Infrastructure Cybersecurity and Emergency Preparedness Academic and Non-academic Credential Development

FINAL REPORT
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16. Abstract

The risks associated with infrastructure are clearly identified but training to minimize the impact of these challenges is sparsely available or lacking in related content. To help train municipalities and organizations staff in Long Island and the region to be prepared to protect life, infrastructure, and transportation systems from unforeseen events, the need for short-term, concise, and affordable staff-student training programs are necessary. Through literature review/searches and contacts with agencies, the framework for workforce training opportunities focused on the area of emergency preparedness was created.

The three components of this short course are:
1-Transportation modeling and road evacuation alternatives and examination of priorities.
2- Medical response and medical site planning.
3- Security Consideration and Protection.

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This report covers activities undertaken by Farmingdale State College (FSC), School of Engineering Technology during June-September 2019 time period in fulfillment of Grant No. 84424.

To help train municipalities and organizations staff in Long Island and the region to be prepared to protect life, infrastructure, and transportation systems from unforeseen events, the need for a short-term, concise, and affordable staff-student training programs are necessary. Through literature review/searches and contacts with agencies, the vision for creation of two course modules in 1) transportation-emergency preparedness and 2) cybersecurity was formed. The following provides a brief description of these efforts.

This report consists of three sections, I-Literature Review, II-Contacts-Collaboration-Partnership, and III- Proposed Course-Modules.

I- Literature Review

A search for an appropriate workforce development structure revealed micro-credentials approach, as described here "Education Micro-Credentials 101: Why do We Need badge"[1]. According to Peter Greene, "The root of the idea is simple—you demonstrate a very specific skill, and a badge certifying that micro-credential become part of your personal digital file"[2]. Thus, participants receive a credential (a digital badge) that documents their training in a specific, highly focused topic. The author noted the need for specific skill sets has popularized these badges that can be acquired in a short period of learning. Employers, also, have welcomed these micro-credential courses as a lower cost option to a formal, lengthy credit-bearing education. Digital badges, with a highly focused content can minimize the time required for employees to be away from their work site.

In a survey reported in "What is Micro-credentialing?"[3], ninety five percent of employers were interested in the micro-credentials of potential hires. Similarly, seventy-six percent of employees were interested in micro-credential for their career growth. This support coupled with a significant rise in spending by employers for training and development of their employees, fifteen percent in 2014[4] suggest this approach for the project is well-aligned with employer needs.

In a review of the status of micro-credential development in the State University of New York System, efforts are summarized in the "SUNY Micro-Credentialing Task Force Report and Recommendations"[5]. Among 39 responding campuses, nineteen campuses (49%) were providing industry certifications, twenty-eight campuses (72% of SUNY) were

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[1] Peter Greene, http://www.forbes.com//sites/petergreene/2019/02/16/educational-micro-credential-101=whio-do-we-need=badgesw/#codac9102419

[2] -ibid, page 2

[3] "What are Micro-credentials" *3-https://study.com › academy › popular › what-is-micro-credentialing*

[4] - ibid

[5] - "SUNY Micro-Credentialing Task Force Report and Recommendation", SUNY, The state University of New York, January 2018, *https://system.suny.edu/media/suny/content-assets/documents/academic-affairs/Micro-Credentialing-TaskForce--Report.pdf*

involved in licensure-related training, three institutions (8%) offered digital badges, and nineteen campuses (49 percent) were providing noncredit certification[6] .

Among 10 recommendation of the SUNY report, recommendation number 4 encourages the six dimensions of quality as described by the American Council on Education in designing micro-Credential offerings. These dimensions are Transparency, Modularity, Portability, Relevance, Validity and Equity[7].

In relation to infrastructure and transportation focus of this grant, a review was conducted of the document titled "SUNY leads in resiliency of Community and Critical Infrastructure"[8]. This document described recent unforeseen risks as the result of New York City and Mohak River flooding in New York State[9] and the collaboration of SUNY campuses to address:

- forecasting extreme weather events,
- managing flood risk,
- strengthening critical infrastructure,
- designing for climate resilience, and
- education and training.

