An Innovative and Successful Model to Promote Cybersecurity Education

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Project Overview 1/2

- This presentation describes activities and services offered by an interesting project funded by the NSA's Investment in Expansion of the CAE-C.

- This project implemented six different services that worked collaboratively to identify and address challenges facing cybersecurity education.

- A focus was to implement a novel program to enhance communications skills (soft skills).

- An objective was to implement a successful model that can be easily replicated in other environments.
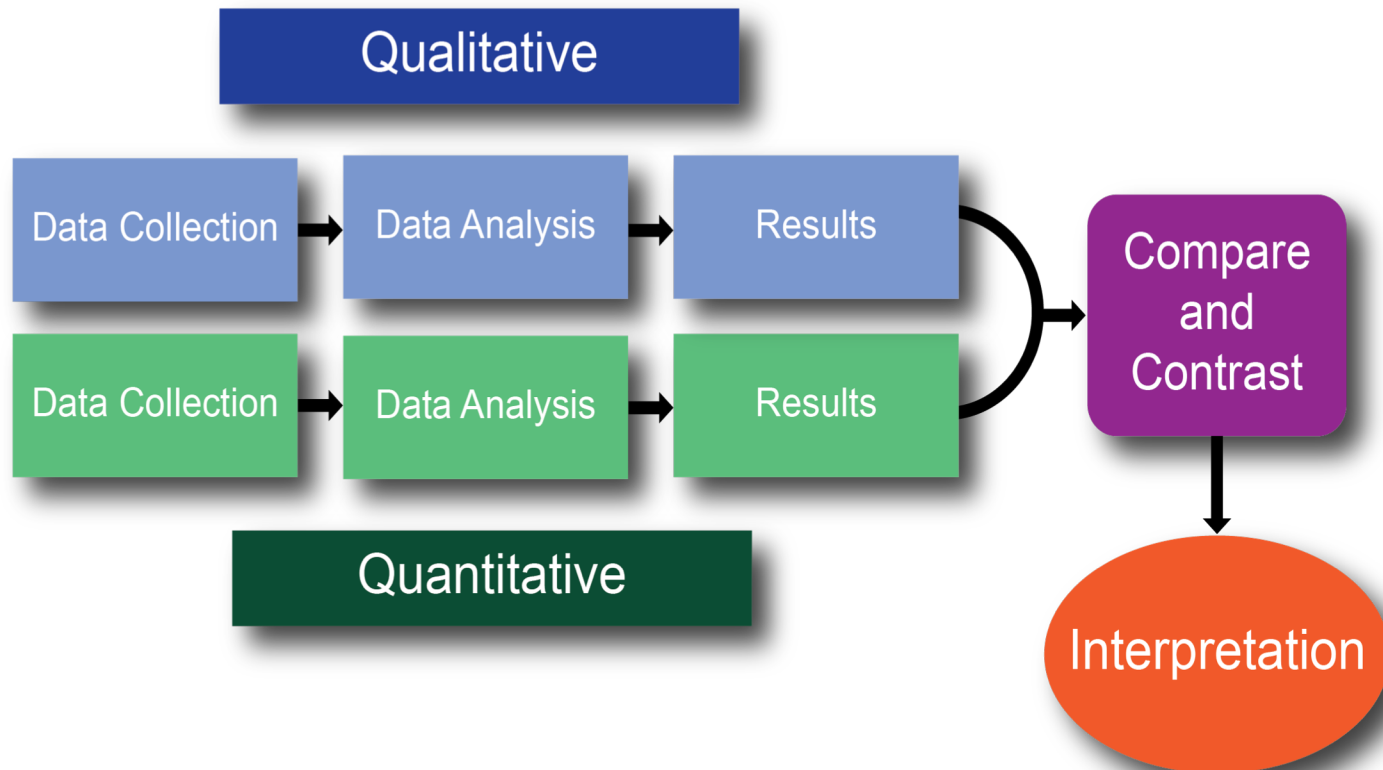
Project Overview *2/2*

Research Study

- Designed and administered quantitative and qualitative research instruments to identify challenges facing cybersecurity education.

