Evidencing Competency Oversight Project

10 November 2020

Dr. Sharon Hamilton, Norwich University
Co-PI/Technical Lead Evidencing Competency Oversight

Three deliverables
(2-year grant)

1. Integrate sub-working group (SWG) deliverables into one coherent program leading to competency development and documentation requirements for individual students and designated programs.

   - SWG-1: define the framework, definitions, and terminology for evidencing competency
   - SWG-2: explore cybersecurity skills assessment tools
   - SWG-3: survey established cybersecurity competitions as competency development and/or evaluation tools

2. Design and implement a CAE-C regional exercise program to engage students from CAE-C institutions in a scenario postulating a cybersecurity crisis and regional response including state and local government, industry, and military resources.

3. Projects to advance the development of competency in designated programs across the CAE-Cs.

NORWICH UNIVERSITY

Evidencing Competency Points of Contact

Role	Name	University	Email
Grant Co-PI/Technical Lead SWGs	Dr. Sharon Hamilton	Norwich University	shamilto@norwich.edu
Sub-Working Group-1	Dr. Vincent Nestler	CA State University- San Bernardino	VNestler@csusb.edu
Sub-Working Group-2	Dr. Susanne Wetzel	Stevens Institute	swetzel@stevens.edu
Sub-Working Group-3	Dr. Dan Manson	Norwich University	dmanson1@norwich.edu
Cybersecurity Exercises	Dr. Kristen Pedersen	Norwich University Applied Research Institute (NUARI)	kpederse@norwich.edu
Security Situation Center	Dr. Jack Skoda	NUARI	jskoda@norwich.edu

We are still seeking Sub-Working group participants!
Please contact SWG POC. Working Group participant travel funding available.

SWG-1: Definitions and Documentation
Dr. Vincent Nestler, CSUSB
Supported by Dr. Zoe Fowler, NU

SWG-1 will define the framework, definitions, and terminology for evidencing competency in CAE-C approved programs.

Tasks:
➢ Finalize the definitions of terminology and definitions of metrics CAE-C designated schools will be expected to provide the program office relative to development and measurement of competency in students
➢ Recommend a method, program, or tool that will provide students in CAE-C designated programs with documentation of their academic achievements, internships and other practical experience, competition participation, and other evidence of competency achieved.
  • These recommendations will be based on a consensus from participating faculty in SWG-1.
  • The deliverable will include evidence of this collaboration
➢ Provide definitions of terminology and metrics the PMO should require in annual reporting regarding implementation of competency assessment in each designated program.

SWG-1 MONTHLY WORKING GROUP

Name	Organization
Vincent Nestler	CSUSB
Zoe Fowler	Norwich
Glenn Dietrich	UTSA
Stephan Smith	Texas A&M
Shankar Banik	Citadel
Mike Battig	Norwich
Margaret Leary	NVCC
William Butler	CapTechU
Li-Chiou Chen	Pace
Scott Nelson*	Cyber Command
Betina Tagle	Maine
Tirthankar Ghosh	UWF
Gretchen Bliss	PPCC
B. Lynne Clark*	NSA
Chengcheng Li	UC
Karen Wetzel	NICE
Wayne Pauli/Erin Kahler	DSU

SWG-1: Definitions and Documentation
Dr. Vincent Nestler, CSUSB
Supported by Dr. Zoe Fowler, Norwich

Work completed, thus far:

- Developed draft definition: Competency is the ability for students to complete tasks in the context of a work role.
- Goal was to keep it simple and able to be implemented by faculty while considering the needs of the workforce.
- Considered if the definition can lead to determining if there is evidence of capability to do the job they are being hired to do

Plan for Year 1 tasks:

- Review and update SWG membership
- Schedule/hold monthly meetings
- Tweak definition and determine where it can be employed and deployed. Just as importantly, is it good enough to start working?
- Discuss all the instances when the definition does not work or is insufficient.

Deliverables

Measure	Metric
Year 1	Conduct monthly sub-working group meetings. Purpose: develop conceptual framework, identify specific metrics (Job roles & tasks), and identify potential pilot programs
	Participate in quarterly working group reviews. Provide updates on: conceptual framework development, identifying specific metrics (Job roles & tasks), & identifying potential pilot programs
	Attend and participate in 1.5 day semi-annual collaboration and working sessions in conjunction to an NSA CAE-C community event
	Complete conceptual framework
	Identify specific metrics (job roles and tasks)
	Identify potential pilot programs
	Provide Year 1 sub-working group results to Working Group PI
Year 2	Conduct monthly sub-working group meetings. Purpose: Review Year 1 feedback and incorporate comments in final report; engage pilot projects with tool assessment, competitions, and/or live fire; and assess pilot projects
	Participate in quarterly working group reviews. Provide updates on: engage pilot projects with tool assessment, competitions, and/or live fire; and assess pilot projects
	Attend and participate in 1.5 day semi-annual collaboration and working sessions in conjunction to an NSA CAE-C community event
	Review feedback and incorporate appropriate comments
	Engage pilot projects with tool assessment, competitions, and/or live fire
	Assess pilot projects
	Produce Final report with metrics for annual reporting within the CAE-C community

SWG-2: Competency Development and Measurement Tool(s)
Dr. Susanne Wetzel, Stevens Institute

SWG-2 will explore cybersecurity skills assessment tools.

