

# Follow up Report on Global Perspective Workshop

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## 1. Background

The Global Workshop at EAO was a remarkable experience. I had the firsthand experience of what identify means through various site visits in France, Germany, and Luxembourg. I realized that identity of an individual may evolve over time and become the driving force of movement across borders, innovation, immigration policy and refugee crisis, economic opportunity and crisis.

From the interaction with some of the speakers at the workshop, I came to learn more about refugee camps and an insight of living conditions. Particularly, I learned the situation of refugee camps having little or no opportunity to receive education and career building. My take from the workshop was to build some open resources available for underprivileged learners while taking advantage of communication technology and mobile devices. I have developed two badges so far.

A badge lets a learner becoming familiar with concepts and skills in an informal settings. Typically, learners access the badges from a website, and complete badges to demonstrate to others to showcase obtained skillsets.

Below, I will provide an overview of the two badges (cryptography, Web-HTML) and show an initial results while I tested them in two classroom students from fall courses.

## 2. Digital Badge on Cryptography

This badge is intended to provide a set of open source videos and reading materials for learners to encrypt and decrypt messages. The classic techniques of cryptography have their roots in Europe (*e.g.*, Caesar cipher has been there around 100 BC-44 BC, one time pad technique was used by Germans Foreign Office after WW1). There were six small learning tasks covering Caesar and Beale ciphering and digital hashing. Figure 1 shows a webpage where learners are provided an overview of learning objectives, outcomes, and instructions to complete the badge.

ksuweb.kennesaw.edu/~hshahria/Global-Workshop-KSU/badge-crypto.html

## Badge on Cryptography

**Learning objective:**

- Understand techniques to encrypt and decrypt messages
- Apply tools to encrypt and decrypt messages

**After completion of this badge, you will be able to**

- Explain some popular approaches in cryptography such as Caesar ciphering and one time padding
- Hide plain text message using hash technique

Please complete the badge by clicking the link [here](#).

Once you complete the badge, please complete the survey [here](#).

Thank you for your participation!

Figure 1: Learning objective and outcome for crypto badge and survey link

There is only one cipher system that cannot be cracked by the FBI or NSA – or by anyone else for that matter. That system is the one-time pad.

A message encrypted using a one-time pad cannot be broken because the encryption key is a *random number* and because the key is *used only once*.

Intelligence agencies routinely use many different kinds of encryption systems – ranging from mechanical devices to invisible inks to computer software – but for *mission critical* messages that must be 100% secure they *always* use a one-time pad.

At the height of the cold war during the fifties and sixties, Soviet spies in the USA used one-time pads to communicate with their controllers, usually located inside Russian embassies and consulates. Not a single message was cracked by the FBI or NSA. And none of those messages ever will be cracked.

Assume [h=8, e=5, l=12, o=14, x=24].

If plain text is "hello" and one time key for padding is "xello", what would be the cipher text based on addition?

- fjxxb
- thvcy
- xcbnk

Figure 2: A screenshot of a learning activity for one time pad encryption (<https://www.oppia.org/explore/7E6CM1BwbIkE>)

I applied this badge as an additional learning material for Fall 2016 IT 6843 course students. The badge is introduced before the students were introduced the learning topic formally as part of regular course schedule. Once completed, the learners were asked to complete a survey.

A set of questionnaires used in the survey are shown below.

1. This badge has clear objectives and learning outcomes.
2. The readings for the badge are adequate to achieve learning outcomes.
3. The video and reading tasks are helpful in solving the problems.
4. These exercises are crucial in understanding the topic.
5. The assessment indeed tests what I have learned while earning this badge.
6. These examples motivated me to learn more about the topic.
7. I learned how encryption works from badges.
8. Seeing examples from this unit gave me better grasp of how to make cryptanalysis for hackers had task.

