Textbook Transformation Grants: Departmental Scaling Invitations

(Spring 2020 – Spring 2021)

Proposal Form and Narrative

# Applicant, Team, and Sponsor Information

*The* ***applicant*** *is the proposed Project Lead for the grant project. The* ***submitter*** *is the person submitting the application (which may be a Grants Officer or Administrator). The submitter will often be the applicant – if so, leave the submitter fields blank.*

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| Institution(s) | Columbus State University |
| Applicant Name | Houbin Fang |
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| Applicant Phone # | 706-507-8258 |
| Applicant Position/Title | Associate Professor of Math Education |
| Submitter Name | Elizabeth McInnis |
| Submitter Email | [mcinnis\_elizabeth1@columbusstate.edu](mailto:mcinnis_elizabeth1@columbusstate.edu) |
| Submitter Phone # | 706-507-8264 |
| Submitter Position | Lecturer |

Please provide the first/last names and email addresses of all team members within the proposed project. Include the applicant (Project Lead) in this list. Do not include prefixes or suffixes such as Ms., Dr., Ph.D., etc.

|  | Name | Email Address |
| --- | --- | --- |
| Team Member 1 | Houbin Fang | [fang\_houbin@columbusstate.edu](mailto:fang_houbin@columbusstate.edu) |
| Team Member 2 | Elizabeth McInnis | [mcinnis\_elizabeth1@columbusstate.edu](mailto:mcinnis_elizabeth1@columbusstate.edu) |
| Team Member 3 | Nehal Shukla | [shukla\_nehal@columbusstate.edu](mailto:shukla_nehal@columbusstate.edu) |
| Team Member 4 |  |  |
| Team Member 5 |  |  |
| Team Member 6 |  |  |
| Team Member 7 |  |  |
| Team Member 8 |  |  |

If you have any more team members to add, please enter their names and email addresses in the text box below.

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Please provide the sponsor’s name, title, department, and institution. The sponsor is the provider of your Letter of Support.

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# Project Information and Impact Data

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| **Requested Amount of Funding** | *$12,800* |
| **Course Names and Course Numbers** | MATH 1001: Quantitative Skills and Reasoning |
| **Final Semester of Project** | *Spring 2021.* |
| **Summer Semester Before: Student Enrollments Currently Affected by No-Cost / Low Cost Savings** | *0* |
| **Summer Semester After: Student Enrollments Affected if Scaled to Department-Wide / All-Sections** | *60* |
| **Fall Semester Before: Student Enrollments Currently Affected by No-Cost / Low-Cost Savings** | *0* |
| **Fall Semester After: Student Enrollments Affected if Scaled to Department-Wide / All-Sections** | *120* |
| **Spring Semester Before: Student Enrollments Currently Affected by No-Cost / Low Cost Savings** | *0* |
| **Spring Semester After: Student Enrollments Affected if Scaled to Department-Wide / All-Sections** | *120* |
| **Original Required Commercial Materials** | *Mathematical Excursions* (4th Edition / ebook) with WebAssign Access  Richard Aufmann, Joanne Lockwood, Richard Nation, Daniel Clegg  $90  <https://www.cengage.com/c/mathematical-excursions-4e-aufmann/9781337879507/> (digital platform tab) |
| **Average Price of Original Required Materials Per Student Section Enrollment** | $90 |
| **Average Post-Project Cost Per Student Section Enrollment** | $0 |
| **Average Post-Project Savings Per Student Section Enrollment** | $90 |
| **Projected Total New Annual Student Savings Per Academic Year** | $27,000 |
| **Using OpenStax Textbook?** | *No* |

# Narrative Section

## 1. Project Goals

MATH 1001: Quantitative Skills and Reasoning is an Area A course for non-STEM majors, including social sciences and humanities at Columbus State University. The course “places quantitative skills and reasoning in the context of experiences that students will be likely to encounter. It emphasizes processing information in context from a variety of representations, understanding of both the information and the processing, and understanding”. A majority of the students have had limited success with mathematical theory as presented in typical textbooks currently used for MATH 1001: Quantitative Skills and Reasoning course.

A variety of instructional material combinations are currently in use by the Mathematics Department for MATH 1001. This includes a bundle of hardcopy textbook and/or e-book via the online homework system Webassign. Typically, many students cannot afford the required text bundle, so some instructors have advised students to purchase Webassign access codes that grant access to the homework platform, e-book and other instructional materials from the publisher. The cost of the Webassign access code, though lower than the cost of the bundle and textbook, is a premium and designated as traditional.

A sizeable number of students delay purchase of the access code. This in part results in limited access to textbooks; original sources would consequently reduce students’ interest and participation in the learning process. Students who do not purchase the access codes fall further behind and performance suffers, affecting retention.

The goals for this project are:

* Provide no-cost-to-students learning materials for all sections of MATH 1001 offered in Mathematics Department.
* Develop easy-to-use teaching and learning materials that focus on real-world applications that increase access to quantitative reasoning experiences for students. The choice and creation of such material will be informed by the Student Learning Outcomes.
* Develop multiple modalities of teaching and learning that are supported by use of technology, Learning Management system D2L and Open Educational Resources for all students.

