Building CyberSupply: The Status of High School Cybersecurity Education

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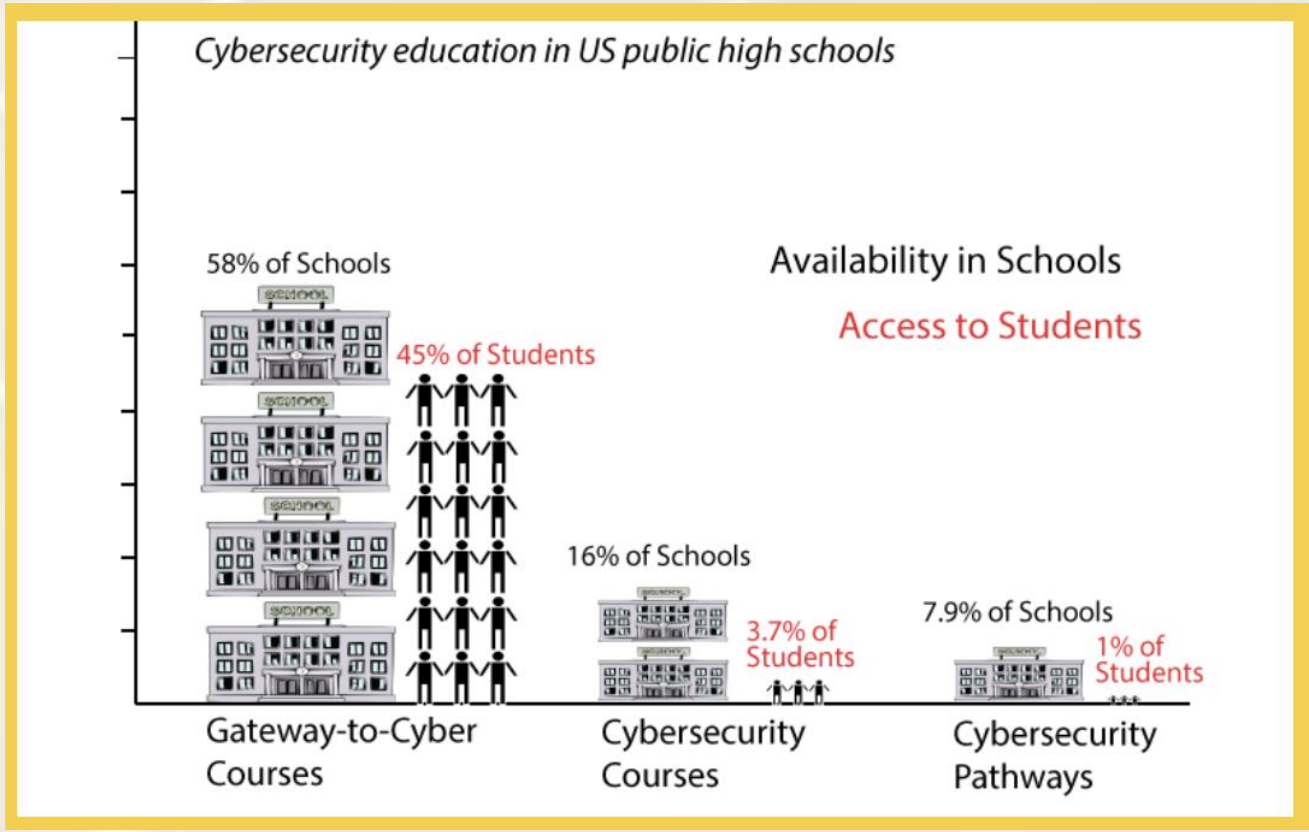
DARK Enterprises, Inc.

