COLORADO

HISPANIC-SERVING COMMUNITY COLLEGES
STEM PIPELINES

Equity in Education for a Growing Population: Hispanic-Serving Community Colleges and STEM Degree Attainment in Colorado

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This research brief focuses on STEM degrees conferred in Colorado by race and gender at three institutional types: Hispanic-Serving Community Colleges (HSCCs), which are 2-year institutions with 25% Hispanic student enrollment or more; Emerging HSCCs, which are 2-year institutions with 15% to 24.9% Hispanic student enrollment; and Non-HSCCs, which are institutions with less than 15% Hispanic student enrollment.

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Introduction

The Hispanic-Serving Community Colleges STEM Pipelines (HSCC-STEM) study is a research project that explores the transitions to and through Hispanic-serving two-year institutions for underrepresented minoritized STEM (science, technology, engineering, and mathematics) students. The literature largely notes Hispanic-serving institutions (HSIs) as four-year colleges and universities (Garcia, 2018; Núñez, Crisp, & Elizondo, 2016). As the discourse primarily engages four-year-centered and full-time equivalent student enrollment framing of HSIs, this should not be the default given the critical influence of HSIs that are community colleges. Hence, there is intentionality in this project that explicitly references two-year HSIs due to the nuance of minority-serving institutions (MSIs), particularly in minority-serving community college (MSCC) contexts (Fox, Thrill, & Zamani-Gallaher, 2017). Thus, to better capture STEM pathway of underrepresented minoritized part-time students, HSCCs are any associate degree-granting postsecondary institutions that have at least 25% enrollment of full- and part-time Latinx students.

This brief uncovers the most viable HSCC STEM pathways for Latinx students and other underrepresented minoritized students as well as which fields they are more likely to persist in, and the promising practices at HSCCs that provide transfer pathways leading to further education—on ramps to STEM baccalaureates. The following information provides a state profile outlining STEM degrees conferred by race and gender in three types of institutions: HSCCs, which are institutions with 25% or more Latinx student enrollment; emerging HSCCs, which are institutions with 15% to 24% Latinx student enrollment; and non-HSCCs, which are institutions that have a Latinx enrollment rate of less than 15%.

State Demographics

There was an estimated population of 5,278,906 in Colorado in 2015, an increase of 100,000 compared to the previous year (Garner, 2016). Whites made up approximately 3,346,224 (69.1%) of the total population in 2015, followed by Hispanics/Latinx (1,112,586; 21.1%), Blacks/African Americans (203,276; 3.9%), and Asians (150,165; 2.8%) (U.S. Census, 2015). While Colorado grew at a rapid pace that year, the forecast suggests a slower growth in the future due to economic worries and low birth rates. However, this growth is still projected to be twice the U.S. growth rate of other states (Garner, 2016).

Data

This brief utilizes 2015 data from the Integrated Postsecondary Education Data System (IPEDS). Two-year institutions were selected by using both the IPEDS and the Carnegie classifications. Three categories were chosen for the selection criteria of IPEDS: Sector, The Highest Degree Offered, and Institutional Category.

The subcategories of each section are Two-Year Public, Private Not-for-Profit, and Private For-Profit in the sector category; Associate's Degree in the Highest Degree Offered category; and Degree-Granting, Associate's and Certificates and Degree-Granting, and Not Primarily Baccalaureate or Above in the Institutional category. Based on these criteria, a total of 1,623 institutions were analyzed.

In the selection criteria of Carnegie Classification 2015 (Basic), one category, Baccalaureate/ Associate's Colleges, was selected. The selected subcategories are Associate's Dominant, Baccalaureate/Associate's Colleges, and Mixed Baccalaureate/Associate's. Overall, this study drew from the data of 403 institutions.

This material is based upon work supported by the National Science Foundation under grant number 1625918. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Lastly, two datasets drawn from IPEDS and Carnegie classifications were merged, and four overlapped institutions were deleted. Considering the high number of HSCCs in Puerto Rico, 23 institutions in that territory were included in our data while other institutions in the U.S. were excluded. Thus, this study analyzed a total of 2,022 institutions.