All questionnaires were measured on a scale from 1 to 5, where,

- 1=Strongly Disagree
- 2=Disagree
- 3=Neutral
- 4=Agree
- 5=Strongly Agree

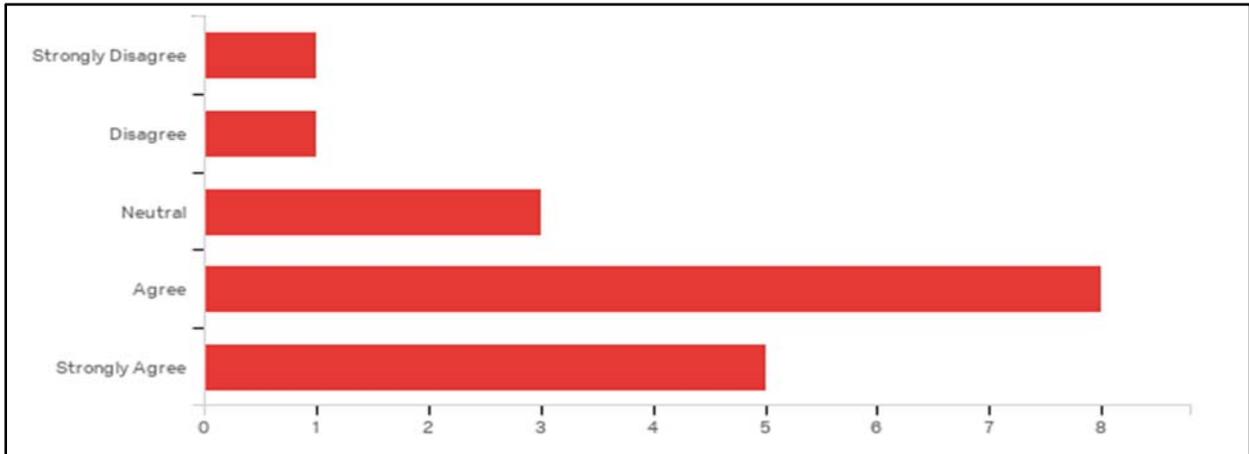
**Survey data from Crypto badge:**

Total # of participants 18.

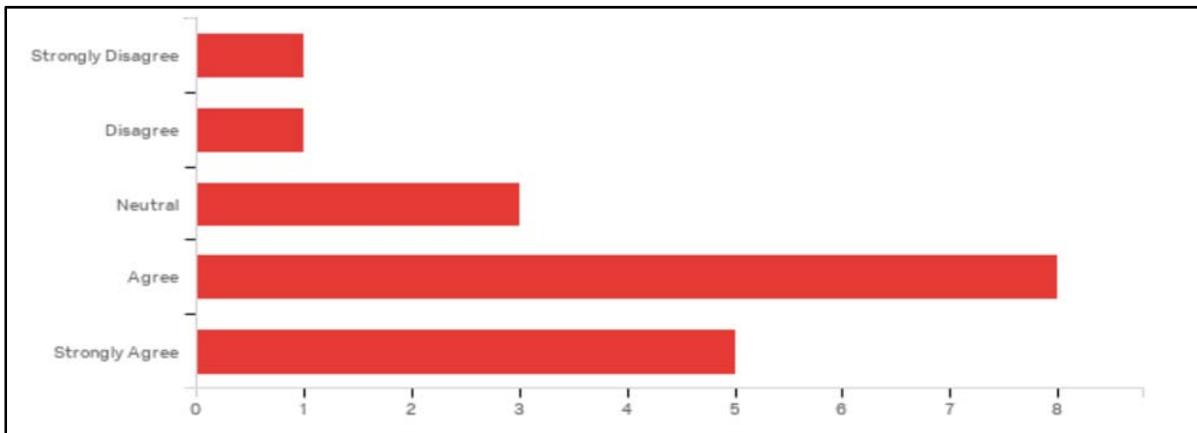
Question	Mean Score
Q1: The badge has clear objectives and learning outcomes.	3.73
Q2: The readings for the badge are adequate to achieve learning outcome.	3.83
Q3: The videos and reading tasks are helpful in solving the problems.	3.73
Q4: These exercises are crucial in understanding the topic.	4.11
Q5: The assessment indeed tests what I have learned while earning this badge.	4.0
Q6: The examples motivated me to learn more about the topic.	3.89

The following are results from the last two questions of the survey:

Q7: I learned how encryption works.