CyberSupply

Securing the Workforce

US Cybersecurity Workforce Demand and Supply

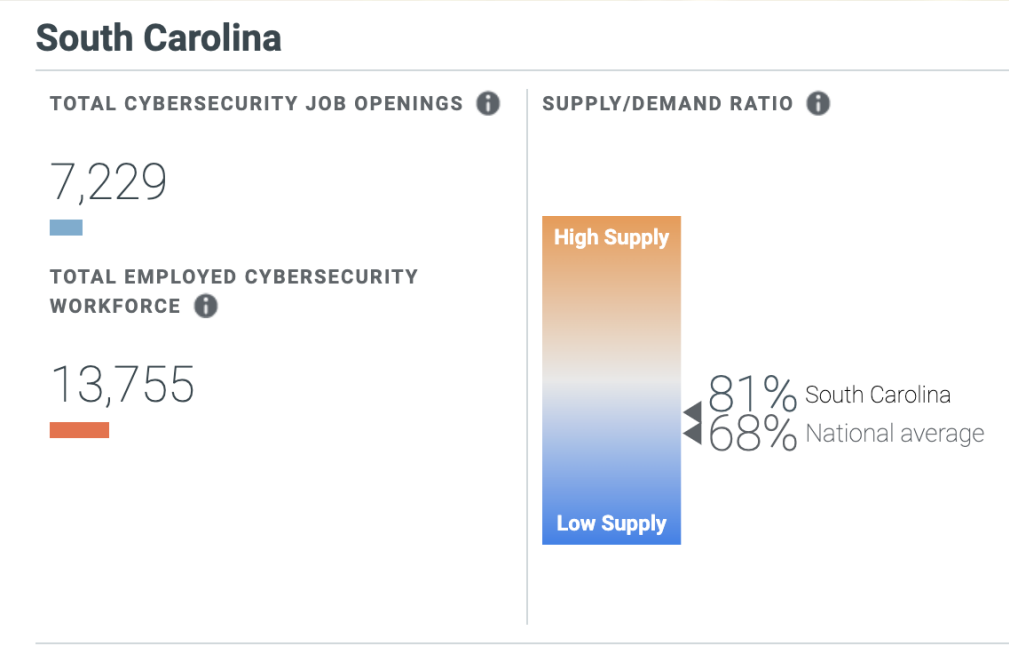
- http://cyberseek.org/
  - The US needs 1 in every 219 US citizens eligible to work to enter the cybersecurity workforce to fill the gap
- https://www.caecommunity.org/cae-map
  - 414 Colleges and Universities
- cybersupply.org*
  - Cybersecurity Education Availability and Access in US Public High Schools

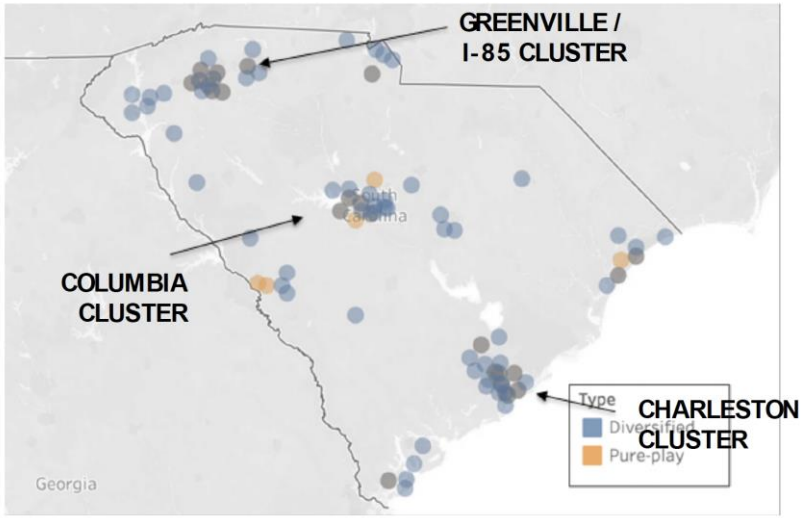


*Research made possible by collaboration with the National Cryptologic Foundation CAE-C: H98230-20-1-0292 Subaward: SA 20137; the University of Alabama-Huntsville, and Moraine Valley Community College, Illinois

South Carolina Demand

South Carolina needs **1 in every 581** South Carolina citizens eligible to work to enter the cybersecurity workforce to fill the gap
http://cyberseek.org/





