PC4A: A Model for Fostering Genuine Collaboration among Community Colleges to Advance Cybersecurity & STEM Education

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PC4A

PA Community College

Consortium Cooperative Agreement

Outline

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1. University & PI Backgrounds
2. PC4A Overview & Objectives
3. Challenges Hindering STEM Advancement at Community Colleges
4. Innovative Solutions to Challenges
5. Lessons Learned (thus far)
6. Conclusion & Questions

University & PI Backgrounds

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Indiana University of Pennsylvania

- One of four public research universities and part of the PA State System of Higher Education (PASSHE).
- One of the first schools to be designated by the NSA as a National Center of Academic Excellence.
- IUP Institute for Cybersecurity (ICS) is the entity responsible for coordinating all cybersecurity education and research activities.

Dr. Waleed Farag

- Professor of Computer Science at IUP and director of the ICS since 2012, securing over $10M in federal funds to support research and the work of the ICS.
- Founder and current PI of several major initiatives that contribute to the enhancement of cybersecurity research and education across the region.

Institute for Cybersecurity Initiatives

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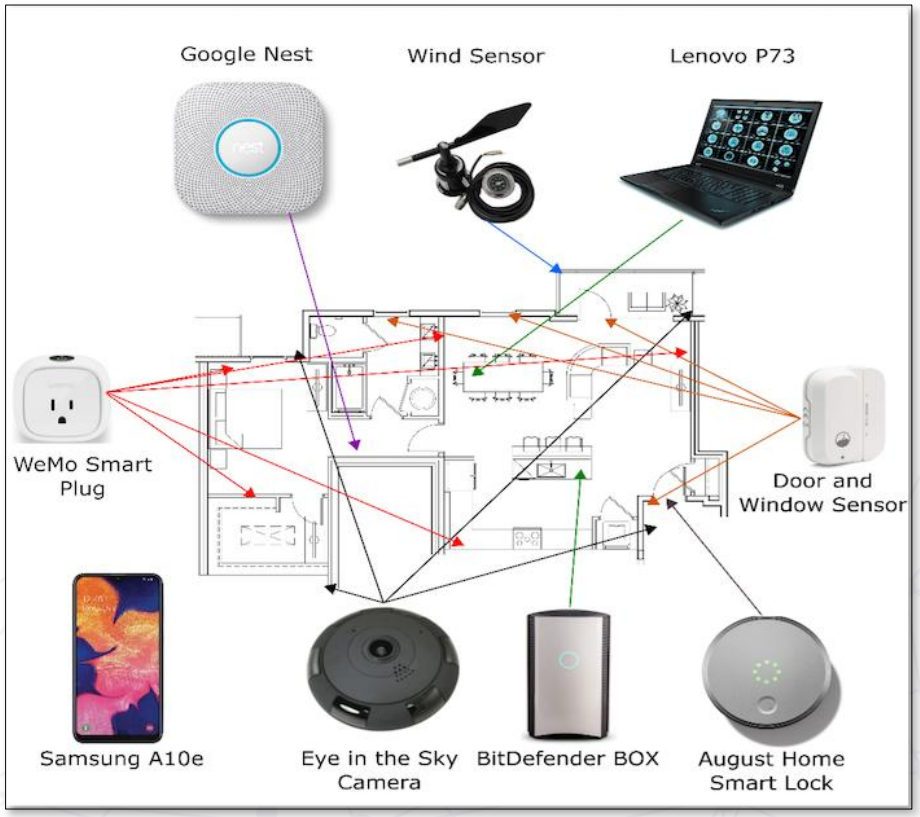
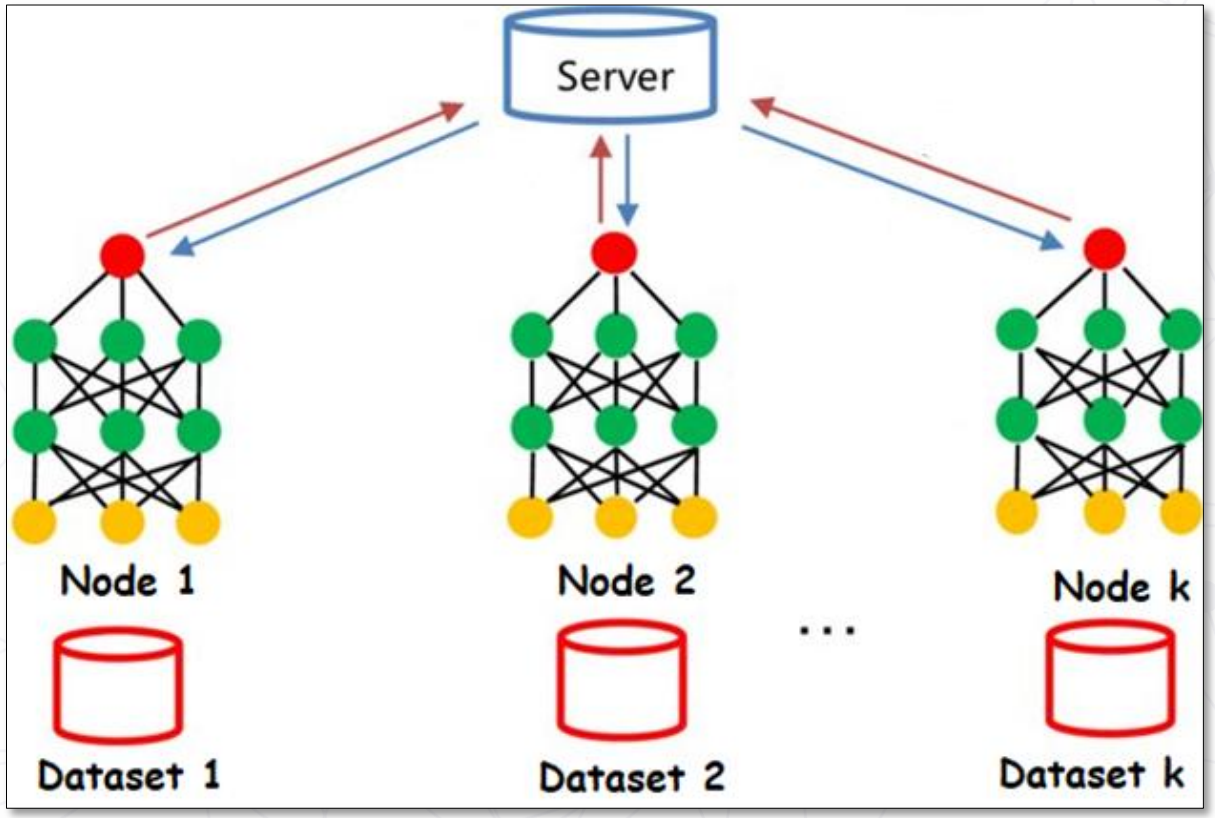
- These initiatives include PC4A project, IoT Anomaly Detection, ARMZTA, CAE-C Expansion, Cyber Scholarship Program (CySP), GenCyber, NCAE-C PhD Scholarship, and Cybersecurity Outreach.



