

Long and Winding Road

Navigating to a Cybersecurity Performance
Based Education (PBE) Curriculum
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NSF Small ATE Grant

- TSTC Online Competency-Based Education (CBE) Project
- Grant #1901776
 - Award: 2019 through 2022
 - Designated Programs
 - Cybersecurity
 - Architectural Design and Engineering Graphics (ADEG)



Performance Based Education (PBE)

- Texas State Technical College's Competency-Based Education (CBE) initiative
- Focus on mastery of Industry skills / competencies
- Self-directed
- Fully online or in a blended learning environment
 - Flips traditional lecture to online
 - Emphasis on hands-on learning in a technical lab environment



<https://www.tstc.edu/performance-based-education/>

- Move at a Flexible Pace
- Access Coursework Online
- Master the Skills
- Add Flexibility to Learning
- Enjoy Multiple Entry/Exit Points

Tier 1 PBE Online Implementation

- Cybersecurity
Associate of Applied Science
(15 courses)
- Digital Forensics Specialist
Advanced Technical Certificate
(4 courses)
- 18 Faculty across 6 out of 10 TSTC Campus Locations
- Primarily Face-to-Face



Acceleration!

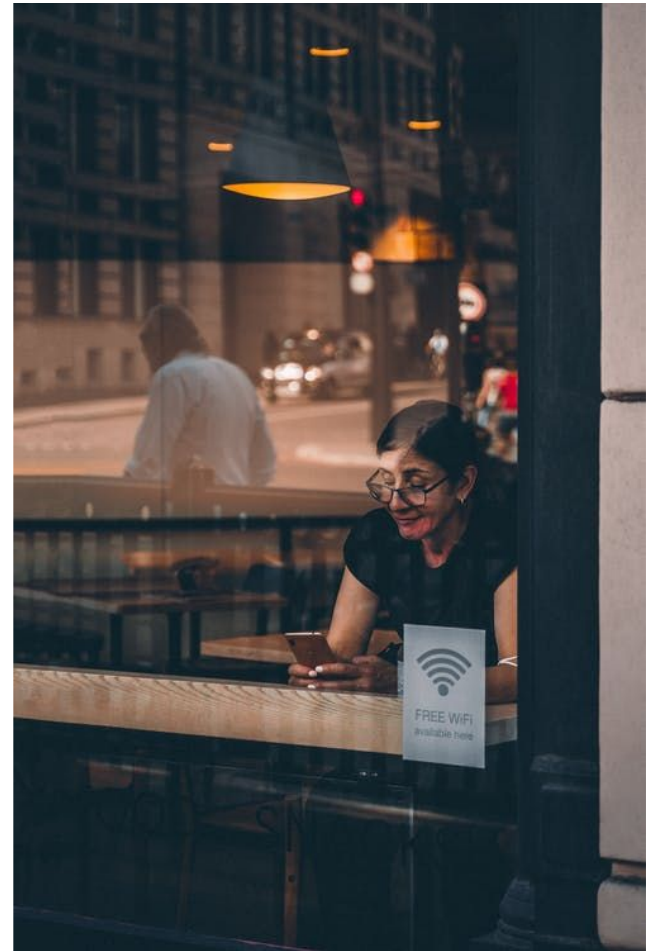
- COVID-19 - Spring 2020
- Conversion of all courses to Online after Spring Break!



Challenge #1: Finish SP20

Internet Connectivity - Student Access

- No Internet Access, Low speeds, Inconsistent (Satellite/Phone) connection, or Metered connections
- Solutions: Extended WiFi connection to parking lot, WiFi in public spaces (McDonald's), Grade of "Incomplete"



Challenge #1: Finish SP20

No Student Home PC

- Solution: CARES Funding to purchase a PC

Student PC Hardware Deficiencies

- Insufficient RAM, processor
- Single vs. dual monitors
- Solution: Remote Access via Google Remote, scaled back labs, focus on core competencies

Challenge #1: Moving Forward - Summer 2020-21

ITSC 1325 - PC Hardware

- Assemble, troubleshoot, and upgrade a PC
- Solution: PC Building Simulator from Galaxy of Games - \$20