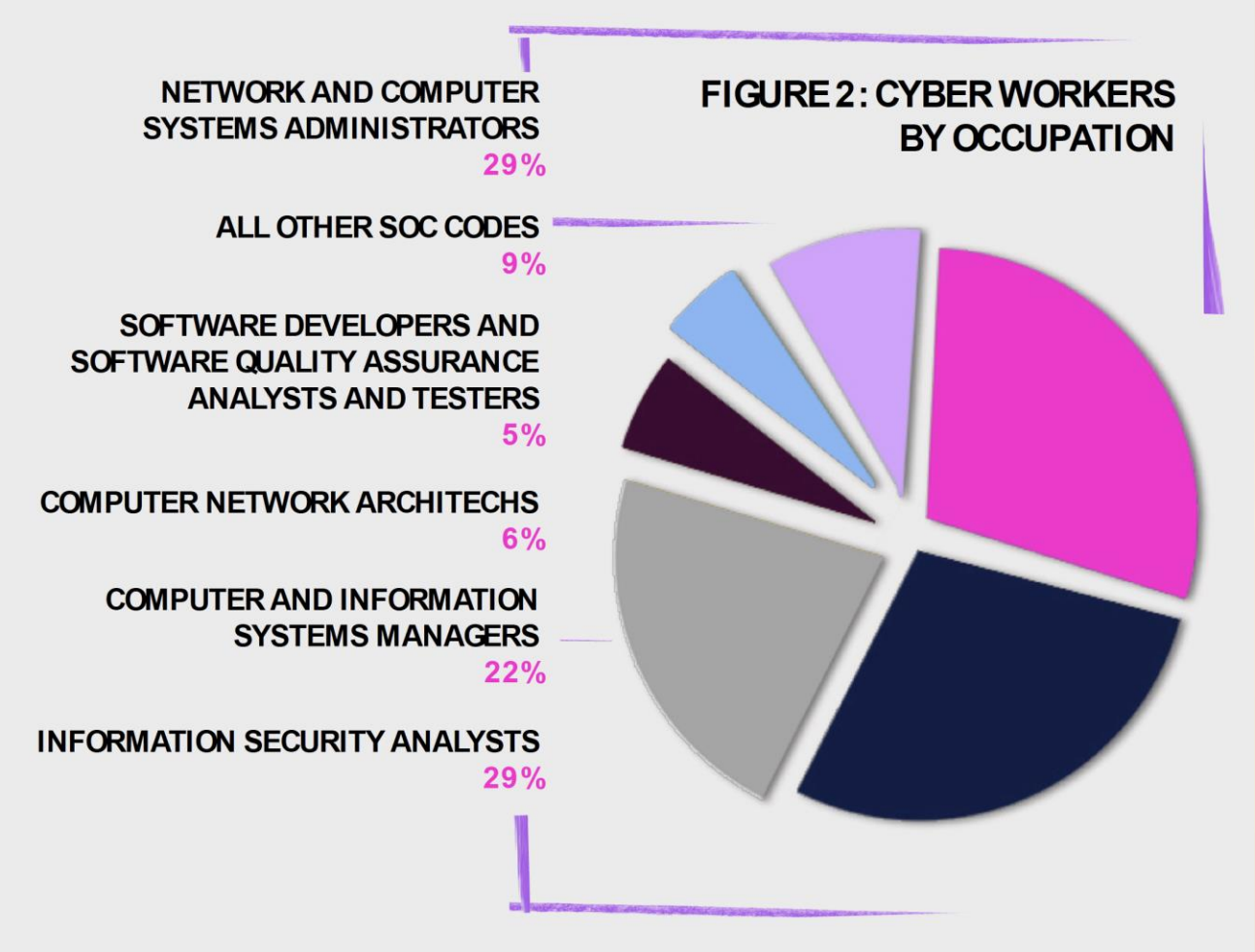
CYBERSECURITY CLUSTERS

South Carolina has:

- 47 pure-play companies (exclusively sell cyber products/services
- 277 diversified companies (cyber may be a single division or subsumed under a broader IT vertical)*

*South Carolina Cybersecurity Ecosystem Study (2022, March)

