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
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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

EDUCATION

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

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Questions