IOT Anomaly Detection



ARMZTA

Institute for Cybersecurity Initiatives

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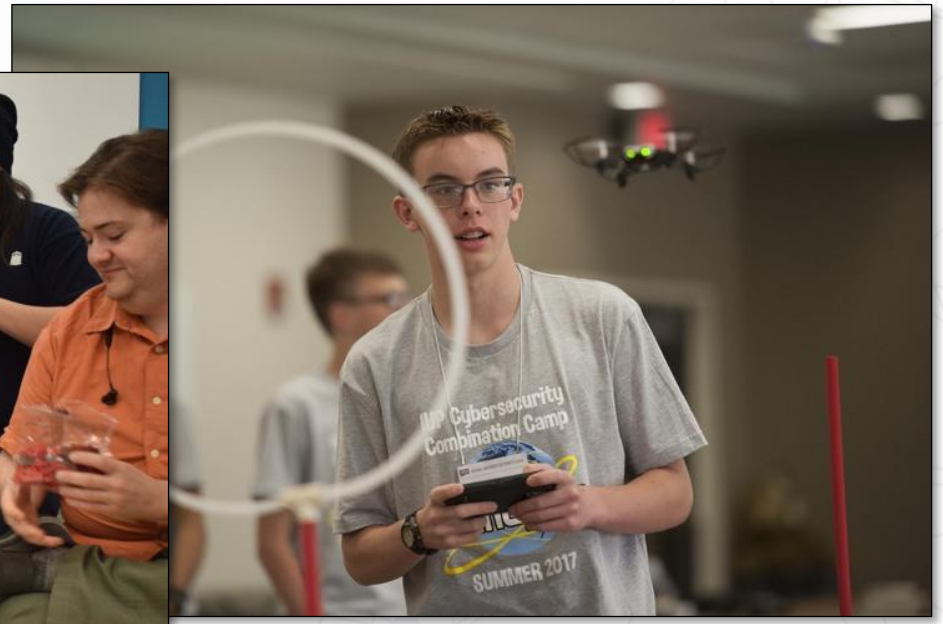
CAE-C Expansion

Cybersecurity Outreach



GenCyber

WARM-UP QUESTION!