5,569 SC Cyber workers as of March, ‘22

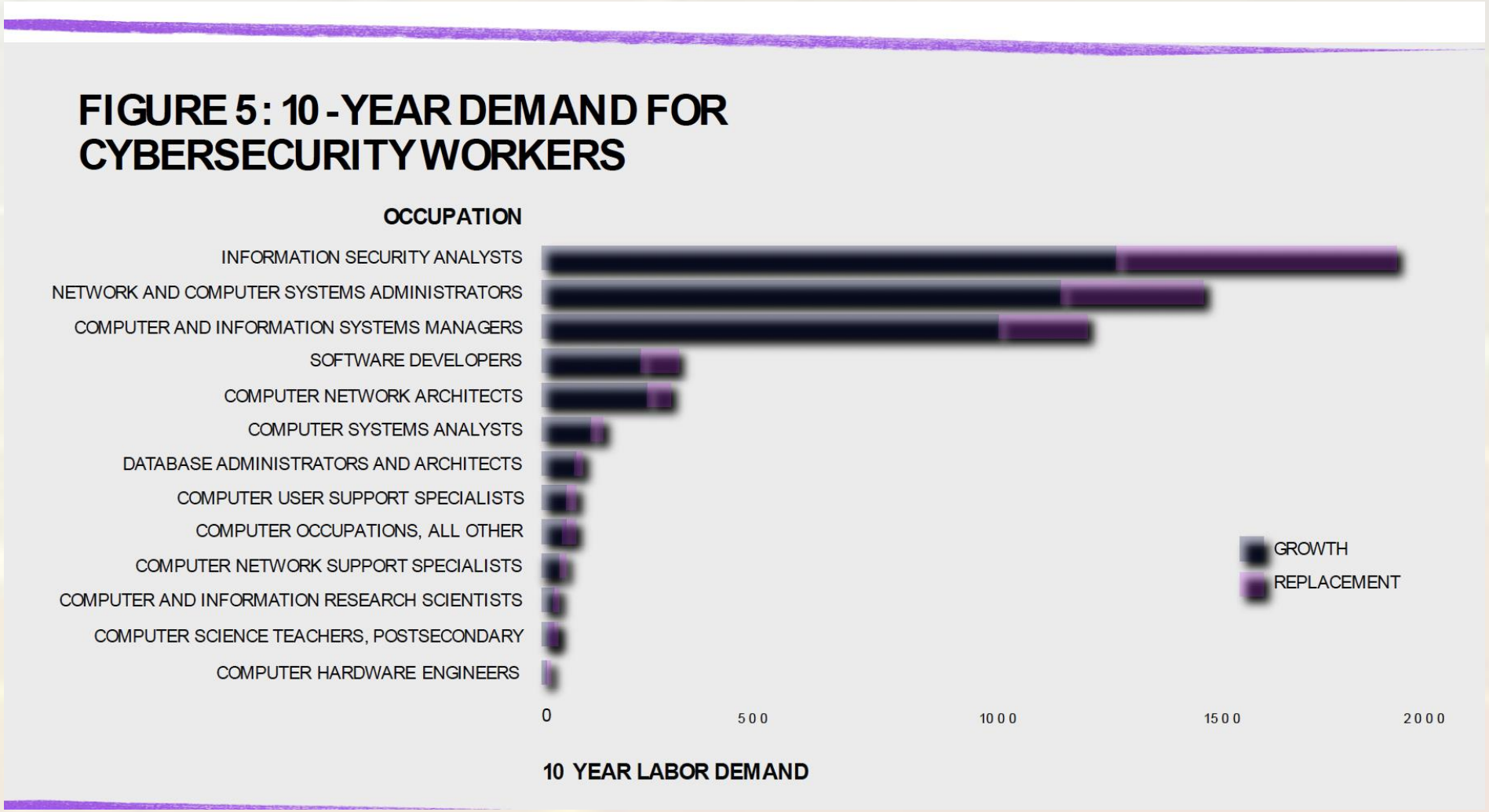


NOTE: Security Analysts, a “bell weather” category of cyber workers is 22% below the national average*

*South Carolina Cybersecurity Ecosystem Study (2022, March)

Projected 10-Year Demand

South Carolina will need to add nearly 6,000 new cyber workers over the next ten years.*

