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Application Summary

Competition Details

Competition Title:	Textbook Transformation Grants, Round Fourteen (2019-2020)
Category:	University System of Georgia
Award Cycle:	Round 14
Submission Deadline:	04/09/2019 at 11:59 PM

Application Information

Submitted By:	Meng Han
Appplication ID:	3396
Application Title:	451
Date Submitted:	04/09/2019 at 8:31 AM

Personal Details

Institution Name(s):	Kennesaw State University
Applicant First Name:	Meng
Applicant Last Name:	Han
Applicant Email Address:	mhan9@kennesaw.edu
Applicant Phone Number:	4705783801
Primary Appointment Title:	Assistant Professor
Submitter First Name:	Meng
Submitter Last Name:	Han
Submitter Email Address:	mhan9@kennesaw.edu
Submitter Phone Number:	4705783801
Submitter Title:	Assistant Professor

Application Details

Proposal Title
451

Final Semester of Project
Summer 2020

Requested Amount of Funding
$15,800

Type of Grant

No-or-Low-Cost-to-Students Learning Materials

Course Title(s)
Introduction to Data Analytics and Technology; Big Data System Administration

Course Number(s)
IT 3703; IT 4733

Team Member 1 Name
Guangzhi Zheng

Team Member 1 Email
gzheng@kennesaw.edu

Team Member 2 Name
Ying Xie

Team Member 2 Email
yxie2@kennesaw.edu

Team Member 3 Name
Meng Han

Team Member 3 Email
mhan9@kennesaw.edu

Team Member 4 Name

Team Member 4 Email

Additional Team Members (Name and email address for each)

Sponsor Name
Rebecca Rutherfoord

Sponsor Title
Professor, Chair of Department of Information Technology

Sponsor Department
Information Technology

Original Required Commercial Materials (title, author, price)

Summary of Savings with No-Cost Learning Material

IT 3703

1. Business Intelligence, Analytics, and Data Science: A Managerial Perspective. 4th Edition. Authors: Ramesh Sharda, Dursun Delen, and Efraim Turban, Publisher: Pearson, 2017, ISBN-13: 978-0134633282

- $119.00
- 210 students
- $24990 projected savings

IT 4733

(1) Data-intensive Systems, Principles and Fundamentals using Hadoop and Spark, Author: Tomasz Wiktorski, ISBN-13: 978-3030046026, Publisher: Springer, 2019

(2) Complete Guide to Open Source Big Data Stack 1stedition, Author: Michael Frampton, ISBN-13: 978-1484221488, Publisher: Apress, 2018

- $69.99+$39.77 = $109.76
- 105 students
- $11524.80 projected savings
- Total: 315 students, $36514.80 projected savings

Average Number of Students per Course Section Affected by Project in One Academic Year
35

Average Number of Sections Affected by Project in One Academic Year
9

Total Number of Students Affected by Project in One Academic Year
315

Average Number of Students Affected per Summer Semester
70

Average Number of Students Affected per Fall Semester
105

Average Number of Students Affected per Spring Semester
105

Original Total Cost per Student
$243.98

Post-Project Cost per Student
$0

Post-Project Savings per Student
$243.98

Projected Total Annual Student Savings per Academic Year
$36,514

Using OpenStax Textbook?

No

Project Goals

In this project, we propose to develop the two new fundamental data analytics courses using no-cost-to-students learning materials for both Bachelor of Science in IT (BSIT) and Bachelor of Applied Science (BASIT) programs of the Department of Information Technology at Kennesaw State University. The graduated student of the two programs has been the big contributor to the much-needed IT workforce for the State of Georgia. As an all section (for the two proposed courses, a total of 9 sections estimated yearly) and department-wide transformation, the focus of data analytics is one of the most important initiatives in 2019-2020 in IT. This project not only aims to reduce the financial burden imposed by the high cost of textbooks but also strives to develop free and open-access learning materials that offer equivalent or better educational effectiveness than traditional textbooks. For the topic of data analytics, particularly, has attracted more and more attention from industry and academia. This project will further reshape education in the domain and improve the success of our students in IT.