Further review of literature in resiliency led to "Training-based Workforce Development for Advanced Cyberinfrastructure[10] (Cyber Training), Program Solicitation National Science Foundation (NSF) 19-524. This program seeks to advance Cyber Security Infrastructure training in the research community, with a goal to "potentially transform fundamental science and engineering research." Although titled "workforce", the focus of the learners are graduate students and researchers. After an internal discussion, it was decided not to apply for this grant due to the Farmingdale computer security program, just being launched and the supporting resources are yet to be developed for this program. There is a possibility that in the future that the school will be able to participate in similarly advanced cyber security infrastructure workforce training.

II- Contact, Collaboration and Partnership

The following is a summary report of contacts and collaboration made during the reporting period. More detailed report of each contact was created after each meeting and shared with stakeholders.

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[6] - ibid, page 11

[7] - ibid page 23

[8] - SUNY Infrastructure Resilience, 'SUNY leads in Resiliency of Community and Critical Infrastructure, - *https://www.rfsuny.org › rf-news › suny-infrastructure-resilience*

[9] - ibid- pages 1-4

[10] - [10] Training-based Workforce Development for Advanced Cyberinfrastructure (Cyber Taring), Program Solicitation National Science Foundation (NSF) 19-524, *-https://www.nsf.gov › pubs › nsf19524 › nsf19524*

A-Center for Advanced Infrastructure and Transportation (CAIT) Meeting

On 6/6/209, we met with Janet Leli, Director, Technology Transfer, NJ Local Technical Assistance, CAIT, Rutgers University.

This meeting was held to exchange experiences and ideas regarding transportation and infrastructure workforce training needs. Discussion included outreach methods including use of email list of agencies and personal contact with the New York and New Jersey DOT offices. The method of training including in-person and on-line training was discussed with preference given to in-person training for its effectiveness and allowing employees to get out of office and concentrate on learning a new skill. Cost of training, fee schedule, and class size was also discussed.

B-Discussion with Cornell Local Road Program (CLRP)

On 6/14/2019, we had a telephone conference call with David Orr, Director, of the Cornell Local Road Program (CLRP) to discuss collaboration in workforce training in the lower New York State region. Mr. Orr agreed to a continued collaboration between CLRP and Farmingdale State College for work force training and sending announcement of training programs via CLRP's associations mailing list.

C-Visit to Atlantic Cape Community College (ACCC)

We have made visit to explore collaboration between the Aviation Department at Farmingdale State College and the Aviation Department at Atlantic Cape Community College (ACCC) campus regarding the ACCC Drones program.   The meeting took place at ACCC on 6/26/2019.

Participants in the meeting were:

1-James Taggart, Professor, Information systems and Aviation Studies Department, Atlantic Cape Community College (ACCC);

2-Tim Cwik, Aviation Instructor, ACCC;

3-Michael O'Connell, Research Engineer, Center for Advanced Infrastructure and Transportation, Rutgers University;

4-Ramon-Osvaldo Gonzalez, Ed.D. Assistant Professor, Aviation, FSC, SUNY;

5-Kazem Oryani, Ph.D., Manager, Transportation and Emergency Preparedness, FSC, SUNY.

We discussed creating a regional program via Region 2 UTC for drones' program between FSC Aviation Department and ACCC.

It was mentioned that there has been good collaboration between Rutgers/CAIT and ACCC regarding the use of drone for shellfish and agricultural projects.

In relation to the this meeting, we searched the Advanced Technological Education (ATE) initiatives of the National Science Foundation (NSF) for information regarding programs appropriate to be performed jointly with other members of the University Consortium. This was a follow-up item after the meeting with ACCC regarding jointly collaboration in Drones Pilot Training.

D-Efforts with Port Authority of New York and New Jersey (PANYNJ)

In assessing the demand for micro-credential modules, we asked Professor Clabby, Aviation Department, FSC, to facilitate a meeting with John F. Kennedy (JFK) airport general manager, Ms. Teresa Rizzuto. JFK airport is one of the largest employers of Port Authority of New York and New Jersey (PANNJ) with about forty-five thousand employees working at the airport site each day. This high number of workers offers great potential as a site to provide workforce development via micro-credentials.