For the descriptive analysis, 1,998 institutions were used from the exclusion of 18 invalided institutions. This brief focuses on 41 community colleges in Colorado. It is important to note that this number might be different from the numbers the state identified as community colleges due to different classification criteria. Additionally, this study includes institutions that conferred more than 10% of degrees at the baccalaureate level or higher (fewer than 90% associate's degrees), as well as institutions that conferred associate's degrees as the highest level of degree attainment.

Postsecondary Context: Colorado HSCC Landscape

Table 1 illustrates the landscape of two-year institutions in Colorado. In 2015, 41 two-year institutions were analyzed in our data, and 54.33% of them were HSIs. Specifically, 14 (34.15%) were identified as HSCCs, 13 (31.71%) as emerging HSCCs and 14 (34.15%) as non-HSCCs. During the past three decades there has been a significant increase nationally in private for-profit institutions (Deming, Goldin, & Katz, 2012). In our data, a similar proportion of institutional control was shown nationally. A growing number of private for-profit institutions, and a similar proportion of institutional control, were shown in Colorado data as well. Out of the 41 total institutions in Colorado, 21 of them (51.22%) were private for-profit. There were five (12.20%) private not-for-profit institutions. Out of 14 HSCC institutions, nine (64.29%) were private for-profit, and four and one were public and private not-for-profit institutions, respectively.

Table 1

Eligibility of HSCCs by control of institution in Colorado

Control of institution (# of institutions)	**Eligibility of HSCCs 2015**			
	Non-HSCCs	HSCCs	Emerging HSCCs	Total
	Count	Count	Count	
Public	6	4	5	15
Private not-for-profit	0	1	4	5
Private for-profit	8	9	4	21
Total institutions	14	14	13	41

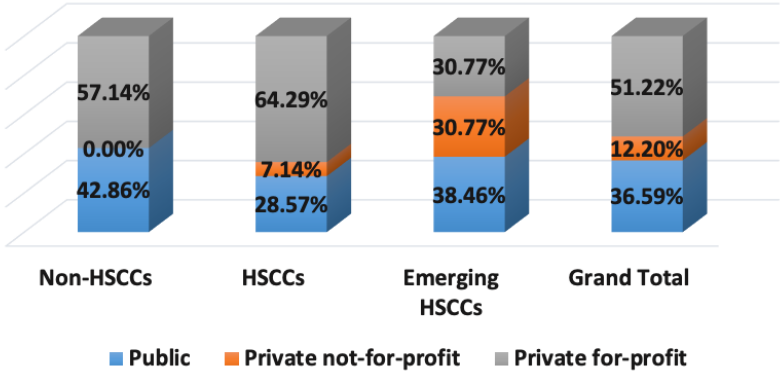


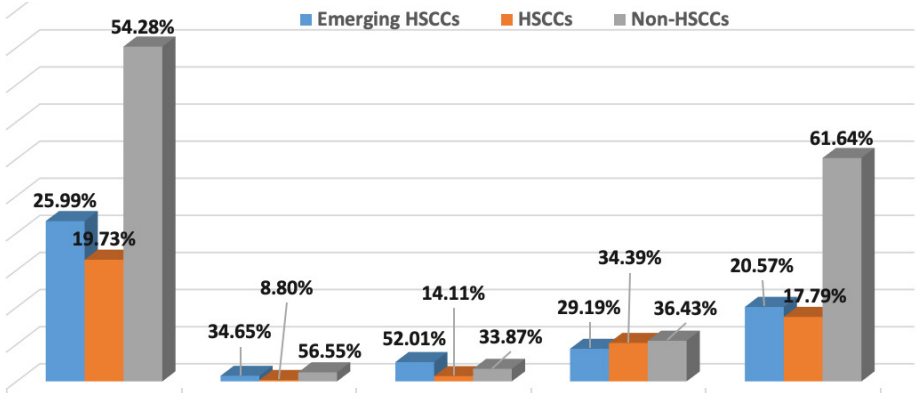
Figure 1. Eligibility of HSCCs by control of institution in Colorado

Minority-Serving Institution Status

In our project, the MSI status was used to see whether there were other federal designations cross-listed with the HSCC designation. We used the federal government designations for Asian American and Native American Pacific Islander-serving institutions (AANAPISIs) and predominantly Black institutions (PBIs). AANAPISIs have an Asian American and Native American Pacific Islander student enrollment of at least 10%, and PBIs have an African American or Black student enrollment of at least 40% (U.S. Department of Education, 2017). Besides HSCCs and emerging HSCCs, there were no other types of cross-designated MSIs such as AANAPISIs and PBIs from 2015 data in Colorado. Additionally, there is no tribal college in Colorado.