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POLL OPEN

Roughly how many community colleges are in the Commonwealth of Pennsylvania?

1. 5 to 7
2. 8 to 11
3. ✓ 12 to 16
4. 17 to 22
5. 23-29
6. 29-36
7. 37+

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PC4A Overview

Pennsylvania Community College Consortium Cooperative Agreement (PC4A) is a large-scale project funded by the DoD National Defense Education Program (NDEP), www.pc4a.org.

- One of only five national cooperative agreements funded in Sep. 2022.
- The consortium represents roughly half of the Community Colleges (CCs) in Pennsylvania.

Focus

Establish a dynamic, collaborative consortium led by IUP (LO) and work together to enhance cybersecurity and STEM education in PA.

- The main vision is to build strong community college programs in STEM and serve as a model for others.

PC4A Members

Project Members

- Bucks County CC
- Butler County CC
- Indiana University of PA (LO)
- Montgomery County CC
- Northampton CC
- Penn Highlands CC
- Westmoreland County CC

PC4A Objectives

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1. INCREASE CERTIFICATION RATES
2. INCREASE TRANSFER RATES TO FOUR-YEAR INSTITUTIONS
3. INCREASE INTEREST IN EMPLOYMENT IN DOD, DIB AGENCIES

Discussion Activity

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- Members of each table are asked to take 3-4 minutes to discuss and identify three key challenges that STEM education is facing at the community college level.
- Choose one person to enter your three identified challenges into the word cloud (please enter phrases of two words or less).

DISCUSSION ACTIVITY!

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Enter Text and Press Send

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Enter your group's chosen challenges that STEM education is facing at the community college level. Please enter phrases of two words or less.

Challenges Hindering STEM Advancement

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- Our project began with a large-scale brain-storming session.
- It is impossible to effectively solve a problem without clearly and accurately identifying its causes.

Identified Challenges

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MARKETING

Effective marketing for community college programs and the ability to recruit students, particularly in STEM and cybersecurity.

RETENTION

Ability to retain students, particularly those from underrepresented groups including veterans. The average time for a typical student to complete her/his associate degree is three and a half years.

FINANCIAL/PERSONAL

CC students are at a higher risk of facing academic, personal, and financial challenges that inhibit their ability to succeed in college.

Implemented Initiatives

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To address challenges, the LO and CC partners are implementing proposed initiatives. Some are offered through the LO to maximize efficiency, minimize resources, and promote collaboration. Each CC partner offers other initiatives to address local challenges and target specific audiences.

Initiatives Offered by LO

- Soft skills tutoring
- Assessments
- IRB Management
- Hands-on Labs
- Professional Development
- DoD/DIB Agency Outreach

Initiatives Offered by CC's

- Mentorships
- Certification Training
- Technical Tutoring
- K-12 Outreach
- Curriculum Alignment
- DoD/DIB Agency Outreach

