

Examining the Landscape of K-12 CS Education in CT

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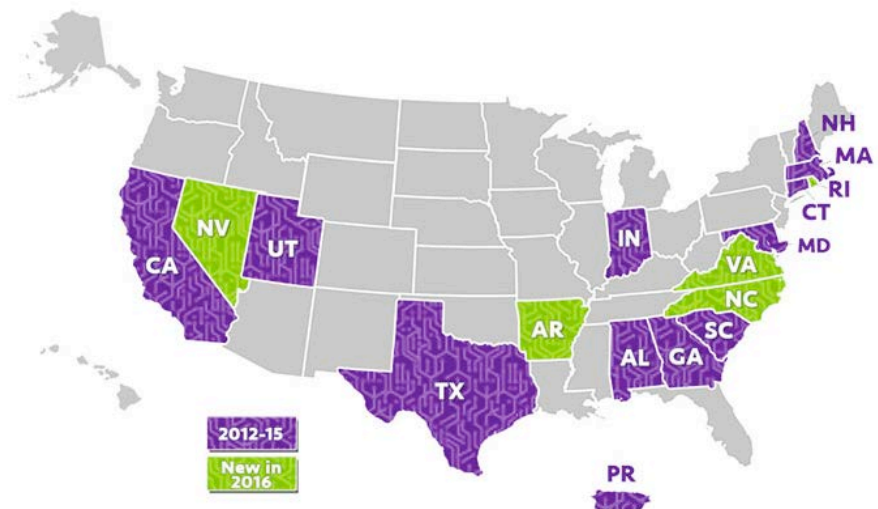
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Teacher
Conard High School

CS4CT SUMMIT 2018

March 16, 2018

Expanding Computing Education Pathways Alliance

- Funded by National Science Foundation
- Collaborative grants to UMass Amherst and Georgia Tech
- Assists and provides resources to states
- Network of 17 states



ECEP Supports Member States . . .

- Developing strategic plans
- Educational policy – state level and/or districts
 - Graduation requirements
 - College admission requirements
 - Standards/frameworks
 - Curricula
 - Teacher credentialing
 - Teacher pre-service training
 - Teacher professional development
- Raising public awareness
- Raising resources, partners

Goal: Broadening Participation in Computing (BPC)

ECEP awarded grant to support **BPC**

Focus on groups traditionally under-represented in computing:

- Women
- persons with disabilities
- African Americans
- Hispanics
- Native Americans
- indigenous peoples

= 70% of the population

ECEP – CT Chapter

- CT joined ECEP as a partnering state in 2015 through CSDE CS Advisory Committee
- Current State Leads: *Seth Freeman, Chinma Uche*
- State Educational Representative: *Jennifer Michalek*



Landscape Study – CS for CT

- CT ECEP Chapter awarded a mini-grant to conduct landscape study ***CS for CT – Examining the Landscape of Computer Science in CT***
- The focus of this study is to identify where and to what extent CS education has penetrated the state
- Gather concrete data on where CS is being taught, and challenges to offering CS
- Help ensure future advocacy and resources are targeted towards schools, districts in need

Landscape Study Components

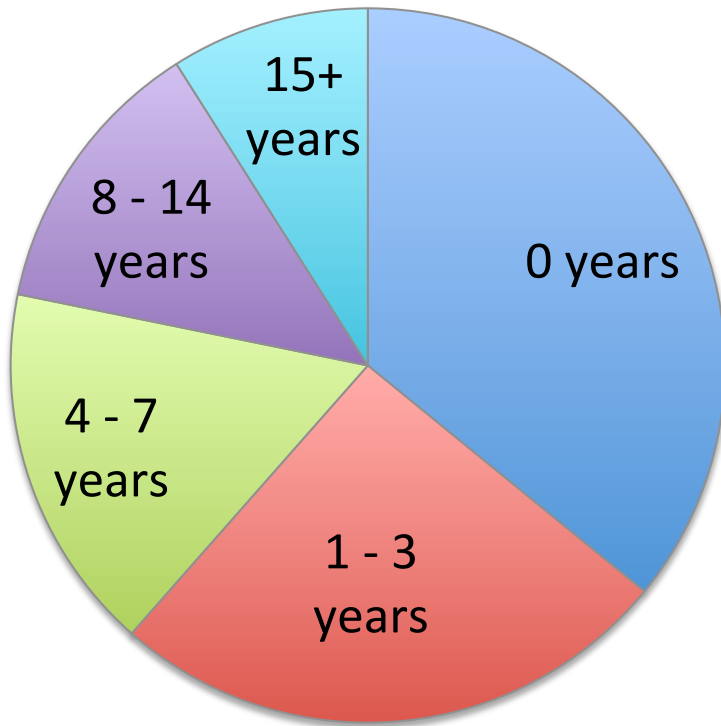
- **K-12 School-Based Survey**
 - Short survey targeted to K-12 CS teachers, administrators and guidance counselors
- **CSDE EdSight**
 - Course Enrollments for School Districts across CT – Computer and Information Sciences Subject
- **College Board Data**
 - Secondary schools offering AP CS A and AP CS Principles
 - AP Exam Scores
- **NCES (National Center for Education Statistics) Undergraduate Data**
 - Demographics of students majoring in CS across the state

K-12 School Based Survey

- K-12 School-Based Survey
 - 10-15 minute survey targeted to K-12 CS teachers, administrators and guidance counselors
 - Public and Private Schools
 - Survey administered between Jan 2017 – May 2017
- 207 individual responses
 - 156 teachers, 45 administrators, 6 school counselors
- 26 Elementary, 55 Middle, 71 Secondary
- 89 School Districts

