ARC - Assessment Resources for Cybersecurity
SaTC-EDU

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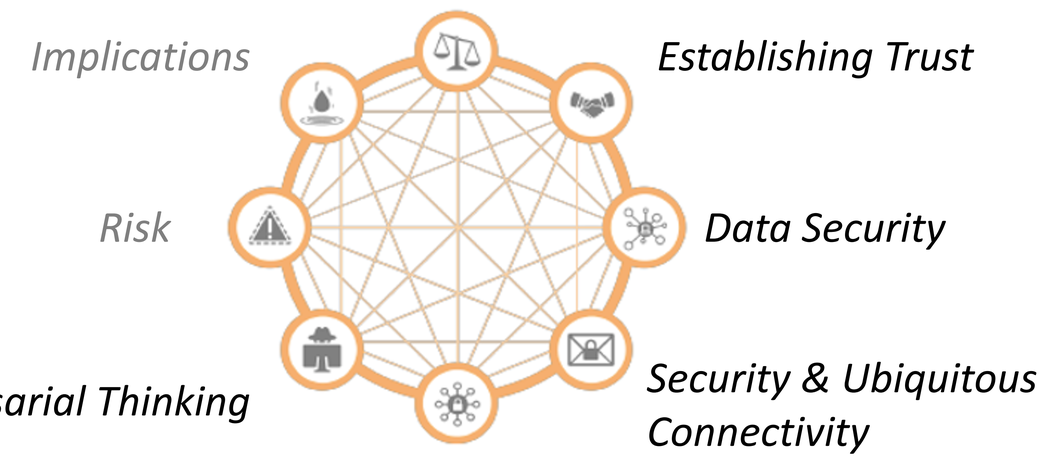
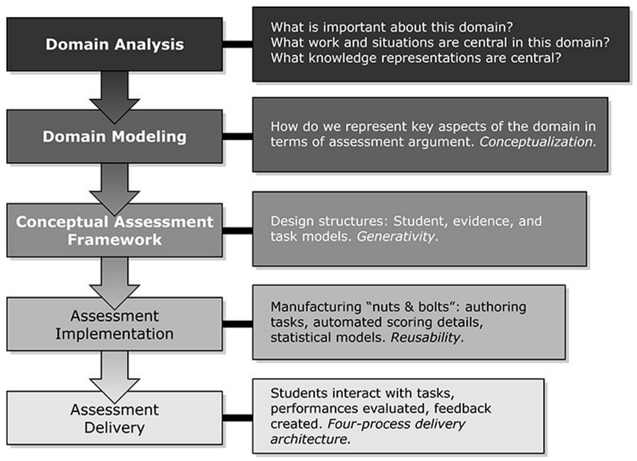
Need: Cybersecurity education has grown across higher education for 25 years and is now growing at the high school level. Quality high school cybersecurity education needs excellent curriculum, trained teachers, and **valid/reliable assessment.** This project will 1) create a bank of cybersecurity assessment items, and 2) pilot test the items with high school cybersecurity educators.

High School Cybersecurity Curriculum Guidelines



Methodology

Evidence-Centered Design



Current Status

- ~200 items developed in Data Security and Security & Ubiquitous Security
- Working on Domain Modeling for Adversarial Thinking and Establishing Trust
- Review workshop June 2022
- Pilot testing starts Spring 2023

Sample Items Based on Domain Modeling

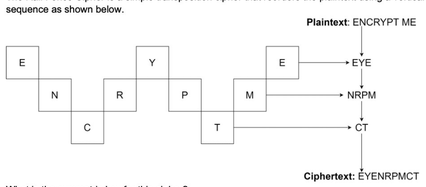
Data Security

FKSAs: Students can encrypt a message using a transposition cipher and explain how a simple transposition cipher can be attacked using the anagram method.

POs: Accuracy of selection and explanation.

PWPs: Selection of symmetric keys given a Rail Fence Cipher and explanation of how to perform a ciphertext attack using different numbers of characters.

The Rail Fence Cipher is a simple transposition cipher that reorders the plaintext using a vertical sequence as shown below.



What is the symmetric key for this cipher?

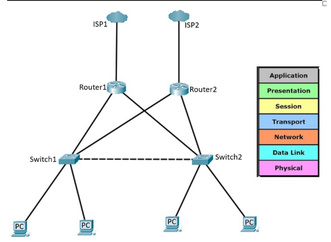
A. **The sequence's vertical length**
B. The shift in the plaintext alphabet
C. An arbitrary permutation
D. An arbitrary substitution

Network Security

FKSA: Students can recall that compromised layers of a network facilitate exploitation of upper layers.

PO: Accuracy of selection.

PWP: Given a topology diagram, selection of the layer that would facilitate exploitation of upper layers.



Suppose an attacker has been able to exploit layer 2 of the OSI model. Which layer(s) of the OSI more are now susceptible to further exploitation?

A. Layer 2 only
B. Layer 1 only
C. Layers 3 and 4 only
D. **Layers 3,4,5,6, & 7**

Classroom Impact

Teach Cyber, over 1,100 teachers and ~30,000 students
RING, 100 teachers and 2,800 students
Army JROTC Cyber, 11 teachers and ~5,800 students

Other Potential Impacts

Educational Research in Cybersecurity
Praxis Teacher Test
Placement Test