disciplines (Adams, 2013). The lack of African Americans in the STEM areas such as computer science may have a negative impact on the economy of the African American community. The trend of African Americans being underrepresented in the STEM areas such as computer science is an issue that needs to be addressed by Historically Black Colleges and Universities (HBCUs).

In this chapter, the authors address the problem of the shortage of African Americans in the computing field, and view retaining and graduating African Americans in computer science as part of the solution of this problem. HBCUs are able to make an impact in providing the solution. This chapter explores techniques that can be used to retain students in computer science at HBCUs. The authors discuss effective techniques implemented at North Carolina Agricultural and Technical State University (NCA&T), challenges encountered during the implementation of these techniques, lessons learned, as well analysis

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