HSCC Student Demographics

In this section, the student demographics are described based on a 12-month enrollment period, with an unduplicated headcount and degrees/awards conferred, which were drawn from IPEDS. In 2015 a total of 166,265 students were enrolled in two-year institutions in Colorado. Approximately 45.72% students were enrolled in HSCCs. Specifically, 32,806 students (19.73%) were enrolled in HSCCs and 43,213 students (25.99%) were enrolled in emerging HSCCs. Whites accounted for 97,676 (58.75%) of the total enrollment, followed by Hispanic/Latinx (30,119; 18.12%), Black American (10,005; 6.02%), and Asian (4,320; 2.60%).



	Grand total	Asian total	Black/African American total	Hispanic/Latinx total	White total
Emerging HSCCs	43,213	1,497	5,204	8,791	20,091
HSCCs	32,806	380	1,412	10,357	17,375
Non-HSCCs	90,246	2,443	3,389	10,971	60,210

Figure 2-1. 2015 Student racial demographics based on 12-month enrollment by institutional type in Colorado

Out of the total students enrolled, 73,040 (43.93%) were men and 93,225 (56.07%) were women. In general, the enrollment of women was higher than men across racial groups. See Figure 2-2.

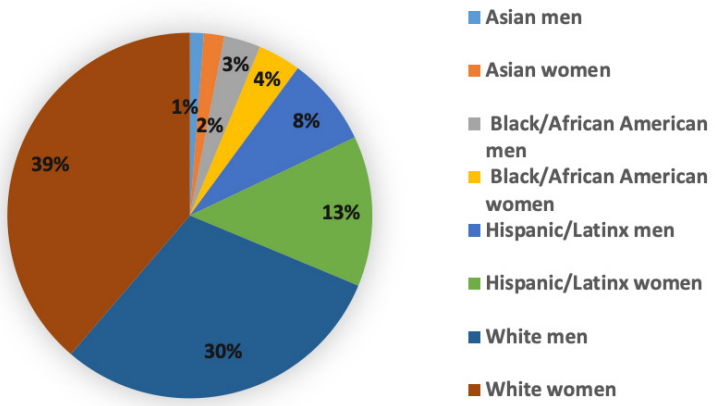
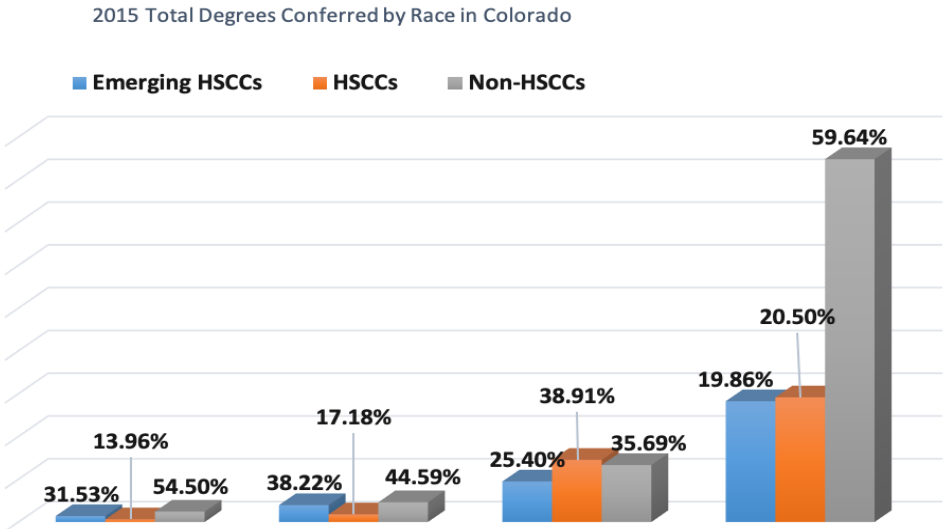