- This QUAL-QUAN mixed-method study identified writing and communication challenges faced by:

  A. 203 undergraduate students enrolled in Computer Science (CS) courses at IUP and one Community College.

  B. 27 professionals working in the cybersecurity field.

- Collected data (qualitative and quantitative) were analyzed and findings have been used to guide the design and implementation of various services including tutoring, workshops and summer camp.

Research Methodology

Research Study Findings (QUAN) 3/4

- 75% of participants have NOT had access to programming courses in high school.

- The majority (>60%) indicated that such courses would have enhanced their ability as CS majors.

- Data analyses identified participants' perception of their strengths and weaknesses in writing and oral communication.

- The study confirmed the hypothesis that students would benefit from resources that help improve such skills.

- Analyzed data also identified the areas and skills CS undergraduates worked on with their tutors.

Research Study Findings (QUAL) *4/4*

- The qualitative study identified writing and oral challenges that face practicing CS professionals.

- Specific areas reported include: grammar, use of technical language and proofreading, and connecting to audiences.

- Participants recommended that universities should:
  - Offer workshops and tutoring sessions on technical writing (documentation, procedural writing, business writing, writing directions, resumes, and memos).
  - Offer workshops on writing professional emails.
  - Have writing centers that market their services to students and faculty more effectively.

Tutoring Service 1/3

- Developed a program to train specialist tutors to assist CS students with writing assignments.

- Delivered one-to-one tutoring (both in-person and synchronously online) for CS students.

- Hired and trained writing tutors in computer science and STEM fields.

- Met with computer science faculty members to publicize and promote the offered services.

- Recruited student participants to meet with tutors.

- Created and posted extensive writing resources for cybersecurity students on the project web portal.

A Training Program for Cybersecurity Writing Tutors

6 Tutors
with STEM-related backgrounds

Tutors learned the technical aspects of communicating in cybersecurity fields.

13 Training Hours

Tutors were trained to work online with students, to analyze assignments, to understand the technical language of the field, and to assess student learning.

#1
Online Tutoring

#2
Computer Science Assignments

#3
Technical Language

#4
Assessment

Resources

Tutors created resources to help students during and after tutoring sessions.