Innovative Solutions Overview

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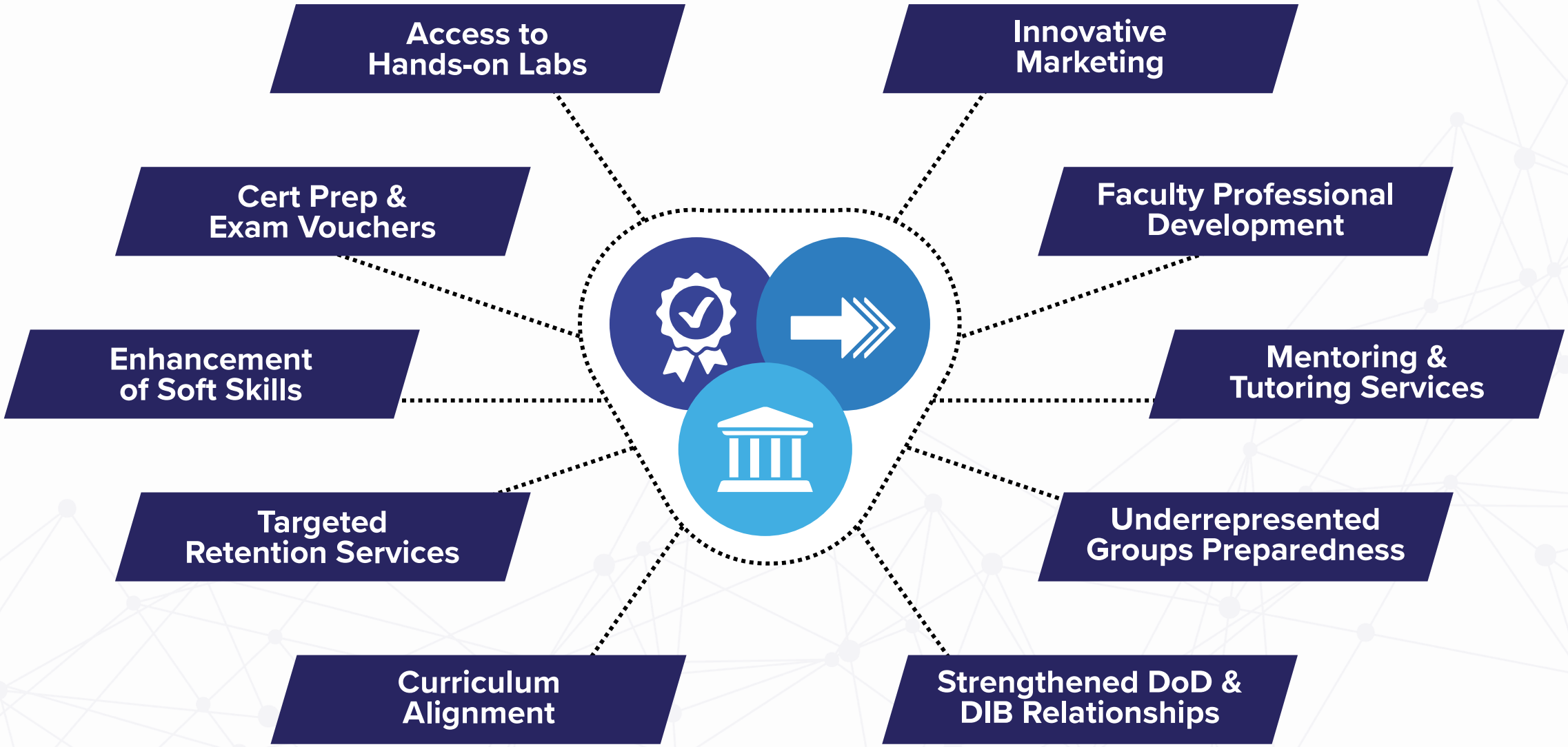

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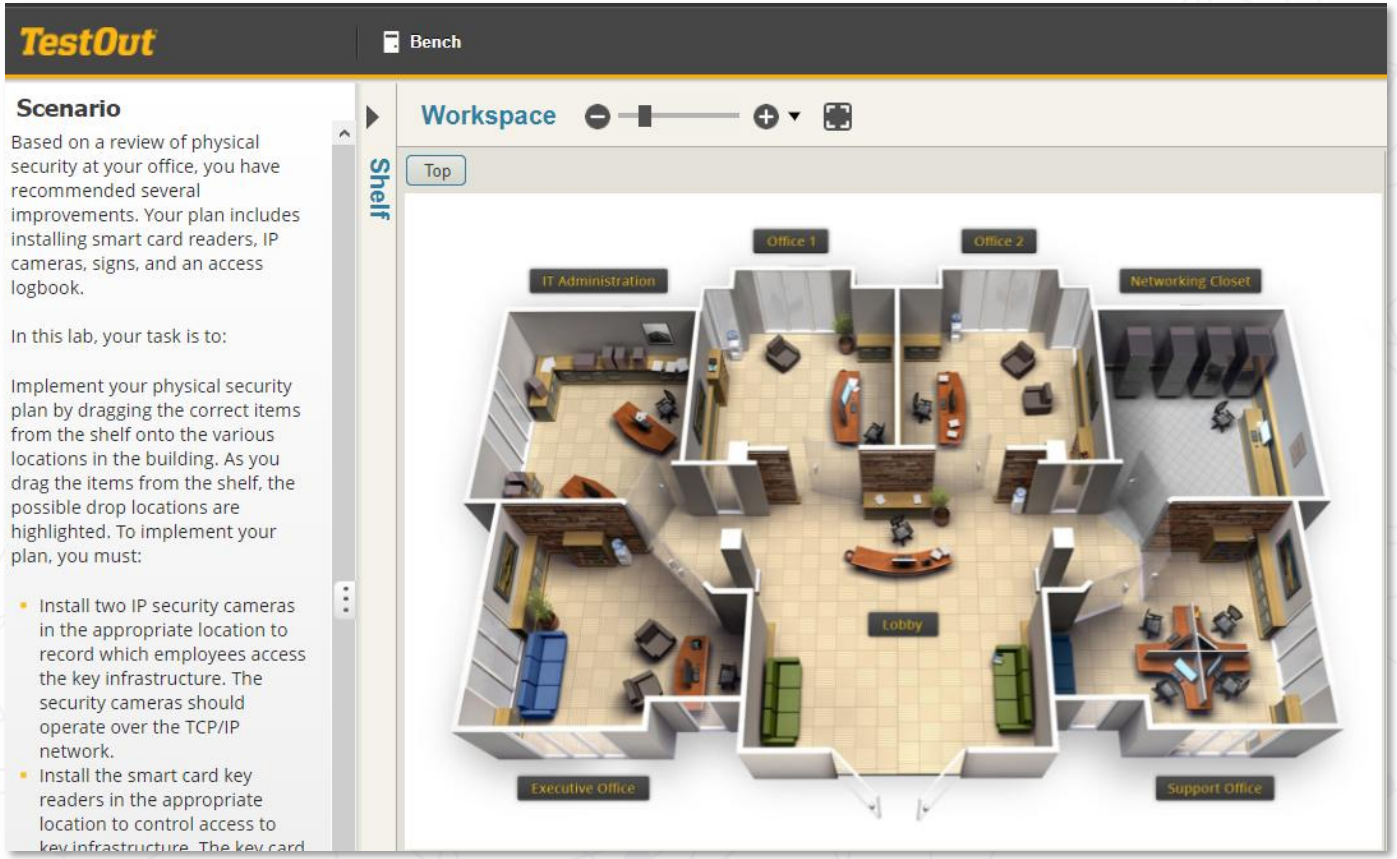
Extensive Access to Hands-on Labs

