Dreams Deferred: The Cost Of Cybersecurity Education

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About Me

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Agenda

- ► What Is A Dream Deferred?
- ► Push For Cyber
- ► What is the Cybersecurity Pipeline?
- ► Types of Cybersecurity Education
- ► Cost of a Dream Deferred
- ► T-ATP
- ► Wrap-Up
- ► Contact

What is A Dream Deferred?

Harlem

BY LANGSTON HUGHES

What happens to a dream deferred?

Does it dry up
like a raisin in the sun?
Or fester like a sore—
And then run?
Does it stink like rotten meat?
Or crust and sugar over—
like a syrupy sweet?

Maybe it just sags
like a heavy load.

Or does it explode?

DISCLAIMER: This presentation is reviewing nuances of cybersecurity education

Cybersecurity – A National Problem

- According to the Cybersecurity & Infrastructure Security Agency (CISA), there are currently 16 critical infrastructures:
  - Chemical
  - Energy
  - Financial Services
  - Healthcare and Public Health
- Each critical infrastructure has at least one breach

Push For Cyber

- White House National Cyber Workforce and Education Summit
  - Build nation cyber workforce
  - Improve skills-based pathways to cyber jobs
  - Educate Americans to have the skills to thrive in an ever-changing digital society
  - Improve Diversity, Equity, Inclusion, and Accessibility (DEIA) in the cyber field

What is the Cybersecurity Pipeline

- ► Like the digital divide
  - ► Gap between populations that have access to digital technology and those who do not
- ► Pipeline focused on attracting and retaining women and marginalized groups into cyber security
  - ► This is needed for the diverse train of thought
  - ► Cyber security is majority white male

Current Cybersecurity Stats

- The cybersecurity shortage has doubled from 300,000 to 600,000+ in recent years

  - 39,000 in the public sector

- International Consortium of Minority Cybersecurity Professionals (ICMCP) reports

  - 14% of cybersecurity professionals are women – women are 51% US population

  - 3% of information security analysts are African-American

- Survey by (ISC)[2] found 77% of cybersecurity professionals stated cybersecurity was not offered as part of their educational curriculum

Type of Cybersecurity Education

- ► Two-year (community) colleges
- ► Four-year colleges and universities
- ► Certifications
- ► Self-study
- ► For-profit colleges
- ► For-profit training centers / boot camps (*)

Cybersecurity Education Comparison

Two / Four Year Colleges

- Students need no to minimal experience
- Classes are at a set time
- Course work is a steady pace
- Program duration is fixed
- Curriculum is held to higher rigor

For-Profit Training Centers

- Students need no to minimal experience
- Classes work around student's schedule
- Course work progress very rapidly
- Promise employment after the program
- Program duration is shorter - usually six months - one year
- Curriculum may not be held to higher rigor

Cost of a Dream Deferred

Monetarily Cost Comparison

For Profit Training Centers

► Prospective cybersecurity professionals that pursue this avenue on average

  ► Spend six months – one year in the program

  ► Spend $10k (tuition)

  ► Take out private student loans

  ► Average loan interest: 10%

Four Year College / University

► Prospective cybersecurity professionals that pursue this avenue on average

  ► Spend four years in college

  ► Spend $15k* (tuition) for degree

  ► Receive financial aid (grants, etc.)

  ► May take out loans

Inspiration

Biden Department Of Education Forgives $3.9 Billion In Student Loans For Former ITT Technical Institute Students

Inspiration – ITT Tech

- Forgiven for the period January 1, 2005, to September 2016

- 208,000 borrowers receiving 3.9 billion in loan forgiveness

- U.S. Education Department report found

  - ITT engaged in widespread misrepresentation related to students getting a job or transfer credits

- "It is time for student borrowers to stop shouldering the burden from ITT's years of lies and promises" – U.S. Secretary of Education Miguel Cardona

Inspiration – ITT Tech

- Consumer Financial Protection Bureau (CFPB) found that ITT practiced predatory behavior in the following ways

    - Private student lending

    - Pressured students to take out high-cost private loans knowing that most students would default on the loans

- "The automatic loan cancellation announced will provide life-changing relief that has been long been owed to former ITT students" – Rohit Chopra, director of the CFPB