Videos

Pre/Post Tests

Handouts

Topics

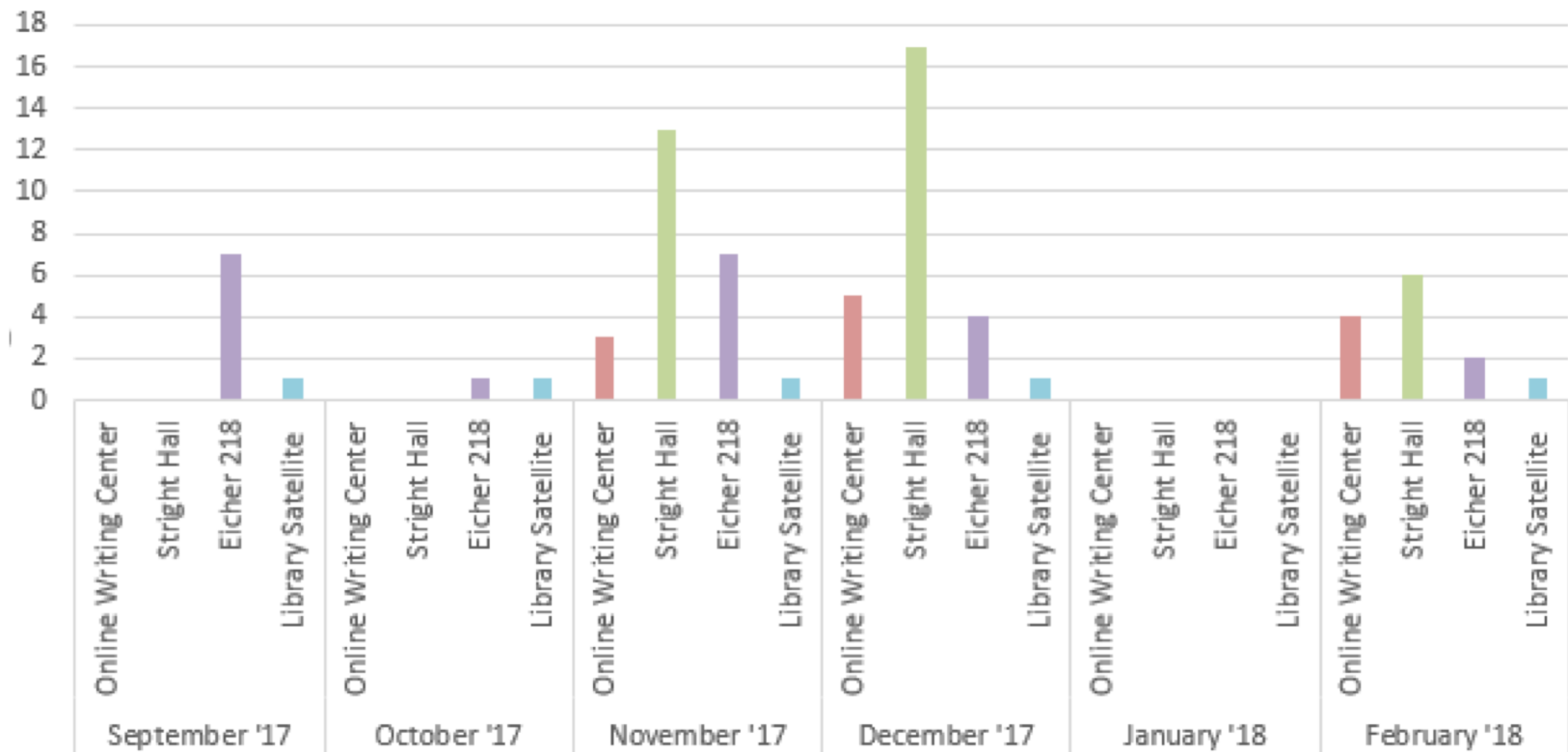Tutors helped students with an array of topics.

- Understanding the assignment
- Brainstorming ideas
- Choosing a topic
- Researching a topic
- Outlining
- Writing a thesis or main idea
- Developing ideas
- Using examples and details
- Incorporating research

- Introductions and conclusions
- Organization
- Transitions and flow
- Voice and style
- Word and sentence errors
- Punctuation Documenting sources
- Formatting the document
- Next steps for the writer

See more from the Kathleen Jones White Writing Center at Indiana University of Pennsylvania at www.iup.edu/writingcenter
Infographic created by Krista Sarraf for the NSA funded CAE-C Expansion Project, 2018