Statement of Transformation

As shown in the table “Summary of Savings with No-Cost Learning Material”, the textbooks used in the two proposed fundamental data analytics-related IT courses are expensive. In fact, most textbooks used in IT data analytics courses are costly.
The IT 3703 Introduction to Data Analytics and Technology course has been proposed as a required BSIT and BASIT course, which provides specific preparation for the more specific data analytics topics. The IT 4733 is Big Data System Administration course concentrating on a very specific and unique topic based on a project and platform-driven approach. In order to deliver course content, multiple textbooks need to be used to cover the content, which imposes inconvenience and cost burden on students. IT 3703 is planned to be offered for the first time in spring 2020 and IT 4733 in summer 2020.
In addition, due to the emerging evolving nature of the technology field, particularly in data analytics, the textbooks used in the proposed courses are updated frequently, which negatively decreases their resale value. The goal of our transformation is to develop the proposed courses from scratch with no-cost-to-students learning materials that offer equal or higher educational effectiveness.

The proposed transformation is an economic and viable solution for the following reasons:
• Firstly, the fundamental data analytics-related learning materials are widely and readily available on the World Wide Web today, and many of these resources are publicly accessible, free, or with an open license to use. These materials include open and free tutorials, books, videos, labs, test banks, software, and services. For example, many data analytics-related topics are strongly supported by the open source communities such as Kaggle and many other technical tutorials online.
• Secondly, online content can better reflect the latest trends and industrial development than traditional textbooks as technology is changing rapidly. So is the content of web resources. Many textbooks may become outdated at the moment they are published. As a matter of fact, many faculties have to use contents from the web as supplemental materials to the textbook. For example, data management platforms and data storage techniques are referred frequently in both two courses.
• The two data analytics courses need to include hands-on labs where software and tools get updated frequently, and the current set of textbooks are not on par with the rapid updates. Most of textbooks can be used in the proposed courses contain links to tools or websites which may no longer be available or supported. As soon as a new version of a tool or software package is released, the instructions in a textbook become obsolete. Therefore, we need to include the latest and available open source tools to prepare hands-on labs.
• Thirdly, the materials from the web are generally more interactive. The interactive content will not only engage the students but also improve their learning experience. For example, a student can better learn how the data processing with the online data visualization tools through animation or a video than a printed diagram in a textbook.
• Fourthly, developing and assembling a set of learning materials by ourselves allows us to better align the course contents not only with the outcomes of each course but also with the outcomes of our Information Technology program. IT 3703 especially requires more effort as it covers a broad range of topics and materials; there is no one textbook can achieve this.
• Furthermore, our team members are well prepared for the proposed transformation. The downsides of using web resources are that they are often disorganized, may contain inaccurate information, may be changed or deleted without notices. However, our team members are not only subject matter experts in the data analytics fields, but also are proficient educators who on average have over 10 years of teaching experience. We will select, organize and integrate resources from the web and transform the information into instructional sound learning materials for the proposed courses. We also created a sustainable plan to periodically review the developed no-cost-to-student learning material. All courses in the department are reviewed every three years as part of the continuous improvement process.
• Last but not the least, Dr. Zheng successfully participated six rounds of ALG grants (round 1 award #42, round 2 #119, round 10 #334, round 11 #365, round 12 #386, and round 13 #429), Dr. Han participated three ALG grants (round 10 #334, round 12 #386, and round 13 #422), while Dr. Xie participated the ALG grant round 13 #422 successfully. As part of a department effort, we had transformed more than 20 IT courses into courses using no-cost-to-student learning material. Those courses were very well received by our students and saved our students more than $300,000 in textbook cost. Building on our previous success and lessons learned we are well positioned to continue transformation efforts and further increase the cost-saving benefits to the students in our program.

Impact of the Transformation/Development
The impact of our transformation efforts will be profound. Under our estimates, more than 315 students will benefit from the no-cost learning material each year. The proposed project is expected to save students approximately $36,514 in textbook cost each year. Because of the cost savings from not having to buy textbooks, students may be able to take a few more courses each year and graduate sooner. Having a series of mobile and network courses adopting no-cost-to-student material not only offers a better and more consistent learning experience for students but also makes our nationally renowned IT programs more affordable. As a result, we could recruit more students and produce more qualified IT professionals that the State of Georgia needs. Developing no-cost-to-student materials can help us better align course content with its learning outcomes and outcomes of our program, which will create a positive impact in terms of curriculum development.
Moreover, the learning materials developed in this proposal will be made available to the public and can be easily