K-12 Survey - Years of Computer Science Teaching Experience

- 156 responses



36% of Respondents report less than 1 year teaching experience in CS

62% of Respondents report less than 4 years teaching experience in CS

K-12 Survey - Elementary Highlights

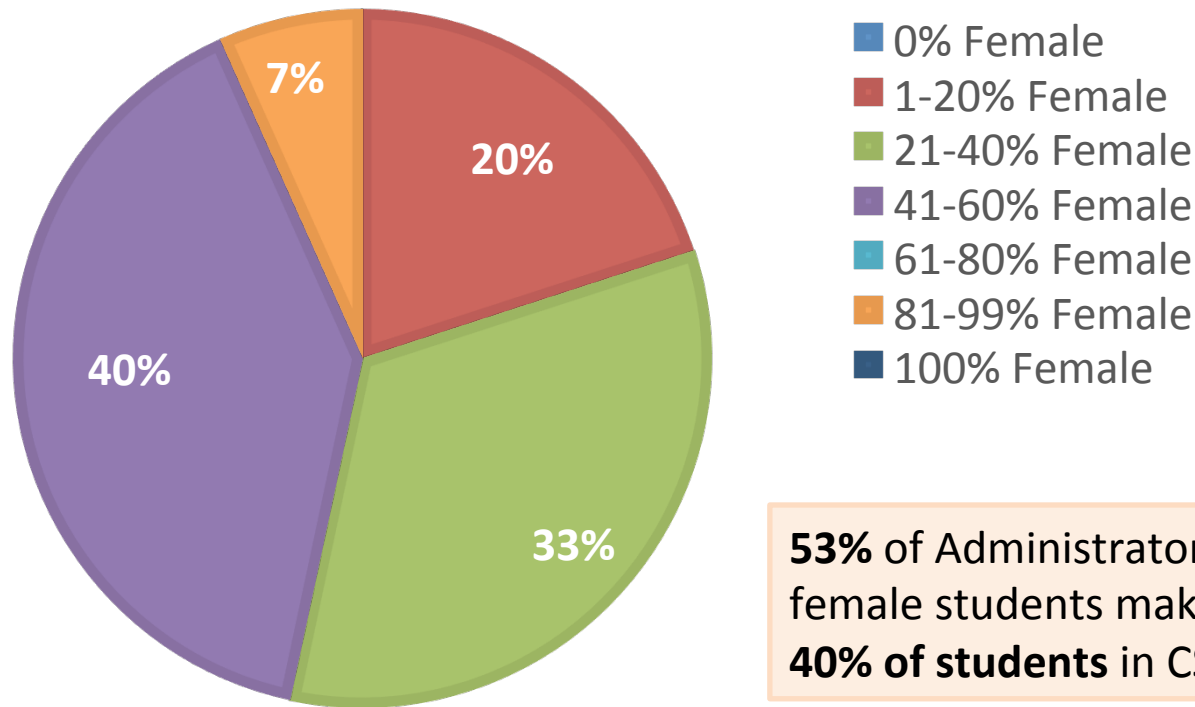
- The majority (71%) of elementary school computer science education happens during specials or a “Unified Arts” block
- The top three topics taught are:
 1. Programming (83%)
 2. Problem Solving (72%)
 3. Robotics (39%)
- The greatest challenges teachers reported:
 - the need for more time
 - need for professional development
 - way to connect computer science to other courses and grade levels

K-12 Survey - Middle School Highlights

- The top three topics taught are:
 1. Problem Solving (77%)
 2. Programming (73%)
 3. Ethics and Social Issues (59%)
- The top resources listed were:
 1. Code.org (75%)
 2. Scratch (56%)
- The greatest challenges teachers reported:
 - the middle school schedule means that time with students in specials is reduced
 - cost of purchase and maintaining technology
 - the need for training

Percentage of Female Students in CS Courses

- 17 Responses from School Administrators

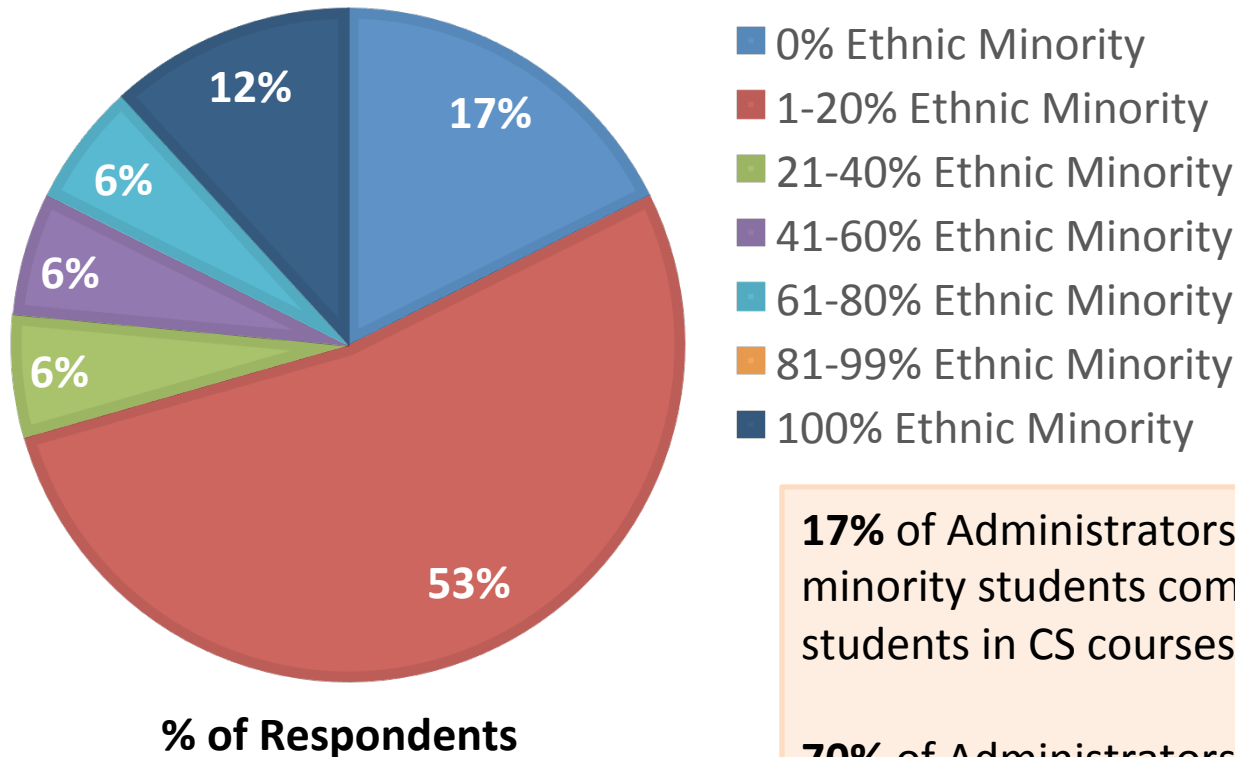


% of Respondents

53% of Administrators report that female students make up **less than 40%** of students in CS courses