Figure 2-2. 2015 Student enrollment by gender and race in Colorado

In Colorado, community colleges awarded a total of 11,264 degrees, with Whites earning the most with a total of 7,109 (63.11%), followed by Hispanic/Latinx (1,866; 16.57%), Black/African Americans (518; 4.60%), and Asians (222; 1.97%). Across institutional types, non-HSCCs granted 6,081 (53.99%). HSCCs granted 2,626 (23.31%) degrees, followed by emerging HSCCs (2,557; 22.70%). Out of the total degrees conferred in 2015, 6,499 (57.70%) degrees went to women and 4,765 (42.30%) went to men. In general, women maintained higher enrollment rates (59.01%) and degrees conferred (57.07%) in Colorado, which indicates an approximate 13% gender gap. When the data is segregated into STEM fields, however, the percentage of women who earned STEM degrees in Colorado was, surprisingly, below the national percentage of women (31.08%; Zamani-Gallaher et al., 2019a, 2019b). The following section describes how inequity was manifested in STEM degrees that were conferred by race and ethnicity in Colorado in 2015.



	Asian total	Black/African American total	Hispanic/Latinx total	White total
Emerging HSCCs	70	198	474	1,412
HSCCs	31	89	726	1,457
Non-HSCCs	121	231	666	4,240

Figure 3. 2015 First major total of associate's degrees conferred by race and institutional type in Colorado

Participation in STEM by Race, Ethnicity, and Gender

STEM programs were classified using the National Science Foundation Classification of Instructional Program (CIP) Code Crosswalk for STEM disciplines (Louis Stokes Alliances for Minority Participation, 2018). By following the NSF LSAMP STEM category, STEM programs were aggregated into 11 STEM fields: agricultural sciences, natural resources and conversation, architecture, computer and information sciences, engineering, engineering technologies, biological sciences, mathematics, interdisciplinary studies, physical sciences, and business and management.

Colorado community colleges conferred 945 STEM degrees in 2015, which accounted for 8.39% of the total degrees awarded in the state (see Figure 4-1). Among the 945 conferred STEM degrees, 255 (26.98%) of the degrees were awarded at HSCCs (see Figure 4-2) and 447 (47.30%) went to students of color. Specifically, Whites earned a total of 498 (52.70%) STEM degrees, followed by Hispanic/Latinx with 93 (9.84%), Black/African Americans with 44 (4.66%), and Asians with 12 (1.27%). Of the number of STEM degrees, women earned a total of only 151 (15.98%), while men earned a total of 794 (84.02%). Women earned approximately 16% more of the total number of associate's degrees conferred compared to men, but they earned 68% fewer STEM degrees than men (see Figure 4-3).

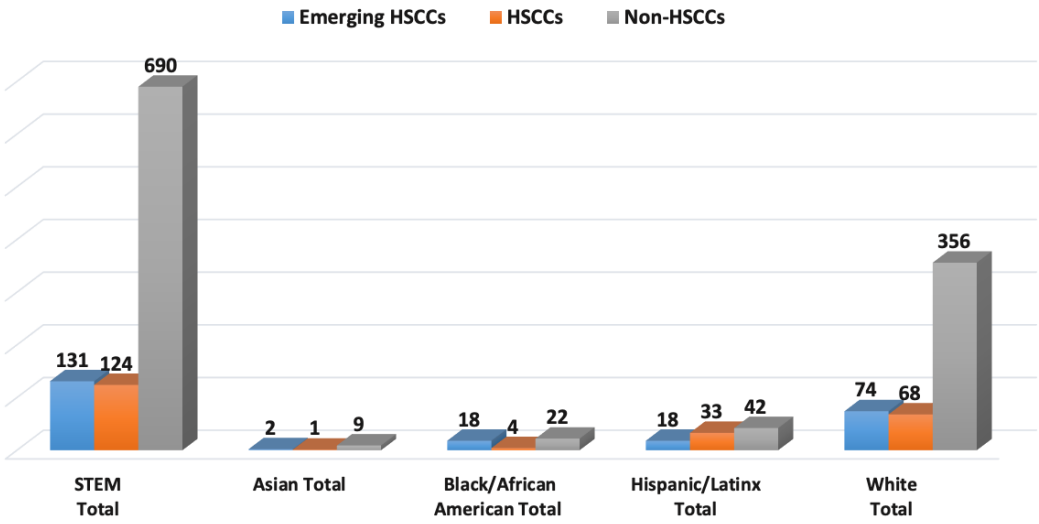


Figure 4-1. 2015 Total and STEM degrees conferred by race and institutional types in Colorado