adopted by other programs or intuitions who want to lower the cost of education to their students. Lastly, we believe that our experience gained in this transformation project could be beneficial to the academic community. We presented our previous ALG grant experience in two national educational conferences: Southern Association for Information Systems Conference (SAIS 2016) and ACM Special Interests Group in IT Education (SIGITE 2016). We also hosted a panel to discuss the not-cost-to-student learning material in SIGITE 2016, SIGITE 2017, and will host another panel at the ACM SIGITE 2019 in October. Another one research paper regarding our open education experience has been submitted to the ACM Global Computing Education Conference 2019. Our presence in the national conferences greatly increased the academic community's awareness of no-cost-to-student learning material and stimulated intriguing discussions among the following educators. We plan to continue doing so in IT academic society with the proposed transformation efforts. In summary, we believe the proposed project will have a positive impact on students' retention, progression, and graduation at program, department and institution level.

Transformation Action Plan

With a coordinated effort, our team of investigators plans the following activities to develop the proposed courses using completely no-cost learning materials:

• Develop the course content in units of learning modules.
• Research and identify no-cost readings for each of the learning modules in each course. The reading list includes both compulsory readings and optional readings. All of these readings will be publicly accessible, free to use, or openly licensed.
• Research and identify no-cost materials that can be shared across the courses.
• Develop study guides and lecture notes for students' use to review course content and key learning points.
• Adopt or develop all assignments, exercises and lab materials that create no cost to students to replace the ones in the textbooks.
• Develop test banks to replace the ones in the textbooks.
• Adopt open source or no-cost-to-student labware for students to gain hands-on experience.

The responsibilities of each investigator are described as follows:

• Primary Investigator: Dr. Meng Han.
Course: IT 4733 and IT 3703.
Responsibilities: Project lead; project coordinator, subject matter expert and instructor of record.
• Co-Primary Investigator: Dr. Guangzhi Zheng.
Course: IT 3703.
Responsibilities: course coordinator, subject matter expert and course developer; instructor of record.
• Co-Primary Investigator: Dr. Ying Xie.
Course: IT 4733.
Responsibilities: course coordinator, subject matter expert and course developer; instructor of record.

All course design with the no-cost materials will be provided through D2L Brightspace and a public website for our students as well the public.

Quantitative & Qualitative Measures

The investigators plan to assess the effectiveness of our proposal in two ways: 1) qualitatively, we will design a survey and gather inputs from the students after they used the no-cost learning material; 2) quantitatively, we will compare students' performance data against our preset goals. Generally, 75% is the aimed passing rate for undergraduate courses and 80% for graduate courses. The detailed assessment plan is shown in the following list.

Student performance measures

This data is from the overall class performance based on the grading of student works. Metrics include:

• Class average, grades distribution, the pass rate for each grading item.

• Overall letter grades distribution, pass rate, withdraw rate, and fail rate.

• Percentage of students meeting or exceeding learning outcomes

Specific survey on no-cost learning materials.

The survey will be distributed at the end of the semester to collect student feedback. It consists of a mixture of quantitative and qualitative measures including:

• Student perception and attitude toward no-cost materials

• Quantitative ratings of the no-cost materials used in this course

• Qualitative comments and suggestions

Timeline

The major milestones of the proposal are illustrated as follows:
• 6/01/2019
Complete baseline gathering of statistics
• 7/31/2019
Complete course level materials redesign, which includes syllabus and schedule for both courses.
Complete project progress report for IT 3703/4733.
Complete the development of no-cost materials include all reading, lecture notes, video clips, exercises, labs, and assignments materials for IT 3703
• 3/01/2020
Complete the development of no-cost materials include all reading, lecture notes, video clips, exercises, labs, and assignments materials for IT 4733.
Develop a survey on the effectiveness of the no-cost materials for course IT 3703 and IT 4733.
• 8/05/2020
Complete the course offering for IT 3703 and IT 4733.
Complete the survey data collection for all offered courses.
Complete student evaluation for all offered courses.
• 8/15/2020
Complete assessment data collection and analysis for the whole project.
Deliver the final status report.
Complete the final report.

