

OER Revisions and Ancillary Materials Creation Mini-Grant Application

Affordable Learning Georgia aims to support the sustainability of previous Textbook Transformation Grants implementations through revisions of created open educational resources or the creation of new ancillary materials for existing OER. Individuals or teams who would like to apply for an OER Revisions or Ancillary Materials Creation Mini-grant participants do not need to be the original creators of the resource(s). While we welcome original authors to revise their original materials, the nature of open licenses allows for the revision and remixing of OER materials by anyone as long as the terms of the license are adhered to.

The final deliverable for this category is the revised or newly-created materials as proposed in the application, which will be hosted through GALILEO Open Learning Materials. All revised or newly-created materials will be made available to the public under a Creative Commons Attribution License (CC-BY), unless the original materials were under a more restrictive license such as the inclusion of SA (Share-Alike) or NC (Non-Commercial).

For the purposes of this grant, we define revision as the major improvement of a resource through updates for accuracy, accessibility, clarity, design, and formatting. We define ancillary materials as any materials created to substantially support the instruction of a course using an existing open educational resource(s).

Applicant Name *

Dr. Chi Zhang

Applicant Position *

Associate Professor of Information Technology

Applicant Institution *

Kennesaw State University

Applicant Email Address *

Please use your institutional email address.

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Other Team Members

Individuals can apply for mini-grants; a team is not required. If you do want to add team members to your grant, please provide the names and email addresses here.

Dr. Hossain Shahriar, hshahria@kennesaw.edu

Type of Project *

- Revision of pre-existing OER
- Creation of ancillaries for pre-existing OER
- Other: _____

Final Semester of the Project *

This is the semester in which the materials created/revised will be completed.

- Fall 2019
- Spring 2020

Proposed Grant Funding Amount: *

This is the total (in a dollar amount) of funding you are requesting for the mini-grant. There is a maximum of \$4800, with a maximum of \$2000 per team member and \$800 for project expenses.

\$4800

Currently-Existing Resource(s) to be Revised / Ancillaries Created *

Please provide a title and web address (URL) to each of the currently-existing resources that you are either revising or creating new ancillary materials for below.

IT3503/6503- Foundation of Health Information Technology,
<https://oer.galileo.usg.edu/do/search/?q=health%20information%20technology&start=0&context=9019036&facet=>

Project Description *

In at least one paragraph, describe your project's goals and deliverables.

Project Title:

Hands-on Experience for Introducing Emerging Trends in Health Information Technology to Enhance Teaching and Enable Active Learning

Project Goals:

In this project, we aim to introduce the emerging trends in Health Information Technology (HIT) through hands-on experience in the first HIT foundation course. The new learning modules will engage students with emerging technologies and tools in the field while encouraging their exploration of the new opportunities in teaching and learning.

We propose to revise three existing modules from IT3503 and IT6503 Foundations of Health Information Technology course (<https://oer.galileo.usg.edu/do/search/?q=health%20information%20technology&start=0&context=9019036&facet=>) with hands-on labs so students will have early exposure to the emerging trends in health IT. Currently, neither the course has self-paced labs, where such labs are essential to engage students in active learning to be prepared for the advanced HIT courses and research, and increase students' interests in HIT as a potential career option.

The proposed hands-on experience will be on the electronic health record systems and health data security testing, and health data statistics and analytics, the two trends in high demand in health information technology. The details of the proposed hands-on labs including the lab topics, purpose, resources, and technologies and tools used are introduced below.

1. Electronic Health Record and health data security

For the Electronic Health Record (EHR) system and data security, we plan to develop labs to assess open-source Electronic Medical Records applications for compliance with Office of National Center for Health Information Technology (ONC) by using the test suite (2015 Edition Test Method, 2018). The ONC test suites are developed to check the compliance of EHR software against meaningful usage criteria and HIPAA security and privacy requirements (HIPAA Compliance checklist, 2018). We will gather a set of open-source EHR software (e.g., OpenEMR 2018, OpenMRS 2018, OpenClinic 2018), and develop instructions to set up and configure the software based on the available user manuals. Next, we will develop instructions on how to check compliance criteria (e.g., HIPAA security and privacy requirements) based on the ONC test scripts. The labs will be conducted through performing use case testing of the EHR software (i.e., running specific features of EHR software such as registering a patient). Students will be able to document any deficiencies based on test suite (e.g., lack of patient health data encryption) in a detailed report along with methods for remediation.

EHR applications are traditional web applications implemented in scripting languages (e.g., PHP, JSP) and deployed with databases (e.g., MySQL) in web servers (e.g., Apache). Attackers may exploit the vulnerabilities by providing malicious inputs and compromising the data processed and stored by EHR applications. The second part of the lab will develop instructions on how to conduct vulnerability scanning of open-source EHR software with available open-source security tools. We will develop the materials covering some common open-source security tools (e.g., RIPS, 2018). This will be a trial and error and researching on the coverage of security tools based on the EHR software (e.g., RIPS can scan EHR software implemented in PHP scripts). The developed resource will also provide basic introduction to common vulnerabilities (e.g., cross-site scripting, SQL injection) from resources such as OWASP Top 10, 2018.

2. Health Data Analytics

One of the current issues in health informatics is the increased healthcare data and patient-generated data and new approach to analytics (Stanford, 2017). Health data analytics has become vital for healthcare organizations to make informed decisions to improve healthcare quality and lower costs.

