Building a Cybersecurity Faculty Network for HBCUs: A Collaborative Approach to Curriculum Development and Professional Growth

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Overview

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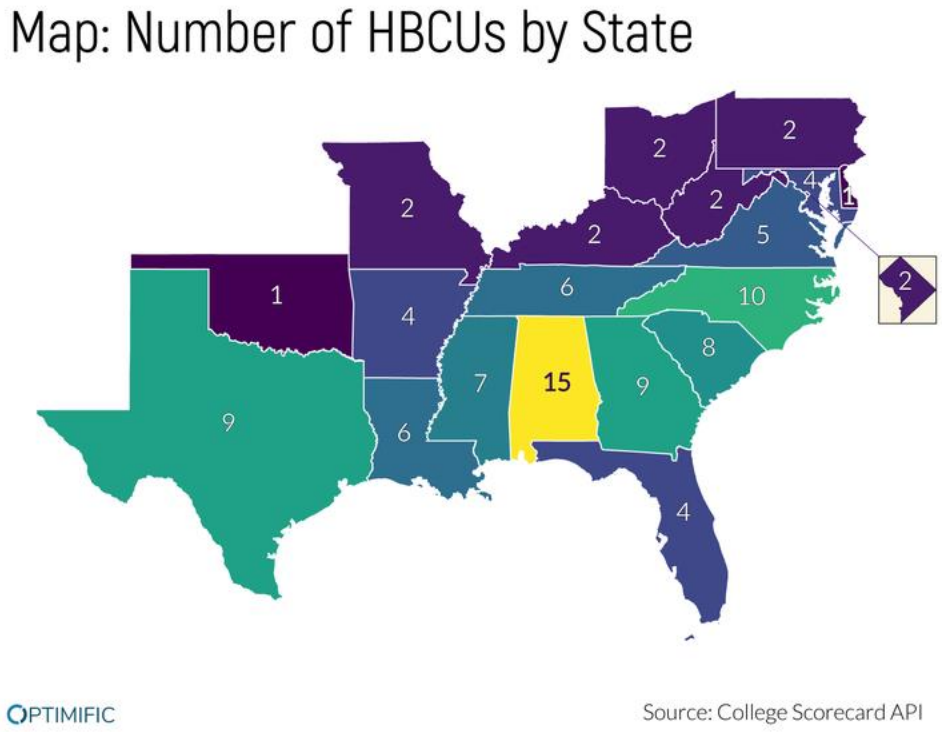
Introduction

- Historically Black Colleges and Universities (HBCUs) are institutions of higher learning that were established before 1964
  - During the time of legal segregation in the United States of America
- HBCUs provide an opportunity to expand the reach of education
- The problem is limited funding, resources, and faculty capacity
- From 2023 to 2024, there were 457,433 job openings for cybersecurity



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Challenges to Program Development

- Limited funding, small endowments
- Shortage of qualified faculty
- Outdated or inaccessible teaching/lab resources
- Keeping up with industry certifications in tech and cybersecurity

HBCU Representation in National Cybersecurity Programs

- Only 13 HBCUs (2.7%) are NCAE-C designated
  - Out of 475 institutions
- Only 4 HBCUs in the Consortium of Cybersecurity Clinics
  - Out of 18 total active clinics

The Consortium of Cybersecurity Clinics

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Proposed Faculty Network Model

- The proposed model provides resources to develop and support cybersecurity programs
- Key features include:
  - Teaching resources (syllabi, labs, tools)
  - Peer mentorship and collaboration
  - Certification and curriculum alignment
  - Access to low-cost or free tools (Packet Tracer, Hack The Box)

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Proposed Faculty Network Model (cont.)

Phase	Action	Example Implementation
Initial Assessment	Take a look at faculty and program needs (curricula, course syllabi, course/lab resources)	Conduct surveys or focus groups to identify areas of need (e.g., faculty development, low-cost resources).
Objective Setting	Establish learning outcomes for faculty (certification readiness, curriculum development, outreach)	Develop a plan of action based on the respective faculty's needs.
Content Selection	Gather open-access resources	Integrate free/low-cost material such as CISA learning modules, Cisco Packet Tracer, HackTheBox labs, etc.
Implementation	Provide peer-led workshops, resources tailored to specific courses, and access to peer mentors.	Monthly virtual seminars, bi-monthly meetings with peer mentors, open access to example syllabi and workshop templates
Evaluation	Measure impacts such as faculty retention, certification rates, and student outcomes.	Use pre/post-surveys and longitudinal tracking of student workforce placement.

Theoretical Foundation

- Peer learning
  - Vygotsky's Social Constructivism
- Hybrid curriculum design
  - Tyler (1962)
  - Taba (1949)
- Peer mentoring
  - Benefits include confidence, self-efficacy, and retention
- Examples:
  - Cyber-HAWKS Peer Mentoring Program
  - Center for Equitable AI and Machine Learning Systems (CEAMLS) at Morgan State University

Case Studies and Best Practices

- The Coding School
  - Hands-on professional development in machine learning, deep learning, and artificial intelligence (AI)
- Propel HBCU Faculty Fellows
  - Professional development for cybersecurity
- Mississippi Artificial Intelligence Network
  - Curriculum development and professional development for AI
- Mississippi Cyber Initiative
  - Ecosystem building for cybersecurity

Expected Outcomes and Impact

- Faculty
  - Better prepared, less isolated
- Students
  - Industry-ready, certification-aligned curriculum
- Institutions
  - More competitive, grant-ready
- Broader use
  - Model can scale to institutions of higher learning, 2-year colleges, nonprofits

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Conclusion

- HBCUs face gaps in cybersecurity education
- The proposed faculty network leads to a scalable, sustainable solution
- Needs for the future: researchers, educators, and sponsors to support and collaborate

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References

- Anderson, D., & Reimers, K. (2019). Cyber security employment policy and workplace demand in the
- US government. In EDULEARN19 Proceedings (pp. 7858–7866). IATED.
- Consortium of Cybersecurity Clinics. (2025). Cybersecurity for the public good.
- https://cybersecurityclinics.org/
- Mississippi Artificial Intelligence Network. (n.d.). https://www.sreb.org/ai-main
- Mississippi Cyber Initiative. (n.d.). https://www.mscyberinitiative.org/
- PROPEL. (2024, March 14). PROPEL, Southern Company launch HBCU-focused cybersecurity
- consortium. Access Newswire.
- https://www.accessnewswire.com/newsroom/en/utilities/propel-southern-company-launch-hbcu-focused-c
- ybersecurity-consortium-858542
- Taba, H. (1962). Curriculum development: Theory and practice. Harcourt Brace.
- The Coding School. (n.d.). https://the-cs.org/

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