Budget

The major development will be in summer 2019/2020. Funding will compensate the team member's work and activities in summer. For each proposed course, no-cost-material development workload is estimated to be approximately 100 hours in total. The instructor of records will spend 20 hours in course assessment. The role of each PIs with the corresponding compensations and other budget details are listed as follows:

• Dr. Ying Xie
Role: IT 4733 course coordinator, developer, & instructor
Investigator compensation: $5,000
• Dr. Guangzhi Zheng
Role: IT 3703 course coordinator, developer, & instructor
Investigator compensation: $5,000
• Dr. Meng Han
Role: IT 3703/4733 co-developer and instructor
Investigators compensation: $5,000
• Travel & Other Expense: $800. $800 is budgeted for three team members to attend the Kickoff Meeting at Middle Georgia State University in Macon, GA, and other travel expenses.
• Total Budget: $15,800.

Sustainability Plan

The IT department of KSU implements a course coordination system for all courses. Each course is assigned to a faculty as the course architecture which is responsible for the content of the course and teaches the course regularly. The two-course architectures are in our team for the corresponding courses and the third team member will serve as the project coordinator connect the development of the two proposed course. Our team members will develop the no-cost-to-student learning material for the proposed courses and teach the courses for the first time using the new material. As a course architecture, our team members will also make sure a course is continuously taught using the developed no-cost learning material in the future semesters even the course might have a different instructor.

Dr. Xie is the coordinator for IT 4733 and Dr. Zheng is the coordinator for IT 3703. The PI Dr. Han is a member of the data analytics track and certificate group and will also teach IT 3703 and IT 4733 sometimes. All three team members will keep teaching the two proposed course in the following several years and all of them will work closely together to maintain these two courses.

The IT department of KSU also has well established continuous course improvement plan. Each course is assessed each semester after being taught, and a course will be formally evaluated and updated every three years. A course coordinator is in charge of the assessment work. Thus, we are committed to continuously updating the no-cost learning material in the proposed courses based on research, assessment results and feedback from students and alumni. As shown in the support letter, our transformation efforts also have strong support from our department chair which further ensures the sustainability of our transformation efforts.

Acknowledgment

Grant Acceptance

[Acknowledged] I understand and acknowledge that acceptance of Affordable Learning Georgia grant funding constitutes a commitment to comply with the required activities listed in the RFP and that my submitted proposal will serve as the statement of work that must be completed by my project team. I further understand and acknowledge that failure to complete the deliverables in the statement of work may result in termination of the agreement and funding.

KENNESAW STATE UNIVERSITY
College of Computing and Software Engineering
Information Technology

April 5, 2019

ALG Grant Committee University System of GA

Dear Colleagues:

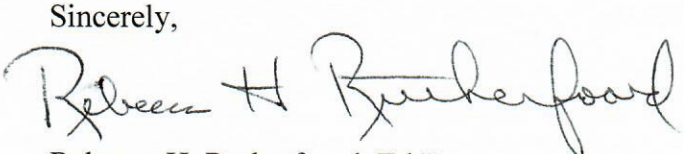
This letter is in support of the proposal "Innovation in Data Analytics: Developing No-Cost-to-Student Learning Materials for Fundamental Data Analytics Topics and Courses", submitted by Dr. Meng Han, Dr. Guangzhi Zheng, and Dr. Ying Xie at the Department of Information Technology from Kennesaw State University. As Department Chair for Information Technology, I clearly see the need for bringing down costs for our students. The ALG grants assist faculty in preparing no-cost courses that allow students to take courses without the monetary burden of expensive textbooks.

Data has become the most important asset for fueling growth and driving change in this age of technology. In this project, the primary investigators will work as a team to develop two new data analytics related fundamental courses with no-cost-to-students learning materials. I believe the proposed transformation is an economical and viable solution to address the challenges imposed by the traditional textbook model. The effort of proposed data analytics courses transforming will help the students build a fundamental data analytics skill set with significantly lower cost for the highly demanded students.

I strongly support this proposal. This is a very sustainable proposal as we have a large Information Technology degree program and our data analytics track and certificate program have also attracted many of our students to learn the related courses. Creating the no-cost for the textbook version of fundamental data analytics courses will allow students for many years to realize savings from not buying textbooks for these courses.

