

REACH *to* TEACH

A Project to Prepare Cybersecurity Experts as Adjunct Faculty

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CAE Meeting

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The Need: An educated workforce



Not possible without increased educational pathways for potential members of the cyber-workforce.

Currently there is a capacity issue: students cannot readily be added to the education system, especially at the community college level, because trained faculty are scarce.

Community Colleges' Role

“Community colleges can play a critical role in giving students the hands-on skills that are needed on the front lines (of) defending computer networks.”

-National Science Foundation, 2013

More than 58% of community college classes are taught by adjunct faculty, most of whom have no teaching experience.

- Center for Community College Student Engagement



So, where will the faculty come from?

A typical advertisement for full-time cyber-security faculty at a community college :

- Bachelor's degree (master's preferred)
- Five years of work experience as computer security analyst
- Technical qualifications such as CompTIA Network+, CompTIA Security+, CISCO certifications, CISSP, SANS, Certified Ethical Hacker (CEH)
- Knowledge of programming languages
- Excellent written and oral communications skills
- Experience in leadership including a history initiating and managing change
- Working with others toward shared goals and developing others

The Goal of Reach to Teach



Engage CyberCorps (SFS) alumni who are working cyber-security professionals as potential adjunct faculty.

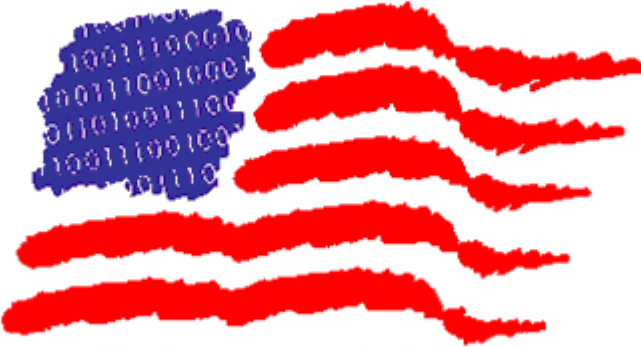


Create, pilot, revise and deploy an online course which will provide:

- insight into the community college climate and context
- ethics within education and the cyber-security profession
- preparation to apply active learning strategies in their teaching
- expand the outreach to working cyber professionals

Why SFS Alumni?

CYBER CORPS



Defending America's Cyberspace

**School of Engineering
& Applied Science**

THE GEORGE WASHINGTON UNIVERSITY

Why SFS Alumni?

- The more than 2200 nationwide CyberCorps alumni
 - are highly educated and have unique experiences that they can bring to the classroom.
 - as government employees, have / had access to the latest technologies, wrestled with the current problems and policies facing the nation, have taken leadership roles and have a wide network upon which to rely for developing academic and career goals. Even those who have left government service usually work with cybersecurity content on a daily basis.
 - have at least a bachelor's degree and most have a master's degree (some even a PhD).
 - graduates from the 2014 cohort, and before, have 5 years of cybersecurity work experience.

Why Do Alumni Need Reach To Teach?

- CyberCorps (SFS) alumni has the requisite cybersecurity content knowledge and experience to teach at this level.
- However, they typically do not have teaching experience or knowledge of diverse learning and assessment techniques.
- Most CyberCorps alumni are not (yet) a product of the community college pathway and they do not know the community college student and their challenges/opportunities.

Creating The Reach To Teach Solution

- What do current Community College Faculty consider important teaching content?
 - Engagement of experts
 - Gather a group of CC Faculty
 - A call to CAE community colleges and our network
 - An electronic meeting
 - Pre-'zoom' call materials
 - Getting to know each other
 - Solicited suggestions for scope and sequence of materials



WHAT WOULD YOU HAVE SAID?

How do you prepare adjuncts?

The Proposed Solution – Results Of Online Discussion

- **Session 1**
 - Getting to know community colleges: history of the movement, mission, advantages of community colleges, faculty issues, degrees offered, faculty development, accreditation, hiring process
- **Session 2**
 - Getting to know community college students: student profiles, challenges and opportunities of working with community college students.
- **Session 3**
 - Understanding educational requirements including catalogues; national, state and college requirements and procedures, ethical aspects of teaching
- **Session 4**
 - Understanding course development: course format and teaching style, role of a syllabus, setting expectations.
- **Session 5**
 - Teaching styles: instructional strategies including active learning, use of case studies, team work?
- **Session 6**
 - Assessment

BORING

A Sample First Attempt

- **Session 1**
- Introduction
- What's this course about?
- The national need
 - Need for security
 - Need for educated workforce
- The community college
 - Faculty
 - Using cyber professionals as adjunct faculty
- What's this session about?
- Preparing to teach
 - Learning about community colleges
 - Learning rudimentaries of college teaching
 - Pairing the two

Objectives for this session

- Students will be able to
 - explain the history of community colleges as relates to the movement toward a more educated populace
 - write objectives in measurable terms
 - list three ethical concerns related to teaching cybersecurity

What Would You Have Said?

