Teaching Cybersecurity to High School Students

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Introductions

Stephen King, PhD PMP is the Computer Science Education Program Consultant for the Kansas State Department of Education. With a doctorate in education and a masters in telecommunications management, he has over twenty years of experience leading and teaching IT and computer science to high school and college students.

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What Will Our Takeaways Be Today?

- What is Cybersecurity? Why teach it?
- What information is in a Cybersecurity curriculum?
- Curriculum options
- Best Practices
- Share ideas

Cybersecurity

- "Measures taken to protect a computer or computer system (as on the Internet) against unauthorized access or attack." – Merriam-Webster

- "Cybersecurity is the practice of protecting systems, networks, and programs from digital attacks. These cyberattacks are usually aimed at accessing, changing, or destroying sensitive information; extorting money from users; or interrupting normal business processes." – Cisco

- "Prevention of damage to, protection of, and restoration of computers, electronic communications systems, electronic communications services, wire communication, and electronic communication, including information contained therein, to ensure its availability, integrity, authentication, confidentiality, and nonrepudiation." – NIST.gov

- "Cybersecurity is the art of protecting networks, devices, and data from unauthorized access or criminal use and the practice of ensuring confidentiality, integrity, and availability of information." – CISA.gov

KS P-12 Model Computer Science Standards

- L1.NI.C.01 Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts.

- L1.NI.C.02 Explain tradeoffs when selecting and implementing cybersecurity recommendations.

- L2.NI.C.01 Compare ways software developers protect devices and information from unauthorized access.

- L2.NI.C.02 Use encryption and decryption algorithms to transmit/ receive an encrypted message.

Why Teach Cybersecurity?

- High Profile -- ransomware
  - Colonial Pipeline
  - JBS Foods
  - Acer (computer manufacturer)
  - 304 million attacks in 2020 – 62% increase
  - Over 1000 reported data breaches in 2020
  - Ransomware "gangs" made $350 million in 2020 (ZDNet)

- Jobs, jobs, jobs
  - BLS: 26% increase in demand for cybersecurity workers
  - Predicted 3.5 million cybersecurity jobs in 2021 – Cybersecurity Ventures
  - "Nowhere is the workforce-skills gap more pronounced than cybersecurity." -Wharton
  - National average salary: $93K (2018 data)

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"...but it's so hard to teach!"

- 8 domains of Certified Internet Systems Security Professional:
  - Security and Risk Management
  - Asset Security
  - Security Architecture and Engineering
  - Communications and Network Security
  - Identity and Access Management
  - Security Assessment and Testing
  - Security Operations

CISSP® | Certified Information
Systems Security Professional

"...but it's so hard to teach!"

- 6 domains of Security+:
  - Threats, Attacks, and Vulnerabilities
  - Technologies and Tools
  - Architecture and Design
  - Identity and Access Management
  - Risk Management
  - Cryptography and PKI (Public Key Infrastructure)
- Cybersecurity Analyst (CySA+) – newer cert
  - Higher level than Security+ (prerequisite)

CompTIA
Security+

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Curriculum options

- CompTIA Security+: several vendors available
  - Cert Prep: CompTIA, Mike Meyers, etc. Usually no labs
  - Cyber.org – Labs on Linux and Windows
- PLTW Cybersecurity course
  - Virtual machine labs with pen test and packet analysis
- Code.org CS Principles Unit 10
  - Data policies, privacy, risks, and data lessons
- Coursera (U of Maryland) Cybersecurity Specialization
  - One hands-on capstone project
- Udemy
- Others: https://www.comparitech.com/blog/information-security/cybersecurity-course-online/

Best Practices

- Project based
- Set expectations early – not all labs are traditional labs
- Do labs in virtual environment, not on the school network
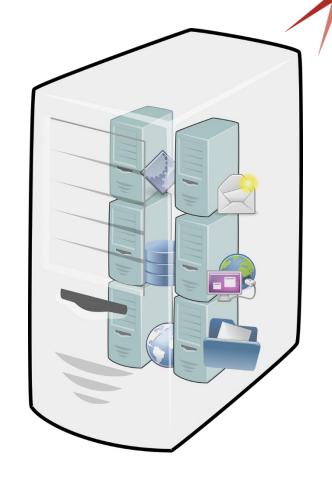- Incorporate YouTube and other videos when possible
- Explain acronyms

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Please take a moment and complete an Evaluation:

https://docs.google.com/forms/d/e/1FAIpQLSeuFk_rD_pbKW3xgW5sDckomYGFAl7r0be_bCAbmwyWsBNpwQ/viewform

Short: bit.ly/GBU2021Certificate

Let's DO THIS!

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