In the prelab section of this hands-on lab, students will learn the importance of healthcare data, data analysis process and tools, and work with free and open-to-the-public healthcare datasets (e.g., Centers for Medicare and Medicaid Services, 2018; U.S. Department of Health & Human Services, 2018; The Office of National Coordinator for Health Information Technology, 2018). We will develop instructions to let student practice with the data analytics tools while familiarizing with the concepts introduced, such as:

- Descriptive statistics of healthcare data in Excel – central tendency and inferential statistics
- Use MySQL Workbench to query healthcare database
- Use MySQL to extract data from a healthcare dataset on a connected remote server, prepare data in Excel, import data to RStudio, and use R commands to generate the charts
- Use Tableau Public to visualize data analysis results

There are rich resources on datasets online. Open-source data can be accessed from a variety of federal agencies including the Health Resources and Services Administration (HRSA), Office of the National Coordinator (ONC), Centers for Medicare and Medicaid Services (CMS), and the US Census Bureau. Examples are:

1. Health Analytics Data <https://app.himssanalytics.org/data/index.aspx>
2. HealthData.gov <https://www.healthdata.gov/>
3. Data.gov/health <https://www.data.gov/health/>
4. Hospital Compare datasets <https://data.medicare.gov/data/hospital-compare>
5. A collection of public datasets including healthcare

<https://github.com/awesomedata/awesome-public-datasets#healthcare>

References:

1. Centers for Medicare and Medicaid Services. 2018. "Data.CMS.Gov," Data.CMS.Gov. (<https://data.cms.gov/>).
2. Stanford Medicine. 2017. "Stanford Medicine 2017 Health Trends Report: Harnessing the Power of Data in Health." (<https://med.stanford.edu/content/dam/sm/sm-news/documents/StanfordMedicineHealthTrendsWhitePaper2017.pdf>).
3. The Office of the National Coordinator for Health Information Technology (ONC). 2018. "Health IT Dashboard." (<https://dashboard.healthit.gov/datadashboard/data.php>).
4. U.S. Department of Health & Human Services. 2018. "HealthData.Gov." (<https://www.healthdata.gov/>).
5. 2015 Edition Test Method, 2018, <https://www.healthit.gov/topic/certification-ehrs/2015-edition-test-method>
6. HIPAA Compliance checklist, 2018, <https://www.hipaajournal.com/hipaa-compliance-checklist/>
7. OpenEMR, 2018, Accessed from <https://www.open-emr.org>
8. OpenMRS, 2018, Accessed from <https://openmrs.org>
9. OpenClinic, 2018, Accessed from <http://openclinic.sourceforge.net/openclinic/index.html>
10. RIPS- A static source code analyzer for vulnerabilities in PHP scripts, <http://rips-scanner.sourceforge.net/>
11. OWASP Top 10, 2018, Accessed from https://www.owasp.org/index.php/Category:OWASP_Top_Ten_Project

Deliverables:

The deliverables of our proposal will include hands-on lab instructions to not only demonstrate how to install open-source EHR software, tools for checking security vulnerabilities, running test suites to check for compliance with regulations, apply analytics tools to analyze health data to make informed decisions, but also provide opportunities to engage students and enhance teaching and learning. More importantly, the proposed hands-on labs and teaching materials will make use of open-source technologies, tools, and datasets at no cost to students. Moreover, the resources provided will help other instructors interested in the field explore the topics by following the instructions to develop advanced skills on health information technology.

Timeline and Personnel *

Provide a project timeline with milestones below, keeping in mind your selected Final Semester above. Provide a short description of the roles any additional team members will take on during the activities in your timeline.

October 2018 – Dec 2018: Researching on resources, software and dataset (Drs, Zhang and Shahriar)

January 2019 – May 2019: Developing instructions and hands-on lab materials (Dr. Zhang/Shahriar)

June 2019 – July 2019: Revision of materials and update websites (Drs, Zhang and Shahriar)

August 2019 – December 2019: Teach in Spring 2019 (Dr. Zhang/Shahriar)

December 2019 Final Report (Dr. Zhang)

Budget *

Please enter your project's budget below. Include personnel and projected expenses. The maximum amounts for the award are as follows: \$4,800 maximum award, \$2,000 maximum per team member, \$800 maximum for overall project expenses. Unlike standard-scale and large-scale transformations, the maximum of \$800 is not a required element of the budget, but rather meant primarily for the purchase of specific tools and software which would help with improving resources.

The project will be carried out by two investigators: Drs. Zhang (PI) and Shahriar (Co-PI). Dr. Zhang will be in charge of developing health data analytics lab module, maintaining the course in D2L to update materials, gather classroom feedback, and deliver a final report. Dr. Shahriar will develop the lab instructions on Electronic Health Record and health data security. Both instructors will be engaged in instructing the developed modules into classroom in Spring 2019. We are requesting total \$4000 stipend for the effort and time (\$2000 for both investigators).

In addition, the software and tools we plan to use for the materials are from open source, cost free. However, having meaningful healthcare dataset will be helpful for the investigators to develop and illustrate hands on lab and results. One example is HCUP Dataset (2018) that can be used in this project. This dataset includes deanonymized medical records of patients that can be suitably used with health data analytics hands on lab manual development. In the absence of such dataset, the investigators are prepared to create hand-made artificial data set as needed.

[1] HCUP Dataset, 2018, Accessed from <https://www.distributor.hcup-us.ahrq.gov/Databases.aspx>

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