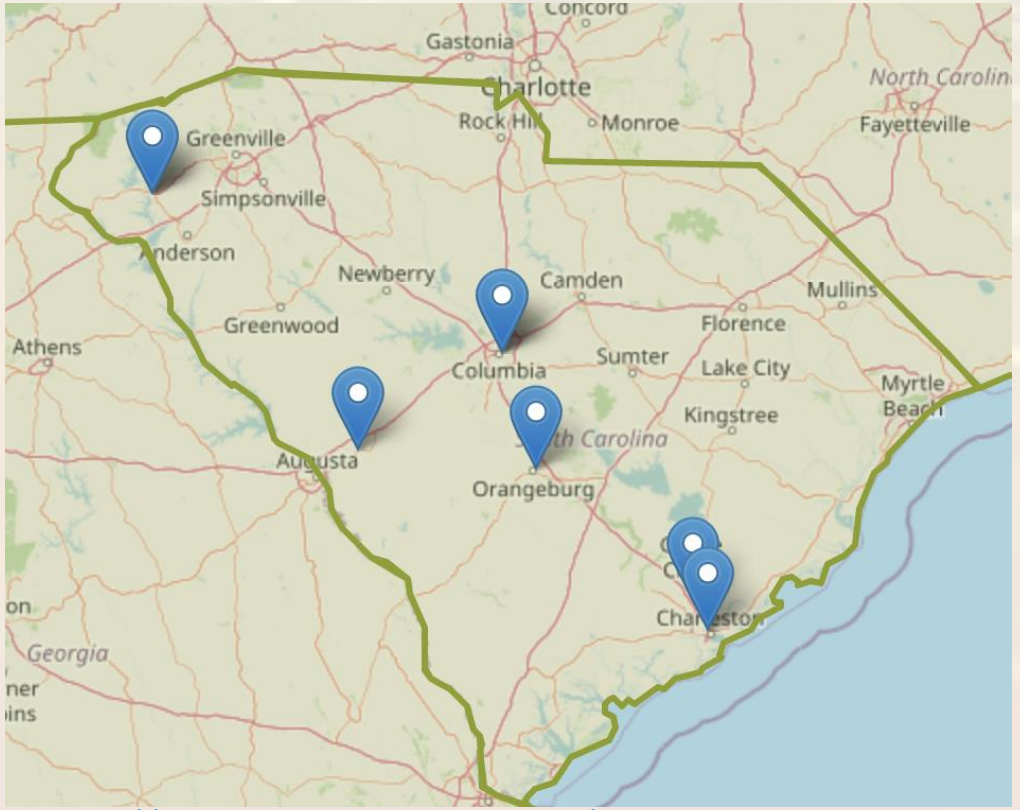


*South Carolina Cybersecurity Ecosystem Study (2022, March)

South Carolina Cybersecurity Supply:
College Level

- 60 Colleges and Universities in South Carolina
- 20 Florida colleges & universities with CAE designation
  - Clemson University
  - South Carolina State University
  - The Citadel
  - Trident Technical College
  - University of South Carolina
  - University of South Carolina-Aike
- SC ranks in the second-lowest quintile for both CAEs per capita (31st out of 50 states) and computer science degrees awarded per capita (36th out of 50 states)*

*South Carolina Cybersecurity Ecosystem Study (2022, March)



https://www.caecommunity.org/cae-map

South Carolina Cybersecurity Supply:
High School Level

- Department of Education's South Carolina K-12 Internet Safety Standards (2009) includes standards for primary, elementary, middle, and high school grade bands.
  - In four areas: digital citizenship, media literacy, cyber ethics, and personal safety
- SC has a Computer Science graduation requirement that can lead to creating more cybersecurity courses and pathways
- Cybersecurity courses are offered largely in CTE centers

CyberSupply

Securing the Workforce

- We collected publicly available data from **42.5% of public high schools** in the US from 11 states concerning **availability** of cyber courses/pathways and **access** to those courses. This included **5,915 schools and 192 CTE centers**.

- **Availability** data reflect what school websites report as available courses: Gateway computing courses, Non-gateway computing courses, Cybersecurity, or None/Undetermined

- **Access** is a function of:
  - % of schools with gateway or cybersecurity courses
  - # of students served in those schools per year, and
  - # of courses available to those students, and the number of students that could be served with those courses.

GATEWAY-TO-CYBER COURSES

57% of schools offer Gateway-to-Cyber courses

compared to 58% of all schools in the study

Gateway-to-Cyber courses are introductory courses that teach necessary prerequisite knowledge. The team used a broad lens in selecting these courses to reflect the diverse nature of computing courses in both CS and IT.

South Carolina CyberSupply
Securing the Workforce

CYBERSECURITY COURSES

19% of schools offer Cybersecurity courses

compared to 16% of all schools in the study

Course Availability reflects what school websites report as available courses. The fact that a course is listed in the school catalog does not mean the course was actually offered. Courses are cancelled due to low enrollment, which happens most often with elective courses. Course offerings for electives are dependent upon student interest, teacher availability and scheduling, hence the likelihood of overreporting.