<u>Project tasks:</u>
- Describe the rubric used by the working group to evaluate each tool
- Provide a list of tools evaluated and the results of each evaluation, including a description of the tool, evaluation comments, cost, and whether the tool meets the CAE-C expectations for measuring student competency
- Provide the tool owner's description of the tool, and include written endorsement from the tool owner granting permission to share the working group's evaluation results with other CAE-C-designated institutions

SUB-WORKGROUP 2: COMPETENCY DEVELOPMENT & MEASUREMENT TOOL

Name	Organization
Susanne Wetzel	Stevens
Drew Hamilton	Mississippi State University
Zoe Fowler	Norwich
Karen Wetzel	NIST/NICE Framework
Shankar Banik	Citadel
Margaret Leary	NVCC
Michael Tu	PNW
Glenn Dietrich	University of Texas San Antonio
Barbara Endicott-Popovsky	UW
Bill Butler	Capitol University
Margaret Leary	Northern Virginia Community College
Stephen Miller	Eastern New Mexico University-Riudoso
Cynthia Irvine	NPS
Jake Mihevc	NVCC
Derek Sedlack	Colorado Tech
Chris Simpson	National University
Davina Pruitt-Mentle	NIST/K-12

SWG-2: Competency Development and Measurement Tool(s)
Dr. Susanne Wetzel, Stevens Institute

Work completed, thus far:

- Initial questionnaire developed
- For an initial set of tools:
  - Tool owners described the functionality and such of the tools
  - Some working group member(s) conducted an evaluation (based on the description from the tool owner and access to the tool)

SWG-2: Competency Development and Measurement Tool(s)
Dr. Susanne Wetzel, Stevens Institute

Plan for Year 1 tasks:

- Review and assess work completed so far
- Based on review
  - Refine rubrics
  - Contact tool owners for updates to tools and possibly redo the initial evaluation (both tool owner input as well as evaluation by a working group member)
  - Allow tool owners to give review and respond to evaluation by working group
  - Publish some initial reviews once approval is received by tool owner
  - Explore and establish streamlined process to facilitate the working group review and tool owner input
  - Explore and establish process to publish results for community use (and to allow for additional community input)

Deliverables

Measure	Metric
Year 1	Conduct monthly sub-working group meetings. Purpose: • Document/establish what features a tool meets • Survey Market for defined tools • Create Rubric for Assessment of Tool • Owners contacted for access to assess
	Participate in quarterly working group reviews. Provide updates on: • Document/establish what features a tool meets • Survey Market for defined tools • Create Rubric for Assessment of Tool • Owners contacted for access to assess
	Attend and participate in 1.5 day semi-annual collaboration and working sessions in conjunction to an NSA CAE-C community event
	Provide Year 1 sub-working group results to Working Group PI
Year 2	Conduct monthly sub-working group meetings. Purpose: • Assess identified tools to test the initial rubrics • Produce Final Report with results and observations
	Participate in quarterly working group reviews. • Provide updates on: Assess identified tools to test the initial rubrics • Produce Final Report with results and observations
	Attend and participate in 1.5 day semi-annual collaboration and working sessions in conjunction to an NSA CAE-C community event

SWG-3: Survey of Established Cybersecurity Competitions as Competency Development and/or Evaluation Tools
Dr. Dan Manson

SWG-3 will identify and explore student competitions, identify established cybersecurity competitions that both provide the student with development of measurable competencies, and document competencies developed during competition.

Project tasks:
➢ Describe the rubric used to evaluate competitions for competency development,
➢ Provide a consolidated list of evaluated competitions, the nature of the competition, how teams are identified and participate, and any associated costs
➢ Indicate if each competition is recommended for evidence of student competency for the purposes of the CAE-C program, with justification.

