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. 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).

While mini-grants do not normally require the Letter of Support process that larger Textbook Transformation Grants require, multi-institution collaborations on a mini-grant project do require a Letter of Support from each institution. This is to ensure that not only the Project Lead's institution is aware of the grant.

Applicant Name *

Julie La Corte

Applicant Position *

Assistant Professor

Applicant Institution *

Georgia State University

Applicant Email Address *

Please use your institutional email address.

jlacorte@gsu.edu

Other Team Members

Please provide both names and email addresses here.

Type of Project *

○ Revision of pre-existing OER

● Creation of ancillaries for pre-existing OER

○ Other:

Course Number(s)

MATH 2211

Course Title(s)

Calculus I

Final Semester of the Project *

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

○ **Spring 2021** (selected)

○ Summer 2021

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.

$2,400.00

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.

OpenStax Calculus
https://openstax.org/details/books/calculus-volume-1
the OER textbook currently being used by Kouok Law (GSU/PC) for Math 2211.

Project Description *

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

Objective.

Using Mathematica or analogous software, I'll be creating interactive applets that cover topics which USG calculus students are known to struggle with.

These topics can be chosen based on the results of the Calculus 1 assessments administered at Perimeter College in 2018 and 2019, and may include:

- slope of the tangent line
- optimization
- determining one-sided limits graphically
- finding intervals of increase and decrease

Method.

In order to appeal to kinesthetic as well as visual learners, the applets will emphasize not just animation, but direct interaction on the part of the student, e.g. by manipulating sliders, placing points by clicking and/or dragging, and selecting choices from pop-up menus.

Examples.

(1) For example, when asked to maximize the area of a rectangle with a fixed perimeter by choosing side lengths l and w, students can be asked to experiment with the length and width of the rectangle by adjusting the value of w with a slider. (A functioning mock-up of this applet was created for this proposal. Screenshots are available on request.)

Question: An 8-inch long pipe cleaner is bent into the shape of a rectangle. What are the dimensions of the rectangle with maximum area?

- The pipe cleaner is visually represented by a line segment, partitioned into four intervals of successive lengths w, l, w, and l (colored red and blue).
- As the student adjusts the value of w with the slider, the lengths of the 4 colored intervals of the "pipe cleaner" update in real-time.
- Simultaneously, a rectangle with red and blue sides of respective lengths w and l is displayed. The rectangle's shape changes in real-time as the student adjusts the value of w with the slider. The following two equations are displayed statically alongside the rectangle.

$A(w) = (4 − w)w$

Perimeter = 8

- In an adjacent panel, the graph of "$y = A(w)$" is displayed. The position of the point $(w,A(w))$ on the graph moves as the student adjusts the value of w with the slider.
- In subsequent interactive slides, students might be asked to find the critical values of the area function, either by using calculus, or by clicking on the graph of "$y = A(w)$".

(2) As another example, when finding intervals of increase and decrease, the student will be able to click to place critical numbers on a number line, and then click again in each interval

st values x* for which the sign of f '(x*) is to be determined.

Deliverables.

The deliverables will be a collected series of standalone applets that can be accessed without requiring Mathematica or any other non-free software to be installed.

Student performance on the topics addressed by the applets will be assessed during routine exams, disaggregated from overall exam scores, and compiled at the end of the semester.

The applets will be designed for use…

- by instructors during lectures in order to save time, improve student understanding, and increase

student engagement, and/or
- by students as a guide through multi-part problems assigned as homework.

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.

Julie La Corte will create the applets and pilot them during a section of Math 2211. She will assess the applet topics in problems on her exams, record data on student performance for those problems, and compile the results in a written report.

Jun. & Jul. 2020:
- Develop materials.

Fall 2020 and/or Spring 2021:

- Implement in classroom.
- Solicit feedback from students.
- Assess student performance on in-class exams.
- Disaggregate and record student performance on relevant exam problems.
- Write a final report documenting the effectiveness of the materials created.

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.

1. PERSONNEL and FRINGE BENEFITS
Julie La Corte will receive summer pay in the amount of $1,482 plus $518 in fringe benefits (35% negotiated rate) for the development of the ancillary materials =
$2,000.
TOTAL PERSONNEL AND FRINGE BENEFITS = $2,000

2. OTHER
Funds are requested for supplies and/or to disseminate the ancillary materials at professional mathematics conferences during the fall 2020/spring 2021 = $400.

TOTAL OTHER = $400
TOTAL REQUEST = $2,400

Creative Commons Terms *

☑ I understand that any new materials or revisions created with ALG funding will, by default, be made available to the public under a Creative Commons Attribution License (CC-BY), with exceptions for modifications of pre-existing resources with a more restrictive license.