Percentage of Ethnic Minority Students in CS Courses

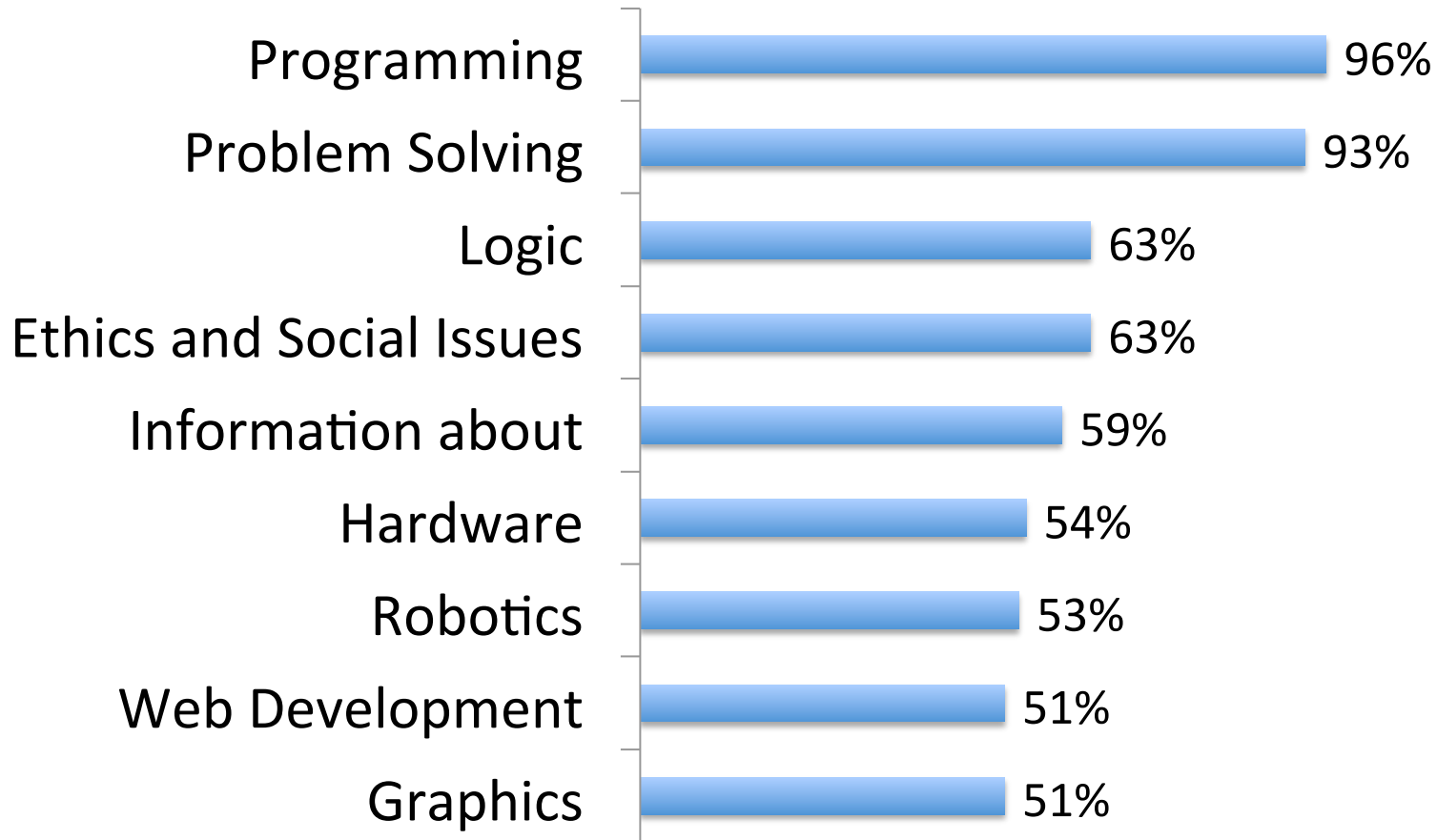
- 17 Responses from School Administrators



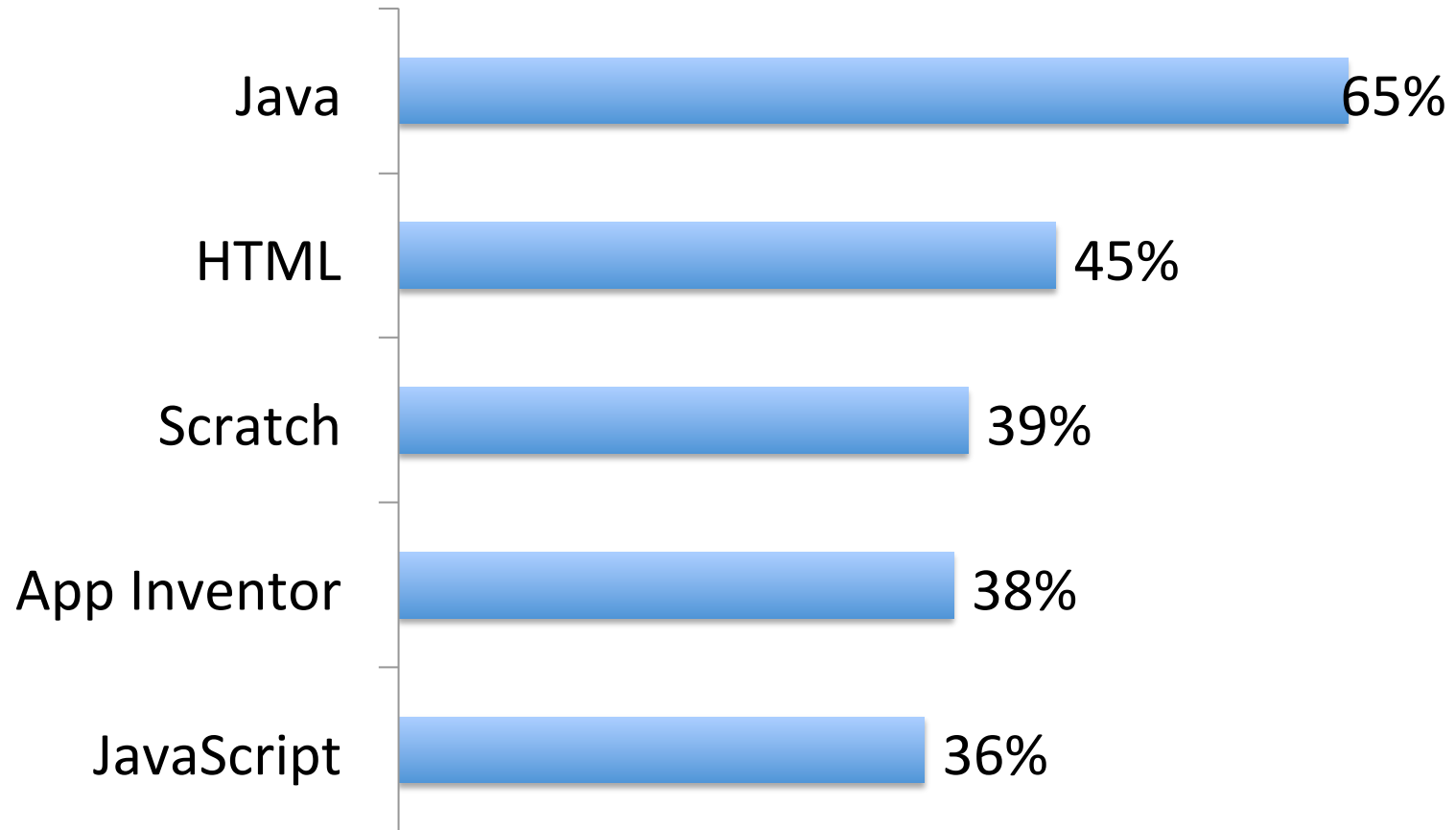
17% of Administrators report that minority students comprise **0%** of students in CS courses