Tutoring Service *3/3*

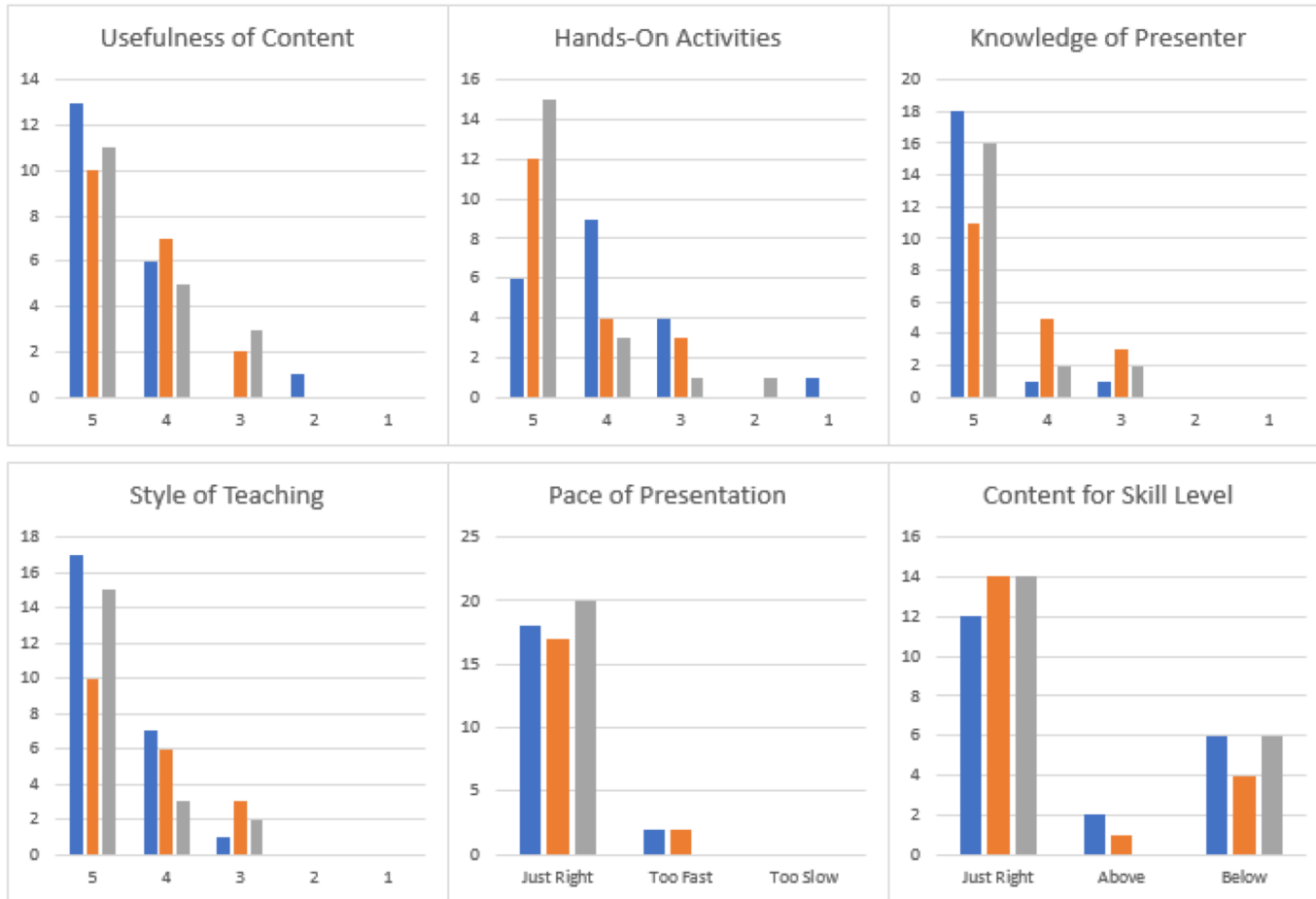Tutoring Sessions by Location

Workshops and Camp 1/3

- Offered three full-day weekend Cybersecurity Skill Enhancement workshops.

- Engaging content, security experts, hands-on activities, and real-world simulated scenarios/sessions.

- Very highly rated by workshop participants.

- Offered a summer camp (June 4-8, 2018) modeled after our GenCyber camps held in the past years.

- Attended by 30 middle and high school students.

- Focused on improving both technical and soft skills.