Q8: Seeing examples from this unit gave me better grasp of how to make cryptanalysis for hackers had task.



Overall, the badge enabled learner to learn the topic and generated interests.

### 3. Digital Badge on Web-HTML

The second badge was on providing some resources on basic HTML and JavaScript for building web pages. A set of video resources were introduced. Figure 3 shows a screenshot of the learning objectives and outcomes for the badge. Figure 4 shows a screenshot of an example activity for HTML learning. The badge was introduced to IT 6203 class as an additional learning material. Some students already were familiar with the topic.

The screenshot shows a web browser window with the address bar containing the URL: [ksuweb.kennesaw.edu/~hshahria/Global-Workshop-KSU/badge-web.html](http://ksuweb.kennesaw.edu/~hshahria/Global-Workshop-KSU/badge-web.html). The page content is as follows:

## Badge on Web and HTML

**Learning objective:**

- Understand HTML tags to create web page
- Apply JavaScript methods to enhance web pages

**After completion of this badge, you will be able to**

- Explain some popular tags in web pages
- Add JavaScript methods to provide functionality

Please complete the badge by clicking the link [here](#).

Once you complete the badge, please complete the survey [here](#).

Thank you for your participation!

**Figure 3: Learning objective and outcome for web page badge and survey link**

The screenshot shows a learning activity interface. On the left, there is a small circular icon of a dog wearing glasses. The main content area is a light blue box containing the following text:

*HyperText* is the method by which you move around on the web – by clicking on special text called **hyperlinks** which bring you to the next page. The fact that it is *hyper* just means it is not linear – i.e. you can go to any place on the Internet whenever you want by clicking on links – there is no set order to do things in. *Markup* is what **HTML tags** do to the text inside them. They mark it as a certain type of text (*italicized text*, for example). HTML is a *Language*, as it has code-words and syntax like any other language.

What does HTML mean?

Below the text box, there are three radio button options:

- Hypertext Makeup Language
- Hyperlink Makeup Language
- Hypertext Markup Language

**Figure 4: A screenshot of a learning activity for HTML**  
<https://www.oppia.org/explore/xm409CR99p6v>

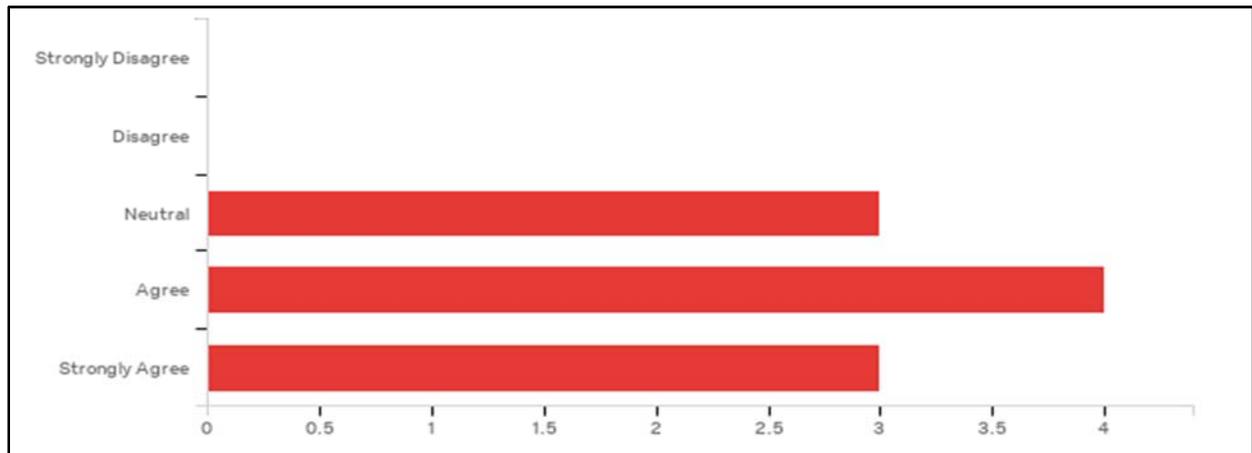
**Survey data from HTML/Web badge:**

Total # of participants 10.