70% of Administrators report that minority students make up **less than 20%** of students in CS courses

Secondary – Subject Matter Taught in CS Courses



Secondary – Programming Languages/ Tools Used in CS Courses



Secondary – Reasons why Students don't take CS

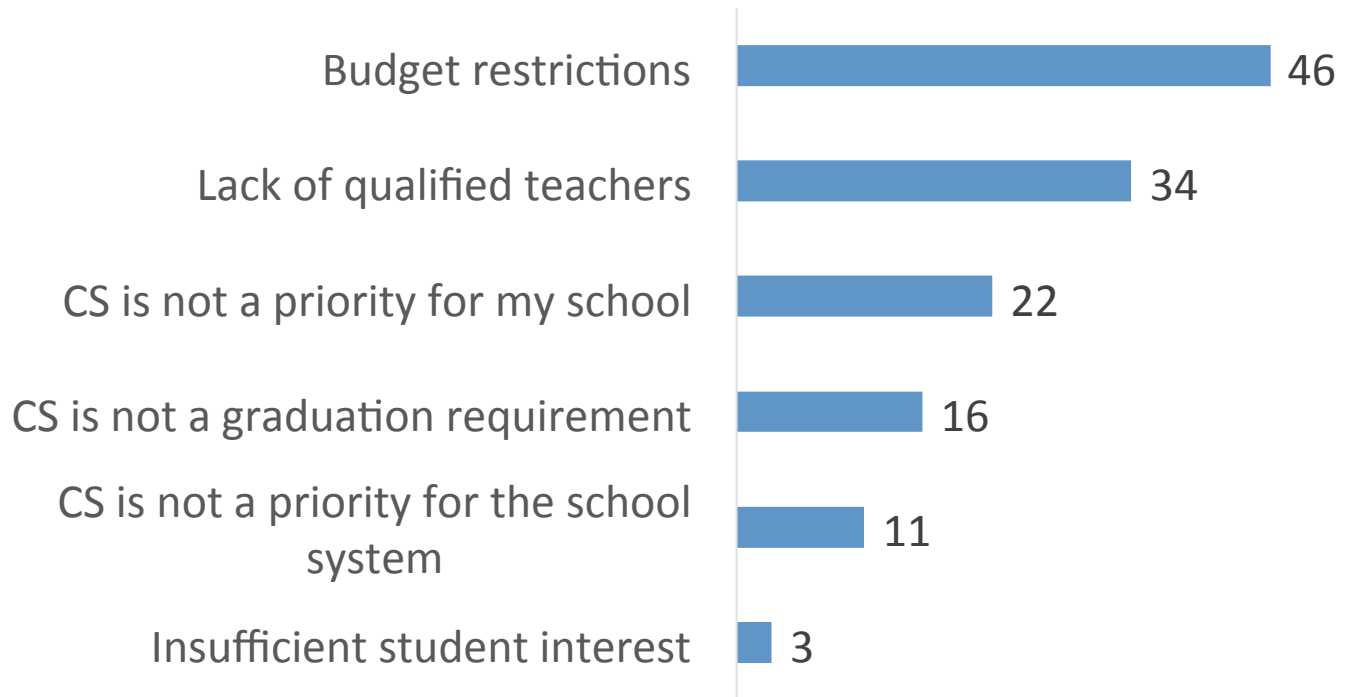
- **77%** of respondents report it is “Very Common” or “Somewhat Common” for students to not take CS because there is no room in their schedule
- **60%** of respondents report it is “Very Common” or “Somewhat Common” for students to not take CS because they don't understand the importance of CS coursework
- **Only 6%** of respondents report it is “Very Common” or “Somewhat Common” for students to not take CS because there is a perception of limited job opportunities

Secondary – Challenges to Teaching CS

- **73%** of respondents report it is “Moderate Challenge” or “Great Challenge” to teach CS due to inability to attract women and minorities to CS classes
- **68%** of respondents report it is “Moderate Challenge” or “Great Challenge” to teach CS due to difficult subject matter for students
- **22%** of respondents report it is “Moderate Challenge” or “Great Challenge” to teach CS due to lack of computer lab space

Reasons Why CS is NOT Offered

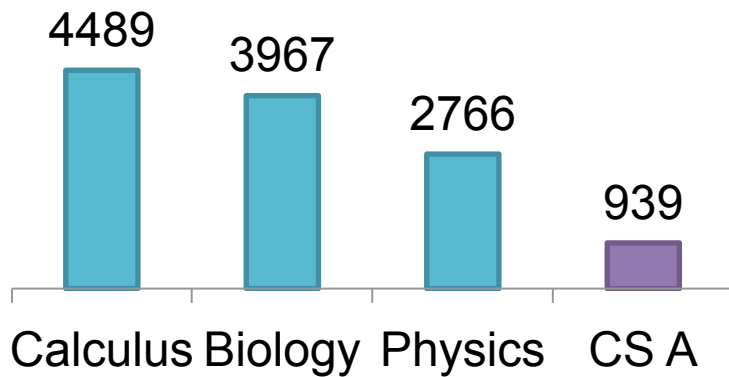
- 88 responses



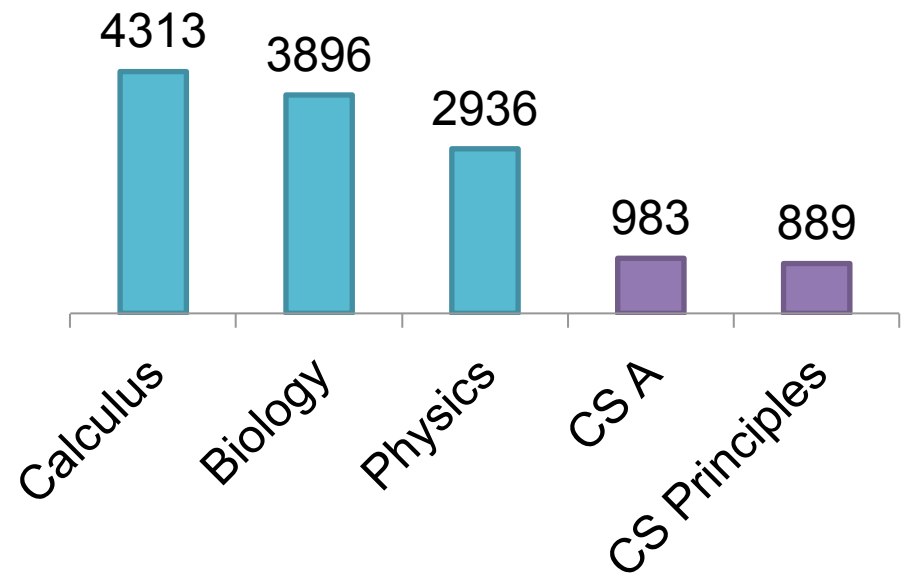
AP Exam Participation by Year/Subject Area