SUB-WORKGROUP 3: SURVEY OF ESTABLISHED COMPETITIONS

Name	Organization
Daniel Manson	Norwich/CPP
Ricardo Torres	CSN
Tobi West	Coastline
Kim Muschalek	Alamo
Norma Colunga-Hernandez	TSTC
Huw Read	Norwich
Chris Simpson	NU
Allen Harper	Liberty
Karen Wetzel	NIST/NICE Framework
Nate Evans*	ANL
Jennifer Fowler*	ANL
Morgan Zantua	CityU
Jake Mihevc	MVCC
James Rice	MVCC

SWG-3: Survey of Established Cybersecurity Competitions as Competency Development and/or Evaluation Tools
Dr. Dan Manson

Work completed, thus far:

- Zoom meetings held 10/22/18 and 12/10/18 (Recordings available)
- 3 Competitions selected for initial competency mapping (DOE CyberForce, CNY Hackathon, National Cyber League)
- Will add competitions that provide the following
  - Need to be open to measurement
  - Competencies are available to measure
  - Include how students prepare

SWG-3: Survey of Established Cybersecurity Competitions as Competency Development and/or Evaluation Tools

Dr. Dan Manson

Plan for Year 1 tasks:

- Conduct monthly sub-working group meetings (Kickoff October 16th)
- Survey market for existing competitions
- Create rubric to assess competitions
- Contact competition owners/operators for access to assess
- Collect findings for feedback
- Participate in quarterly working group reviews
- Provide Year 1 sub-working finalized rubric and group findings to Working Group PI
- Attend and participate in 1.5 day semi-annual collaboration and working sessions in conjunction to an NSA CAE-C community event

SWG-3: Survey of Established Cybersecurity Competitions as Competency Development and/or Evaluation Tools
Dr. Dan Manson

Plan for Year 2 tasks:

- Conduct monthly sub-working group meetings to review Year 1 feedback and incorporate comments into finalized rubric, assess identified competitions, and collect and analyze results and observations
- Participate in quarterly working group reviews
- Develop final rubric
- Assess identified competitions using rubric
- Produce Final report with metrics for annual reporting within the CAE-C community

Regional Cybersecurity Exercises
Dr. Kristen Pedersen

Norwich will engage with CAE institutional and regional leadership, across the 5 CAE regions to provide 2 cybersecurity learning exercises per region, that build upon existing academic programs engaging students in the areas of cyber event response and recovery.

➢ Norwich University Applied Research Institutes (NUARI) will design, develop, and implement 10 cybersecurity exercises (2 per 5 identified regions)
➢ Exercises will enhance students' skills and abilities in risk resiliency by providing an opportunity to exercise on a broad range of threats, while strengthening their knowledge about incident response plans and crisis communications.
➢ Students will apply cybersecurity policy in relation to escalation, legal constraints, public affairs, and capacity issues, while exploring the command-and-control functions impacting organizational operations.
➢ Norwich will support the CAE institutions to strengthen understanding of cybersecurity policy issues, influence future development of cyber response education, and build greater collaboration between the CAE's
➢ Norwich will be inviting local, state, and regional government and DoD agencies to participate in the exercises along with the students, to enhance the experience and gain valuable insight from the agency's participation

Regional Cybersecurity Exercises

Plan for Year 1 tasks:

- CAE Hubs as centers for hosting
- Constructing the exercise from examples
- 2 months of formal planning
- 3 months of communications
- 3-4 exercises (each with final after-action report & participant survey)

Plan for Year 2 tasks:

- 6-7 exercises (each with final after-action report & participant survey)
- Final report

Security Situation Center (SSC)
Dr. Jack Skoda

NUARI will create a comprehensive resource for CAE-C institutions to replicate an SSC for modeling at their home institutions.

Tasks:

➢ Identify CAE-C community members employing "live" environments for educational purpose, collect information on operations, architecture, and operating models

➢ Define tools and training requirements for Work Roles

➢ Map Work Roles to Tasks for each role and define appropriate "evidencing competency" demonstration

➢ Assemble concept of operations document for CAE-C institutions to replicate Norwich SSC

➢ Produce final report of results and future opportunities

Security Situation Center (SSC)

Work completed, thus far:

- Working SSC activity with documentation on procedures and technical requirements
- SSC work roles mapped to NIST CDA and OSINT collector roles
- Initial and mission training available

Plan for Year 1 tasks:

- Build survey instrument to use with other CAE locations
- Conduct skill gap analysis on existing training products
- Consolidate documentation for SSC policies, procedures, training, and requirements into a CONOPS

Deliverables

Milestone	Title	Purpose	Deliverable(s)
1	Kick-off Meeting	Identify CAE-C community members employing live environments for educational purposes.	Final plan and approach to executing project
2	Discovery	Create plan, expectations, assignments, and due dates for next steps.	1 page report outline
3	Define Tools and training requirements	Understand capabilities of CAE Institutions.	1 page report outline on the tools and training requirements
4	Map work roles and tasks	Assist CAE's in understanding the tools and approach to the roles within the SSC.	1 page outline or summary of the work roles and tasks related to the tools
5	Develop Framework	Put together a kit that can be replicated for the CAE-C institutions to utilize.	1 page description of the kit
6	Final Report	Report final project outcomes.	Final report

°NUARI survey template
~NUARI XPA template
*THIRA = threat and hazard identification and risk assessment

Questions?