Key Findings:

- Availability of Gateway-to-Cyber courses in schools is near the study average and access is above the study average
- Availability of Cybersecurity courses is above the study average of 16%, however, below the average for Cyber pathways

https://cybersupply.org/

CYBER PATHWAYS

<1% of students have access to a Cybersecurity pathway

Pathways are career-themed and college preparatory programs in high schools and CTE centers. Cybersecurity is often found in either the IT or STEM career cluster.

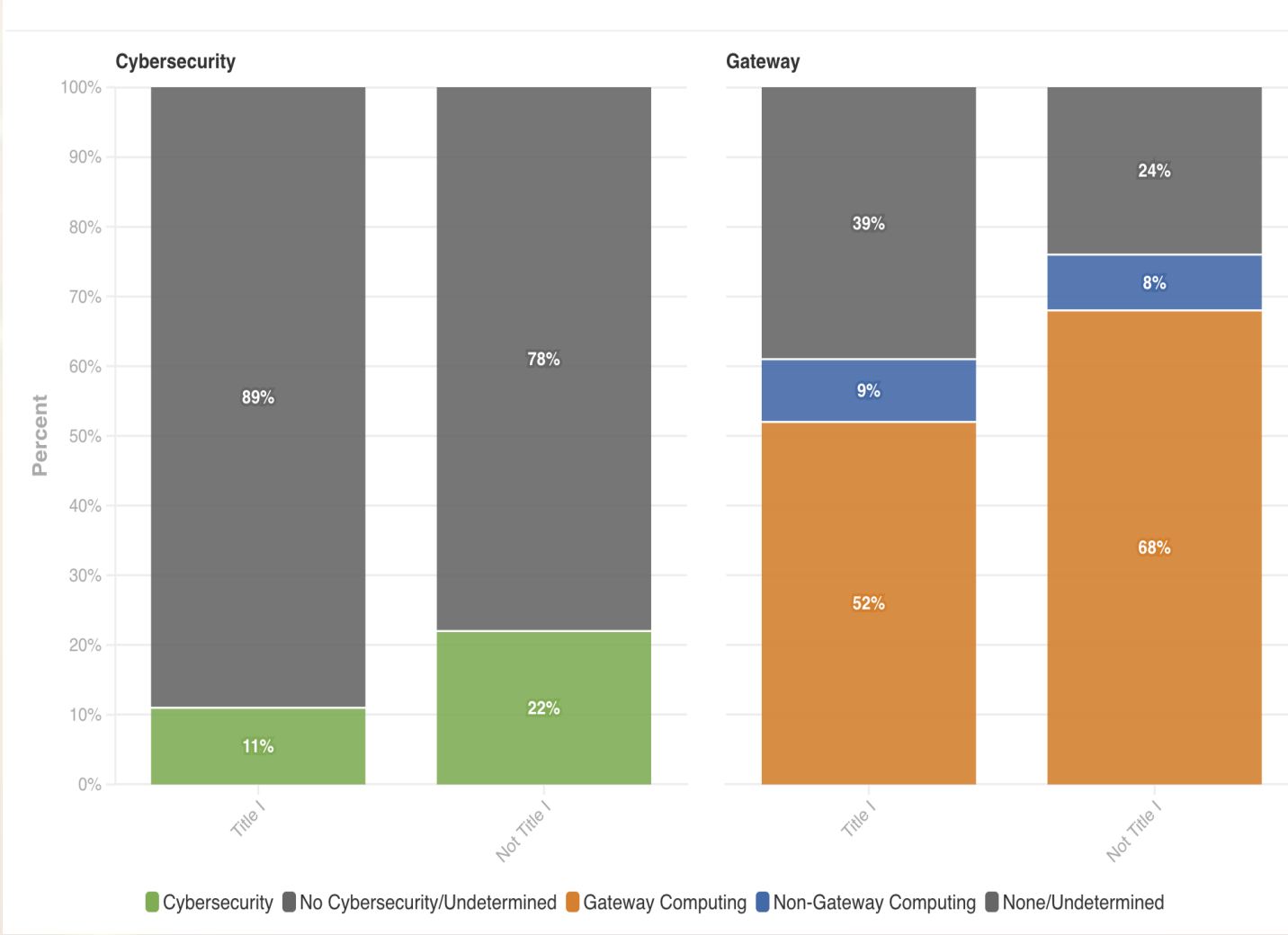
Disparities in access

Across all 11 states:

- Twice as many Non-Title 1 schools than Title 1 schools offer a Cybersecurity course.
- 16% more Non-Title 1 schools have Gateway-to-Cybersecurity courses than Title 1 schools.