CT Secondary Schools

AP Exams in 2016



AP Exams in 2017

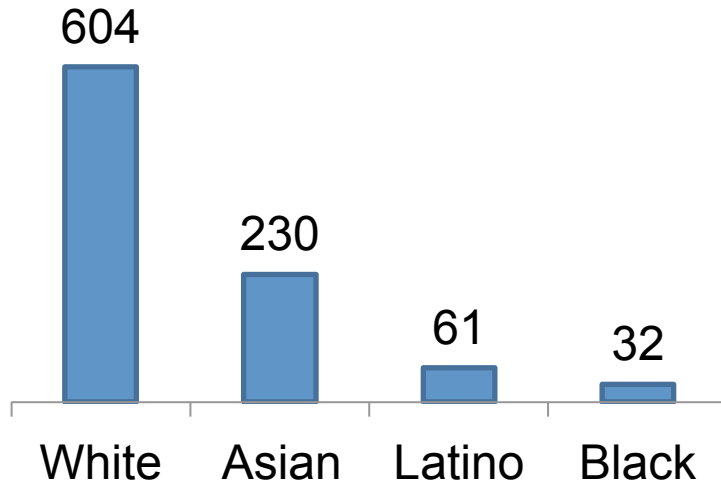


Source: College Board

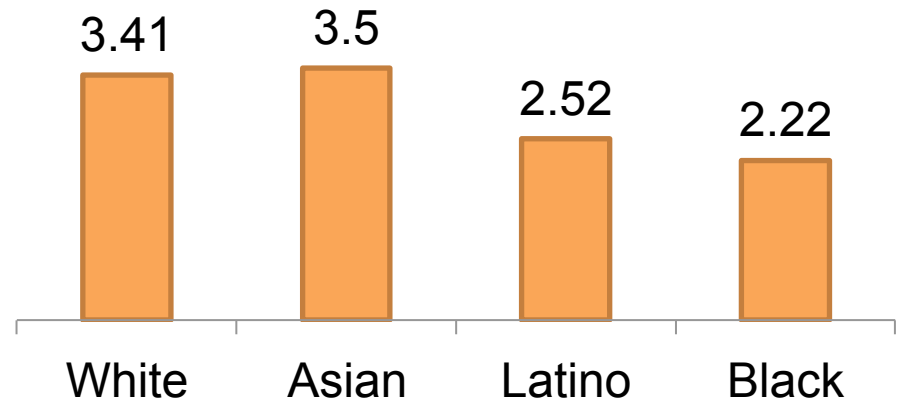
AP Exam Participation/Performance by Ethnicity

CT Students in 2017

Students Taking AP CS A Exam



AP CS A Exam Avg Score

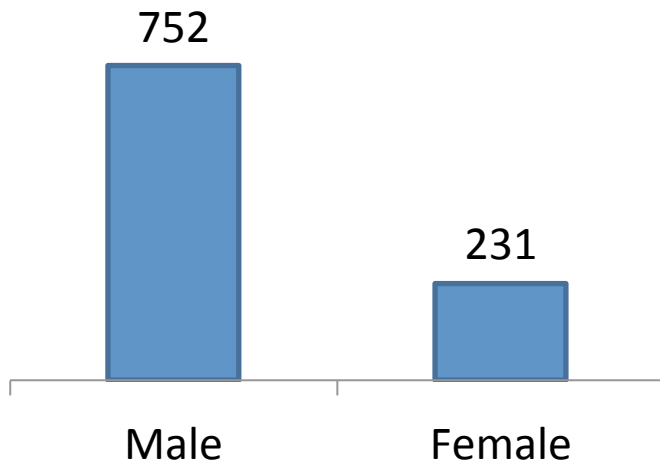


Passing assumes score of 3 or higher

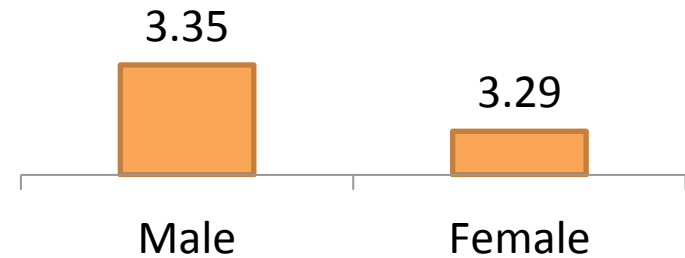
AP Exam Participation/Performance by Gender

CT Students in 2017

**# Students Taking
AP CS A Exam**



AP CS A Exam Avg Score



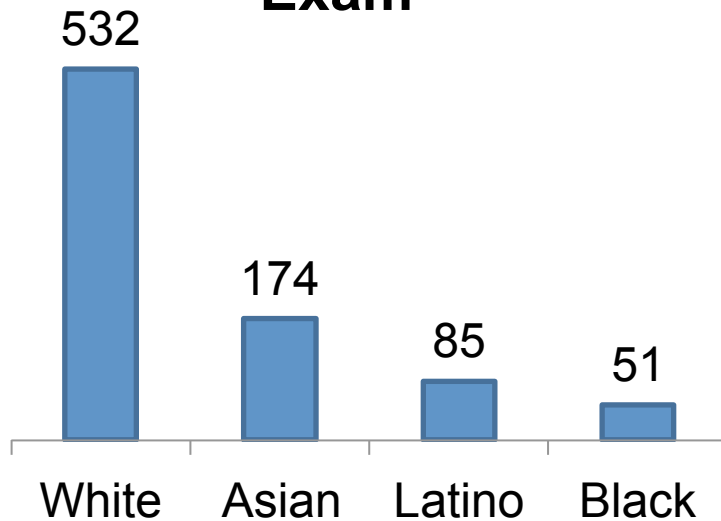
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Source: College Board