**What would you like adjuncts to know about the
classroom?**

The Face To Face Workshop

Some face to face- others such as Barbara Belon stayed with us for two days online!



Lots of 'post-it's to capture session ideas

Topic	Time	Session 1	Session 2
Introduction	3 min.		
Community College Context	5 min.		
Legal and Ethical Issues	5 min.	Ethical concerns in the classroom	Definition of plagiarism
Instructional strategy	27 min.	Setting Objectives	Going from concrete to abstract
Applications	7 min.		
Assessment	5 min.	Formative assessment	Feedback and Performance Assessment
Engaging students	5 min.	Ice breakers	Providing Support
Review	3 min.	Review	Review

Session	General topic	Community College	Ethics	Pedagogy	Engaging your students	Homework	Assessment
1	Introduction	Goals of CC, mission statement	General education ethics: FERPA and ADA	Structure of a lesson			Three level assessment for immediate feedback
2	Setting Objectives	History of CC	Classroom ethics	Developing and setting objectives	One minute pape	Write three objectives	Difference between formative and summative assessment
3	Concepts from concrete to abstract	CC admission policies	Plagerism	Use of metaphors and other concrete items to introduce new topics	Using humor	Introducing a topic on privacy beyond passwords using concrete to abstract concepts	Levels do detailed assessment
4	Group work	CC degrees		Group work uses and challenges	Engaging students in setting their own assignments	Design a group project where you can judge the effort of each group member	Muddiest item
5	Case studies	Comparison of CC and 4 year institutions		Use of case studies	Discussion on what types of assessment work for your students	Prepare a case study as a basis for a class discussion	
6	Discussions and questions	CC institutional policies and your first day	Major ethical issues in your CC	Discussions and questions	Create opening or closing discussion on password protection	Role of panels	Students peer to peer discussion

The Use Of 1st Person Videos

- The sessions include stories from the trenches about the first day as an adjunct or faculty member.

What anecdote or cautionary tale would you share?

Revised order for The Reach To Teach Solution

- **Reach to Teach has 6 sessions concerning pedagogy:**
 - An overall view of the structure of a lesson
 - The creation of measurable objectives
 - Teaching using concrete to abstract concepts
 - How to integrate group work into classwork or homework
 - How to use case studies to enhance learning
 - How to craft discussions and questions to provide a meaningful class experience
- **Each session also addresses community college context and ethics within education.**

REACH TO TEACH STATUS

- Designed to run without a moderator or instructor
- Assigned homework is 'reviewed' in the following session
- The sessions are on a website and available at no cost
- <https://blogs.gwu.edu/seas-reachtoteach/>
- Sessions are being piloted with SFS alumni

Session 1: The Structure of a Lesson

REACH
to
TEACH

SESSION ONE

THE STRUCTURE OF A LESSON



The Reach To Teach Website

The screenshot displays the 'Reach to Teach' website interface. At the top, the title 'Reach to Teach' is followed by a horizontal line and the word 'HOME'. Below this, the heading 'Home' is visible. The main content area is titled 'Sessions' and features two session cards. The first card, 'Session 1: The Structure of a Lesson', includes a video thumbnail with the text 'THE STRUCTURE OF A LESSON', a descriptive paragraph about learning to become a faculty member at a community college, and a 'Download Session 1' button. The second card, 'Session 2: Setting Objectives', includes a video thumbnail with the text 'SETTING OBJECTIVES', a descriptive paragraph about learning the history of community colleges and writing measurable objectives, and a 'Download Session 2' button. The bottom of the image shows a Windows taskbar with various application icons and a file explorer window.

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Evaluating Reach To Teach

- Validity through multiple reviews
 - Content literature review
 - Content validation with adjunct coordinators at community colleges
 - Content refinement through community participation
 - Content review by community participation
- Feedback
 - Students
 - Educators

Survey Questions

Learning objectives were clear

Course content was organized and well planned

Course workload was appropriate

Course organized to allow all students to participate fully

Rate confidence to teach at a community college. Before

Rate confidence to teach at a community college. After

What aspects of this session were particularly valuable or novel?

How would you improve this session?

If any, what topic(s) would you remove/move? Why?

If any what topic(s) would you add? Why?

What materials do you suggest we include in the sessions? (audio,

video, diagrams, etc.)