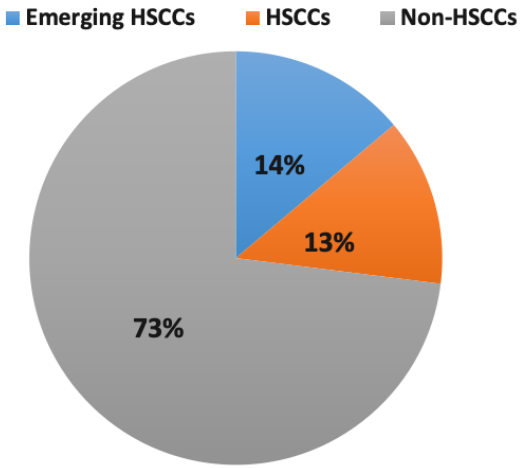


Figure 4-2. 2015 STEM degrees conferred by institutional types in Colorado

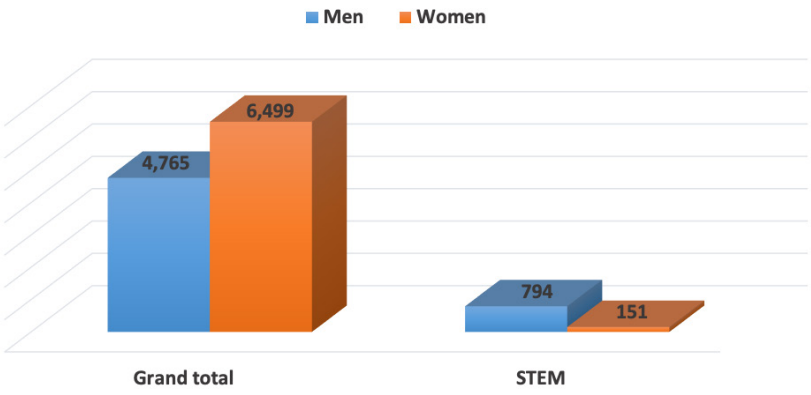


Figure 4-3. 2015 STEM degrees conferred by gender in Colorado

HSCCs

HSCCs awarded 2,626 (23.31%) of the total degrees conferred in Colorado. Hispanics earned a total of 726 (27.65%) degrees in HSCCs with Whites earning 1,457 (55.48 %), Blacks/African Americans earning 89 (3.39%), and Asians earning 31 (1.18%). Women earned 29.56 % more degrees than men out of the total degrees awarded at HSCCs: 1,701 (64.78%) earned degrees compared to 925 (35.22%). The STEM degrees conferred at HSCCs accounted for 124 (4.72%) of the total degrees awarded at these institutions (2,626). Of the STEM degrees conferred by HSCCs in 2015, Whites earned 68 (54.84%), followed by Hispanic/Latinx with 33 (26.61%), Black/African Americans with four (3.23%), and Asians with one (0.81%). Of the STEM degrees conferred by HSCCs, women earned 62.90% less than men, with men earning a total of 101 (81.45%) and women earning 23 (18.55%).

Emerging HSCCs

Emerging HSCCs awarded 2,557 (22.70%) of the total degrees conferred in Colorado. Whites earned a total of 1,412 (55.22%) degrees in emerging HSCCs, followed by Hispanics with 474 (18.54%), Black/African Americans with 198 (7.74%), and Asians with 70 (2.74%). Of the total degrees awarded at emerging HSCCs, women earned 21.32% more than men, with women earning 1,551 (60.66%) and men earning 1006 (39.34%). In STEM degrees conferred, emerging HSCCs awarded 131 (5.12%) out of the total degrees (2,557). Whites earned a total of 74 (56.49%) STEM degrees, followed by Hispanic/Latinx with 18 (13.74%), Black/African Americans with 18 (13.74%), and Asians with two (1.53%). Out of the STEM degrees conferred by emerging HSCCs, women earned 63.36% less than men, with men earning a total of 107 (81.68%) STEM degrees and women earning 24 (18.32%).