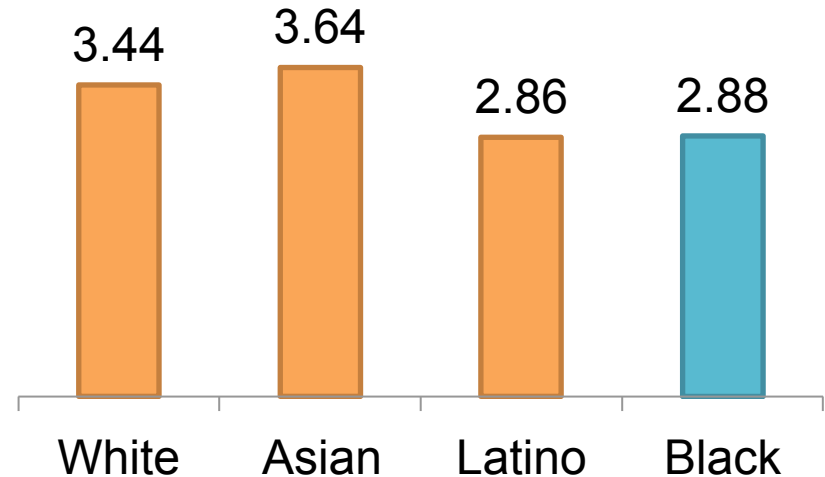
AP Exam Participation/Performance by Ethnicity

CT Students in 2017

Students Taking
AP CS Principles
Exam



AP CS Principles
Average Exam Score



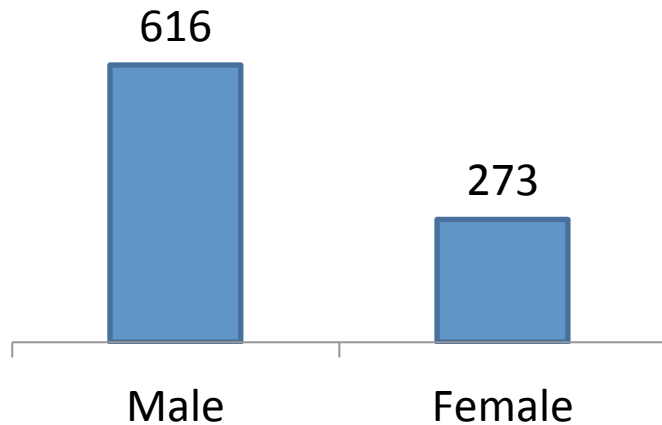
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Source: College Board

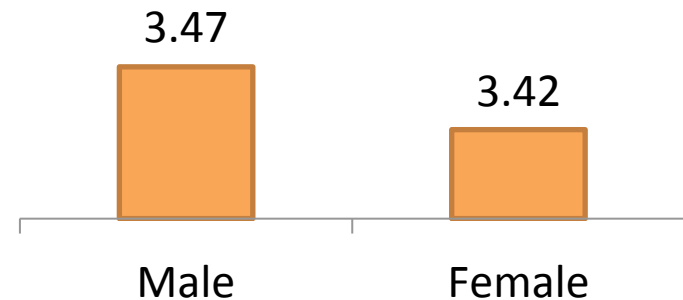
AP Exam Participation/Performance by Gender