South Carolina:

- .3% of Title 1 schools have cybersecurity as compared to 2.1% of Non-Title 1 schools
  - CTE centers make up the rest of the cyber offerings



Changing Supply to meet Demand in SC

- Leverage growing interest in Computer Science and the CS graduation requirement.
- Build capacity to support the Cybersecurity Pathway through funding of teacher professional development, lab space, and cyber range access, especially in Title 1 schools.
- Develop awareness and interest in middle school courses that lead the the high school curriculum
- Design college-and-career pathways that target specific cyber work roles, especially Security Analysts

TeachCyber.org

- Created to support high school cybersecurity courses and pathways including courseware, teacher PD, and other resources
- High school courseware is free, Creative Commons and designed to foster cybersecurity learning through:
  - Hands-on learning in a safe/sand-boxed environment using the U.S. Cyber Range
  - Based on the High School Cybersecurity Curriculum Guidelines
  - Easy to implement into LMS

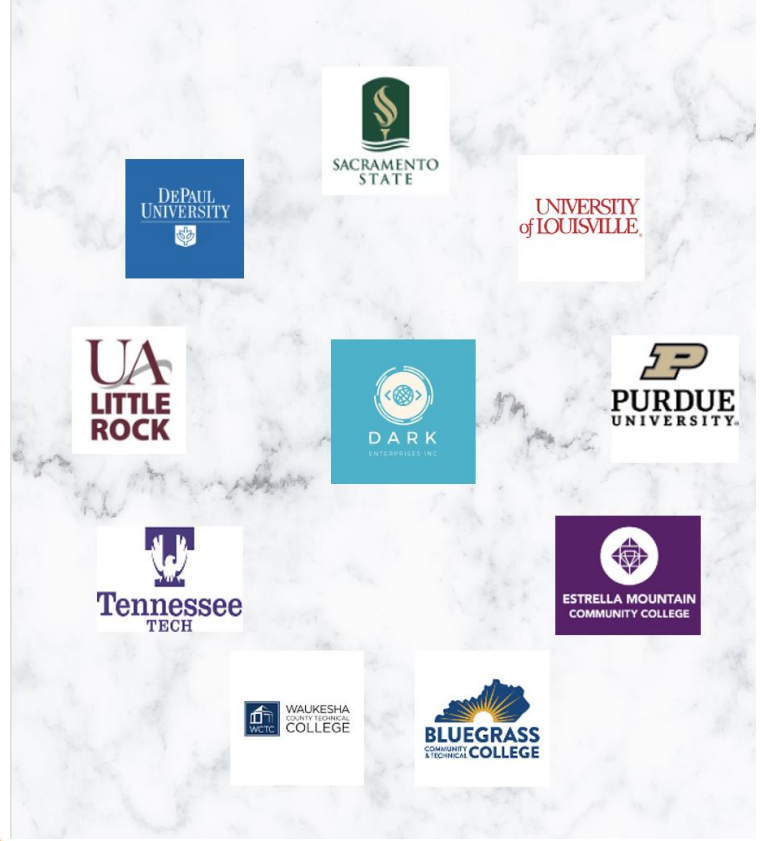
TeachCyber.org

- Middle school discovery kit, virtual lounges, and other opportunities to engage
- Teach Cyber NetAcademy: Free, online, self-paced courses
- Summer virtual teacher workshop – July 24-28 *(registration at TeachCyber.org coming soon)*

TEACH CYBER

National Cybersecurity Teaching Academy

- The NCTA offers a 12-18 hour graduate teaching cybersecurity certificate to in-service high school teachers.
- To support teachers who plan to use their cybersecurity knowledge to **remain in the classroom.**
- Currently the NCAE-C has provided funding to support scholarships for ~125 teachers at four universities via completely virtual course offerings.



Questions?

DARK Enterprises, Inc. is a small, women-led, non-profit dedicated to stewarding K-12 cybersecurity education. Teach Cyber is one of our projects that includes curriculum and teacher resources. In addition to CyberSupply, we partner with collaborators on research, evaluation, and program development projects and initiatives.

Interested in learning more? Contact me:

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