Non-HSCCs

Non-HSCCs awarded 6,081 (53.99 %) of the total degrees conferred in Colorado. Whites earned a total of 4,240 (69.73%) degrees in non-HSCCs, followed by Hispanic/Latinx with 666 (10.95%), Black/African Americans with 231 (3.80%), and Asians with 121 (1.99 %). Of the total degrees awarded at non-HSCCs, men earned 2,8341 (46.60%) and women earned 3,2471 (53.40%). Non-HSCCs awarded a total of 690 (11.35%) STEM degrees out of the total degrees conferred. Whites earned a total of 356 (51.59%) STEM degrees, followed by Hispanic/Latinx with 42 (6.09%), Black/African Americans with 22 (3.19%), and Asians with nine (1.30%). Of the STEM degrees conferred by non-HSCCs, women earned 69.86% less than men, with men earning a total of 586 (84.93%) STEM degrees and women earning 151 (15.07%).

Underrepresentation in Top Three STEM Fields

Colorado awarded a total of 945 STEM associate's degrees in 2015. From that number, 794 (84.02%) of the degrees were received by men and 151 (15.98%) were received by women. Overall, the top three STEM fields in Colorado were engineering technologies (504; 53.33%), computer and information sciences (392; 41.48%), and natural resources and conservation (32; 3.39%). Combined, these three fields accounted for 98% of the STEM degrees conferred in Colorado. The number of degrees conferred in other STEM fields was zero or was not reported in the Colorado data from 2015.

There were substantial disparities for gender and race in top contributing STEM fields. Overall, 690 degrees awarded at non-HSCCs accounted for 73.02% of STEM degrees, meaning most of the degrees in top contributing STEM fields were conferred at non-HSCCs (Figure 5). Based on the large disparity between the second and third top STEM fields, the next section will only cover the computer and information sciences and engineering technologies fields.

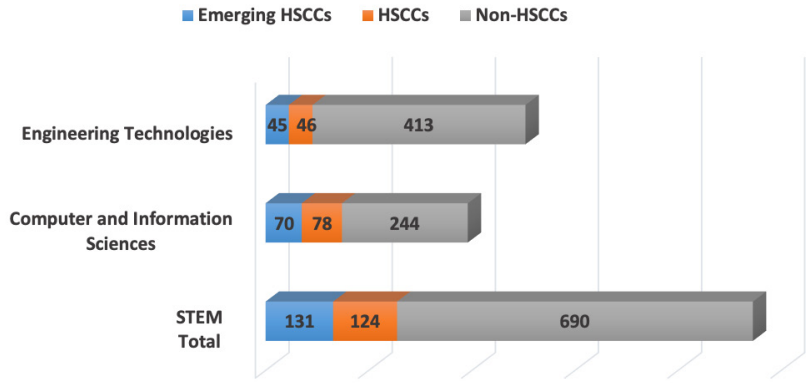


Figure 5. Top contributing STEM fields by institutional type in Colorado

Engineering Technologies

HSCCs conferred a total of 18.06% of the degrees in engineering technologies in Colorado. Specifically, 413 (81.94%) out of the total engineering technologies degrees (504) were awarded at non-HSCCs, followed by HSCCs with 46 (9.13%) and emerging HSCCs with 45 (8.93%) (Figure 5). Whites earned a total of 203 (40.28%) of the engineering technologies degrees, followed by Hispanic/Latinx with 39 (7.74%), Black/African Americans with 18 (3.57%), and Asians with four (0.79%). Men earned 453 (89.88%) engineering technology degrees and women earned 51 (11.26%). The dramatic gender gap in this field was evident across racial groups (Figure 6). Specifically, 176 White men and 27 White women received degrees in engineering technologies, followed by 34 Hispanic/Latinx men and five Hispanic/Latinx women, 18 Black/African American men and no Black American women, and three Asian men and one Asian woman.