Obj. 1

- Provide a consortium-wide platform so CC students can obtain state-of-the-art hands-on training in cybersecurity and other STEM fields.
- Providing these services also promotes collaboration among members of the consortium.

TestOut

CENGAGE UNLIMITED



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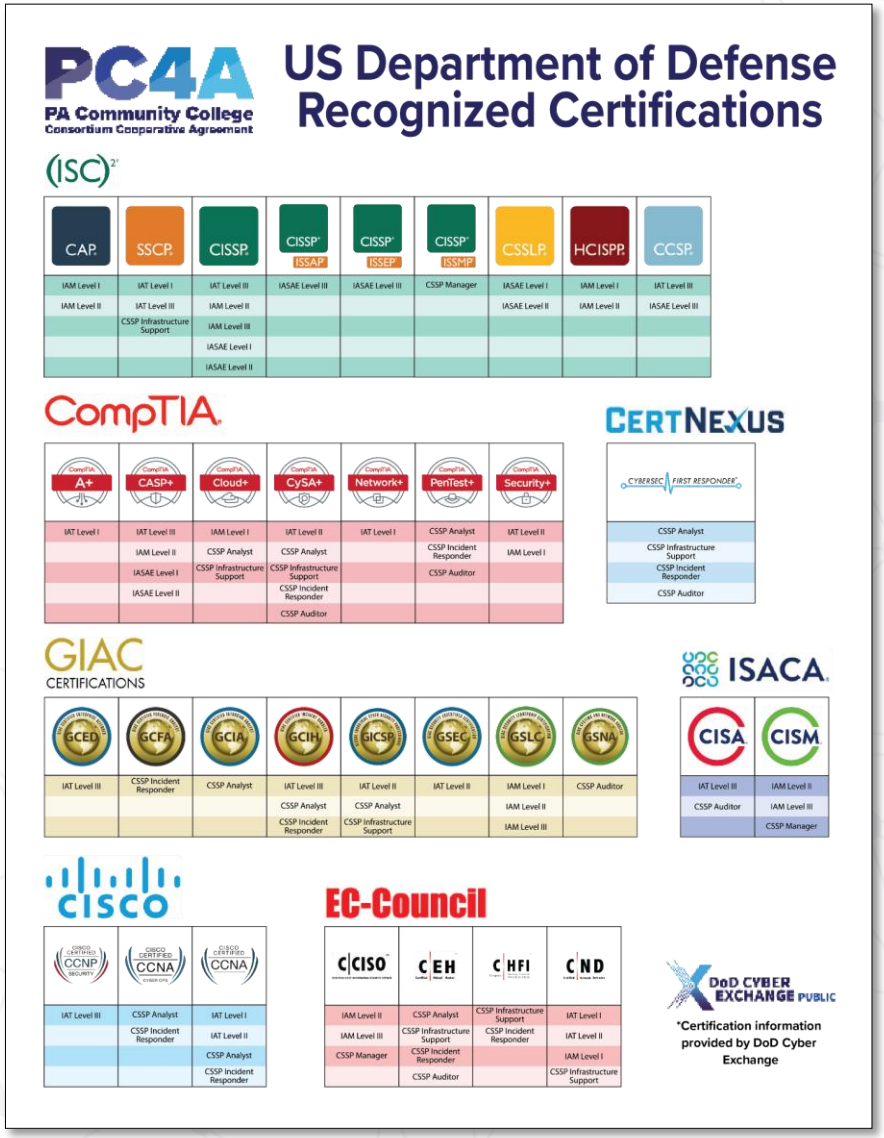
Certification Prep & Exam Vouchers