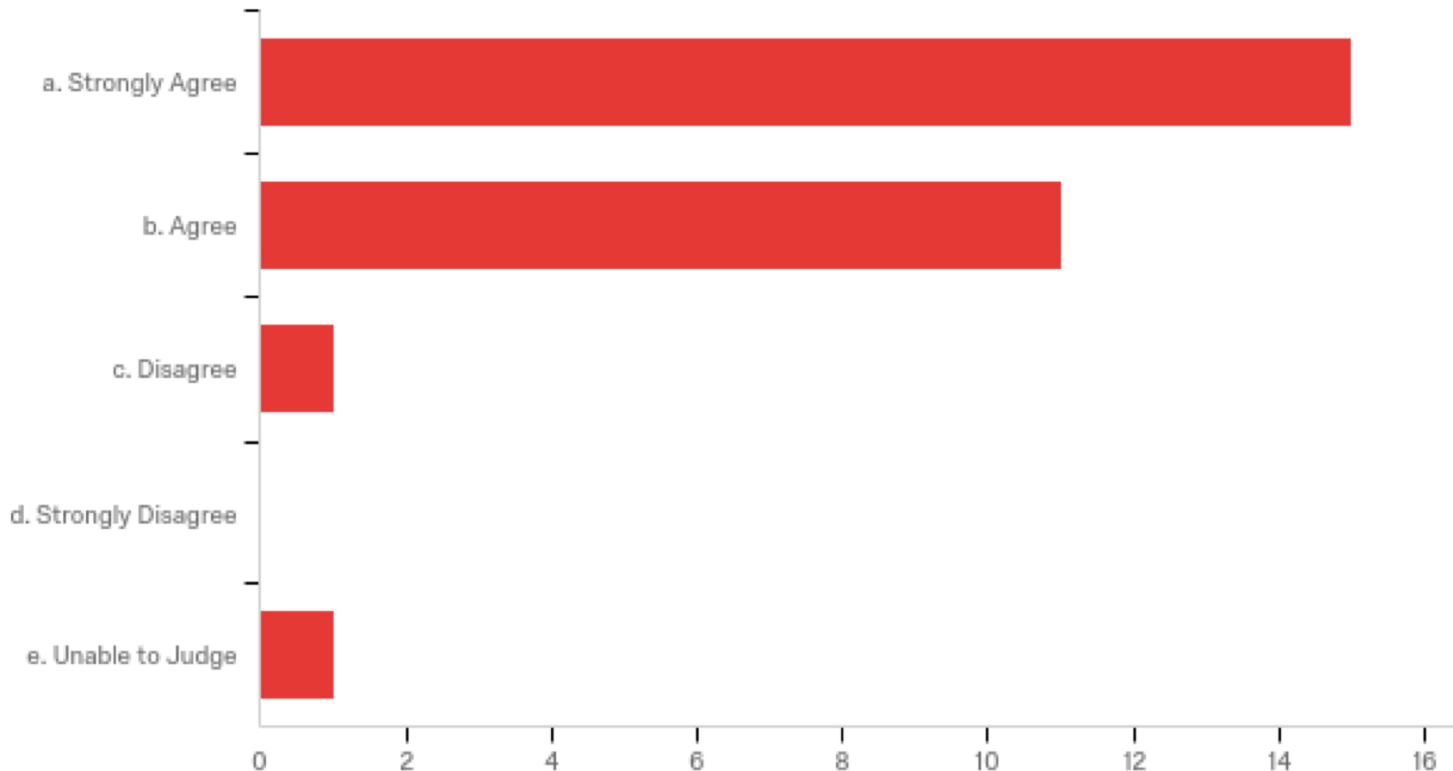- Participants were highly satisfied by the camp and its activates and sessions.

Workshops and Camp 2/3

KEY: ■ Session 1 ■ Session 2 ■ Session 3

* Numbered rating system used to indicate favorability (1 = least favorable, 5 = most favorable)

Workshops and Camp *3/3*

96% of camp participants strongly agreed/agreed with the statement "The camp increased my interest in cybersecurity"

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Cybersecurity Community and Web Portal

- Established a Cybersecurity Community to improve and expand the cyber education and skills in western PA.

- Forty eight public school districts and 79 parochial/private schools.

- Connected with surrounding CCs, businesses, non-profit organizations and other stakeholders.

- Designed and implemented a comprehensive Web Portal to facilitate access to all implemented services and developed resources (Project Documents, Photo Gallery, In the News, Video Gallery, and Grant Statistics).

- Project Site: www.iup.edu/caecexpansion