This is a very solid proposal. All faculty participating in the past ALG grants completed their courses and offered them successfully. I believe that this new ALG proposal will have the same student satisfaction and success that the past ALG grants did. This new proposal will have an even larger monetary impact on our students than the previous grants. Thank you for your consideration of this proposal.

Sincerely,



Rebecca H. Rutherfoord, Ed.D.
Interim Assistant Dean of the College of Computing & Software Engineering,
Department Chair for Information Technology, Professor of Information Technology
brutherf@kennesaw.edu

Affordable Learning Georgia

Textbook Transformation Grants, Round Fourteen
(Summer 2019 –Summer 2020)
Proposal Form and Narrative

Notes

- The proposal form and narrative .docx file is for offline drafting and review. Submitters must use the InfoReady Review online form for proposal submission.
- The only way to submit the official proposal is through the online form in Georgia Tech's InfoReady Review. The link to the online application is on the Round 14 RFP Page.
- The italic text we provide is meant for clarifications and can be deleted.

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.

Institution(s)	Kennesaw State University
Applicant Name	Meng Han
Applicant Email	mhan9@kennesaw.edu
Applicant Phone #	470-578-3801
Applicant Position/Title	Assistant Professor
Submitter Name	
Submitter Email	
Submitter Phone #	
Submitter Position	

N/A 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	Guangzhi Zheng	gzheng@kennesaw.edu
Team Member 2	Ying Xie	yxie2@kennesaw.edu
Team Member 3	Meng Han	mhan9@kennesaw.edu

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

N/A

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

Department Chair： Rebecca Rutherfoord, Professor *Department of Information Technology*

Project Information and Impact Data

Title of Grant Project	*Innovation in Data Analytics: Developing No-Cost-to-Student Learning Materials for Fundamental Data Analytics Topics and Courses*
Type of Grant	*No-or-Low-Cost-to-Students Learning Materials*
Requested Amount of Funding	$15,800
Course Names and Course Numbers	IT 3703 Introduction to Data Analytics and Technology IT 4733 Big Data System Administration
Final Semester of Project	*Summer 2020*
Average Number of Students Per Course Section Affected by Project	35
Average Number of Sections Affected by Project in One Academic Year	9
Total Number of Students Affected by Project in One Academic Year	315
Average Number of Students Affected per Summer Semester	*70*

Average Number of Students Affected per Fall Semester	105
Average Number of Students Affected per Spring Semester	105
Title/Author of Original Required Materials	*Table 1*
Original Total Cost Per Student	*$243.98*
Post-Project Cost Per Student	*$0*
Post-Project Savings Per Student	*$243.98*
Projected Total Annual Student Savings Per Academic Year	*$36,514*
Using OpenStax Textbook?	*No.*

Table 1. Student Enrollment Summary & Projection

Course	Summer 2020*	Fall 2020*	Spring 2020*	Total	Projected 2020 Enrollment	
					Number of Sections	Total Number of students
IT 3703	**35**	**70**	**70**	**210**	**6**	**210**
IT 4733	**35**	**35**	**35**	**105**	**3**	**105**
Total	**70**	**105**	**105**	**315**	**9**	**315**

*Both the two proposed courses are new offering in Kennesaw State University; the IT 3703 has been approved as the required BSIT courses, while IT 4733 is part of the data analytics track and certificate. We project the enrollment based on another two equivalent courses IT 3203 and IT 4203. The projection will only reflect the minimum growth of enrollments since the data related topics attract much more student's attentions in broad IT domain.

Table 2. Summary of Savings with No-Cost Learning Material

Course	Textbook Used	Cost per Student	Projected Enrollment	Projected Costs
IT 3703	(1) Business Intelligence, Analytics, and Data Science: A Managerial Perspective. 4th Edition. Authors: Ramesh Sharda, Dursun Delen, and Efraim Turban, Publisher: Pearson, 2017, ISBN-13: 978-0134633282	$119.00	210	$24, 990

IT 4733	(1) Data-intensive Systems, Principles and Fundamentals using Hadoop and Spark, Author: Tomasz Wiktorski, ISBN-13: 978-3030046026, Publisher: Springer, 2019 (2) Complete Guide to Open Source Big Data Stack 1st edition, Author: Michael Frampton, ISBN-13: 978-1484221488, Publisher: Apress, 2018	$69.99+$ 39.77 = $109.76	105	$11,524.8
	Total:	$228.76	315	36,514.8