CT Students in 2017

Students Taking
AP CS Principles Exam

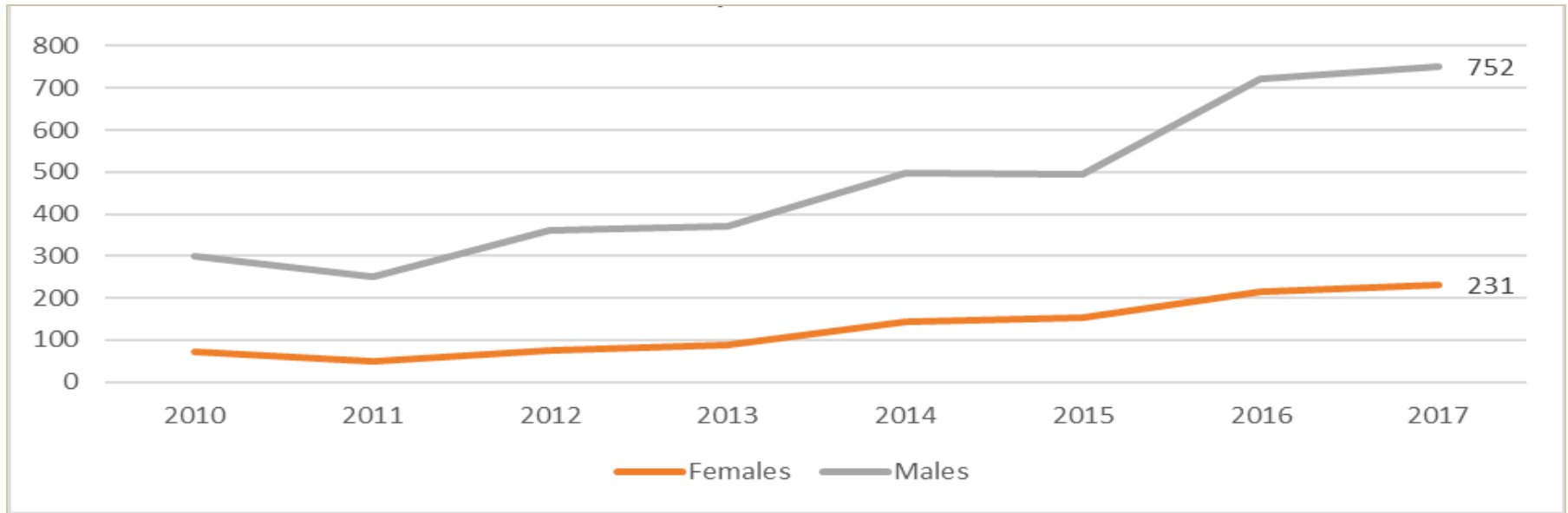


AP CS Principles
Avg Exam Score



Passing assumes score of 3 or higher

Computer Science A Exam Participation 2010 – 2017 by Gender



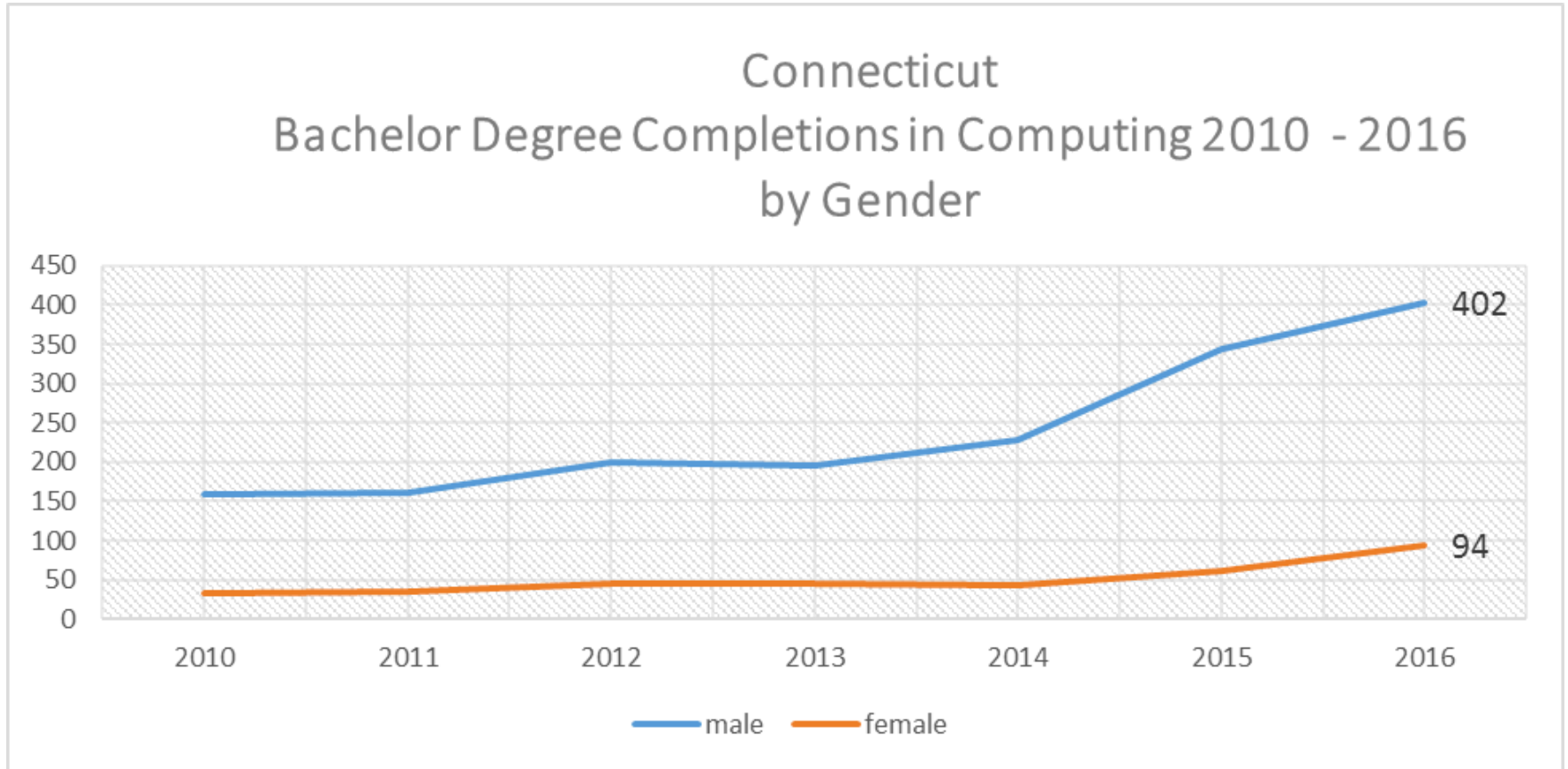
Source: College Board

IPEDES Higher Education Data

<https://nces.ed.gov/ipeds/>

- NCES (National Center for Education Statistics) Undergraduate Data
- Provides demographics of students majoring in CS across the state
- Search for completers using the [Computer and Information Sciences](#) CIP code