Professor Clabby explained that cybersecurity training needs are in many areas of the Kennedy airport but the transportation and emergency preparedness training needs have more immediate use at the airport. He explained that the main challenge in the Kennedy airport is congestion on both passenger and Cargo sides of the facility. Some of the areas that could use FSC-CAIT services are discussed below.

Congestion in the passenger roadways lead to increased congestion on the cargo side due to road system being clogged. As the airport system site is so large, location of buildings and cargo areas are not obvious and can be confusing to truck driver and passengers. This has become more complicated as GPS system does not work properly in the airport. The airport buildings are not numbered consequently due to their age and different year of construction. Thus, the development of a cell phone ap that shows facility location within the airport would be a useful tool to provide to the airport.

On the cargo side operation of the airport, synchronization and providing information to truckers are vital for on-time loading and unloading of cargo. There are occasions that truckers come early but the cargo is not unloaded from the airplane or the cargo is not cleared from customs. There are times where truckers are idle on the airport ground for up to three days. A system of tracking of cargo items showing at the stage of cargo clearance will help truckers as well as lessen the truck congestion in the airport land ground and roadway system.

Professor Clabby said that he can arrange to have a meeting in the Kennedy airport with Ms. Teresa Rizzuto, general manager of the Kennedy airport for problem definition and support and sponsoring of the FSC-CAIT efforts. He can also arrange for meeting with Mr. Michael Bernardamz, airport real estate manager, and Mr. Peter Demedco who is involved in a committee for truck movement issues. In addition, while the training modules are being developed, he can arrange meeting with Kennedy Airport Authority Management Council Organization (KAAMCO) for a problem definition, systems analysis and related solutions, as well as app development recommendations. Professor Clabby added that he can arrange meeting with Ashae Trucking owner, a private trucking company, as a source for problem definition and desired analysis and app development to bring private sector views in course -module development.

On November 22, 2019 a visit was made to JFK Airport for Aviation students of FSC to become familiar with decision makers, members of JFK Airport Chamber of Commerce and become familiar with the Airport operations for future employment opportunities. This meeting was arranged by Professor Joseph Clabby, FSC Aviation Department and Dr. Jeanne Radigan, Professor and Chair, FSC Aviation Department.

Kazem Oryani, Manager, Transportation and Emergency Preparedness at FSC, also participated in this visit to explore work force training opportunities for micro-credential course development at FSC School of Engineering and become familiar with the decision makers at PANYNJ.

Before the start of the meeting, Kazem Oryani discussed briefly with Mr. Robert Caton, Regional Vice President, Business Development, Aeroterm about the work force training and other services that GFSC and Region 2, University Transportation Center Consortium led by CAIT at Rutgers University can provide for PANYNJ and the airport community.

Mr. Caton has been involved previously with the Transportation Research Board (TRB) in Cargo and Goods Movement committee. Mr. Caton is building the largest cargo facility in the East Coast at the JFK Airport for Aeroterm. The company is leasing land from New York City, the owner of JFK Airport, via PANYNJ. Typical lease period is 20-25 years but due to high cost of construction and an effort to bring a building rent down, efforts are being made to have a longer lease term of say 45-50 years for easier amortization purposes.

In addition, Kazem Oryani briefly discussed a transportation and emergency preparedness course module and other services of FSC and Region 2 consortium with Ms. Teresa Rizzuto, JFK airport general manager. A presentation for JFK general manager and private sector stake holders by FSC and CAIT is in the planning phase for January 27, 2020 at the PANYNJ headquarters.

E- Sustainable Transportation Symposium and New York Metropolitan Transportation Council (NYMTC)

We participated in the Sustainable Transportation Symposium that showcased transportation innovations by local agencies and New York Metropolitan Transportation Council (NMTC) Shared Mobility Public Workshop. This symposium was held in Suffolk Community College, on September 18, 2019. During this workshop, we discussed collaboration/connection of FSC with NYMTC with Gerry Bogacz, planning Director. Previously as part of a larger proposed effort for feasibility of establishing "Infrastructure, Transportation and Security Center at FSC", we obtained a letter of support from Debra Nelson, NYMTC's Assistant Director for collaboration with FSC regarding transportation and related issues.