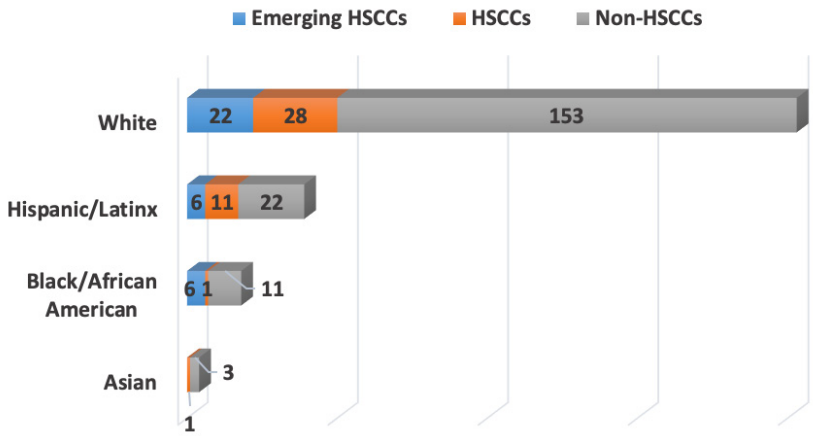


Figure 6-1. Engineering technologies degrees conferred by race and institutional type in Colorado

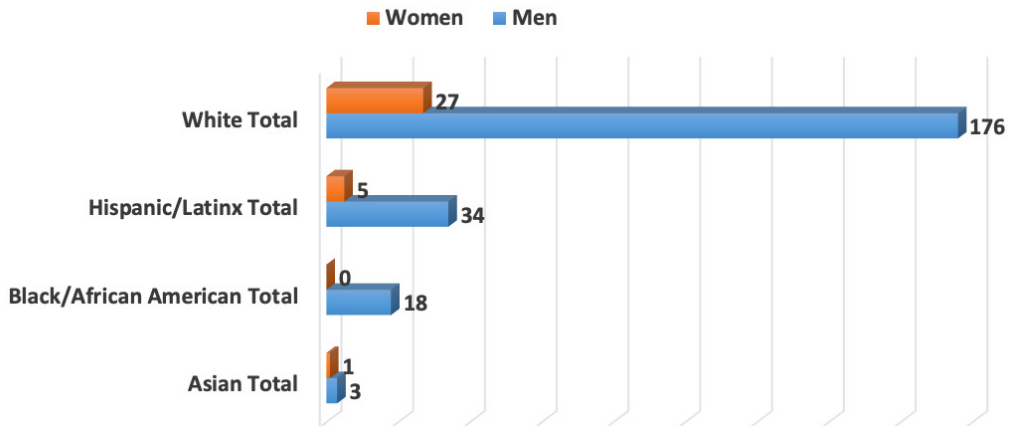


Figure 6-2. Engineering technologies degrees conferred by race and gender in Colorado

Computer and Information Sciences

In 2015, 37.76% out of the 392 total degrees in computer and information sciences were awarded via HSCCs. Specifically, HSCCs awarded a total of 78 (19.90%) degrees and emerging HSCCs awarded a total of 70 (17.86%) degrees in this field. More than 62% of computer and information sciences degrees were awarded at non-HSCCs (Figure 5). Whites earned 269 (68.62%), followed by Hispanic/Latinx with 49 (12.50%), Black/African Americans with 25 (6.38%), and Asians with five (1.28%). Men earned 304 (77.55%) of these degrees and women earned 88 (28.95%). This gender gap in computer information sciences was evident across racial groups except for Asians. Specifically, 212 White men and 57 White women received degrees in this field, followed by 38 Hispanic men and 11 Hispanic women, 21 Black/African American men and four Black/African American women, and two Asian men and three Asian women.

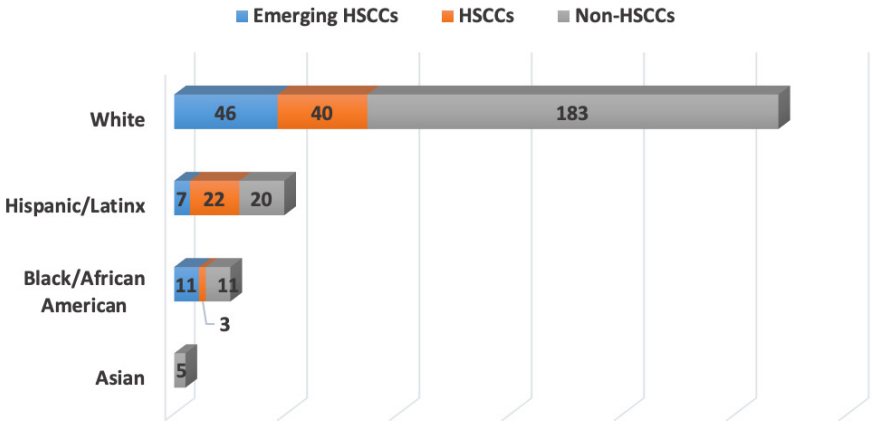


Figure 7-1. Computer information sciences degrees conferred by race and institutional type in Colorado