ITNW 1325 - Fundamentals of Networking

- Assemble and troubleshoot network cables and drops
- Solutions
 - Student purchased toolkit - \$40
 - “Fake” Ethernet drops (RJ45 \longleftrightarrow Keystone)
 - Student Video Submission(s) - Creating and testing cable

ITSY 2330 - Intrusion Detection

- Live Malware Analysis on separate physical network
- Solution: Virtual Machines not connected to NIC

Challenge #1: Moving Forward - Summer 2020-21

ITNW 2355 - Server Virtualization

- Resource-intensive Virtual Machines with ESXi and Hyper-V
- Solution: Remote Access via Google Remote and AnyDesk on Fort Bend and Waco campuses

ITSY 2359 - Security Assessment and Auditing

- VMs attacking and scanning each other for Pen Testing and vulnerabilities identification
- Need for nested virtualization and Kali Linux
- Solutions:
 - Temporary bare metal environment hosted at Fort Bend and Harlingen campuses
 - Terminal server jump station into virtual apps being hosted by VMware
 - Accessed via a VPN

Challenge #1: Moving Forward - Summer 2020-21

ITDF 2420 - Digital Forensics Collection

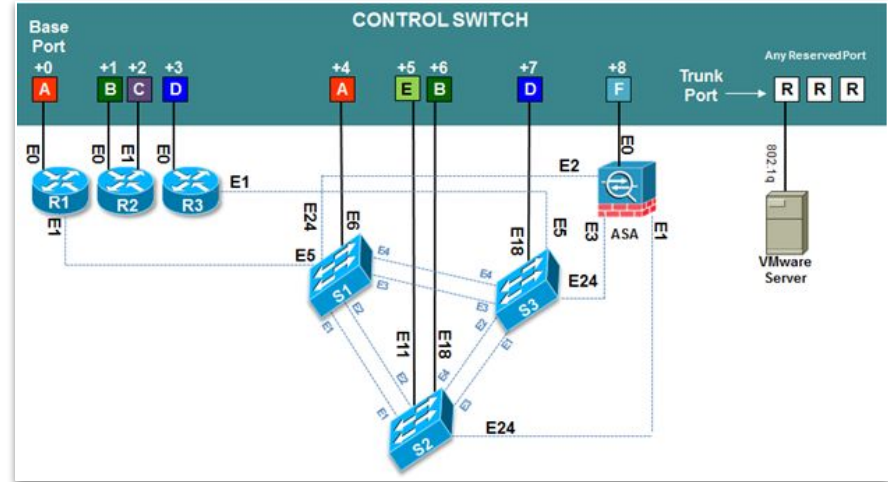
- Hardware-based write blockers to produce forensically sound images of computers and USB drives
- Solution: Software-based write blocker via Registry



Challenge #1: Moving Forward - Summer 2020-21

ITNW 2321, ITNW 2312,
ITSY 2301

- Cisco switches, routers, and firewalls
- Lower-level solution: Cisco Packet Tracer
- Upper-level solution: NETLAB+



16 PODs

- 1 Cisco 3750X Switch
- 2 Catalyst 2690 Switches
- 3 Cisco ISR 4321 Routers
- 1 Cisco ASA 5506-X Firewall