## 2. Statement of Transformation

At Columbus State University, MATH 1001: Quantitative Skills and Reasoning, is being taught by the use of either the textbook *Mathematical Excursions* 4th Edition (physical or e-book) with WebAssign access. Many students postpone buying a big, expensive textbook or getting an access code of WebAssign due to cost. This results in them falling behind right away or dropping the course. Additionally, students are reluctant to study chapters 1, 2, 3, 10, 11, 12 and 13, which are not only not sequential, but also cover only 50 to 60 pages of over 800 total pages. This leaves students in MATH 1001 with 7 chapters of irrelevant material they have paid for with no subsequent class that also requires this text.

There are two goals for the transformation:

1. Eliminate textbook / WebAssign e-book cost by making these study materials as “Not Required” for this course.
2. Design video lectures as an OER (Open Educational Resources) that incorporates real world related instructional materials which motivate and challenge the learners and promote active learning so students are able to make explicit connections to the quantitative concepts. These video lectures will be created by the faculty (to be shared amongst the department) and will be posted on D2L for the students to have an access at any time at their own pace and as many times as they wish to facilitate understanding of the concept without any cost to them. At least three faculties teaching this course will use this OER as their instructional material.

In addressing these problems, the proposed transformation will aim at safeguarding the effectiveness of the instructional material, the integrity of the course content and the faithfulness to the original sources. Given that this mathematics course is for students in non-science majors, our proposed instructional material and approach is envisioned to impact this cohort of students positively, and improve the retention, progression, graduation rates.

## 3. Transformation Action Plan

Our first step is for our team members (Dr. Houbin Fang, Dr. Nehal Shukla and Ms. Elizabeth McInnis), to review the description, standards and requirements of MATH 1001: Quantitative Skills and Reasoningfrom our university website, led by Dr. Fang. We will consider the current curriculum we are using in our department for us to have a complete understanding. We will also discuss and analyze our current student demographic data as it relates to best instructional practices.

The next step is to look for appropriate materials that can be used for MATH 1001. Dr. Shukla will lead our team to investigate the materials we are currently using in the department and the available materials to which we have access. The team will focus on textbooks that have been recommended by the “Affordable Learning Georgia” initiative. Our plan is to go over all the related materials/textbooks and customize them to meet the needs of our students.

We will also try to go through the resources available online such as the “American Institute of Mathematics.” We anticipate that the adopted textbook may need to be supplemented with applications specific to our student population.

There might be a need for our team to customize the materials and/or select different part from each curriculum we find. However, we will not change the course outcomes or the topics to be covered. Instead we want to deliver an equivalent course at a cheaper cost for our students.

After our team creates and implements the entire project, an evaluation of the project will be undertaken. We will use GALILEO as a platform to provide access to other colleagues.

## 4. Quantitative and Qualitative Measures

Utilization of OERs allows for complete control of the course material and how it is

presented. We will examine the effectiveness of OER using the video lecture through both qualitative and quantitative measures:

Qualitative Measures

* Distribute survey/questionnaires collecting students’ feedback on the free materials including but not limited to accessibility, usability, and coherence.

Quantitative Measures

* Comparing pre-quiz and pre-test scores with post-quiz and post-test scores to measure learning.
* Pre/post learning satisfaction survey.
* Comparison of general success rates to previous semesters without using OER.

## 5. Timeline

August 2020: Complete pre-evaluation of the project.

September 2020: Initial design of the course including the investigation of the materials available.

October 2020 – November 2020: Complete the first draft: detailed lecture presentations and videos, class notes and other supporting resources, assignments, quizzes and exams along with syllabi.

December 2020: Final evaluation, discussion, and adjustment of the project through conversation with colleagues in the math department and other related departments.

January 2021 - April 2021: Implementation

May 2021: Collect and study data. Revise material for use in future terms. Final report. Share through GALILEO.

## 6. Budget

$4000 – Salary for Dr. Houbin Fang

$4000 – Salary for Dr. Nehal Shukla

$4000 – Salary for Ms. Elizabeth McInnis

$800 – Travel

## 7. Sustainability Plan

Of the two Area A mathematics courses for non-STEM majors, MATH 1001 has the highest enrollment and is projected to remain high. The three faculty members all have been teaching this course and will continue to teach sections of this course in the department’s 3-year schedule cycle. This will provide significant feedback, reflection, and assessment. The three faculty members are involved in department’s Math Connections Seminar that will provide a platform for teamwork and sharing of experiences and practices.

The course material will be housed in D2L and maintained and updated by the Gateway Math Team comprising of faculty teaching 1000-level courses.

The experiences in this project will be will be shared through Math Connections Seminar and Gateway Math team with the aim of recruiting more faculty to expand the project to other course sections including MATH 1101: Mathematical Modeling, STAT 1401: Elementary Statistics.

## Note: Letter of Support

*A letter of support must be provided from the sponsoring area (unit, office, department, school, library, campus office of the Vice President for Academic Affairs, etc.) that will be responsible for receipt and distribution of funding.*