Narrative Section

1. Project Goals

In this project, we propose to develop the two new fundamental data analytics courses using no-cost-to-students learning materials for both Bachelor of Science in IT (BSIT) and Bachelor of Applied Science (BASIT) programs of the Department of Information Technology at Kennesaw State University. The graduated student of the two programs has been the big contributor to the much-needed IT workforce for the State of Georgia. As an all section (for the two proposed courses, a total of 9 sections estimated yearly) and department-wide transformation, the focus of data analytics is one of the most important initiatives in 2019-2020 in IT. This project not only aims to reduce the financial burden imposed by the high cost of textbooks but also strives to develop free and open-access learning materials that offer equivalent or better educational effectiveness than traditional textbooks. For the topic of data analytics, particularly, has attracted more and more attention from industry and academia. This project will further reshape education in the domain and improve the success of our students in IT.

2. Statement of Transformation

As shown in table 2 “Summary of Savings with No-Cost Learning Material”, the textbooks used in the two proposed fundamental data analytics-related IT courses are expensive. In fact, most textbooks used in IT data analytics courses are costly.

The IT 3703 Introduction to Data Analytics and Technology course has been proposed as a required BSIT course, which provides specific preparation for the more specific data analytics topics. The IT 4733 is Big Data System Administration course concentrating on a very specific and unique topic based on a project and platform driven approach. In order to deliver course content, multiple textbooks need to be used to cover the content, which impose inconvenience and cost burden on students. IT 3703 is planned to be offered for the first time in spring 2020 and IT 4733 in summer 2020.

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material. All courses in the department are reviewed every three years as part of the continuous improvement process.

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The impact of our transformation efforts will be profound. Under our estimates, more than 315 students will benefit from the no-cost learning material each year. The proposed project is expected to save students approximately $36,514 in textbook cost each year. Because of the cost savings from not having to buy textbooks, students may be able to take a few more courses each year and graduate sooner. Having a series of mobile and network courses adopting no-cost-to-student material not only offers a better and more consistent learning experience for students but also makes our nationally renowned IT programs more affordable. As a result, we could recruit more students and produce more qualified IT professionals that the State of Georgia needs. Developing no-cost-to-student materials can help us better align course content with its learning outcomes and outcomes of our program, which will create a positive impact in terms of curriculum development.

Moreover, the learning materials developed in this proposal will be made available to the public and can be easily adopted by other programs or intuitions who want to lower the cost of education to their students. Lastly, we believe that our experience gained in this transformation project could be beneficial to the academic community. We presented our previous ALG grant experience in two national educational conferences: Southern Association for Information Systems Conference (SAIS 2016) and ACM Special Interests Group in IT Education (SIGITE 2016). We also hosted a panel to discuss the not-cost-to-student learning material in SIGITE 2016, SIGITE 2017, and will host another panel at the ACM SIGITE 2019 in October. Another one research paper regarding our open education experience has been submitted to the ACM Global Computing Education Conference 2019. Our presence in the national conferences greatly increased the academic community's awareness of no-cost-to-student learning material and stimulated intriguing discussions among the following educators. We plan to continue doing so in IT academic society with the proposed transformation efforts. In summary, we believe the proposed project will have a positive impact on students' retention, progression, and graduation at program, department and institution level.

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With a coordinated effort, our team of investigators plans the following activities to develop the proposed courses using completely no-cost learning materials:

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- Develop test banks to replace the ones in the textbooks.
- Adopt open source or no-cost-to-student labware for students to gain hands-on experience.

The responsibilities of each investigator are described as follows:

- **Primary Investigator:** Dr. Meng Han.
  - **Course**: IT 4733 and IT 3703.
  - **Responsibilities:** Project lead; project coordinator, subject matter expert and instructor of record.
- **Co-Primary Investigator:** Dr. Guangzhi Zheng.
  - **Course**: IT 3703.
  - **Responsibilities:** course coordinator, subject matter expert and course developer; instructor of record.
- **Co-Primary Investigator:** Dr. Ying Xie.
  - **Course**: IT 4733.
  - **Responsibilities:** course coordinator, subject matter expert and course developer; instructor of record.

All course design with the no-cost materials will be provided through D2L Brightspace and a public website for our students as well the public.