Cost – Cybersecurity Pipeline

- High number of marginalized groups are enrolling in the for-profit training centers
  - Students only know what they know at the time of enrollment
  - Believe this is the pathway in getting into cyber
  - Four prospective cybersecurity professionals in the past three months
- Students not finishing the program
  - Coursework is too strenuous
  - Losing / not retaining cybersecurity talent from diverse backgrounds

Dream (Almost) Deferred

- Worked at a non-profit, Access to Software for All People (ASAP)
  - Created to expose inner-city kids to information technology to close the digital divide
- Worked at ASAP throughout high school
- After graduation almost enrolled to DeVry University

Inspiration – DeVry University

- 1,800 former DeVry University students will receive approximately 71.7 million in full borrower defense discharges

  - Department of Education found that the institution made widespread substantial misrepresentations about its job placement rates

  - DeVry claimed 90% of graduates who actively seek employment obtained jobs in their field within six months of graduation

  - The actual job placement was 58%

Inspiration – DeVry University

- National advertising campaign "We Major in Careers" with a brand of "Career Placement University"

- Found half the jobs in the 90% placement rate were held by students who obtained them before graduating from DeVry and often before they enrolled
  - DeVry education was not attributed to these students' obtaining employment

- DeVry excluded students from their calculation who did not conduct job searches in the manner the University's Career Services preferred

- Senior executives knew the 90% percent statistic was false

Cybersecurity Pipeline Example

- ▶ Prospective cyber security professional reached out to me on Instagram
- ▶ Currently in a for-profit training center program
- ▶ Program is six months
- ▶ Took a personalized private loan
  - ▶ $12k tuition
  - ▶ 13% interest rate
  - ▶ 10-year loan

Cybersecurity Pipeline Example

▶ Student was overwhelmed as the material was accelerating at a rapid pace

▶ Was told the program was for beginners

▶ Training center has a career center, but it's lacking

▶ Helped student create an online portfolio

  ▶ Great tool to obtain employment in cyber

▶ Gave pointers on how to network

  ▶ Social media/meetups, etc.

How can we change this?

Solutions

- Evangelize cybersecurity education
  - Elementary / middle school
  - High School
  - Colleges / Universities
  - Non-traditional students
  - Veterans
- Create more apprenticeship opportunities

T-ATP

- ► Non-profit focused on exposing all facets of cybersecurity to marginalized groups
  - ► Web Exploitation
  - ► Reverse Engineering
  - ► Binary Exploitation
  - ► Forensics
  - ► Cryptography
- ► Mission statement – quality cybersecurity education should be accessible to everyone

T-ATP Challenges at DEFCON

► Created challenges for the Biohacking Village CTF at DEFCON in the following areas

  ► Web Exploitation

  ► Reverse Engineering

  ► Binary Exploitation

  ► Networking

  ► Cryptography

  ► Forensics

T-ATP Stats with Biohacking Village CTF

- ▶ 279 people participated in CTF
- ▶ Challenges were distributed at DEFCON due to large distribution of experience
  - ▶ Beginner to experienced players
- ▶ Most solved challenges – web exploitation, cryptography (Caesar cipher)
- ▶ Least solved challenges – cryptography (RSA cipher), forensics (stenography)

Upcoming T-ATP Events

- Preliminary launch of T-ATP tentatively January 2023
  - Application and registration details will soon follow
  - Focus on college students
  - Kinesthetic and cohort style learning

Wrap-Up

- Cybersecurity shortage is a national issue
  - White House National Cyber Workforce and Education Summit
- With the increased need for cybersecurity jobs
  - Need to find a better way to evangelize cybersecurity education/training
  - Need to create more apprenticeship opportunities for prospective cybersecurity professionals – T-ATP

Wrap-Up

- Let's not defer any more dreams
    - Let's not repeat the mistakes of ITT Tech and DeVry
- Having prospective cybersecurity professionals go to for-profit training centers is removing marginalized groups from the cybersecurity pipeline
    - Students not adequately prepared
    - Students are dropping out of the program
    - Students are saddled with debt
    - Students are not finding jobs in cybersecurity

Contact

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Questions