Positive Outcomes

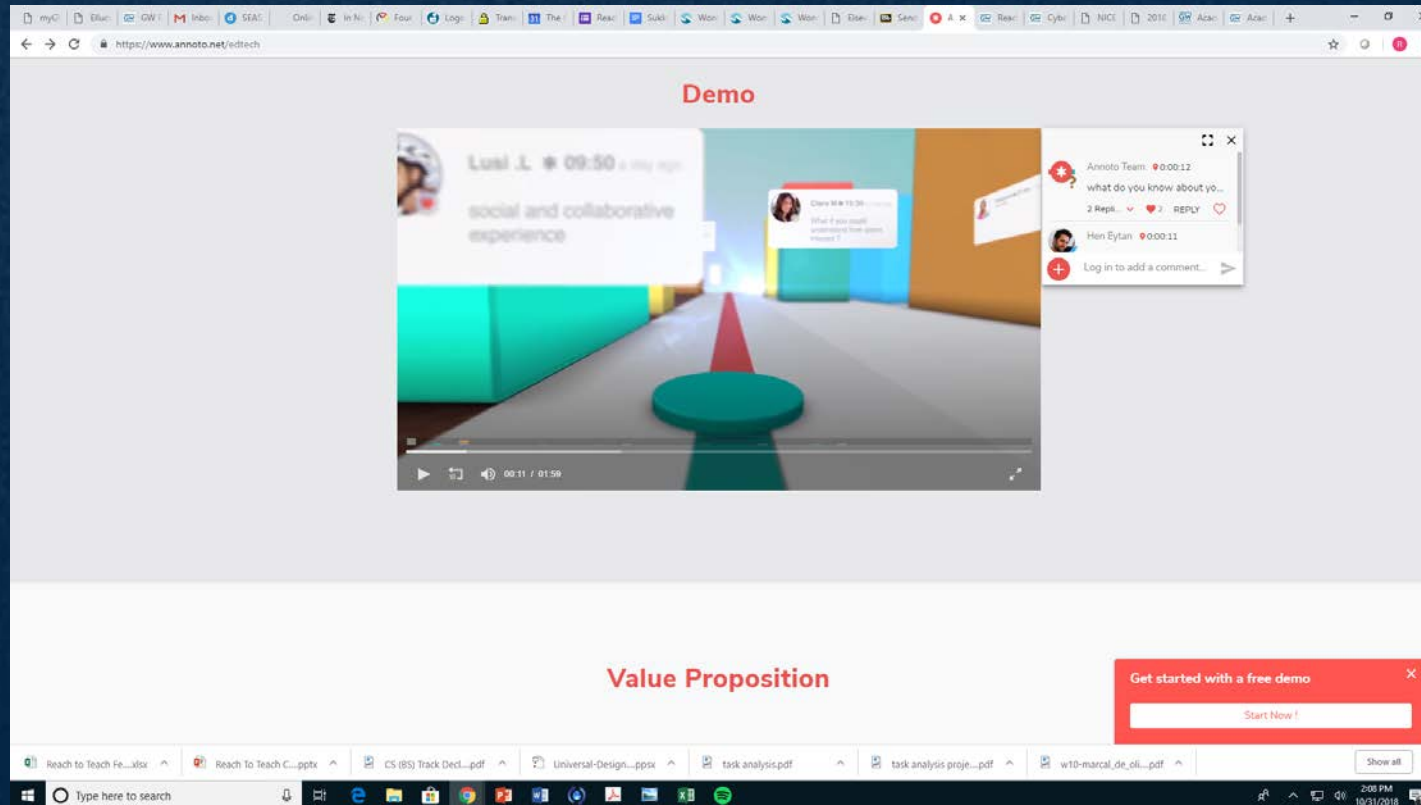
Learning objectives were clear, workload appropriate	Strongly Agree
Course content was organized and well planned	Strongly Agree; Teaching cc history was interesting; Highlighting the importance of class objectives having observable results was immediately useful
Course organized to allow all students to participate fully	Strongly Agree
What aspects of this session were particularly valuable or novel?	It provided examples of what the instructor is trying to teach. The embedded guest presentations were very engaging The iterative approach shown for refining objectives was engaging and felt useful

Outcomes to be resolved

- Generic presentation errors
 - Correct typos and links; Often the slides advanced without playing the embedded video; Remove the annotation section; add closed captioning
- Organization Improvements
 - Where does the password section come from? Why in the middle of history?
- Content improvements
 - Case studies are a vital part of teaching to teach/reach but they must be focused with predetermined objectives/goals

What's next

- Pilot test with Annoto



POTENTIAL BENEFITS

- **As a result of completing the online course, there would be increased capacity in the numbers of potential adjunct faculty available o community colleges**
- **This would enable the education of more cybersecurity students which would in turn add qualified workers to the cybersecurity work-force in numbers higher than currently possible**
- **As the CyberCorps alumni move into adjunct teaching positions at community colleges, the community college students will benefit from the intellectual and employment experiences of CyberCorps alumni who were previously not adjunct faculty at community colleges.**

But, we need you!

- To review the sessions
 - <https://blogs.gwu.edu/seas-reachtoteach/>
- Please use the site handout to send any comments
- Comment on included and missing content

sheller@gwu.edu for just emailing ideas!

THE REACH TO TEACH TEAM



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