Challenge #2: Student Software Licensing

Azure for Education

- Word, Excel, Visio

Kivuto

- VMware Workstation Pro
- VMware vCenter
- VMware ESXi

AccessData/Exterro

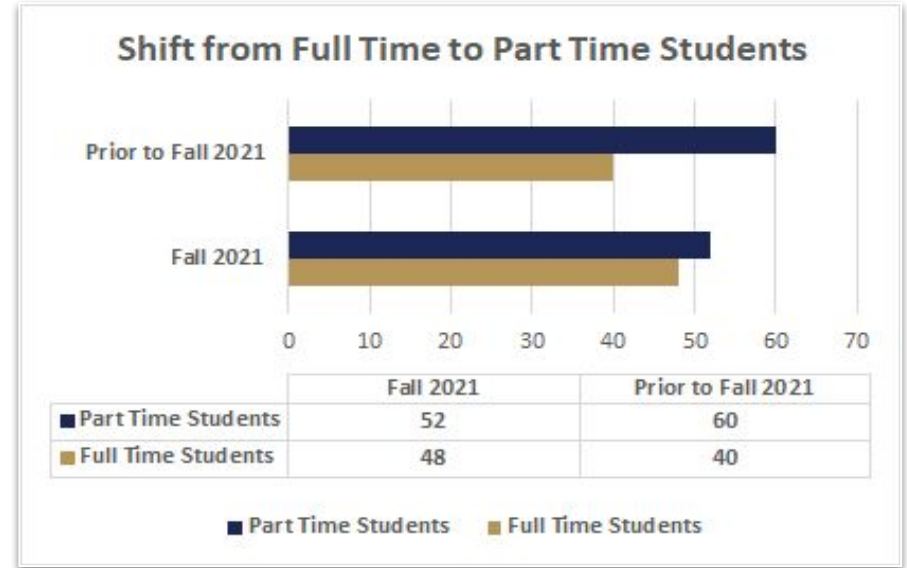
- Forensics Toolkit (FTK) Suite taught only on Waco campus with licensing dongle
- Converted to Virtual CMStick



Challenge #3: Student Engagement

Notable Changes to student availability

- Pre-COVID
 - Face-to-face: 2 days a week, 3 hours each day per course
- Post-COVID
 - Shift from full-time to part-time
 - Working additional hours, Working additional jobs, altered work schedules



Challenge #3: Student Engagement

Unified Support Model

- Google Meet/WebEx “office hours”
 - Two hour blocks
 - Monday - Friday 8am to 8pm
- Instructor Availability spreadsheet
 - Contact any Subject Matter Expert (SME)
- Slack Workspace
 - Channel for each course as well as Career Services, announcements, tutoring, and with a coach
 - Popular on nights and weekends

Monday		Tuesday	
Instructor	Lecture/Lab	Instructor	Lecture/Lab
8:00 AM		8:00 AM	
Doug Peters	Open Lab	Doug Peters	Open Lab
Joel Bryant	Open Lab	Daniel Follis	Open Lab
Daniel Follis	Open Lab	Tim Janssen	ITSX-2301
Jan Nesmith	Open Lab	Joel Bryant	Open Lab
Tim Janssen	ITSX-2359		
10:00 AM		10:00 AM	
Alan Sulak	ITNW2312/2323	Doug Peters	Open Lab
Doug Peters	Open Lab	Keith Kooyman	Open Lab
Keith Kooyman	Open Lab	Jan Nesmith	Open Lab
Jan Nesmith	Open Lab	Tim Janssen	Open Lab
Tim Janssen	Open Lab	Carol Scheler	Open Lab
Carol Scheler	Open Lab	Linda Shorter	Open Lab

Challenge #3: Student Engagement

- Cyber Student Resource Site [Internal]

CYBERSECURITY Student Resources



Connect to Instructors
for Questions or
Assistance on Course
Assignments -- or Just
General Tech Talk



Use mymail credentials
for Cyber Slack Channel
-- Engage with your
Peers, Instructors, or
Enrollment Coaches



Access Course Software
and ISOs
for Lab Assignments



Review Hardware/
Technology
Requirements



View "How to"
Tutorials & Videos



Review Grading and
Mastery Assessment
Policy

Challenge #4: Instructor Nervous Breakdown(s)

- Re-engineering/re-designing courses with time constraints
 - Rewriting labs, lectures, and recording videos [real time]
- Identification of CME/SME Teams for development
 - Instructor collaboration (Google Chat and Google Meet)
- Instructional Designers hired
 - Continuous Process, Quality, Course Improvement
 - LMS Transition- Moodle/Canvas
- Instructor student availability
 - *No longer 8 to 5*
 - Flexible schedule



➤ Questions?



THANK YOU!



MORE INFORMATION

- Performance Based Education @ TSTC
The next level of performance education at TSTC
<https://www.tstc.edu/performance-based-education/>
- TSTC NSF Project
<https://bit.ly/tstc-nsf>
- Cybersecurity Program
<https://www.tstc.edu/programs/cybersecurity/>