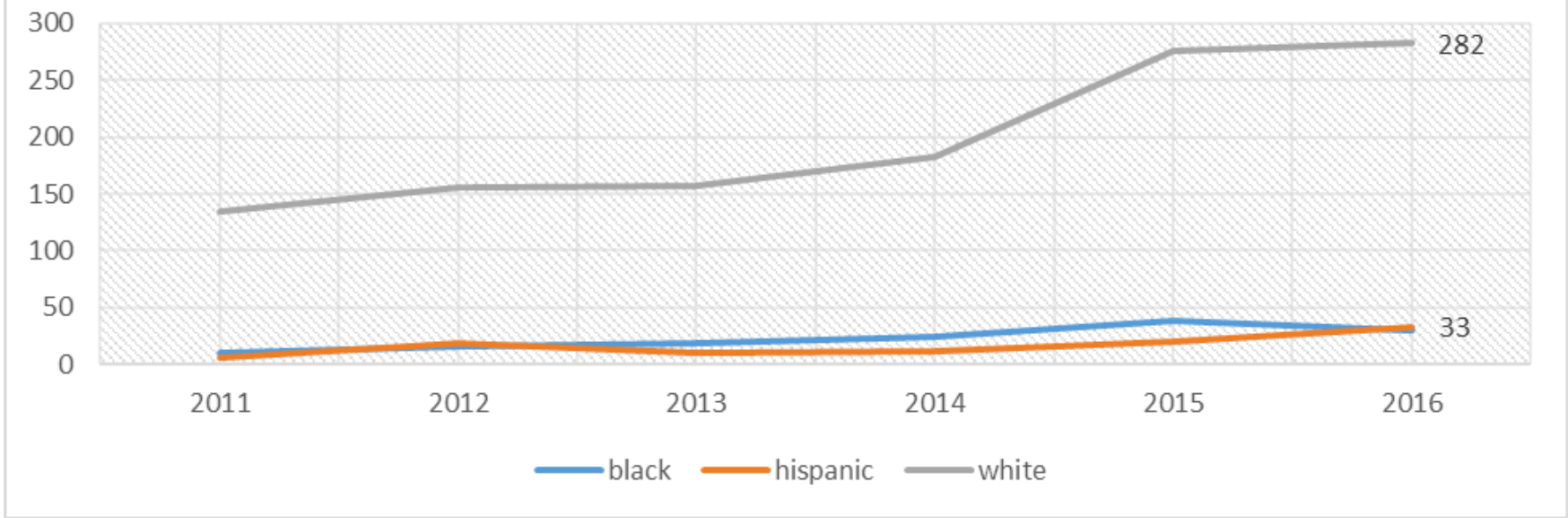
NCES



Source: NCES

NCES

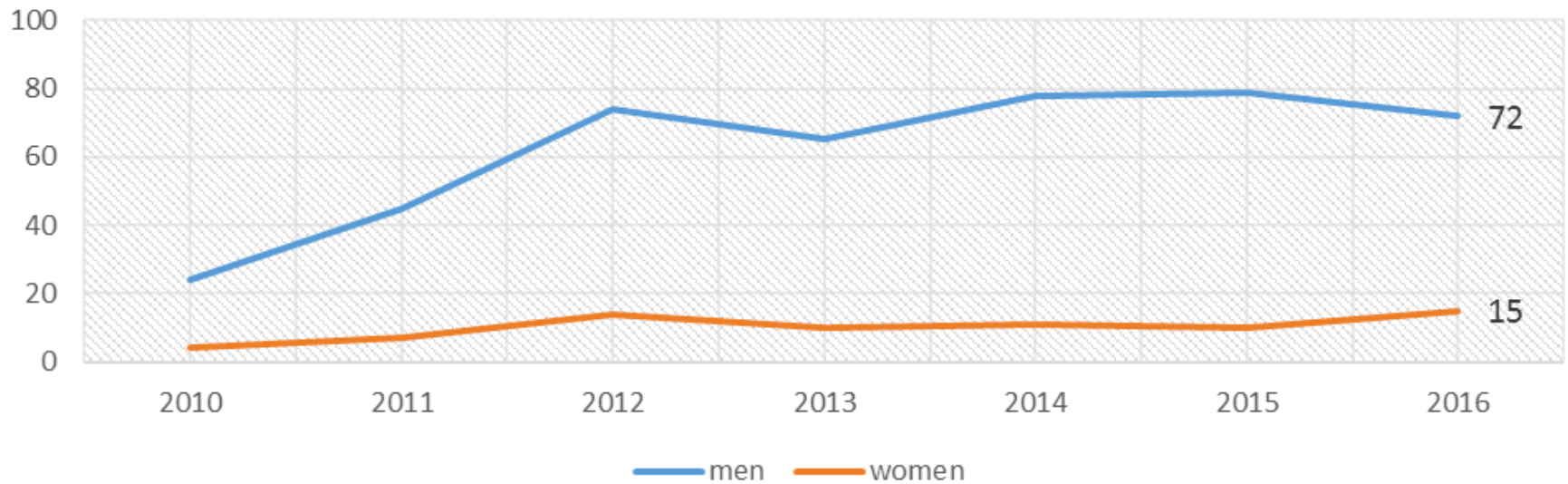
Connecticut
Bachelor Degree completions in Computing 2010 - 2016
by Ethnicity



Source: NCES

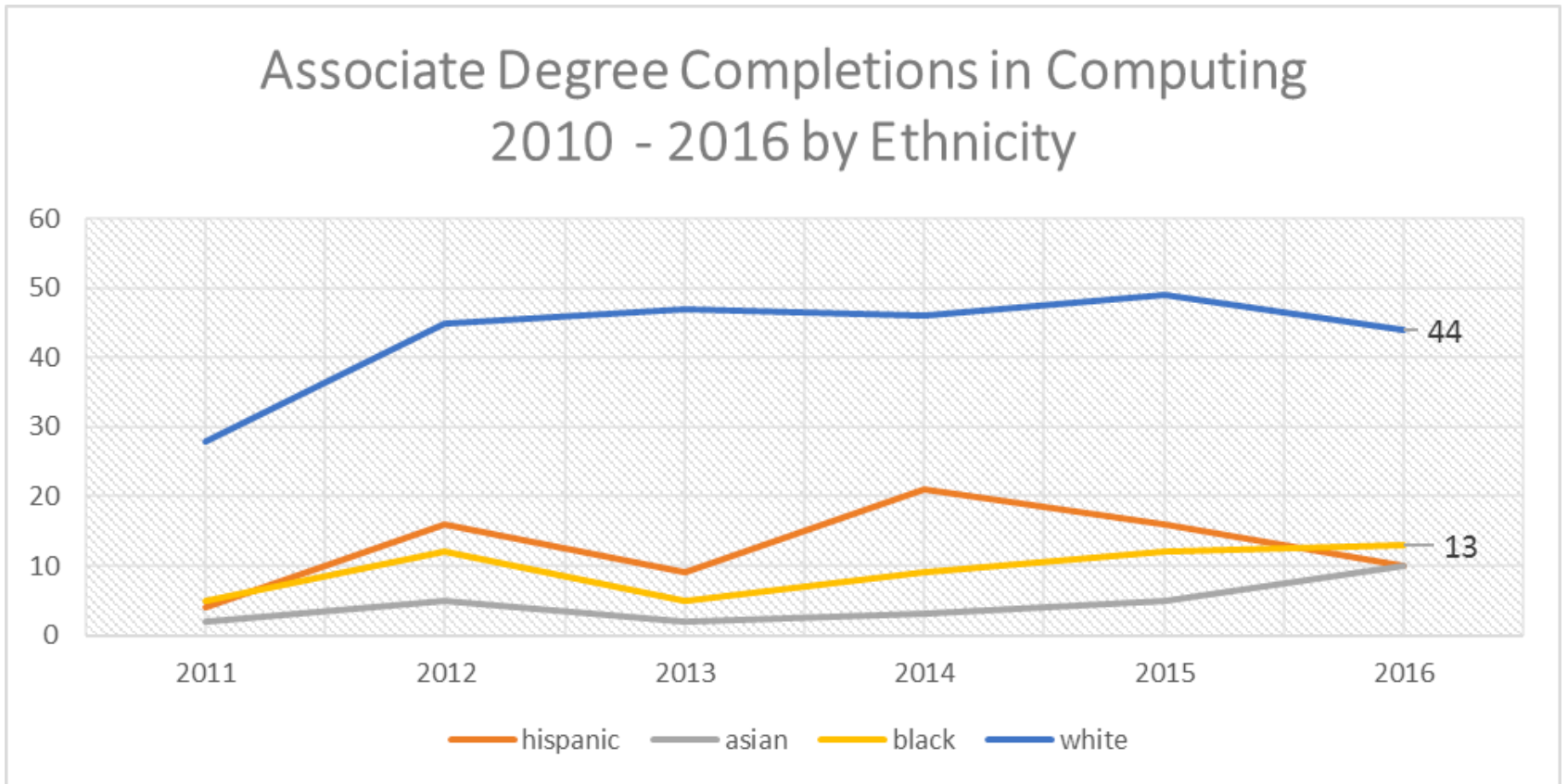
NCES

Associate Degree Completions in Computing 2010 - 2016 by Gender



Source: NCES

NCES



Source: NCES

EDSight

www.edsight.ct.gov

- Public portal for CT State Dept of Education data
- Go to [Instruction](#) -> [Courses](#) to the [Course Enrollments by Subject](#) page
- Stores course information listed by school district for the 2013-2014, 14-15, and 15-16 school years
- Searched using the Subject: [Computer and Information Sciences](#)

EdSight – Three Highest Reported Categories (Topics) under for Computer and Information Sciences Category

Category	% of Schools Reporting Courses
Computer Literacy	56%
Media Technology	25%
Computer Programming	13%

EdSight – Challenges

- Midway into our use of EdSight we identified errors in the reports
 - CS courses incorrectly coded
 - CS courses missing
- Realized effort is needed by school districts to ensure correct classification of CS courses

Next Steps

- Finalize Landscape Study written report to share with Computer Science Advisory Committee
- Assist districts to improve reporting of CS courses in EdSight
 - Identify select districts across the state to pilot/partner with
- Support SDE in dissemination of soon to be adopted CS K-12 Standards

Thank you

Questions?

Contact

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