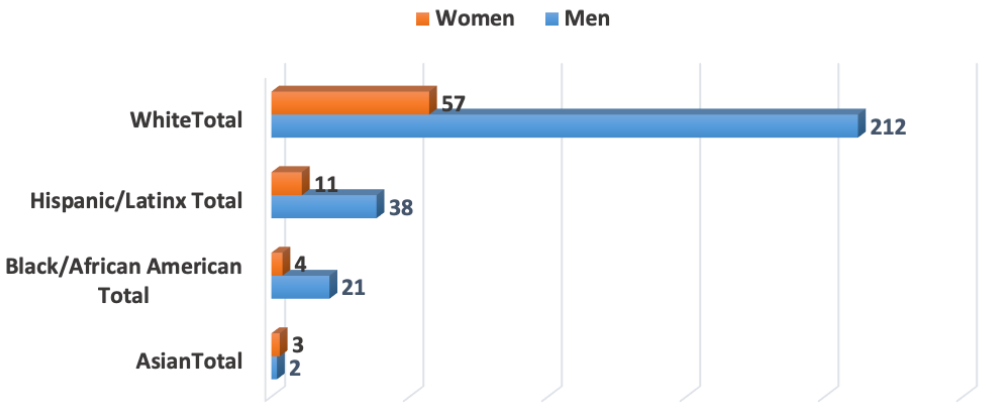


Figure 7-2. Computer information sciences degrees conferred by race and gender in Colorado

Summary

In Colorado in 2015, almost 60% of institutions were designated as HSIs (one out of three institutions were non-HSCCs). Out of 14 HSCC institutions, nine (64.29%) were private for-profit places of learning (Figure 1). There were no other types of cross-designated MSIs such as AANAPISIs and PBIs from the 2015 data in Colorado. Additionally, there is no tribal college in Colorado.

Among the 945 conferred STEM degrees, 255 (26.98%) were awarded at HSCCs (see Figure 4-2) and 447 (47.30%) went to students of color. In Colorado, however, most of the students were enrolled in and earned their degrees at non-HSCCs: 6,081 (53.99 %) of the total associate's degrees and 690 (73.02%) STEM degrees were conferred at non-HSCCs in 2015. The top contributing STEM fields in Colorado, engineering technologies and computer and information sciences, were overwhelmingly awarded at non-HSCCs. Specifically, 413 (81.94%) out of the total engineering technologies degrees (504) and more than 62% of computer and information sciences degrees were conferred at non-HSCCs.

Women earned approximately 16% more associate's degrees than men, but they earned 68% fewer STEM degrees than men (see Figure 4-3), a gender gap that was seen nationally. Still, the 15.98% of women who earned STEM degrees in Colorado was, surprisingly, below the 31.08% national percentage of women (Zamani- Gallaher et al., 2019a). Though there are growing numbers of private for-profit postsecondary institutions and a large number of degrees conferred at non-HSCCs, HSCCs continue to increase access and opportunity to students of color, especially Hispanic students and women. In the future, these institutional types will continue to play a significant role in the education of students of color who are working toward attaining STEM degrees.

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Notes.

1. Racial/ethnic categories in the data followed the IPEDS categories using their data collection and reports. The categorization of groups is as follows: Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, Hispanic, White, two or more races, race/ethnicity unknown, and nonresident alien. Among these, this research focused on four groups: Blacks or African Americans, Asian Americans, Hispanic Americans or Latinx, and White Americans. In addition, this research intentionally identified Black/African American and Hispanic as Latinx (i.e., gender nonconforming), and all groups included in this analysis reflected domestic racial/ethnic diversity, not international student enrollments.

2. The percentage of racial/ethnic groups shown in the figures and texts do not add up to 100% because of the exclusion of other racial/ethnic groups.

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