Obj. 1

- Offer free certification exams and preparation workshops so that students can overcome financial obstacles.



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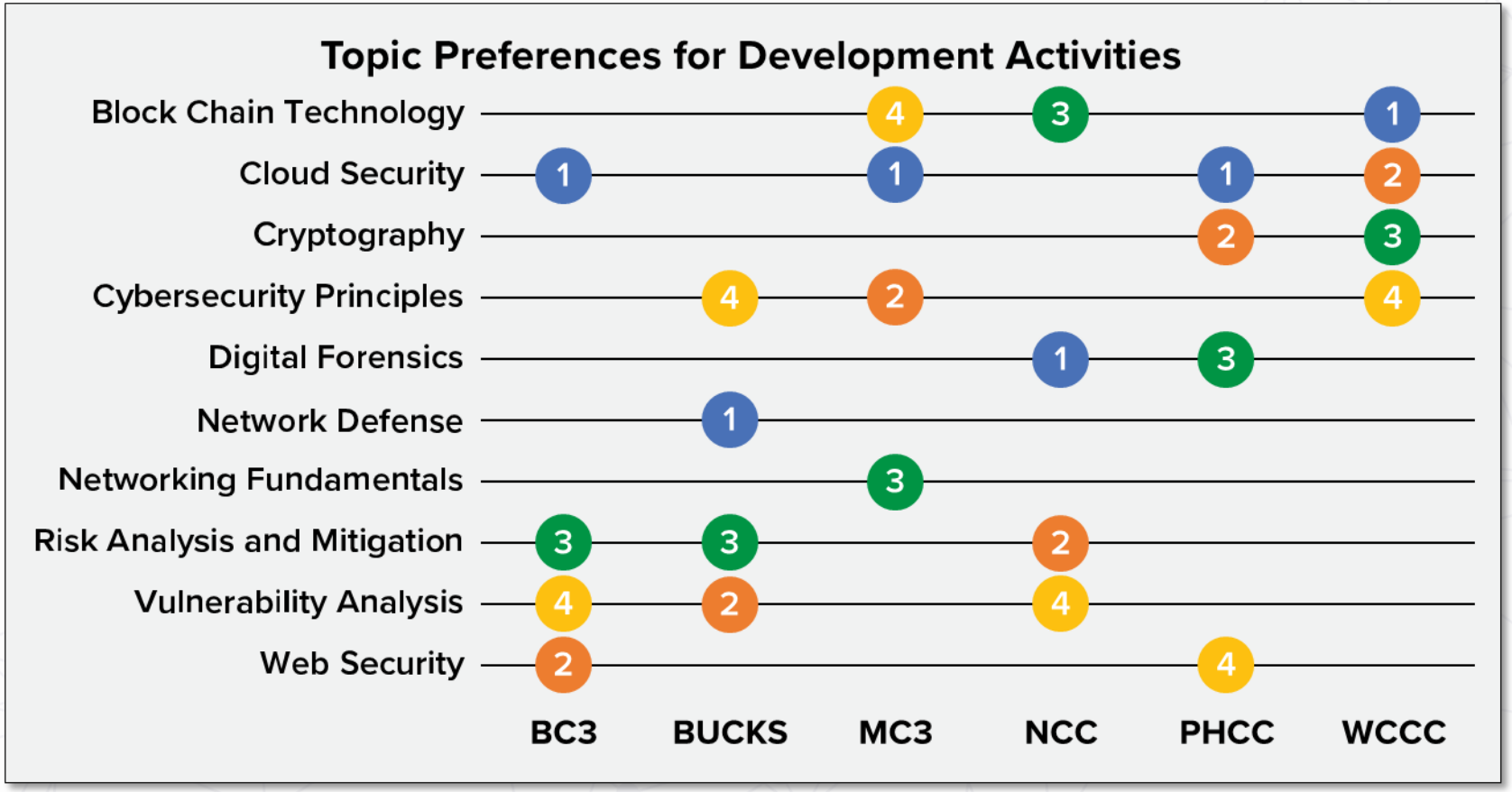
Faculty Professional Development