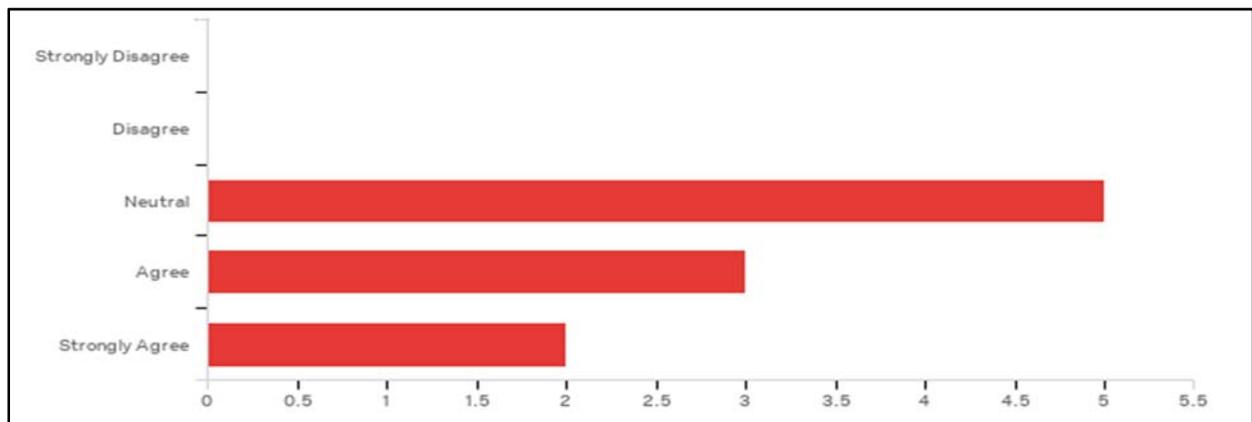
Question	Mean Score
Q1: The badge has clear objectives and learning outcomes.	3.90
Q2: The readings for the badge are adequate to achieve learning outcome.	3.80
Q3: The videos and reading tasks are helpful in solving the problems.	3.80
Q4: These exercises are crucial in understanding the topic.	3.70
Q5: The assessment indeed tests what I have learned while earning this badge.	3.90
Q6: The examples motivated me to learn more about the topic.	3.80

The following are results from the last two questions:

Q7: I learned how HTML page works.



Q8: Seeing examples from this unit gave me better grasp of how to develop a webpage.



Overall, the initial results show that badge generated some interests among learners. In future, the examples would be refined and more examples will be added.

#### **4. Conclusion and dissemination of results**

To summarize, the Global workshop tour enabled me to understand identity and develop resources for under privileged learners globally. A fast abstract on badge-based learning and skillset development for cybersecurity career has been published in IEEE COMPSAC 2016 conference [1], held in Atlanta during June 2016. In future, I plan to test the developed badges to classroom who may not have prior exposure on the topic. I plan to write another article based on learning outcome and survey data in the future.

#### **5. Reference**

- [1] H. Shahriar, S. Peletsverger, H. Zafar, B. Bailey, L. Johnston, “Digital Badges to Enhance Skills and Preparation for a Career in Cyber Security,” *Proc. of 40<sup>th</sup> IEEE Computer Society International Conference on Computers, Software & Applications (COMPSAC)*, Atlanta, USA, June 2016, pp. 622-623.