F- USGBC-LI Sustainable Transportation Committee

In an effort to reach Long Island municipalities, we attended a monthly meeting of U.S. Green Building Council (USGBC), Long Island- Sustainable Transportation Committee on September 25, 2019.

 Members include representative from Nassau and Suffolk counties, Trustee of City of Port Washington, Sierra Club, USGB-LI, Consulting firms, Suffolk Community College, and the Farmingdale State College. In this meeting, we discussed the proposed workforce training at FSC and solicited input from the cities and agencies for emergency preparedness training needs. In addition, we discussed briefly the services of "Region 2 University Consortium Members". The committee invited us to provide a full hour presentation of these services in their next meeting. On October 30th, 2019 Dr. Ali Maher, Professor and Director, CAIT, Rutgers University and Dr. Barbara Christe, Dean, School of Engineering

Technology, FSC, made power point presentation to the committee members. A full report of these presentations was sent to the attendees and CAIT.

G- New York Department of Transportation, Region 10

Previously, with assistance from Dr. Amit Bandyopadhyay, Distinguished Professor, FSC, we explored collaboration with New York Department of Transportation (DOT) Region 10 at a meeting held on November 28, 2018 in DOT office. This office serves and plans Long Island transportation systems. We met with Mr. Sid Bhattacharya, Regional Materials Engineer of Region 10 and visited Mr. Jeffrey Middleton to discuss the possibility of recertification of Region 10 construction managers as an activity of FSC.

In subsequent visit on 10/29/2019, during Dr. Amit Bandyopadhyay's student visit to region 10, we briefly discussed the proposed cybersecurity as well as the transportation and emergency preparedness training modules with Mr. Joe Brown, P.E. Region 10, Regional Director. Mr. Brown inquired whether these course modules could be used as fulfillment for PDH/CEU requirements of continuing education. Indeed, FSC has the ability to issue PDH/CEU certificates. Thus. Additional discussion was requested. Through subsequent contact of Dr. Amit Bandyopadhyay with Region 10 Director office, a meeting on January 24, 2020 is planned to seek input elements from DOT for Transportation and Emergency Preparedness course module. In the same meeting, Dr. Amit Bandyopadhyay will explore the possibility of the creation of a construction materials and inspection recertification micro-credential to be offered to DOT staff.

III-Proposed Course-Modules

As Farmingdale State College (FSC) campus is located in mid-long Island with high possibility of flooding and considering the synergies of the existing programs at the SUNY system, the need for emergency preparedness became a clear area of focus and need. In addition, previous discussion with Clifton Lacy, M.D., Distinguished Professor and Director, Center for Emergency Preparedness, Infrastructure and Communication (EPIC) within CAIT at Rutgers University led us to envision a credit and non-credit module in Transportation and Emergency Preparedness.

This is in line with "SUNY Micro-Credentialing Task Force Report and Recommendation" that emphasizes that today's industry needs for employees to develop the skill sets to be able to perform detailed tasks requiring highly specific knowledge. A micro-credential, which can take the form credit or non-credit short course, is an answer to this need. In addition, a micro-credential can also fulfill the need for continuing education needs in related industry.

This course module in Emergency Preparedness will be offered to municipalities in Long Island, NY for disaster planning and event management. The anticipated program will have the following three components:

1-Transportation modeling and road evacuation alternatives and examination of priorities. This will be headed by Kazem Oryani, School of engineering Technology, FSC.

2- Medical response and medical site planning. This effort will be led by Clifton Lacy, MD, at CAIT, Rutgers University.

3- Security Consideration and Protection. This will be headed by Professor Robert Greenburg, Department of Security Systems and Law Enforcement Technology, FSC.

A preliminary workforce training module is being drafted. This includes a one-day seminar to bring awareness and familiarity with elements of emergency planning.

In addition to the Transportation and Emergency course module, currently, FSC is offering several credit-bearing courses in computer security. Experience gained in teaching these courses will be utilized to develop a micro-credential course module as non-credit course for staff agencies and other learners. This short one-day course will introduce the participants to major concepts in securing systems. This module can be followed by more detailed modules, of say, one-week in length, for more through teaching of the elements of Cyber Security for Computer Security Technology, Software Systems and Network Protection.