Obj. 1, 2, 3

- Building on the established expertise of the LO in this area, we planned one annual development workshop for faculty at each of the participating CCs.
- The graph on the left shows results of the Development Activity Survey completed by all CC partners.



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Supporting Preparedness of Underrepresented Groups

Obj. 1, 2, 3

- Create an intentional approach to shift underrepresented students into STEM pathways through STEM appreciation, engagement, onboarding, and college-readiness programs.

Targeted Retention Services

Obj. 1, 2

- Implement programs at each CC to help retain students from underrepresented groups including veterans and their spouses. Examples of planned programs include job shadows, paid internships, and supportive services.
  - NCC is currently building program support that improves the retention of underrepresented students in cybersecurity and related programs.

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Innovative Marketing

Obj. 1, 2, 3

- Create a focused marketing campaign hosted by the LO and designed to promote STEM and cybersecurity programs at all participating CCs.
- CC's will devise a custom recruitment plan adapted to their target audiences and local demographics.
- Social media accounts have been created to promote all LO and CC partner activities and offer a method of engaging with younger generations.

Follow us on Social Media!

Twitter
@pc4a-stem

LinkedIn
/pc4a

Facebook
/pc4astem

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Curriculum Alignment

Obj. 2

- Collaborate to align the curricula at participating CCs in the areas of cybersecurity and STEM with those offered at various four-year schools including the LO.
- Create agreements between CC's and IUP to ensure implementation of the 2+2 model.

Effective Mentoring/Tutoring

Obj. 1, 2

- Provide needed resources and staff to implement focused mentoring/tutoring services in the areas of cybersecurity and STEM. This will enhance the chances of students successfully completing their degrees and ensure they are equipped with the skills and knowledge needed in these changing fields.

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Soft Skills Enhancement

Obj. 1, 2

- Implement a centralized service through the LO designed to enhance soft skills and provide trained peer tutors to assist students one-to-one as they practice and refine their skills.

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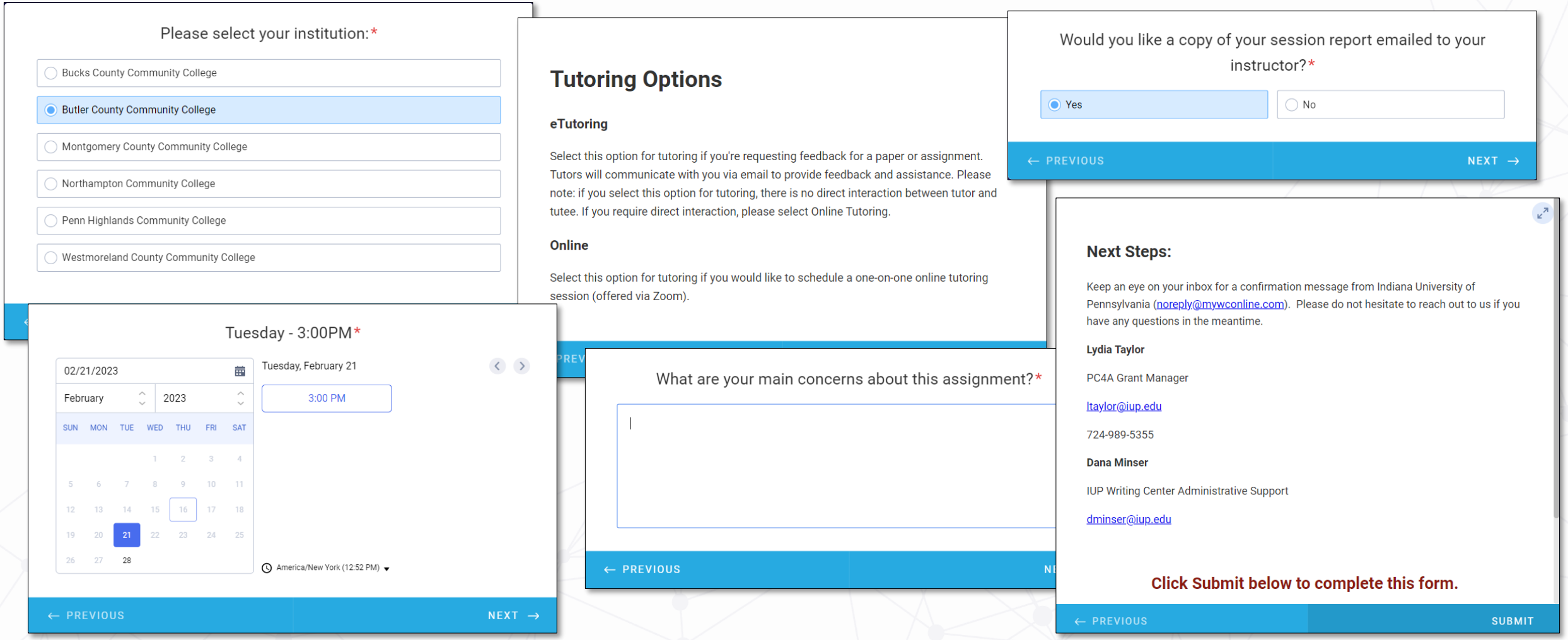
Students can schedule tutoring sessions through an online form:



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Strengthened Relationships with DoD and DIB Agencies

Obj. 3

- Build on the relationships between IUP and other DoD agencies as part of the CySP program.
  - For example, senior personnel from NAVSUP will visit IUP on April 11th to explore opportunities for collaboration and publicize employment opportunities to students.
- Work with local DIB entities such as the National Center for Defense Manufacturing and Machining (NCDMM) and Concurrent Technology Corporation to better understand their needs and customize our services accordingly.
- Recruit members from DIB entities to serve on advisory boards at various participating institutions to offer advice on updating curriculum to better equip CC students.

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DEFENSE INFORMATION SYSTEMS AGENCY
U.S. MARINE CORPS FORCES CYBERSPACE COMMAND
SPAWAR
NATIONAL SECURITY AGENCY · UNITED STATES OF AMERICA
NAVSEA WARFARE CENTERS
NAVSUP NAVAL SUPPLY SYSTEMS COMMAND WEAPON SYSTEMS SUPPORT

Lessons Learned Thus Far

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1 Focus on Relationships

The experience of the LO working with CCs on previous projects has proven crucial for establishing a truly collaborative consortium. Establishing a connection to the K-12 ecosystem has also enabled a steady pipeline of students.

2 Plan Ahead

Allow plenty of time to secure IRB approvals for all partners and establish a baseline with partner data to properly assess various project performance metrics.

3 Utilize Social Media

Utilize social media to connect with younger generations. Create a posting schedule and engage with all related accounts including partners, collaborators, funding agency, etc.

4 Meet Regularly

Bi-weekly meetings have allowed all partners to stay on top of tasks, collaborate on projects, and overcome challenges.

KNOWLEDGE CHECK!

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POLL OPEN

How many community colleges are part of the PC4A project?

1. 2
2. 4
3. 6
4. 8

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POLL OPEN

Which of the following is NOT one of the STEM education challenges identified by the PC4A team?

1. Marketing
2. Retention
3. Financial/Personal
4. Equipment ✓

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POLL OPEN

What is the main reason the PC4A Team is utilizing Social Media in their marketing efforts?

1. It's economical.
2. ✓ It offers a method of communication with younger generations.
3. It allows for collaboration between members, employers, and government agencies.
4. It is efficient.

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POLL OPEN

Which of the following is NOT one of PC4A's main objectives?

1. Increase certification rates
2. Increase transfer rates to 4-YR institutions
3. Increase relationships with K-12 institutions
4. Increase interest in employment with DoD, DIB, and STEM

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POLL OPEN

IUP (the LO) is offering which of the following centralized services?

1. Certification Training
2. Technical Tutoring
3. Mentorships
4. Soft Skills Tutoring

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POLL OPEN

Hands-on labs will be provided to students using which of the following platforms?

1. TestOut
2. ACI Learning
3. JB Learning
4. Cyberbit

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Conclusion

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Focus

- The PC4A Project established a dynamic, collaborative consortium of six community colleges to enhance cybersecurity and STEM education.
- Proudly funded by the DoD National Defense Education Program.

Objectives

Activities/Solutions

- Project activities include innovative marketing, soft skills tutoring, certification preparation, faculty professional development, hands-on labs, and targeted retention services, among many others.

Questions?