4. Quantitative and Qualitative Measures

The investigators plan to assess the effectiveness of our proposal in two ways: 1) qualitatively, we will design a survey and gather inputs from the students after they used the no-cost learning material; 2) quantitatively, we will compare students' performance data against our preset goals. Generally, 75% is the aimed passing rate for undergraduate courses and 80% for graduate courses. The detailed assessment plan is shown in table 3.

Table 3. Assessment Plan

Source	Description
Student performance measures	This data is from the overall class performance based on the grading of student works. Metrics include: • Class average, grades distribution, the pass rate for each grading item. • Overall letter grades distribution, pass rate, withdraw rate, and fail rate. • Percentage of students meeting or exceeding learning outcomes
Specific survey on no-cost learning materials.	The survey will be distributed at the end of the semester to collect student feedback. It consists of a mixture of quantitative and qualitative measures including: • Student perception and attitude toward no-cost materials • Quantitative ratings of the no-cost materials used in this course • Qualitative comments and suggestions

5. Timeline

The major milestones of the proposal are illustrated as follows:

- 6/01/2019
  - Complete baseline gathering of statistics
- 7/31/2019
  - Complete course level materials redesign, which includes syllabus and schedule for both courses.
  - Complete project progress report for IT 3703/4733.
  - Complete the development of no-cost materials include all reading, lecture notes, video clips, exercises, labs, and assignments materials for IT 3703
- 3/01/2020
  - Complete the development of no-cost materials include all reading, lecture notes, video clips, exercises, labs, and assignments materials for IT 4733.
  - Develop a survey on the effectiveness of the no-cost materials for course IT 3703 and IT 4733.
- 8/05/2020
  - Complete the course offering for IT 3703 and IT 4733.
  - Complete the survey data collection for all offered courses.
  - Complete student evaluation for all offered courses.

- 8/15/2020
    - Complete assessment data collection and analysis for the whole project.
    - Deliver the final status report.
    - Complete the final report.

6. Budget

The major development will be in summer 2019/2020. Funding will compensate the team member's work and activities in summer. For each proposed course, no-cost-material development workload is estimated to be approximately 100 hours in total. The instructor of records will spend 20 hours in course assessment. The role of each PIs with the corresponding compensations and other budget details are listed as follows:

- Dr. Ying Xie
    - Role: IT 4733 course coordinator, developer, & instructor
    - Investigator compensation: $5,000
- Dr. Guangzhi Zheng
    - Role: IT 3703 course coordinator, developer, & instructor
    - Investigator compensation: $5,000
- Dr. Meng Han
    - Role: IT 3703/4733 co-developer and instructor
    - Investigators compensation: $5,000
- Travel & Other Expense: $800. $800 is budgeted for three team members to attend the Kickoff Meeting at Middle Georgia State University in Macon, GA, and other travel expenses.
- Total Budget: $15,800.

7. Sustainability Plan

The IT department of KSU implements a course coordination system for all courses. Each course is assigned to a faculty as the course architecture who is responsible for the content of the course and teaches the course regularly. The two course architectures are in our team for the corresponding courses and the third team member will serve as the project coordinator connect the development of the two proposed course. Our team members will develop the no-cost-to-student learning material for the proposed courses and teach the courses for the first time using the new material. As a course architectures, our team members will also make sure a course is continuously taught using the developed no-cost learning material in the future semesters even the course might have a different instructor.

The Dr. Xie is the coordinator for IT 4733 and Dr. Zheng is the coordinator for IT 3703. The PI Dr. Han is a member of the data analytics track and certificate group and will also teach IT 3703 and IT 4733 sometimes. All three team members will keep teaching the two proposed course in the following several years and all of them will work closely together to maintain these two courses.

The IT department of KSU also has well established continuous course improvement plan. Each course is assessed each semester after being taught, and a course will be formally evaluated and updated every three years. A course coordinator is in charge of the assessment work. Thus, we are committed to continuously updating the no-cost learning material in the proposed courses based on research, assessment results and feedback from students and alumni. As shown in the support letter, our transformation efforts also have strong support from our department chair which further ensures the sustainability of our transformation efforts.

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. Letters must reference sustainability. In the case of multi-institutional affiliations, all participants' institutions/departments must provide a letter of support.